URBAN COYOTES (Canis latrans Say, 1823 ) IN THE LOWER MAINLAND,
BRITISH COLUMBIA: PUBLIC PERCEPTIONS AND EDUCATION

by

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B.Sc. (Agr.), U.B.C., 1993

A THESIS IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

in

THE FACULTY OF GRADUATE STUDIES

(Department of Animal Science)

We accept this thesis as conforming

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to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

August, 1997

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Date October 14, 1997.
ABSTRACT

Increasing complaints to wildlife agencies and negative media reports about urban coyotes (*Canis latrans*) suggest a negative attitude toward coyotes. I surveyed the public in the Greater Vancouver Regional District (GVRD) for their opinion of urban wildlife and management. Based on these surveys, an educational approach was developed to address public concerns and misconceptions about urban coyotes.

Two public surveys were conducted. The first surveyed attitudes and concerns about urban wildlife through local GVRD community centers. The second focused specifically on urban coyotes, and was directed at 3 sub-populations: the general GVRD population, veterinary clients, and naturalists. The surveys showed that the public has a broad concept of urban wildlife, but has concerns about some urban wildlife including coyotes. Negative attitudes toward coyotes portrayed in the media, were not supported by survey results. The attitude of the general GVRD public toward coyotes was mainly neutral (52%), whereas veterinary clients (51%) and naturalists (62%) felt positively toward coyotes. Non-lethal control methods, such as education, were preferred for addressing problem urban wildlife. Confusion about agencies responsible for dealing with urban wildlife concerns was identified.

Eleven coyotes that I examined from the GVRD were similar in weight, morphology and diet to those in other western coyote populations. GVRD coyotes demonstrated the typically diverse diet of an opportunistic carnivore. Preying (or scavenging) of pets was confirmed by the presence of cat and dog hair in scats. None of the coyotes were infected with either heartworm or rabies. Distribution of coyote sightings reported by the public showed
most were seen during the day (56%), and individual coyotes (77%) were most often seen. Half the sighting were in parks, golf courses or GVRD greenspaces.

Based on survey results, I concluded that the most effective and publicly acceptable approach to addressing concerns about urban coyotes is though public education. Education materials were produced that address misconceptions identified in the surveys, and provide pet owners with strategies to keep their pets safe. Clarification of the responsibilities of the different agencies that deal with urban wildlife would be useful for the public in their search for information or assistance.
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Acknowledgements

I would like to extend my gratitude to all those people who contributed to my Master's work and who have made this a rich and memorable experience. I am certain that I am not the only student who began this process calling it "My Master's" and somewhere along the way realised that its success belongs to many more people than just myself.

The "urban coyote project" was the combined effort of dedicated volunteers, coerced friends, tenacious citizens and other students. To Lavona Liggins, Denise Koshowski, Terry Wright, Sara Muir, Diane King and the phone survey team, I thank-you for your many hours slicing and dicing, entering data, chasing critters, phoning and standing in all kinds of weather delivering public educational materials. To the public who provided opinions, stories, and sightings; my office-mates who had to listen to the endless ringing of the "coyote hotline"; Dee Wamsley for her guidance in the making of the video; Lone Tratt, who's line drawings appear in the pamphlet; Micheal Smith who kept me abreast of coyote happenings on the golf course; K. Fletcher and Donna Baylis for their gorgeous coyote slides; Elaine Humphrey for her electron microscopy work; and the media for their interest, thank you all. I would also like to extend my thanks and congratulations to Stephen Huddart, Craig Naherniak, Ann Finlayson and Darlene Tavares for their (continuing) work on the Coyote Kit.

Funding and in-kind support were provided by the BCSPCA, the Vancouver Branch of the SPCA, the City of Vancouver, Anne Vallee Scholarship Fund, Ministry of Environment Lands and Parks, BCSPCA Education Department, UBC Department of Animal Science, Ecology Society at Stanley Park, Conservation Committee, Urban Wildlife Committee,
Cheryl's Pet Taxi and Delta Cable. The knowledge and unusual sense of humour of the late Knut Atkinson, was greatly appreciated and will be missed.

To my committee: Drs. David Shackleton, Alton Harestad, and Michael Pitt, who alternately dashed and bolstered my spirits - I appreciate your efforts, your patience, and your expertise. A special thank-you and a warning to Shack, who has become both a mentor and a friend- you know your grad students really never leave, don't you?

I also need to thank my family, especially my parents, Ann and Joe Webber, for both their financial and moral support. They always encouraged me to seek my own path, and told me to find something I really wanted to do. I have. To my husband, who put up with me, and who I hope has come to appreciate us “eco-freaks” a bit more, thank-you. And finally to Mormor, who’s words echoed as I sat at the computer (“Aren’t you finished that coyote-thing yet?”), yes its finally done!
CHAPTER 1 - GENERAL INTRODUCTION

The world’s population is estimated to increase to 6.9 billion people by the year 2000, and almost half are expected to be living in urban centers (Sukopp and Werner 1983, Garber 1987). Presently, 80% of the population in Western countries resides in urban areas (Garber 1987) and demographic trends suggest this percentage will increase (Adams 1994). As more people move into cities and their adjacent suburbs, urban sprawl and concomitant fragmentation of the surrounding countryside will continue to increase pressure on existing wildlife areas (Shaefer et al. 1993). In spite of this, human activity and land development have not eliminated wildlife in and around cities (McLoughlin 1978, Garber 1987, Adams 1994). They may, however, have altered wildlife in terms of periods of activity, frequency of use (Vogel 1989), and faunal assemblages (Adams 1994).

Highly adaptable and often habitat-generalist species, such as the raccoon (*Procyon lotor*) and grey squirrel (*Sciurus carolinensis*), survive extremely well in an urban setting. Such species may even have higher population densities, body sizes and reproductive rates in urban habitats (Adams 1994). However, because the home ranges of both humans and urban wildlife inevitably overlap in densely populated urban environments, the opportunity for conflicts between humans and wildlife arises (Shoesmith and Koonz 1977, Gilbert 1982).

The coyote (*Canis latrans*), like the red fox (*Vulpes vulpes*) in Europe (Macdonald and Newdick 1982, Harris and Rayner 1986, Cavallini and Lovari 1991) and parts of North America (Sargeant et al. 1987, Adkins 1991), has adjusted to living within dense urban areas and in proximity to people in North America. Having benefited by the reduction in wolf (*Canis lupus*) numbers and clearing of land for agriculture, coyotes are now distributed widely.
across the continent (Nowak 1978). Coyotes are, however, relative newcomers to parts of the Greater Vancouver Regional District (GVRD). In fact, the first reported sighting of a coyote in the City of Vancouver was not until 1987 (Mackintosh, Vancouver Park Board, 1995, pers. comm.).

In spite of coyotes being ubiquitous across most of North America and present in many large cities, most research on coyotes has focused on conflicts between livestock producers and coyotes (e.g., Connolly 1978, Sterner and Schumake 1978, Atkinson 1985, Atkinson and Shackleton 1991) in rural areas. The research that has been published on coyotes in suburban (MacCracken 1982, Shargo 1988, Gibeau 1993) and urban (Quinn 1995) environments has focused on coyote ecology (movement and diet) and not the human dimensions of coyotes in an urban setting. Research on human dimensions of coyotes is important because people affect coyotes both directly and indirectly: directly, by providing them with sources of food (e.g., garbage, pets); or indirectly by creating suitable coyote habitat (by clearing forested land for development). In addition, public opinions are increasingly influential to managers. In this study, I survey GVRD public opinion about issues regarding urban wildlife including coyotes. As a result of the public opinion surveys (Chapter 2), an educational approach was implemented to deal with public concerns and misconceptions about urban coyotes. Relevant baseline data on local coyotes were also collected to support the education campaign (Chapter 3).
STUDY AREA

The study was conducted from May 1995 through May 1996 in the GVRD, a 3,292 km² area in the southwestern mainland of British Columbia (Figure 1). The study area is classified as the Georgia Depression Ecoprovince; the Lower Mainland ecoregion; and the Fraser Lowland ecossection (Prov. of BC et al. 1990). This area also corresponds to the Ministry of Environment Lands and Park’s (MoELP) Region 2, (Management Units 2-4 and 2-8).

The GVRD is a collection of mainly urban and suburban communities (Appendix A) shifting from densely populated urban areas in the City of Vancouver toward less dense semi-rural and agricultural areas in the Lower Fraser Valley. The GVRD is a political designation encompassing 20 Lower Mainland Electoral Districts (Figure 1). It is considered a Census Metropolitan Area (CMA) by Statistics Canada because it meets the requirements of being a large urban core together with adjacent urban and rural areas that share integrated social and economic destinies (GVRD 1996). It is because of the integrated nature of this area and because wildlife does not recognize political boundaries, that I chose to include the entire GVRD within my study area as opposed to focusing on a single city or municipality (see Appendix A).
Figure 1. The study area was the Greater Vancouver Regional District (GVRD), located in the southwestern British Columbia (49° 0' N, 121° 30'-123° 15' W).
CHAPTER 2 - PUBLIC OPINION SURVEYS

INTRODUCTION

Since 1987, there has been a general increase in the number of wildlife complaints from the GVRD residents to the Wildlife Branch, BC Ministry of Environment, Lands and Parks (MoELP 1992). Complaints about coyotes comprise a significant proportion of this overall increase. The Wildlife Branch believes that the increase in coyote complaints is a result of nuisance reports from urban and suburban residents, rather than reflective of concerns about depredation of livestock. However, no data on urban complaints or concerns about depredation on pets have been collected.

The increase in complaints coupled with often negative media reports on urban wildlife give the impression of a dubious public attitude toward urban wildlife and suggests increasing concerns about urban wildlife issues. However, the complaints may not necessarily reflect overall opinion of residents of the GVRD, just the opinions of those lodging complaints. Likewise, media reports may not be an accurate gauge of public opinion, often focusing on sensational reports of depredation of domestic pets and concerns for safety of children.

Government wildlife managers have an interest in reflecting public opinion in their policies (Filion 1981, Decker and Purdy 1988, Craven et al. 1992). However, little is known about the real opinion or attitudes of the GVRD public or of their perceptions and concerns about urban wildlife and its management. This is unfortunate because it is essential for wildlife managers to know which methods the public sees as acceptable so that action plans are not
met with resistance or misunderstanding. This is especially true when dealing with highly visible urban wildlife policy matters or controversial species such as the coyote.

The public wants greater input in deciding major wildlife issues (Self 1982, Watson 1983, MoELP 1993) and also wants the needs of wildlife to be considered when land use decisions are made (Self 1982). In addition, the public is also becoming more vocal and increasingly likely to use the political process in demanding its voice be heard (Decker and Gavin 1987). It is recognized that traditional approaches to wildlife management, and their underlying assumptions (Leuschner et al. 1989) may no longer be appropriate especially in urban areas. It is both a responsibility of and a challenge for wildlife managers to seek public input and to develop approaches consistent with public opinion.

Human dimensions research can help managers meet public expectations by identifying public perceptions, attitudes and opinions about wildlife issues. "Human dimensions” research is the acquisition and application of social science data to wildlife and natural resource issues. It can be divided into two parts: acquiring information on human thought and actions through the application of social science methodologies; and the application of that information to developing suitable approaches to wildlife problems or issues (Manfredo 1995).

I applied human dimensions research in an attempt to learn about the public’s opinions about urban wildlife which may facilitate greater public involvement in local wildlife policy. This was done in 2 ways: 1) designing and conducting 2 public surveys; and 2) communicating this information to wildlife managers and agencies involved with urban wildlife.
Why Survey?

Surveys are a means of assessing public perceptions, attitudes and concerns. They are a commonly used tool for determining information which infers, describes, or explains some social phenomena, such as voting trends, shopping preferences (Gray and Guppy 1994), or as in my study, public opinion about urban wildlife. Surveys are used for 2 main reasons: 1) they can provide accurate information; and 2) they can be used to determine the opinions of a large number of people relatively inexpensively and quickly. In my case, I chose to design and conduct 2 surveys. The purpose of the first survey was to assess GVRD public attitudes, perceptions and concerns about general urban wildlife and its management. From hereon this will be called the *Wildlife Survey*. The purpose of the second survey was again to determine perceptions and opinion, but this time specifically on urban coyotes and their management. Also, this was a survey not only of the general GVRD public but also of 2 special interest groups. Henceforth this is referred to as the *Coyote Survey*.

**METHODS**

**Survey Design**

The accuracy and value of a survey is a function of the representativeness of the sample and the quality of the questions (Gray and Guppy 1994, Dillman 1978). However, there are tradeoffs when considering construction of questions and sampling design. Closed questions and those using Likert scales, although much easier for the researcher to analyze, cannot afford the depth of individual responses provided by open-ended questions. Similarly, respondent and cost differences exist in differing approaches to survey format and delivery.
My survey questions were constructed using a number of resources including manuals and reference material (Dillman 1978, Keppel 1991, Lehman 1991, Gray and Guppy 1994), other wildlife and recreation surveys (Gilbert 1982, Self 1982, Watson 1983, MoELP 1993, Liggins 1995), and input from social survey professionals (Guppy 1996, pers. comm; and Allison 1996, pers. comm.) and stakeholders. A combination of both closed, Likert scale (a summative response scale which can be used in questions of attitude where the strength of the respondents attitude is evaluated, i.e., strongly dislike to strongly like), and open-ended questions were included. To test the survey format and reduce ambiguity of questions, a pilot survey was conducted during UBC Open House Exhibition from 13-15 October 1995. This survey was subsequently analyzed (Muir 1996), and I used these results to examine the effectiveness of questions and to refine them for the 2 subsequent public surveys. Some phrasing and format changes were made on the advice of social survey experts and as a result of the pilot study.

1) Design of the Wildlife Survey

The Wildlife Survey was conducted with a sample of the GVRD public to determine opinions about 8 broad topics (Table 1).
Table 1. Broad question topics and rationales used to direct the Wildlife Survey of public opinions about urban wildlife in the Greater Vancouver Regional District.

<table>
<thead>
<tr>
<th>Question</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) What is the overall attitude of the public in the GVRD towards urban wildlife?</td>
<td>To determine if the public considers urban wildlife as having merit or value. If so, any management protocol or educational program promoting coexistence has a greater likelihood of success.</td>
</tr>
<tr>
<td>2) Which species do the public consider urban wildlife?</td>
<td>The term “urban wildlife” means different things to different people. I was interested in identifying the species that GVRD residents classed as urban wildlife.</td>
</tr>
<tr>
<td>3) Which species do they consider urban pests?</td>
<td>Identification of these species is important because they are likely to be the subject of complaints.</td>
</tr>
<tr>
<td>4) Why do these animals cause them concern?</td>
<td>Does the public have concern for personal safety, the safety of children, that of pets, property damage, or do they express a range of concerns?</td>
</tr>
<tr>
<td>5) Are coyotes selected as “urban wildlife” and/ or “urban pests” when asked to select from a list containing a number of urban wildlife species?</td>
<td>Determine how coyotes are perceived by the public in an urban environment and if this differs from opinions about other common urban wildlife species. Should coyotes be treated differently in educational materials and management programs?</td>
</tr>
<tr>
<td>6) Who does the public think should be responsible for dealing with urban wildlife complaints?</td>
<td>It is useful to know who the public sees as responsible for addressing concerns about urban wildlife, because it is from these organizations that they will seek assistance and expect action.</td>
</tr>
<tr>
<td>7) What methods should be used to deal with complaints about urban wildlife?</td>
<td>Success of management approaches are determined partially by public acceptance.</td>
</tr>
<tr>
<td>8) How important is wildlife to the public?</td>
<td>Level of public tolerance toward wildlife is partially dependent on the perceived benefit(s) of wildlife to the public.</td>
</tr>
</tbody>
</table>
2) Design of the Coyote Survey

The Coyote Survey was more specific, and its primary objective was to determine the general GVRD population's attitudes, opinions and concerns about coyotes living within the GVRD. By assessing the opinions and identifying misconceptions that the general public held about coyotes, gaps in awareness and educational needs could be determined. This information could then be used by managers to meet these needs for the majority of residents in the GVRD. However, because it is often the voices of a vocal few raised in complaint about wildlife issues that command a disproportionate part of the manager's time, an attempt was made to collect a range of opinions about urban coyotes. To ensure that I included a broad range of viewpoints, I also surveyed 2 special interest groups: veterinary clients, and members of naturalists clubs, in addition to the general GVRD public. Differences in responses identified among the general GVRD public and special interest groups should prove valuable to managers when they formulate specific approaches to meet the needs of each group.

Atkinson (1985) found that the most effective way of dealing with coyote sheep-predation complaints was through education; working with individual farmers to assess and develop specific management strategies to reduce their individual risk. To assess whether education might be a useful approach for dealing with coyote complaints in urban areas, the Coyote Survey was used to determine: 1) if the public supported an educational approach; 2) what the informational needs of the general GVRD public were; and 3) if there were differences in the educational needs of the 2 special interest groups.
Sampling Design

Surveys employed today vary from their historical counterparts in that they use a representative sample of the population rather than complete enumeration. Unlike the surveys imposed by past Kings and Emperors, today’s respondents are no longer required by law to answer survey questions (Gray and Guppy, 1994). On average, the expected response rates for today’s surveys (without follow-ups) are about 50% (Heberlein and Baumbartner 1978, Dillman 1978). Many factors influence a survey’s response rate (Heberlein 1978, Dillman 1978, Brown et al. 1989) and where possible I manipulated those factors shown to maximize return rates (e.g., format, length, and question type). Other factors known to contribute to higher response rates were not possible to alter due to cost and time considerations (e.g., personal or written follow-ups). I expected that the current and topical nature of the subject, the surveys’ association with UBC, and the format (including larger typeset and relatively short length) to all have a positive effect on the response rate (Heberlein and Baumbartner 1978, Dillman 1978, Brown et al. 1989). In addition, the segment of the GVRD reflected in the non-response group was also expected to be either people disinterested in, or having no strong feelings (positive or negative), about urban wildlife. In general, this segment of the population is not expected to lodge complaints about urban wildlife or to express dissatisfaction about current management approaches, and is therefore of less consequence to managers.
1) Sampling Design of the Wildlife Survey

The local network of community centers was used to distribute the Wildlife Survey. The decision to use community centers as a sampling tool of the GVRD population for the Wildlife Survey was based on several factors: 1) they are accessible to most residents regardless of income bracket, disability or age; 2) they are dispersed throughout the GVRD; 3) community centers could provide a distribution point for future educational materials (e.g., pamphlets); 4) the centers provided supervision and a collection point for returned surveys; and 5) the choice was also fiscal in that community centers were willing to participate at no cost to the researcher. I chose to limit the distribution of Wildlife Surveys to 5 community centers dispersed throughout the City of Vancouver partly to limit costs and also in an attempt to gather a representative sample. Selection of community centers was determined both by their willingness to participate in the project and their location within the City of Vancouver.

Response rates were improved by: survey presentation; placing the surveys in a display box; and making follow-up visits to the community centres to ensure surveys were prominently displayed. Additionally, I encouraged staff, both in writing and verbally (during follow-up visits), to promote the survey by suggesting to patrons that they complete a survey when they approached the reception desk.

2) Sampling Design of the Coyote Survey

For the Coyote Survey, 3 separate groups were surveyed about their awareness of, attitude to, and opinions on the management of urban coyotes. A probability sampling technique (stratified random sampling) was used to select respondents representative of the
general GVRD population for the first group (which I refer to as the GVRD sample). These respondents were canvassed by telephone, using a telephone-adapted format of the written questionnaire. Telephone numbers were selected using a random digit table after predetermining the 3 digit telephone prefix that indicates the general geographical location, (and thus represents each stratum to be used). In this way, I met the objectives of the selection process for phone survey participation, namely to randomise and distribute the sample of respondents throughout the GVRD. The decision to use a telephone survey was both fiscal and logistical. It allowed a small number of volunteers to quickly and safely survey respondents over a wide geographical area, as opposed to canvassing door to door in person or having a mail questionnaire.

A further 2 groups, representing special interests, were surveyed and included: clients of veterinary clinics (vet sample), and members of naturalist clubs or similar interest organisations that requested urban coyote seminars (naturalist sample). Veterinary clients were surveyed from January to March 1996. Seventy-five surveys were sent to each of 12 veterinary clinics. Selection of a veterinary clinic was determined both by the willingness of the owner(s) to be involved, and its location within the GVRD (I attempted to select locations throughout the GVRD). Vet sample response rates were improved by presentation of the surveys in a display box, and by follow-up visits to the veterinary clinics to ensure they were prominently displayed. Clinic receptionists were also encouraged to suggest to clients that they complete a survey when checking in for their appointment. Surveys from the naturalist sample were collected from December 1995 to May 1996 at presentations about urban coyotes. Surveys were distributed on demand and completed surveys collected, prior to my
presenting a seminar. The sampling of both special interest populations was a non-probability sampling technique because distribution of the questionnaire was a function of the respondent using a particular veterinary clinic or being present at a seminar.

ANALYSES

Statistics permit the description and interpretation of numerical data. Human dimensions or social survey data are frequently nominal, ordinal or categorical in nature, and as such do not meet the assumptions of parametric statistical tests which require at least interval data (Siegel and Castellan 1988). I used descriptive and nonparametric statistics in my analysis of survey questions. Means were used to describe demographic data such as age.

Responses from completed surveys were incorporated into an Excel 5.0 (Microsoft Corporation) spreadsheet and frequencies calculated for each of the question categories. Responses to open-ended questions were organized into categories during analyses. Each question has a unique sample size due to variation in response rates per question. For questions where the response categories were not mutually exclusive, both a total of respondents (n) and a grand total (N, total number of responses) are provided.

Response rates were calculated for the Wildlife Survey and for the GVRD and vet samples of the Coyote Survey, as a ratio between the number of returned surveys and the number of surveys removed by the public. For the GVRD sample of the Coyote Survey the response rate was calculated as the number of completed surveys as a proportion of respondents contacted by phone (including those who refused or were unable, generally due to language, to participate). A response rate was not calculated for the naturalist sample because the surveys were available on demand at seminars and audience sizes were unknown.
In both the Wildlife Survey and the general GVRD sample of the Coyote Survey, differences between categories within survey questions were analyzed using either Chi-Square Goodness of Fit, or the Fisher Exact Probability test (Zar 1984, Seigel and Castellan 1988). Differences between the responses of the 2 special interest groups were tested using either Chi-Square Contingency Tables or the Fisher Exact Probability test. The null hypothesis for each survey question predicted an equal distribution either between response categories, or a similar “response category profile” between the 2 special interest groups. In the case of the 2 special interest groups, if differences were identified, further analysis using a Z-test on standardized residuals (Lehman 1991) was used to determine the nature of the differences.

The standardized residual for any cell in a contingency table is calculated as:

\[
\text{the standardized residual} = \frac{\text{residual}}{\text{standard deviation of the residual}}
\]

WHERE: \( \text{residual} = \frac{(f_o - f_e)^2}{N} \) where: \( f_e = R \times C \), and \( f_o \) is the observed frequency

\( \text{standard deviation of the residual} (SD_{resid}) = \sqrt{\frac{N - R}{N - C}} \)

\( N = \text{grand total}, R = \text{row sum}, C = \text{column sum} \)

\( z_{resid} = \frac{\text{residual}}{SD_{resid}} \)

If the residuals are assumed to come from a standardized normal distribution, then a \( z \) value of 1.96 or greater is significantly different from the mean. In this manner the cells (i.e., opinions) that differ can be isolated. A significance level of 0.05 was selected \textit{a priori} and used to test all hypotheses.
A “Coyote Awareness Index” was calculated for each of the 3 groups (GVRD sample, vet sample, and naturalist sample) using 11 survey questions that assessed a respondent’s basic knowledge about local coyotes. The index was calculated as the mean number of correct responses per group, and is presented in the respondent information section.

Not all questions included in a survey are meant to elicit information from the respondent about the survey’s topic. Some questions serve to make the respondent feel at ease, or to create trust between the researcher and the respondent so that the respondent can be asked more difficult or personal questions later. Other questions are included to either focus the respondent’s attention on principal questions or to make the questions less obvious or leading (Gray and Guppy 1994). For these reasons not all of the questions included in the surveys (see Appendix B) are presented in the Results section.
RESULTS

1) RESPONDENT PROFILES

All Surveys

The response rate was greatest for the GVRD sample of the Coyote Survey (47%, with 184 valid surveys collected), followed by the vet sample (45%, with 258 valid surveys returned) and lastly, the Wildlife Survey (32%, with 73 valid surveys returned). Twelve percent of non-respondents in the GVRD sample of the Coyote Survey, were unable to participate because of difficulties speaking English. Fifty-one valid surveys were collected at 4 coyote talks given to naturalist clubs.

Substantially more women than men completed the surveys with the exception of the GVRD sample of the Coyote Survey (Table 2). The average age of respondents was similar for each of the surveys (40-42 years old) with the exception of the naturalist sample of the Coyote Survey where the average respondent was older (57 years). Overall, survey respondents were more highly educated than the general GVRD public (Table 2) and the naturalists were the most highly educated with 57% of those surveyed having a university degree.
Table 2. Attributes of GVRD census results\(^1\) and respondent profiles for the 2 surveys.

<table>
<thead>
<tr>
<th></th>
<th>GVRD(^1) (1991)(%)</th>
<th>Wildlife Survey (%)</th>
<th>Coyote Survey (%)</th>
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</thead>
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<tr>
<td></td>
<td></td>
<td>GVRD</td>
<td>Vet Clients</td>
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<tr>
<td>Valid Surveys</td>
<td>n=73</td>
<td>n=184</td>
<td>n=258</td>
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<tr>
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<tr>
<td>Age</td>
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<td>20-39</td>
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<td>15.4</td>
</tr>
<tr>
<td>mean</td>
<td>41</td>
<td>42</td>
<td>40</td>
</tr>
<tr>
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<td>1.6</td>
<td>1.3</td>
<td>0.8</td>
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<tr>
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<td>n=236</td>
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<td>34.5</td>
<td>7.5</td>
<td>8.2</td>
</tr>
<tr>
<td>graduated high school</td>
<td>21.0</td>
<td>20.9</td>
<td>24.1</td>
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<tr>
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<td>32.2</td>
<td>23.0</td>
<td>28.5</td>
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<td></td>
<td></td>
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<tr>
<td>university degree</td>
<td>12.3</td>
<td>47.7</td>
<td>39.2</td>
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</tbody>
</table>


\(^2\) Standard error of the mean.

Coyote Survey: Pets, Personal Responsibility and Coyote Awareness

As expected, almost all (96%, n=254) respondents who obtained their surveys from veterinary clinics had pets, whereas, 62% (n=50) of naturalists and only 44% (n=176) of the GVRD sample did. Naturalists were most likely to give their pet access to outdoors (94%,
n=31) followed by veterinary clients (84%, n=247) and then the GVRD sample (70%, n=79). A relatively small percentage of veterinary clients (19%, n=232) and GVRD residents (20%, n=74) fed their pets outdoors at least some of the time, but respondents in the naturalist sample were the least likely to feed their pets outdoors (10%, n=30). About one third of all groups placed their garbage outside the evening before garbage collection. The naturalists were the most likely to have a compost (60%, n=50) and the least likely to have it “open” (20%, n=30) and accessible to wildlife. Forty-six percent of veterinary clients (n=252) and 30% of the GVRD sample (n=41) had composts with 35% (n=115) and 39% (n=41) respectively, having them “open”. The naturalists were the most knowledgeable about local coyotes with a Coyote Awareness Index of 5.7 out of a possible 11 points (SEM=0.5, n=20) followed by veterinary clients at 4.2 (SEM=0.1, n= 214) and lastly the GVRD sample at 3.9 (SEM=0.1, n=184).

2) WILDLIFE SURVEY

The public identified a number of species or species groups as “urban wildlife” (Figure 2). They associated a number of smaller animals, such as squirrels, raccoons, crows, and songbirds, with the urban landscape (Figure 2), more so than they did larger wildlife species such as bears, cougars and wolves. Coyotes were judged by 84% of respondents to be “urban wildlife”.
Figure 2. Percentage of respondents that identified particular species as “urban wildlife” (total number of respondents n=70, total number of responses N=1324).
Many species were considered “urban pests” (Figure 3), with rats, raccoons, mice, coyotes and Canada Geese, being identified most often. Rats were identified by the largest number of respondents as being an “urban pest” (70%), while coyotes were identified as pests by 29%. Respondents were asked to clarify why species that they identified as pests caused them concern (Figure 4). Differences among the categories were found ($\chi^2=20$, df=4, N=148), further analysis showed differences were not discernible among the four categories of property damage, safety of pets, safety of children or personal safety, but a lower than expected frequency of responses was recorded in the “other” category ($\chi^2=4$, df=3, N=138). The responses in the “other” category included specific concerns about a range of topics such as noise pollution (e.g., crows), aesthetics (e.g., Canada goose droppings), and fear that introduced species upset “the balance of nature” often out-competing indigenous species (e.g., starlings).

![Diagram of Concerns]

**Figure 3.** Concerns identified by respondents for considering urban wildlife species as “urban pests” (n=62). (Property- damage to property; pets- safety of pets; children- safety of children; personal- personal safety.)
Figure 4. Percentage of respondents that identified particular species as “urban pests” (total number of respondents n=59, total number of responses N=202).
When asked to select from a list of acceptable methods for addressing concerns with "problem wildlife", public education was the most common suggestion, and humanely destroying wildlife was the least acceptable method (Figure 5). The differences among categories were significant ($\chi^2 = 30, df=4$). Greater than expected responses were in the "public education", "relocation" and "combination of all" categories, and a lower than expected number in the "destroy/other category" (combined for the analysis).

![Preferred methods](image)

**Figure 5.** Methods that Wildlife Survey respondents deemed appropriate for dealing with complaints about urban wildlife ($N=101$).

No significant difference ($\chi^2=1.3, df=3$) was found among the primary 4 agencies that respondents thought should be responsible for dealing with complaints about urban wildlife (Figure 6). However, respondents did place significantly less responsibility on veterinarians for dealing with these complaints ($\chi^2=28.20, df=5$). Some respondents commented on the need for increased tolerance toward wildlife and that the safety of pets and protection of personal property is the responsibility of the individual.
Figure 6. The relative responsibility of particular agencies (MoELP=Ministry of Environment Lands and Parks; NPRA=nonprofit rehabilitation agencies; Municipal=municipal governments; SPCA=Society for the Prevention of Cruelty towards Animals; Vets=veterinarians) for addressing complaints about urban wildlife as perceived by survey respondents (N=143).

The majority of respondents (90%, n=68) in the GVRD Wildlife Survey felt that urban wildlife enhanced their life in the Lower Mainland and they were willing to modify their lifestyle or habits to maintain or enhance wildlife activity in the city. Of the 5.6% that indicated they were unsure if they were willing to modify their lifestyle, some explained that their decision was the result of being uncertain about the cost or extent of the commitment that would be required.
3) GVRD COYOTE SURVEY

i) Awareness

Eighty-two percent (n=184) of the GVRD residents surveyed were aware that coyotes are present in the GVRD. In addition, 42% (n=165) had seen a coyote locally in the past 2 years. When asked about the population status of local coyotes 27% (n=168) thought coyote numbers were increasing and 49% were unsure. Seventy percent (n=177) believed that coyotes are present in the GVRD because “we have taken over the coyote’s habitat”.

Eighty-two percent (n=177) believed that coyotes would prey on domestic pets. The overwhelming majority of respondents believed that a small portion, 0-20%, of a coyote’s diet is comprised of domestic pets (Figure 7); however, 22% (n=176) believed that coyotes were active, and therefore hunting, only at night.

![Figure 7. GVRD perception of the percent of domestic pets in the diet of a typical urban coyote (n=148).](image-url)
Only 25% (n=171) of the GVRD respondents correctly identified the average weight of a coyote (Figure 8). Sixty-six percent over-estimated the weight and 3% were unsure.

![Figure 8. Perceived weight of coyotes as identified by GVRD residents (n=171). The actual weight, calculated from measurements of local coyotes, is indicated by the dashed lines.](image)

GVRD respondents were generally poorly informed about coyote diseases of concern to people and pets. Twenty-nine percent (n=175) thought that local coyotes were carriers of rabies. When asked about 3 other diseases that coyotes can carry and are of concern to domestic dogs (distemper, parvovirus and heartworm disease), the majority of respondents, 64% (n=174), 81% (n=175), 72% (n=175) respectively, were unsure whether coyotes could carry the diseases. Concerns over human safety issues were highlighted in the responses to
whether coyotes would attack humans. Thirty percent (n=177) believed coyotes would attack children, whereas only 9% (n=177) believed coyotes would attack adults.

ii) Attitude

There were significant differences among attitude categories ($\chi^2=127.7$, df=4) but the GVRD sample was predominantly neutral in their attitude about coyotes (Figure 9). Only 21% (n=173) felt negatively towards coyotes, whereas 79% were either neutral or felt positive about coyote presence in the GVRD. When asked to expand on their reasons, neutral attitudes were often associated with a lack of knowledge or experience with coyotes; people said they “hadn’t had a problem”, they felt coyotes were too costly to remove, or it was the individual’s own responsibility for their pet’s safety. Positive attitudes were associated with particular perceptions about coyotes such as coyotes: being a natural part of the ecosystem; being important for rodent control; improving the quality of life for GVRD residents; and “deserving” to be in cities because humans have taken over their natural habitat. Those with negative attitudes expressed concerns for pets, concerns about human safety, suspected the loss of a pet, perceived that coyote populations were “out of control”, that coyotes were “savage killers” or that coyotes “don’t belong” in an urban environment.
iii) Management

People were asked to choose from a list, the agency that they thought was responsible for dealing with coyote complaints. Many chose more than one agency, bringing the total number of responses (N) to 252. People indicated no preference for either the Ministry of Environment Lands and Parks (26%), the Society for the Prevention of Cruelty toward Animals (27%), or the Municipal Government (25%) ($\chi^2=0.19$, df=2); however responses to the remaining categories were significantly lower ($\chi^2=83.33$, df=5). Eight percent identified non-profit rehabilitation agencies and 3% veterinary clinics, as being responsible. Ten percent selected the “other” category offering suggestions such as “personal responsibility”.

When asked how complaints about “problem wildlife” should be approached the frequency of responses (N=209) differed significantly ($\chi^2=160.93$, df=4) among the
categories. Non-lethal methods such as relocation (44%) and education (39%) were popular solutions, and few advocated humanely destroying the offending animal (8%). Although many people explained that the appropriate approach should depend on individual circumstances and prior history, only 5% of respondents chose the “combination” category (Figure 10).

![Preferred methods](image)

**Figure 10.** Methods that Coyote Survey respondents deemed appropriate for addressing “problem wildlife” (N=209).

Although some people gave very precise circumstances, most agreed that in some circumstances coyotes should be humanely destroyed (76%, n=176). A *post priori* summary of their reasons is given in Figure 11.
Figure 11. Reasons GVRD residents identified for humanely destroying problem coyotes (N=191).

4) VETERINARY CLIENT AND NATURALIST COYOTE SURVEY

i) Awareness

Ninety-six percent (n=251) of the veterinary clients and 100% (n=51) members of naturalist clubs were aware that coyotes are present in the GVRD. Eighty-three percent (n=201) of veterinary clients and 95% (n=19) of naturalists were aware that coyotes could prey on domestic pets but most respondents in each sample believed that pets were only a small portion of the coyote’s diet (Figure 12). Although both groups believed coyotes would prey on domestic pets, only some of the veterinary clients thought coyotes hunted only at night (14%, of veterinary clients n=203, and 0% of naturalists n=20), and others were uncertain (28% of veterinary clients n=203, and 10% of naturalists n=20) when they were active. The naturalists were more accurate in estimating coyote weight than were veterinary clients (Figure 13, $\chi^2=11.30$, df=2; residual analysis $z > 1.96$).
Figure 12. Percentage of domestic pets in the diet of coyotes perceived by veterinary clients (n=164) and naturalists (n=17).

Figure 13. The perceived weight of coyotes as identified by veterinary clients (n=201) and naturalists (n=20).
ii) **Attitude**

There was no difference between the attitude toward coyotes of veterinary clients and members of naturalist groups ($\chi^2=2.34$, df=2). The majority of veterinary clients (51%, n=243) and naturalists (62%, n=51) liked or strongly liked coyotes; only 21% and 14%, respectively, disliked or strongly disliked them.

iii) **Management**

Naturalists were significantly less likely to advocate relocation and more likely to recommend educational approaches than were veterinary clients ($\chi^2=7.83$, df=3; residual analysis, $z > 1.96$). Also, 45% (N=65) of the total responses from naturalists advocated education, compared to 30% (N=413) of responses from veterinary clients (Figure 14). Few of either group supported humanely destroying problem animals to deal with complaints, although 75% (n=244) of veterinary clients and 86% (n=49) of naturalists agreed that it is acceptable to humanely destroy coyotes in some circumstances.

The reasons why humane destruction of problem coyotes was acceptable did not differ between the two groups (Figure 15). Few respondents (5% of veterinary clients, n=178 and 6% of naturalists, n=43) believed concerns about pets justified destroying coyotes. The two main reasons given to warrant such a control method were human safety or where a coyote was diseased or injured (63% of veterinary clients, N=250; 59% of naturalists, N=53).
Figure 14. Methods preferred by veterinary clients (N=413) and naturalists (N=65) for dealing with problem animals.

Figure 15. Circumstances for destroying coyotes acceptable to veterinary clients (N=250) and naturalists (N=53).
DISCUSSION

Survey respondents were not necessarily representative of the GVRD population. The Wildlife Survey respondents and Vet Client and Naturalist sample of the Coyote Survey were more likely female than the GVRD average. In addition, all groups were more highly educated than the GVRD average. By completing the survey the respondents indicated some level of interest or engagement with the subjects of urban wildlife and coyotes. It stands to reason, that those willing to commit the time and effort to participate in this study would also be those people more likely to contact respective wildlife agencies about their urban wildlife concerns, thus making their opinions relevant to this study and the agencies that serve them.

Almost all respondents to the Wildlife Survey believed that wildlife in the Lower Mainland enhanced the quality of their life. Wildlife can also have a strong positive effect on outdoor recreation experiences (Leuschner et al. 1989) and are important to both consumptive and non-consumptive users, for emotive and financial reasons. Also suggesting that the public inherently values urban wildlife, most respondents in my Wildlife Survey stated they were willing to modify their life-style in some way if it would enhance or maintain wildlife activity. Other studies have shown support for wildlife by identifying the public’s “willingness to pay” either to participate in wildlife activities (Filion 1987, Filion et al. 1991) or to support conservation or management initiatives (Gilbert 1982, Watson 1983, Leuschner et al. 1989, Schreyer et al. 1989). Rather than ask about willingness to pay, I chose to ask about their willingness to change personal behaviours to maintain or enhance urban wildlife activity. I saw this as a more appropriate indicator of how receptive the public might be to educational materials aimed at effecting behavioural changes. I felt the phrasing of my question was better
because "most wildlife problems start out as biological problems but eventually become people problems" (Teague 1979:59), and it is often more likely (but perhaps not easier) to change human behaviour than the behaviour of wildlife.

Wildlife means different things to different people and often has a broader meaning to the lay person than to wildlife managers (Gilbert 1982). Manager's terminology, such as "game" and "nongame species", may have little relevance to the public who relate wildlife to the butterfly in the backyard or the squirrel on the park bench as much as to deer or elk in the hinterland. Given that it is important that managers and the public communicate, both need to "talk the same language", and managers may find a more receptive public if they were willing to communicate in a more holistic and inclusive manner (Gilbert 1982). As a start, it may be useful for local managers to know the range of species the public considers as urban wildlife and pests. As identified in the Wildlife Survey, the GVRD public had a very broad definition of urban wildlife, with some respondents selecting all of the listed species (including cougars and wolves) as "urban wildlife". Some people suggested additions to the list such as reptiles, insects and numerous bird species. This inclusion of many species, some clearly not "urban" wildlife (e.g., cougars, wolves), may indicate that respondents focused on the term "wildlife", rather than on the modifier "urban", although a definition of "urban wildlife" was included in the instructions accompanying the question. Alternatively, the flurry of media coverage surrounding isolated incidents when cougars or bears travel through residential parts of the GVRD may have conditioned the public to associate these animals with an urban environment.

The GVRD public identified a number of species as urban pests in the Wildlife Survey. More than 20% considered rats, raccoons, mice, coyotes and Canada geese as pests, although
they had previously identified them as urban wildlife. Thus the use of the term “urban wildlife” by the public does not necessarily imply positive attitudes toward species. Other studies (Dagg 1970, Brown et al. 1979) have shown that the public’s preference for wildlife depends on its proximity to one’s home. Some species (virtually all birds and some smaller mammals like squirrels and rabbits) appear acceptable near people’s homes and are valued, but other larger mammalian species (such as fox or raccoon) are not.

Not only is it useful to know which species the public consider as “urban pests”, but knowing why they are considered a nuisance or threat can help an agency formulate appropriate response protocols or educational materials to address public concerns. Concerns about personal safety are likely to take a different form and priority to those of an aesthetic or nuisance nature. The GVRD public selected a range of species as urban pests and therefore also identified a range of issues concerning those species that it would be useful to cover in public educational materials. To reflect the concerns identified by the public, education materials on a variety of species should also address safety issues, by providing information on preventing conflict, and giving realistic information on the chance of disease transmission. Information on protecting pets and preventing property damage, are also areas of educational interest identified by the Wildlife Survey.

The majority of respondents in both surveys, supported non-lethal methods to address problem wildlife. This attitude provides a challenge for wildlife managers and eliminates many traditional control methods (e.g., poisoning, trapping and hunting) if they are to gain public support (Decker and Gavin 1987). However, most respondents to the Coyote Survey thought it acceptable to humanely destroy a problem animal if it was a threat to humans or if
destroying it ended the animal's suffering. Some respondents also believed that humanely destroying an individual animal was appropriate if all other alternatives had been exhausted. The desire to employ non-lethal methods may reflect the increase in non-consumptive wildlife users within the general public (Filion et al. 1991, Boxall and McFarlane 1995), as well as an increasing urbanization of the population (Kellert 1979). Education, both because of its public endorsement and lack of other effective available methods, is becoming a more important tool for wildlife managers, especially those in urban areas. However, simply transplanting education programs from one region to another may prove ineffective because there are substantial differences in attitudes between people from different locations (Gilbert 1982), as well as within populations (Kellert 1976, McIvor and Conover 1994). Increasingly, human dimensions research is being used to develop and support management approaches, but, there are concerns over the lack of wildlife professionals with the necessary training (Manfredo 1989).

"Relocation" was a popular solution chosen by respondents as appropriate for addressing problem wildlife. Kellert (1979) similarly found support from the general public (but not from sheep producers or cattlemen who favoured lethal methods) for relocating coyotes depredating on sheep although it was explained as an expensive option. The public’s support for relocation may reflect the public’s perception that it is a humane alternative whereby people’s needs are met without harming the wild animal. The public may not consider where the offending animal is to be relocated, if the animal is likely to “re-offend” in its new home, or whether the removed animal is likely to be replaced by another. One relocation advocate, Vancouver City Councilor George Puil, has suggested catching...
Vancouver's coyotes and shipping them to the "boonies" (Vancouver City Council meeting, December 14, 1995). Attitudes such as this should be seen as educational opportunities, underscoring the need for "environmental literacy" (VandenHazel 1974, McLaren 1989).

The overall attitude toward coyotes in the GVRD ranged from neutral to positive; very few respondents held negative attitudes. Both the veterinary clients and naturalists felt more positive than the general GVRD public, perhaps reflecting their respective interests in domestic and wild animals, their knowledge of coyotes, or both. Human dimensions researchers divide attitudes into three components: emotional, perceptive (cognitive) and behavioural (actions and intents) (Scalet et al. 1996). Attitudes expressed by respondents about coyotes mainly reflected emotional and perceptive components. Positive attitudes were associated with perceptions about coyotes ranging from coyotes "deserving" to be here, to being an esthetic resource, or improving the quality of life. Those with neutral attitudes expressed a lack of knowledge, experience or concerns about coyotes. The few negative attitudes were associated with strong concerns for person and property, and a perception that coyotes "don't belong" in an urban environment. Negative attitudes were reinforced by negative experiences such as the suspected loss of a pet to coyotes.

When particular levels of damage are exceeded, tolerance to wildlife declines (Decker and Brown 1982, Craven et al. 1992, Liggins 1995); thus educational materials which reduce the risk (or perceived risk) of conflict, such as the depredation of pets, may improve attitudes toward wildlife and increase residents' tolerance to wildlife. Decker and Purdy (1988) described a concept called Wildlife Acceptance Capacity (WAC) which is analogous to biological carrying capacity or social carrying capacity, but describes how human preference
and beliefs affect management decisions. Wildlife acceptance capacity reflects the acceptance of a given constituency for particular species at a given time and depends on the attitudes and beliefs of people that comprise that constituency. Changing how people perceive a species and the damage or risk caused by that species, is integral to increasing the WAC. Attitudes are determined by peoples' beliefs (perceived knowledge) about an object and their beliefs about the consequences of their actions toward that object (Morgan and Gramann 1989). Other studies have shown that attitudes (Kellert 1980) and preference (Dagg 1973, Schauman et al. 1987) are related to an individual's knowledge about wildlife and habitats. Thus if someone believes that coyotes are large, dangerous carnivores, they will likely feel fearful and negative toward coyotes. If, on the other hand, the public is well-informed about the size, likelihood of attack, or the chance of contracting rabies, their attitudes will likely reflect this. The naturalist and veterinary client respondents were better informed about coyotes and had a more positive attitude toward them than did the general GVRD population. The general GVRD population scored the lowest Coyote Awareness Index and had a slightly more negative attitude toward coyotes. However, both groups scored less than 50% on the Coyote Awareness Index raising concerns that the questions comprising the index may not have been at an appropriate level to distinguish between relatively high and low levels of public knowledge about coyotes. Regardless, raising public awareness and about coyotes and eliminating common misconceptions, should be an effective way to change underlying beliefs and improve the attitude and increase the WAC of the general public toward the presence of coyotes in the GVRD.
With increasing urbanization, the voting influence lies with an overwhelmingly urban population which traditionally has little access to or knowledge about wildlife. Fortunately, there is a desire on the part of the public for more wildlife education programs that are sponsored by wildlife professionals (Self 1982), especially programs in urban areas (Brown et al. 1979, Boxall and McFarlane 1995). The concentration of people in dense urban centers can also provide wildlife professionals with easier access to a large public audiences for their educational programs (Boxall and McFarlane 1995), and should make the programs more cost effective. However, although there is increasing interest on the part of urban residents to see wildlife (Filion et al. 1991), there is currently only moderate participation in urban wildlife programs by the general public. Perhaps this is due to ineffective identification and marketing of these wildlife programs to the urban resident (Boxall and McFarlane 1995). Wildlife education is not only necessary to increase awareness and appreciation, but can also be used to prevent and address conflicts between urban residents and wildlife - an approach supported by respondents of the Wildlife and Coyote Surveys.

If education is a preferred approach for dealing with wildlife concerns, the next logical steps are to determine: 1) the most effective educational programs (discussed in Chapter 2); and 2) the best manner of reaching the public with educational messages. Currently, most people obtain their information about wildlife from television and other media (Gilbert 1982, Self 1982), so the media can be a useful tool for reaching the public with information about wildlife. However, this is true only if the information presented is accurate. Often media coverage can be erroneous and misleading (McPherson and Shaw 1994), thus thwarting educational objectives. This is probably because the media often focus on conflict and
controversy and rely substantially upon groups and individuals with vested interests for their information, that are generally biased towards one viewpoint. This may have occurred during the summer of 1996 when wildlife managers tried to release information about the presence of coyotes in a GVRD park (BCTV, June 19, 1996). The intent of the press release was to inform the public of the presence of coyotes in the park and to reassure them that coyotes, unless habituated, are rarely a threat to humans. However, the news station covered it as a public warning about dangerous urban coyotes in local parks, and showed dramatic footage of a young mother standing guard by her child as a coyote sauntered past. Further, the accuracy of “facts” presented in the story was poor. In 3 sequential news broadcasts throughout the evening, reported numbers of potentially hazardous coyotes ranged from 200 to 20,000. This possibly incited fears that the population of coyotes was out of control and a risk to the public, as well as created confusion about true coyote population estimates. When the media are inaccurate in their portrayal of wildlife, misconceptions and fears can be perpetuated.

More accurate media coverage will require the active involvement of wildlife professionals (McPherson and Shaw 1994) and a better working relationship between wildlife professionals and the media.

In both the Wildlife and Coyote Surveys, respondents did not distinguish among the various options presented to them in terms of these agencies’ responsibilities to deal with problem wildlife complaints. This may be a result of confusion over who is responsible for urban wildlife or reflect a viewpoint that responsibility is shared among several agencies. In a similar study, Gilbert (1982) found that few people in Guelph, Ontario, knew of the federal or
provincial agencies responsible for wildlife, and most reported they would approach the local university when seeking information about wildlife.

The diverse opinions held by the GVRD public about who they consider responsible to address their concerns about urban wildlife, may lead them to seek information and assistance from several agencies. This will likely result in unnecessary duplication and waste of both person-hours and resources. Clearly, clarification of the roles and responsibility of these different agencies is necessary. However, even if the public is aware of the correct agency, if their complaint is not dealt with effectively, they are likely to become frustrated. Individuals who lose confidence in wildlife managers or agencies to deal effectively with their concerns may choose not to report wildlife problems at all, or go so far as to take matters into their own hands. The MoELP suspects this is currently occurring with sheep producers and their coyote complaints in Region 2 on agricultural land adjacent to the GVRD. According to the MoELP’s own report (MoELP 1992), current recorded levels of coyote complaints are probably an underestimation of actual incidents because the agricultural community feels the Wildlife Branch’s response is inadequate; farmers are not reporting problems and may be dealing with problem animals on their own. Some GVRD residents, unsatisfied with local agencies’ response to concerns about urban coyotes, have threatened den-hunting or poisoning near their properties (Grescoe 1996). Vigilantism, especially in urban areas employing lethal methods, is both a risk to the wildlife causing the problem, as well as to non-target species, domestic animals, and the public. Thus, the public’s need to know who to contact, and which agency will deal effectively with their concern, are important from economic, social (public perception), and potentially public safety, perspectives.
SUMMARY

My 2 surveys have shown that the public has a broad concept of urban wildlife, and that it expresses its concern about a number of urban wildlife species including coyotes. At the same time, the public still values the presence of wildlife within the GVRD. It also seems clear that the majority of people are willing to change their behaviour to accommodate present and future wildlife activity. However, confusion exists over which public agencies are responsible for urban wildlife and thus who the public should turn to when they have concerns. The public clearly favours education and non-lethal methods, such as relocation, for addressing urban wildlife problems. Only in extreme circumstances, either when human safety is at risk or in eliminating animal suffering, do they feel that wild animals should be destroyed.

Both surveys identified that: 1) coyotes are of genuine concern to the public; 2) an educational approached is favoured in dealing with concerns about urban wildlife; 3) the public has specific concerns about coyotes; and 4) there are gaps in the public’s knowledge about coyotes. The following chapter outlines public educational materials about coyotes, based on my survey results, and data that I collected on the ecology of coyotes in the GVRD.
CHAPTER 3 - COYOTE ECOLOGY AND PUBLIC EDUCATION

MATERIALS FOR THE GVRD

INTRODUCTION

Coyotes have substantially expanded their range since the arrival of European colonists in North America (Nowak 1978) and are now found from the west to east coasts, and from the Yukon to Panama. Two main reasons have been put forth to explain their range expansion: 1) the removal of wolves; and 2) the creation of favourable habitat, mainly through cutting down forested areas (Nowak 1991). Coyotes have probably also taken advantage of networks of roads and railways (which could act as travel corridors) linking together parts of cities and regions. They even seem to thrive in the face of an increasing human population, urban expansion and efforts to control them. This is probably because coyotes are generalists in their food habits and thus able to exploit vast urban food sources such as plentiful supplies of small mammals (e.g., rats) and garbage. Their ability to vary their social structure and territoriality with habitat (Nowak 1991) and food supply, has also helped them adapt successfully to a range of habitats.

In light of their adaptive capabilities and with adequate food and suitable habitat, coyotes are likely to remain part of the GVRD's fauna. Unfortunately, there is little published information about urban coyotes that managers can use in formulating approaches for dealing with them or in educating the public. In correspondence with other graduate students, mainly through the internet, it appears that a growing body of research on urban coyotes (Grinder 1997, pers. comm. and Hall 1996, pers. comm.) and more information in the areas of ecology and human dimensions should soon be available for managers.
There is increased interest in urban wildlife in general, not just coyotes, by the public (Schreyer et al. 1989) as well as, researchers, managers and planners (Wolch et al. 1995). Urban Wildlife is an untapped resource for wildlife education (Milne and Milne 1973, VanDruff 1979), which is one of few management approaches that can be used in the city. Urban wildlife is accessible and can be used to teach the public, the majority of whom live and vote in cities, about ecological principles. By considering urban wildlife in land use plans, planners can avoid conflicts with wildlife and create livable city habitat for more than just human inhabitants (Wolch et al. 1995).

To be worthwhile, wildlife education must effect positive attitudinal and behavioural change (Morgan and Gramann 1989). One way that this can be done is by increasing the public’s knowledge and awareness of wildlife (Kellert 1980). Hence in the educational materials that I constructed and during my oral presentations, I tried to present facts about coyotes in a manner that emphasized the interrelationships between people (and their actions) and coyotes. For example, most people do not consider coyotes when they fill their bird-feeders, but in the educational materials I illustrated that feed spill-over could attract small mammals, which in turn could attract coyotes into their yard, which may increase the risk of coyotes preying on their pets. I attempted to communicate that coexisting with coyotes (or other urban wildlife) requires considering the impacts of our actions before conflict arises.

Effective educational programs also have a well defined nature and scope (Roth 1973), so that the goals of the program are understood by educators (and managers), and can be both assessed and revised. The intent of my educational materials about urban coyotes was not to
teach the public everything known about coyotes, but to provide them with specific information based on areas of need.

Because little information is available on the ecology of urban coyotes -- or how to coexist with them, I felt an obvious first step in developing an educational approach was to collect baseline biological data on coyotes inhabiting the GVRD. This local information would allow me to respond meaningfully and effectively to concerns and misconceptions identified in the public surveys, and create educational materials from local information and tailored to meet local needs. Four aspects of urban coyote ecology and biology were studied: morphology (weight, body size), diet, disease (heartworm and rabies), and distribution.

Morphological data of GVRD coyotes were collected to accurately describe our local coyotes, because misconceptions about the size and weight (and therefore perceived threat) of coyotes were identified in the surveys. Some people felt urban coyotes might be "better fed" and thus, larger than their rural counterparts.

Diet was considered important because it relates directly to predation of domestic pets by coyotes. Coyotes are opportunistic carnivores feeding on a variety of prey from white-tailed deer to rabbits, but mainly consuming smaller mammals depending on availability (Nowak 1991), as well as pets, vegetation, fruit, carrion and garbage (Atkinson 1985, Shargo 1988, Quinn 1992). Most information available on coyote diet has been obtained from wild or rural coyotes, so there has been no accurate information on the percentage of diet composed of domestic pets.

Respondents in the surveys were worried about wildlife diseases that could impact them or their pets. Rabies was identified although there have been no reported cases of rabid
coyotes in BC (Pemble *pers. comm.*). Another disease of concern to local dog owners is heartworm (*Dirofilaria immitis*), an internal parasite up to 300 mm in length that matures in the right ventricle and pulmonary arteries of coyotes, dogs and other canids (Gier et al. 1978). Often fatal, heartworm can be transmitted among animals by mosquitoes which act as the intermediate vector. The infection rate in coyotes is variable (Gier et al. 1978) but because they can potentially act as a reservoir for heartworm, even a low incidence is important to dog owners.

In my discussions with the public, people were usually aware that coyotes were present in the GVRD, but were often insistent that coyotes were not present in their respective neighbourhoods. Another common misconception was that coyotes were only active at night. I used public sightings to determine the distribution and movements of coyotes throughout the GVRD. Traditional wildlife techniques for determining movement, such as telemetry, are not always feasible in an urban setting. Technical aspects (overwhelming radio interference), problems associated with trapping wildlife in an urban area (mainly concern for pets safety) and cost, are limiting factors. By using public sightings, I avoided these problems and immediately increased public participation and awareness in the study, thereby increasing my opportunity to answer the public’s questions when they reported sightings. Public sightings have been used in other studies for determining broad-scale habitat use by coyotes (Quinn 1992), and it may be an effective tool for collecting distribution data on other conspicuous wildlife species in urban areas.

The effectiveness of an educational program is partially determined by the form and accessibility of the materials or presentations. I used a number of formats and presentation
styles to: A) accommodate different learning styles (some people are visual, others experiential); B) serve a range of purposes (from providing "fast facts" to more in-depth information); C) be suitable for different education levels; D) reduce costs of production and distribution; and E) increase accessibility. The internet is a relatively new educational tool for the general public and I hoped that by posting a coyote web page the novelty of this medium would help increase the number of people that I reached. Pamphlets on the other hand, did not require computer access and could be included in municipal mail-outs (for example with dog license renewal notices), or could be made available in various locations (e.g., MoELP, veterinary clinics). Thus, I tried to maximize distribution of basic materials (i.e., pamphlet, internet web page) and to provide easier access to more in-depth materials (video, presentation) to reach as many people as possible. Educational products included: 1) pamphlet, 2) video, 3) Coyote Kit, 4) internet web page, and 5) slide show presentations and public displays.

**METHODS AND ANALYSES**

Coyote cadavers were collected at motor vehicle accidents (MVAs), donated by private citizens, and provided by conservation officers (COs). Measurements of total body length (including tail), hind foot length, and chest girth, were made prior to skinning, and measurements of males and females were compared using an F-test and a 1-tailed t-test. Stomachs, skulls, and hearts were removed for future analysis, rabies testing and heartworm testing, respectively.

The percent occurrence of food items was estimated in both scats (previously autoclaved and rinsed) and stomach contents, using a compound microscope. For hair
samples, wax impressions were made and a compound microscope used to identify prey species (Adorjan and Kolenosky 1969, Brunner and Coman 1974, Kennedy and Carbyn 1981). In the case of difficult samples, the hairs were examined under a scanning electron microscope. It was difficult to distinguish between domestic dog and coyote faeces, so not all of the samples collected were analysed. Scat was collected only in the vicinity of known den sites and along frequently used coyote travel routes.

Brain tissue was sent for rabies testing to the Center for Coastal Health. The centre is currently studying the incidence of endemic rabies as part of their BC Wildlife Disease Survey. The occurrence of heartworm was assessed by Dr. T. Khan (Burnaby New Westminster Central Animal Hospital) by examining coyote hearts for the presence of mature worms.

To determine the distribution and movement of coyotes, sightings reported by the public were collected from January 1995 though March 1997 by several means: A) calls to the “coyote hotline”, B) responses to the Coyote Survey, C) e-mails to the coyote homepage, and D) in person at educational seminars. Date, time, nearest street intersection, number of coyotes, activity of the coyote(s), as well as, a contact name and telephone number, were all requested. All sightings were recorded in an Excel 5.0 spreadsheet (Microsoft Corporation). Sightings were compared by time, number of coyotes, biological season, and location, using a Chi Square Goodness of Fit test with a significance level of 0.05 determined a priori. Each comparison had a unique sample size based on the number of sightings that had complete information for the variable in question (i.e., time or location). Comparisons of time were made using 4 time categories: dawn, day, dusk and night. Monthly averages of daily sunrise and sunset data (Environment Canada 1997) were used to designate the categories. The time
between 1 hour pre-sunrise and 1 hour post-sunrise or 1 hour pre-sunset and 1 hour post-sunset, were considered dawn and dusk respectively. Comparisons of the number of coyotes in the sighting were made after sorting the sightings into 3 categories: singles, pairs, or groups of 3 or more. Sightings were also compared by dividing the year into 3 biological seasons (Smith et al. 1981, Laundre and Keller 1984, Nowak 1991, Harrison 1992): denning from January 1 through April 30; rearing from May 1 through August 31; and dispersal from September 1 through December 31. Lastly, I examined where the coyotes were seen. I used 3 categories based on the description of the sighting: 1) parks, golf courses and greenspaces; 2) freeways, roadsides, or residential cross streets; and 3) lanes, private backyards, or school yards.

RESULTS

Eleven coyotes (6 males and 5 females) were collected, but I could obtain measurements only from 9 of them (Table 3). There were no significant differences between the means of the sexes (weight, t=0.34; total body length, t=0.73; hind foot length, t=0.89; and chest girth, t=1.35).

Table 3. Body measurements of 4 male and 5 female coyotes sampled in the GVRD.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>12.6 (SEM=1.4)</td>
<td>12.0 (SEM=0.7)</td>
</tr>
<tr>
<td>Nose to Tip of Tail (mm)</td>
<td>1197.5 (SEM=21.7)</td>
<td>1186.0 (SEM=30.8)</td>
</tr>
<tr>
<td>Hind foot (mm)</td>
<td>186.3 (SEM=6.9)</td>
<td>180.0 (SEM=3.2)</td>
</tr>
<tr>
<td>Chest girth (mm)</td>
<td>532.5 (SEM=11.1)</td>
<td>505.0 (SEM=15.8)</td>
</tr>
</tbody>
</table>
Scat and stomach contents analyses revealed that small mammals, plant material and coyote hair were the most frequent items in the coyote diet (Figure 16). Domestic pets, both cats and dogs, were also eaten, but occurred only in the scats.

![Graph](https://example.com/graph.png)

**Figure 15.** Percent occurrence of food items in scat (n=22) and stomach contents (n=11) of GVRD coyotes.

With the exception of one coyote that was shot, all other coyotes collected for analyses, were killed in collisions with vehicles. One coyote had mange. No positive cases of heartworm (n=11) or rabies (Schwantje 1997, *pers. comm.;* n=4) were found.

The public reported 613 coyote sightings. Although coyotes were seen at any time of the day or night (Figure 17), there were significantly more daytime and fewer night-time sightings ($\chi^2 = 36.63$, df=3) using weighted analyses (to account for the disproportionate time in each category). Single coyotes were the most often sighted (77%, n=505), however, pairs (12%), and groups (11%) containing as many as 9 individuals, were also reported. Coyotes were significantly ($\chi^2 = 25.33$, df=2) more likely to be seen in the denning season (January to April) and less likely to be seen in the dispersal season (September to December). Fifty
percent of all sightings were in parks, golf courses or GVRD greenspaces. Only 3% of sightings were in people’s yards, lanes or in school yards.

![Figure 16. Distribution of sightings according to time of day (n=327).](image)

**EDUCATION PRODUCTS**

Four types of educational products (Appendix C) were produced about urban coyotes for distribution in the GVRD: 1) a pamphlet, 2) a video, 3) an internet web page, and 4) the Coyote Education Kit. In addition, I gave approximately 40 presentations or interviews about coyotes. The pamphlet and internet web page contained easily accessible “quick facts” about urban coyotes and coexistence. Although the internet web page mirrored the information in the pamphlet, it also provided viewers with a direct e-mail connection if they wanted to report sightings or ask questions.

The 30-minute video, divided into 3 parts (concerns, characteristics, coexistence), was aimed at a general audience who require more information than could be delivered in a pamphlet. The video allowed me to develop some issues that the public identified in the surveys (e.g., concern about pets and personal safety), in greater detail than in the pamphlet or
internet web page. It was produced in collaboration with Delta Cable during May and June 1996 and it features questions from school children (William Bridge Elementary in Richmond), interviews with local experts, and comments from the public.

The video is also included as part of the Coyote Kit, an intermediate school level environmental education kit featuring ecology of the urban coyote, and including 7 “be-a-scientist” activities based on my graduate research. I developed the kit in collaboration with the BC Humane Education Society, and it is suitable for both public schools and community-based environmental education programs.

DISCUSSION

Although often overestimated by the public, the weights of GVRD coyotes fell within the expected range for weights and measurements and were consistent with values reported in other studies in western North America (Nowak 1991). Displaying pelts and presenting local measurements at presentations and in educational materials, seemed to help the public develop a realistic view of the size and weight of coyotes. This, in turn, allowed them to put into perspective the minimal threat that coyotes pose to people.

GVRD coyotes have the typically diverse diet of an opportunistic carnivore (Nowak 1991). Predation (or scavenging) of pets was confirmed by the presence of domestic cat and dog hair in scats, however, domestic pets were not a primary food item. Consistent with other studies (Andrews and Bogess 1978, Berg and Chesness 1978, Atkinson 1985, Shargo 1988, Quinn 1992), many of the samples contained vegetation. Garbage found in the stomach of one of the coyotes underscores the need to make garbage inaccessible to coyotes and thus discourage them from using private yards. In addition, making access to pets more difficult
(by fencing yards, leashing and supervising pets), *removing enticements* mainly in the form of alternative food sources (such as pet food, compost, and garbage), and *actively deterring* them from around one’s property (by throwing objects, yelling, chasing), should encourage coyotes to find easier alternative sources of food.

No positive cases of rabies or heartworm were found in my sample of GVRD coyotes. This could reflect a low incidence these diseases or be an artifact of small sample size. Although there has never been a case of rabies in coyotes reported in BC, even in areas of the province where heartworm is more prevalent (e.g., the Okanagan) the number of detected coyote heartworm cases can be low (Falkenberg 1995, *pers. comm*). Thus, further work should be done by other researchers to determine the incidents of these diseases in local coyote populations.

Coyotes were most often seen singly, refuting claims of packs roaming city streets. People were more likely to see coyotes during the denning season and rearing season. Increased hunting activity during the denning season (January to the end of April) to meet the demands of reproduction, likely explains the abundance of sightings at this time. Sightings during the rearing season are probably explained by the public’s movements - people, and their pets, are more likely to be outside enjoying spring and summer activities during the months of May through August when coyotes are raising their young. Awareness programs targeted to these periods would probably be effective at reducing conflict.

Using public sightings to determine distributions and movements of a wildlife species may not always be desirable, but it can supplement or provide an alternative to telemetry in urban areas (Quinn 1992). Because the purpose of collecting these data was to raise
awareness about coyotes distributions and movements, I felt the benefits of this approach outweighed any biases that might be present. Although coyotes would be reported only in areas and at times when people were present, the opportunity for sightings was never totally eliminated because a portion of the public will always be active (e.g., shift workers, taxi drivers).

The public provided me formally with information (sightings and surveys) but also contacted me with observations, stories and with requests to “remove” their coyote problems. In most instances, I found that validating people’s concerns and providing them with information, was a successful approach, and as a result some of the most adamant and angry callers became active supporters in distributing information about coyotes.

From my conversations with the public, coyotes appeared more bold if people were walking with their dogs, which the coyote probably viewed as prey. However, in all reported instances, the coyote(s) retreated when challenged by the owner. Tales of coyotes snatching small dogs off the ends of leashes remain unconfirmed and likely fall into the realm of urban mythology. Unfortunately, instances of coyotes injuring children, although rare, have been documented (Carbyn 1989) and range in severity. Two such incidents happened in the GVRD (July 11, 1995; May 8, 1997) during this study. In both cases young children (aged 7 and 3 respectively) in the presence of an adult were approached by the coyote. Neither child was seriously injured and health professionals did not feel it was necessary to commence rabies treatment. Both events occurred in the same Burnaby park, but it is not known if the same coyote was involved in each case; a single coyote was removed from the area after the second attack. Although food was not directly a factor in either of the two attacks, it is possible that
feeding by a local resident has habituated coyotes in this park, which may have resulted in the unusually bold behaviour of the particular coyote and its subsequent destruction.

The level of interest in my study, and urban wildlife in general, was quite astonishing. In addition to coyotes, I found myself fielding questions about a range of wildlife species, from raccoons to "predatory carp". Interest was further highlighted by public receptivity to education materials, and an overwhelming number of requests for presentations. Informal reporting from local agencies (Liz Thunstrom, Wildlife Rescue Association; Mike Mackintosh, Stanley Park Wildlife Manager; and Stephen Huddart, BCSPCA) indicates that complaints about coyotes within the GVRD have decreased since the start of my educational campaign; a response also found by Atkinson (1985) in rural areas.

There is a recognized need for environmental literacy (VandenHazel 1974, McLaren 1989) and urban wildlife programs (VanDruff 1979, Boxall and McFarlane 1995). The coyote, and the challenges for its coexistence with people, may make it an ideal "flagship" species for urban wildlife programs. The urban coyote is bold, curious, and wild. This "wild dog" is a reminder of the wilderness and has a captivating urban personality. The coyote provides an educational opportunity challenging us to value and learn to live with, the untamed creatures that share our cities.
RECOMMENDATIONS

1. Incorporate human dimensions information (public opinion) when formulating management approaches for coyotes and other urban wildlife. Also, use it as a means of assessing the progress and acceptance of such programs.

2. Use public education and other non-lethal methods for addressing urban wildlife problems. Public education is an important tool for the management of urban coyotes because traditional wildlife management techniques are not feasible or publicly acceptable in cities.

3. Target educational materials to particular segments of the GVRD population such as parents with young children and pet owners. It may be practical to target pet owners at veterinary clinics and local branches of the SPCA, for example.

4. Expand current “do not feed the wildlife” initiatives because this should also help reduce conflicts between coyotes and people.

5. Enforce municipal bylaws that discourage the public from feeding wildlife.

6. Different agencies that deal with urban wildlife should collaborate promoting a co-ordinated approach and consistent message in addressing coyotes and other urban wildlife. This would reduce duplication and make information more accessible and consistent for the public.

7. Clarification of the roles of different agencies that directly and indirectly deal with coyotes and other urban wildlife would be useful for the public.

8. Agencies should become more actively involved in working with the media to distribute valid information about coyotes because the vast majority of people get their information about wildlife from television.
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## APPENDIX A

GVRD Municipalities and their Participation

<table>
<thead>
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<th>Municipality</th>
<th>Survey</th>
<th>Sighting</th>
<th>Collection of cadavers for necropsy</th>
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<tr>
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<td>✓</td>
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<tr>
<td>Electoral Area C (Bowen Island / Barnston Island)</td>
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APPENDIX B

SURVEY QUESTIONS

WILDLIFE SURVEY

For the purposes of this survey, Urban Wildlife is defined as any non-domestic animal or bird that lives within an urban setting.

1) Please place an X beside the animals or birds that you consider to be urban wildlife.

squirrel seagull songbird cougar
rat hawk bat
shrew mouse crow muskrat
table: table: table: table: table:

raccoon crow duck

other:

2) Please circle any of the above marked species you have seen in the Lower Mainland in the past year.

3) Please list any of the above urban wildlife species that you consider to be "pests" or that cause you concern.

4) Identify why these animals cause you concern from the reasons provided below.
   □ personal safety / health □ pets' safety / health
   □ children's safety / health □ property damage
   □ other, please list

5) Are you aware that coyotes are present in Lower Mainland? yes □ no □

If yes, circle the response which best represents your attitude about coyotes in Lower Mainland?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly dislike</td>
<td>dislike</td>
<td>neutral</td>
<td>like</td>
<td>strongly like</td>
</tr>
</tbody>
</table>

6) May we contact you at a later date with questions about coyotes in the Lower Mainland? yes □ no □

7) Do you place your garbage out the night before your garbage collection? yes □ no □

8) Do you have an outdoor compost? yes □ no □
   If yes, is it open? yes □ no □

9) Do you have pets? yes □ no □
   If yes, do they go outdoors? yes □ no □
   If yes, are they ever fed outdoors, or on the porch? yes □ no □

10) Have you ever tried to dissuade wildlife from your property/place of residence? yes □ no □
    If yes, identify the method(s) used
    □ body language (loud threatening display)
    □ use of objects (throwing rocks, etc.)
    □ fencing
Were you successful? yes □ no □

11) When there is a problem with an urban wildlife species, who should take the appropriate action to deal with the complaint?
□ SPCA □ Ministry of Environment, Lands & Parks
□ Veterinarians □ Non-profit wildlife Rehabilitation Centers
□ City/Municipal Gov’t □ other, please list:

12) Have you ever asked for assistance or information from any of the above agencies with wildlife concerns? yes □ no □

If yes, please list which agencies and indicate whether you were satisfied with their response.

13) Are there adequate agencies/individuals within the city to address any wildlife concerns you might have now or in the future? yes □ no □ unsure □
If unsure, explain why

14) Is there a need to make information about urban wildlife more readily available to the public? yes □ no □ unsure □

15) Check the method you feel most appropriately addresses “problem wildlife” (i.e., those animals causing concern)?
□ relocate animals □ humanely destroy
□ public education □ all of the above but depends on circumstances
□ other, please describe below:

16) Are there circumstances under which it is acceptable to humanely destroy problem wildlife species? yes □ no □
If yes, which:

17) Does urban wildlife enhance your life in the Lower Mainland? yes □ no □

18) Are you willing to modify your lifestyle or habits in order to maintain or enhance wildlife activity within the city? yes □ no □ unsure □
If unsure, please explain

Name: ___________________________ Sex: Male □ Female □ Age: ______
Birth Country ___________________________
Occupation: ___________________________
Level of Education: Gr.10 □; Gr. 12 □; diploma □; bachelors □; masters □; PhD □
Phone OR if you prefer the first three digits of your phone number: ___________________________
Address OR if you prefer, your postal code: ___________________________
COYOTE SURVEY - GVRD Sample

Interviewer: ____________________________ Phone #

Date: ____________________________

Are you aware that coyotes are present in Vancouver? yes/no

Which response which best represents your attitude about coyotes in Vancouver?
1) strongly dislike 2) dislike 3) neutral 4) like 5) strongly like

Do you feel their numbers are increasing? decreasing? Staying the same? Unsure?

Do you feel that the coyote population in the Lower Mainland is "a problem"? yes □ no □

Have you seen a coyote(s) in the Lower Mainland in the past 12 months? (If yes, ask: date, time of day, # of coyotes, location including cross street)

What is your best estimate of the average body weight of an adult coyote
0 - 8 kg (0-17 lbs) 8 - 14 kg (17-31 lbs) 15 - 22 kg (33-48 lbs)
23 - 30 kg (50-66 lbs) 31 - 38 kg (68-84 lbs) more than 38 kg (84 lbs)

I'm going to read you some statements about coyotes, please answer true, false or unsure to each:

| Coyotes in the Lower Mainland are known carriers of the following diseases: | 
| Rabies virus | true □ false □ unsure □ |
| Canine Heartworm disease | true □ false □ unsure □ |
| Canine Distemper virus | true □ false □ unsure □ |
| Canine Parvo virus | true □ false □ unsure □ |
| Lyme's Disease | true □ false □ unsure □ |

Coyotes rarely attack children. true □ false □ unsure □

Coyotes live in urban areas because humans have "taken over the coyote's habitat". true □ false □ unsure □

Coyotes are a threat to adults. true □ false □ unsure □

Coyotes only hunt at night. true □ false □ unsure □

Coyotes have been in the Lower Mainland for more than 100 years. true □ false □ unsure □

Coyotes prey on domestic animals true □ false □ unsure □

if true, what proportion of the coyote's diet do you think consists of domestic animals? 0 - 20% 21-40% 41 - 60% 61 - 80% 81 - 100%

Do you think there needs to be more information/education made available to the public about coyotes?

Who (which agency or agencies) do you think should be responsible for dealing with complaints about coyotes [possibilities include 1) SPCA 2) vets 3) gov't/city council 4) MOELP 5) Non-profit animal rehab centers 6) other]

What method(s) do you think are appropriate for dealing with urban coyote complaints/concerns? [some possibilities = 1) relocate 2) humanely destroy 3) public education campaign 4) all 5) other]

Are there circumstances under which it is acceptable to humanely destroy...
**COYOTE SURVEY - vet and naturalist sample**

**Part A: General**

For the purposes of this survey, Urban Wildlife is defined as *any non-domestic mammal or bird that lives within an urban setting.*

1) Please place an X beside the animals or birds that you consider to be urban wildlife.

<table>
<thead>
<tr>
<th>Animal</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>squirrel</td>
<td></td>
</tr>
<tr>
<td>seagull</td>
<td></td>
</tr>
<tr>
<td>songbird</td>
<td></td>
</tr>
<tr>
<td>cougar</td>
<td></td>
</tr>
<tr>
<td>shrew</td>
<td></td>
</tr>
<tr>
<td>eagle</td>
<td></td>
</tr>
<tr>
<td>bat</td>
<td></td>
</tr>
<tr>
<td>wolf</td>
<td></td>
</tr>
<tr>
<td>rat</td>
<td></td>
</tr>
<tr>
<td>hawk</td>
<td></td>
</tr>
<tr>
<td>bear</td>
<td></td>
</tr>
<tr>
<td>skunk</td>
<td></td>
</tr>
<tr>
<td>mouse</td>
<td></td>
</tr>
<tr>
<td>crow</td>
<td></td>
</tr>
<tr>
<td>coyote</td>
<td></td>
</tr>
<tr>
<td>muskrat</td>
<td></td>
</tr>
<tr>
<td>mole</td>
<td></td>
</tr>
<tr>
<td>starling</td>
<td></td>
</tr>
<tr>
<td>deer</td>
<td></td>
</tr>
<tr>
<td>pigeon</td>
<td></td>
</tr>
<tr>
<td>raccoon</td>
<td></td>
</tr>
<tr>
<td>duck</td>
<td></td>
</tr>
<tr>
<td>swan</td>
<td></td>
</tr>
<tr>
<td>Canada Goose</td>
<td></td>
</tr>
<tr>
<td>other:</td>
<td></td>
</tr>
</tbody>
</table>

2) Please circle any of the above marked species you have seen in the Lower Mainland in the past year.

3) Identify any of the above urban wildlife species that you consider to be “pests” or that cause you concern.

4) Identify in general terms why these animals cause you concern from the reasons provided below.

- personal safety / health
- pets' safety / health
- children's safety / health
- property damage
- other, please list

5) Do you place your garbage out the night before your garbage collection? yes □ no □

6) Do you have an outdoor compost? yes □ no □
   If yes, is it open? yes □ no □

7) Do you have pets? yes □ no □
   If yes, do they go outdoors? yes □ no □
   If yes, are they ever fed outdoors, or on the porch? yes □ no □

8) Have you ever tried to dissuade wildlife from your property/place of residence? yes □ no □
   If yes, identify the method(s) used
   - body language (loud threatening display)
   - use of objects (throwing rocks, etc.)
   - fencing
9) When there is a complaint about a urban wildlife animal, who should take the appropriate action to deal with the problem?
- SPCA
- Ministry of Environment, Lands & Parks
- Veterinarians
- Non-profit wildlife Rehabilitation Centres
- City/Municipal Gov’t
- other, please list:

10) Have you ever asked for assistance or information from any of the above agencies with wildlife concerns?
- yes □  no □
If yes, please list which agencies and indicate whether you were satisfied with their response.

11) Are there adequate agencies/individuals within the city to address any wildlife concerns you might have now or in the future?
- yes □  no □  unsure □
If unsure, explain why

12) Is there a need to make information about urban wildlife more readily available to the public?
- yes □  no □  unsure □

13) Are there circumstances under which it is acceptable to humanely destroy problem wildlife?
- yes □  no □
If yes, which:

14) Check the method you feel most appropriately addresses “problem wildlife”
(i.e., those animals causing concern)?
- relocate animals
- humanely destroy
- public education
- all of the above but depends on circumstances
- other, please describe below:

15) Does urban wildlife enhance your life in the Lower Mainland?
- yes □  no □

16) Are you willing to modify your lifestyle or habits in order to maintain or enhance wildlife activity within the city?
- yes □  no □  unsure □
If unsure, please explain

Part B. Coyotes

17) Are you aware that coyotes are present in Lower Mainland?
- yes □  no □
If yes, please answer the following questions, if no, please go to Part “C”.
Circle the response which best represents your attitude about coyotes in Lower Mainland?
1 strongly dislike 2 dislike 3 neutral 4 like 5 strongly like

18) Explain why you feel this way about coyotes in the Lower Mainland:

19) Have you seen a coyote(s) in the Lower Mainland in the past 12 months?
- yes □  no □
If yes, Date: _______ Time of day: _______ Number of coyotes: _______
Location of Sighting (include cross-street):

20) Please check the response which best answers this statement: I feel the population of coyotes in the Lower Mainland is ....
- increasing □  decreasing □  staying the same □  unsure □

21) Please circle your best estimate of the average body weight of an adult coyote
0 - 8 kg (0-17 lbs) 9 - 14 kg (17-31 lbs) 15 - 22 kg (33-48 lbs) 23 - 30 kg (50-66 lbs) 31 - 38 kg (68-84 lbs) more than 38 kg (84 lbs)

22) Please answer the following true or false questions carefully.
Please, mark unsure if you don’t know the correct response:
Coyotes in the Lower Mainland are known carriers of the following diseases:
<table>
<thead>
<tr>
<th>Disease</th>
<th>True</th>
<th>False</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rabies virus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canine Heartworm disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canine Distemper virus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canine Parvo virus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lyme's Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Coyotes rarely attack children.  

Coyotes live in urban areas because humans have “taken over the coyote’s habitat”.  

Coyotes are a threat to adults.  

Coyotes only hunt at night.  

Coyotes have been in the Lower Mainland for more than 100 years.  

Coyotes prey on domestic animals  

<table>
<thead>
<tr>
<th>Proportion (%)</th>
<th>True</th>
<th>False</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 20%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 - 40%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41 - 60%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61 - 80%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>81 - 100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23) Do you have any specific concerns about/for coyotes in the Lower Mainland? yes ☐ no ☐  
   If yes, Please identify those concerns: ____________________________________________

24) Do you feel that the coyote population in the Lower Mainland is “a problem”? yes ☐ no ☐  
   Please explain your answer above: ____________________________________________

25) May we contact you at a later date with questions about coyotes in the Lower Mainland?  
   yes ☐ no ☐  
   contact number: ________________________________

Part C: About You  
Name: ________________________________  
Sex: Male ☐ Female ☐  
Age: ______

Birth Country: ________________________________

Occupation: __________________________________________________________________

Level of Education: Gr.10 ☐; Gr.12 ☐; diploma ☐; bachelors ☐; masters ☐; PhD ☐

Phone number OR if you prefer the first three digits of your number: ________________________________

Address OR, if you prefer, your postal code: ________________________________
APPENDIX C

EDUCATIONAL MATERIALS

1) Pamphlet

2) Urban Coyote Video

3) Internet web page
   accessed by: www.interchange.ubc.ca/kwebber or search for “urban coyotes”

4) Coyote Kit - intermediate level education program
Coexistence is the best choice

Trapping coyotes in the city is very difficult and ineffective. Poisoning programs to reduce coyote numbers, would also kill other wild animals. In the city, these poisons could also be a risk to pets and children.

It is not surprising these methods are socially unacceptable in today's society.

Relocation is often suggested as an alternative. This simply moves the problem coyote to someone else's backyard. It can also put a coyote at risk by placing it in another coyote's home range or territory. In addition, when you remove one coyote it may be replaced by one or more in the same area.

Coexistence with this interesting wild species, seems to be the best option simply because coyotes are difficult to trap and both eradication and relocation programs in other parts of North America have proven both ineffective and very expensive.

Things you can do....

1) Keep pets under your control (dogs and cats on leash when outside).

2) If you must let your pet out unattended, provide a secure space for your it to exercise (such as an enclosed cat or dog run).

3) Never feed coyotes. Our best defence is not to habituate or get them used to people. We need to keep them wild. This is one of the best ways to protect our pets.

4) Be careful not to feed coyotes unintentionally. For example they are attracted to:
   - improperly contained garbage
   - open composts containing fruit or vegetables
   - fruit that has fallen from trees and is left on the ground
   - an overflowing bird feeder (they'll eat the grain as well as the small mammals this food attracts)
   - pet food, so never feed pets outdoors

5) Fencing helps discourage them from entering your yard. Make sure fences are flush to the ground and in good repair.

A Fed Coyote is a Dead Coyote

Coyotes are industrious animals quite capable of surviving in the city without our help. In fact, by feeding coyotes you put yourself and the coyote at risk.

A coyote that becomes dependent on humans for food, may become too bold, bite someone and have to be destroyed.

Please don't feed any wildlife, especially coyotes - enjoy them from a distance.

For More Information

Urban Coyote Video - available from the Urban Wildlife Committee, Delta Cable, or the BCSPCA Education Dept.
Urban Coyote Kit - an educational kit for school kids and interested adults!
Contact the BCSPCA Education Dept.
Coyote Homepage:
www.interchange.ubc.ca/kwebber
brought to you by:
Urban Coyote Project

supported by:
Ministry of Environment Lands and Parks; BCSPCA; SPCA Vancouver Branch; BCSPCA Education Department; Urban Wildlife Committee; City of Vancouver; UBC Department of Animal Science; Stanley Park Ecology Society; Cheryl's Pet Taxi

Urban Coyotes

In our city?

Coyotes are an extremely adaptable wildlife species that survives well in urban environments - including our city.

Coyotes are relatively new to the Lower Mainland, but have lived in large cities like Calgary and Los Angeles for many years.

Not in my neighbourhood?

Coyotes are often sighted on local golf courses and in parks, but they can be found in most GVRD neighbourhoods - including yours!
**Why are they here?**

Many people believe coyotes are in the Lower Mainland because we have "taken over their habitat". Actually, we often create habitat for this generalist species, when we clear forested land for housing.

**What do they look like?**

They look much like a cross between a fox and a small collie or German Shepherd.

Coyotes in the Lower Mainland weigh between 9 - 14 kg. They often appear heavier than they actually are due to their thick, double coat. Coyotes have bushy tails which they hold low when running. They have narrow delicate noses and relatively large ears.

Although there is variation in colour, coyotes appear a grizzled reddish yellow colour. They have darker grey and black hairs on their upper body and lighter cream-coloured undersides.

**How many?**

Contrary to some news reports, there are probably only between 2,000 and 3,000 coyotes in the whole of the Lower Fraser Valley and perhaps 200 in the greater Vancouver area.

**What do they eat?**

Coyotes eat a variety of foods. In rural and wild environments, up to 70% of a coyote's diet consists of small mammals (mice, voles, rabbits, etc.), the rest is a combination of fruits, vegetables, insects, garbage and other available items.

In urban areas, such as the Lower Mainland, coyotes also prey on rats, squirrels, raccoons, opossums, Canada geese, ducks and domestic pets (especially cats and small dogs).

**When are coyotes most active?**

Coyotes can be active both day and night.

Coyote young are born in the spring, and food requirements of the nursing females and growing young are very high at this time of year.

Also at this time, people and their pets spend more time outdoors as the weather becomes warmer.

Therefore, the potential for conflict at this time increases. Please be aware of the potential risk to your pets.

**What to do if approached**

If someone is approached by a coyote, they should make themselves appear larger (stand up if sitting) and act aggressively by waving arms, throwing stones, or shouting.

Any of these should send the coyote packing.

**Are coyotes a risk to people?**

Coyotes are rarely if ever a risk to people. They are curious but timid animals and will run away if challenged.

In the only reported incident in the last 2 years in the GVRD where a coyote has bitten a human, the coyote had been fed by well-meaning but misguided individuals.

Feeding coyotes can cause them to lose their natural fear of people and become dependent on handouts. So please don't feed them.

**What about Rabies?**

This is not a current safety concern. To date, rabies has not been found in any BC coyote population.
Urban Coyotes

brought to you by the Urban Coyote Project with support from

- UBC Department of Animal Science,
- BCSPCA Humane Education department,
- Ministry of Environment Lands and Parks,
- City of Vancouver, and the
- Stanley Park Ecology Society

Coyotes' sense of smell helps them locate prey and avoid danger

In Our City

Coyotes are an extremely adaptable wildlife species that survives well in urban environments. Coyotes are relatively new to the Lower Mainland, but have lived in large cities like Calgary and Los Angeles for many years.

Not in my Neighbourhood!

Coyotes are often sighted on local golf courses and in parks but they can be found in most Vancouver neighbourhoods - probably yours!

What do they look like?

They look much like a cross between a small collie and German Shepherd. Although there is variation in colour, coyotes generally have a grizzled reddish brown coat interspersed with darker mane hairs and have lighter undersides. Coyotes in the Lower Mainland weigh between 9 -14 kg. They often appear heavier than they actually are due to their thick double coat and may appear taller because of their long legs. They can use these long legs to run up to 64 km/h for short distances. Coyotes have thick bushy tails which they hold low while running.
What do they eat?

Coyotes eat a variety of food: in rural and wild environments up to 70% of a coyote’s diet consists of small mammals (mice, voles, rabbits, etc.) the rest being a combination of fruits, vegetables, insects, garbage and other available items. In urban areas coyotes scavenge garbage and will also prey on cats and small dogs.

When are Coyotes most Active?

Coyotes are active both day and night. The young are born in the spring and food requirements of the nursing females and growing young are very high at this time. By late summer the pups are learning to hunt for themselves. At the same time, people and their pets are spending more time outdoors and the potential for conflict increases.

Are Coyotes a risk to People?

Coyotes are rarely if ever a risk to people. In the very few incidents where a coyote has bitten a human, the coyote has generally been fed by well-meaning but misguided individuals and so lost its natural fear of people. Coyotes are curious but timid animals and will generally flee if challenged. Feeding coyotes can cause them to lose their natural fear of people and become dependent on handouts.

What about Rabies?

Rabies has never been detected in the BC coyote population, thus is not a concern at this time.

Coexistence the Best Choice

Trapping coyotes in the city is difficult. Poisoning programs that could be employed to reduce coyote numbers, would also kill other wild animals such as raccoons and squirrels, and would be a risk to pets and children. It is not surprising that these methods are socially unacceptable in today’s society.

Relocation programs have 3 main drawbacks:

1. After removing one coyote, another (or possibly two) may move into that habitat.
2. Relocated coyotes may be at risk if they are released into an area already occupied by a coyote.
3. We are simply moving our problem to someone else’s backyard.

Coexistence with this interesting species, seems to be the best option since the coyote is difficult to trap and eradication / relocation programs in other part of North America have proven both ineffective and
expensive. This map shows the increase in the coyote's range since European arrival in North America. This increase occurred in spite of many efforts to control coyote numbers through bounties, trapping, den-hunting and poisoning.

What Can You Do to Coexist?

1. Keep pets under your control (dogs and cats on leash when outside)
2. Coyotes are only one risk facing the outdoor pet, consider making your cat or dog and indoor animal
3. If you must let your pet out unattended provide a secure space for your pet to exercise (such as an enclosed cat or dog run)
4. Never feed coyotes. Our best defence is not to habituate them. We need to keep them wild. This is one of the best ways to protect our pets.
5. Be careful not to feed coyotes unintentionally. For example they are attracted to:
   - improperly contained garbage
   - open composts containing fruit or vegetables
   - fallen tree fruit
   - an overflowing bird feeder (they'll eat the grain as well as the small mammals it attracts)
   - pet food (so never feed pets outdoors)
6. Fencing helps discourage them from your yard, but make sure fences are flush to the ground and are in good repair

Fed Coyote is a Dead Coyote

Coyotes are industrious animals, quite capable of surviving in the city without our help.

In fact, by feeding coyotes you put yourself and the coyote at risk. A coyote that becomes dependent on humans for food may become too bold, lose its natural fear of people, it might bite someone and then have to be destroyed.

Please don't feed any wildlife, especially coyotes, enjoy them safely form a distance.

If you'd like more information on coyotes or would like to report a coyote sighting, please contact me (Kristine Webber) at the below e-mail address.

Kristine Webber, UBC Graduate Student studying urban coyotes
kwebber@unixg.ubc.ca
The Coyote Kit Includes:
- This Teacher's Guide/Student Activity Manual
- Urban Coyote video (30 min)
- "Wild, Wily Coyote" Poster
- Pamphlets
Acknowledgments:
The Coyote Kit was produced as a non-profit education project in partnership with the B.C. S.P.C.A.
Education Division, Stanley Park Ecology Society, and Department of Animal Science, UBC. The writing of
the kit has been the work of a team of people. The principle contributors are:

Ann Finlayson
Stephen Huddart
Sophia Johannesson
Craig Naherniak
Kristine Webber

The authors would like to acknowledge the expertise, advice and work of the following people who
contributed to the development of this kit: Susan Campbell, Tom Harder, Diane Major, Darlene Tavares, Liz
Thunstrom, Dee Wamsley, Knut Atkinson, and members of the Vancouver Urban Wildlife Committee.

The video, much of the factual material and the science activities were the result of the Urban Coyote Project, a
study of urban coyotes carried out by UBC Department of Animal Science Masters student Kristine Webber.
We wish to thank the following connected to the Urban Coyote Project for their contributions: Dr. D.M.
Shackleton, K. Fletcher & Donna Baylis, Vancouver Film School, Delta Cable, Dee Wamsley, UBC Department
of Animal Science, BC SPCA, BC SPCA Vancouver Regional Branch, Stanley Park Ecology Society,
Conservation Committee, City of Vancouver, Ministry of Environment, Lands and Parks, Urban Wildlife
Committee (and its member organizations), Sara Muir, Denise Koshowski, and Lavona Liggins.

Special thanks to the following who contributed their photos/artwork/stories:
Jeff Foott (cover photo), Barry Lopez (“The Dead Whale” story), E. Humphrey and K.
Webber (electron microscope photos), Jacque Pearson (illusions), Ann Finlayson
(illusions), Lone Tratt (illusions), Mike MacKintosh (photo), Liber Films Inc.
(photo), Kristine Webber (photo), Dr. D.M. Shackleton (photographs), Paul Stivees (photo),
Gerry Kehrmann/Provincial (photo), Glenn Baglo/Vancouver Sun (photo), Craig
Naherniak (layout/design/photo)

Project funding provided by:

City of Vancouver
BC SPCA
BC Ministry of Environment, Lands and Parks

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e-mail: info@spca.bc.ca

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The Coyote Kit
Intermediate Level Teacher's Guide and Student Activity Manual
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The Coyote Kit also includes:
  • Urban Coyote video (30 min)
  • “Wild, Wily Coyote” Poster (17x22 in.)
  • Pamphlets — Urban Coyotes and Bite Free (dog bite safety)
Preface

Welcome to the Coyote Kit

The materials in this unit emphasize the development of empathic relationships with animals and nature. Instead of reinforcing the utilitarian idea that nature is to be controlled and exploited for strictly human ends, we explore a vision where humans live in cooperation with the natural world. Throughout the kit reference is made to the real relationship between humans and coyotes. This is a topical issue and one that highlights the difficulty with the controlling, exploitive approach.

In the unit you will meet a real wildlife biologist; follow her real scientific research; and encounter her real problems around public attitudes and responses to an increase in the urban coyote population in Vancouver, B.C. in the 1990s.

You will read of Jean Mackenzie, a woman who is learning to live with coyotes after she lost almost all her pet hens to them. By gaining an understanding of the ecology of coyotes students will learn why techniques used to control coyotes in North America have not been successful. The unit encourages the view that we are part of nature, that we share a world with other beings, and that animals should be respected and treated with compassion. Students learn about wild and domestic animals with needs similar to their own.

The urban wildlife unit was also created to enable you to offer students a variety of ways to experience the wonders of nature. In identifying with the world around them children develop empathic relationships with not only the wider community of nature, but also with each other. Students – and teachers! – will find opportunities for learning, understanding, and wonder as they explore the concepts and activities in the Coyote Kit.
Section 1

Background Information for Teachers
Urban wildlife is all around us. Whether it's raccoons on the balcony or pigeons on the roof tops, wild animals are making their homes in the city. Human reactions to urban creatures range from annoyance and indignation to excitement and wonder.

Children are almost always intrigued by other creatures. While ignorance, prejudice or surprise may cause us to have negative or fearful feelings about wild animals, an enlightened approach — based on knowledge and an ethic of respectful coexistence — turns encounters with urban wildlife into exhilarating and highly memorable experiences. Often the fear of wild animals comes from a lack of understanding about them. This urban wildlife unit is about understanding the coyote and other wild creatures that are part of our urban communities.

While many of us may think living close to animals is wonderful, some do not. As a result, humans and other animals come into frequent conflict over the desired use of habitat. This conflict can be reduced by removing opportunities for animals to locate in areas where they are not welcome, and by being especially conscientious in dealing with garbage.

The Coyote Kit will raise children's awareness of coyotes in their area, and help to dispel the myths that are growing about them. Many believe coyotes are "bad" animals that kill pets and livestock, and attack children. While it is true that pets left outdoors are easy prey for coyotes, attacks on people are extremely rare. We hope that if people better understand coyotes and their behaviour, humans and coyotes will be able to coexist peacefully.
Why Use This Urban Wildlife Unit?

By studying this unit on urban wildlife you will be helping your students to:

- discover and experience the natural world around them
- develop empathy/tolerance towards nature and others.
- develop an awareness that they are part of an ecological community
- increase their knowledge of animals in the urban environment
- develop critical thinking and cooperative learning skills
- investigate a scientific problem for themselves using a variety of scientific techniques

Curriculum Linked

While the Coyote Kit was developed within the discipline of environmental and humane education, it is extensively linked to curricula for Social Studies, Science, Language Arts and Personal Planning. In particular, the Kit is designed to meet learning outcomes prescribed in the B.C. Ministry of Education IRP's (Integrated Resource Packages) for Grades 4-7. Appendix C contains details of these and other links to the provincial curriculum. By emphasizing particular threads or themes, teachers can plan to meet specific curriculum objectives and learning outcomes for the class as a whole. The needs of split classes, small groups and individuals can also be met, as the Kit allows multiple entry points and provides for simultaneous activity at several levels in different areas of interest.

Which Path Will You Follow?

As the Coyote Kit can accommodate a variety of teaching and learning styles, we encourage you to create a lesson plan that meets your needs with a balance of individual and group work, teacher-directed activity and student-driven cooperative learning, scientific enquiry plus artistic expression and so on. We also hope that you will offset reading and research done indoors with some of the outdoor learning activities. Appendices A, B, and C provide you with summaries of the styles and outcomes of each activity, to assist you in designing your approach. The Teaching Needs Chart, which appears as page 18 can also be helpful in applying the Kit to your needs. Although most of the activities are based on coyotes, we have included suggestions on how to extend the unit to the larger urban wildlife community.
From Study to Action

Kristine Webber’s approach to the issue of urban coyotes combined academic and field work with real action in the community. You and your students may want to emulate her example — by holding an Urban Wildlife Day at school for example, or by forming an Urban Wildlife Committee or Animal Action Club, to continue and build upon their work with the kit. A blank Personal Action Plan is included as Page 17, and at an early point in their work on the unit, or at its conclusion, you may want to invite students to create a plan to learn more about or take action on an urban wildlife issue. You will note that Section 2, Background Information for Students and Section 4, Urban Wildlife Action are for student use. The latter outlines ways all of us can assist urban wildlife. It is also, incidentally, a useful means of reviewing and concluding the classes' formal work on the unit.

Getting Started

The following suggestions are designed to assist you in introducing the unit to your class. See also:

Teaching Needs Chart — p.18
Appendix B - Inquiry-Based Teaching Strategies — p. 157

Background Information — To Stimulate Interest for Research and Self-directed Activity

Photocopy and hand out Section 2 (Background Information for Students), Personal Action Plan (p. 17) and Section 4 (Urban Wildlife Action). Section 2 is a stand alone unit. It contains a factual summary about coyotes and profiles the work of Kristine Webber, a wildlife biologist studying urban coyotes. It also reports on the problems one citizen faced when coyotes moved into her neighbourhood. A reading list and glossary are included.

Section 4 extends the coyote theme to urban wildlife in general, with information and activities on animal homes, how to respond to injured or orphaned animals and so on.

The Personal Action Plan can be filled out early on or at the conclusion of students' work on the unit.

Throughout sections 2 and 4, students are engaged with questions and activities highlighted as follows:

Now its your turn!

Data from actual studies are highlighted in boxes and may be used to help introduce students to referenced material and studies. For example:
Create A “Coyote Corner”

Set up a “Coyote Corner” in your classroom centred on the coyote poster. The poster is divided into two sections. The large photograph of a coyote gives details about coyote senses and physical abilities. “Sharing the City” describes ways of “coyote-proofing” homes and pets, and explains how coyotes can be observed safely. All or parts of Section 2 (Background Information for Students) can be included.

Set Up Science Stations

Setting up the “Be a Scientist” stations around the room allows for self-directed individual and group investigation. Additional or alternative stations could be made up of the Urban Coyote video, the Media File, the Urban Wildlife Action section and the Math Activities. By having additional reading material and worksheets on hand you can allow for the fact that some station activities will take longer than others.

Show the Urban Coyote Video

Showing the “Urban Coyote” video is another way to begin the unit. It can also form part of the review or wrap-up to the unit (see Synopsis of Coyote Video). A number of questions can be asked about what students have seen in the video. Did it change their understanding or attitude toward coyotes?

Opinion Research Project

Older students might be interested in conducting an opinion poll or attitude
Urban Coyote Video - Synopsis

The video looks at the urban coyote phenomena from many viewpoints, and features plenty of footage of real coyotes. It can be used as an introduction to the unit, as a research tool, or for review. Its three sections follow a question and answer format:

(set clock to 00:00).

1. Concerns —

   In an opening sequence (with a couple of students' questions answered in the second section) we meet biologist and narrator Kristine Webber, who tells us about coyotes' arrival in Vancouver in the mid 1980's, and how she came to undertake her study. Citizens whose pets were attacked by coyotes express their concerns, and a park official describes peoples' fear that the coyote they saw was a wolf. A policeman describes peoples' distress when they see coyotes preying upon small mammals. Kristine introduces an attitude survey that shows public concerns centre on:

   1. pet predation
   2. safety of children
   3. fear of diseases

   Owners of small pets are cautioned to keep their animals under their care and control, and assurances are given that coyotes are not normally dangerous to humans. We do, however, see a boy who was nipped by a coyote that he tried to feed. A wildlife official explains that rabies is rare in B.C. and has never been detected in coyotes here.

2. Characteristics — beginning at 06:30

   Coyotes' weight, size, colour, body shape, and tail are covered, and this is followed by a graphic comparison of skull sizes among wolves, coyotes and foxes. A series of students' questions follows, with responses from several experts...

   What colour are their eyes?
   How fast do they run?
   Do they come out in the day?
   What keeps them warm?
   What other animals are they related to?
   How do coyotes communicate?
   When are pups born?
   How long do pups stay with their elders? (Note — a brief shot of mating behaviour occurs around the 11:00 minute mark)

   Discussion of pups and denning

   What do coyotes eat? (Note close-up shot of pup eating a rat)
   — 14:00 analysis of stomach contents and scat
   — 15:00 electron microscope slides of animal hairs

   What ecosystem are coyotes most commonly found in?

   Are coyotes on the road to extinction? (Note newsreel footage of men shooting at a fleeing coyote from a hot air balloon)
survey using a segment of the video and a questionnaire to be answered twice—before and after viewing the tale. They prepare and administer a questionnaire that asks directed and open-ended questions about aspects of coyotes—much as Kristine did in her study. See *How Do You Feel About Coyotes in Your Backyard?* science station. This activity could be done as part of a presentation to another class or during an Urban Wildlife Day.

Other videos of interest include *Wild in the City*—about urban wildlife found in Vancouver, and *Pets and Their Wild Relatives*. See the Resources Section for more information.

### Create A Reading Centre

Create a reading centre with a variety of fiction and non-fiction material. Don't overlook the B.C. Ministry of Environment, Lands and Parks and the Canadian Wildlife Service—both produce excellent information sheets on animal and environmental topics. The latter produces some in French as well. (See Section 5—Resources for annotated lists and sources.)

### Invite A Guest Speaker or Visit One

You may want to begin by inviting a guest speaker, by visiting a wildlife refuge, or by booking a wildlife outdoor program. Suggestions and addresses are listed in Section 5—Resources: Urban Wildlife/Animal Related Organizations).

### Use the Internet to Locate Coyote Sites

The internet has a small number of sites with coyote information. Be advised that there is a professional hockey team called the Phoenix Coyotes with many web sites—a tempting distraction for some, but also a possible topic for discussion: why do sports teams take on the names of certain animals? There are some notable wolf sites on the internet including the International Wolf Center (http://www.wolf.org) where students can follow the movements of radio-collared wolves in northern Minnesota. (See also Section 5—Resources: Coyote Websites, and also Urban Wildlife/Animal Related Organizations).

### Brainstorm About Coyotes

You may want to take a values or attitudes clarification approach to a study about urban coyotes. One idea is to ask each child to begin by imagining his or her ideal place to live. Then brainstorm a list of all the things needed in that imaginary place that would keep you alive. Discuss which of the aspects of their imaginary world are natural and which are of human construction. A collage of magazine clippings prepared either by you or the students might help to illustrate the differences. Then analyse the differences in each other’s imaginary worlds. Did anyone include animals in their world? How would they feel if you put a coyote in their imaginary world? Where do they think they got their ideas about coyotes from? At the conclusion of the unit you may have students revisit
and modify their ideal place to see how it has changed.

**Begin An Investigation — With a Mind Map**

An investigative approach to an urban wildlife study can begin with the creation of a simple mind map:

Begin by soliciting questions — for example:

- How big are they?
- How much do they weigh?
- How fast can they run?
- When are the pups born?
- How many pups are there in a litter?
- Where do they live?
- What are they in danger from?
- What do they eat?

Questions can be assigned to groups or individuals. Reading the Background Information for Students and/or watching the video will provide many — but perhaps not all — of the answers.
Teaching Strategies

What are you looking for in this unit?
Since we fully understand that every teacher has different needs (despite a common curriculum) we have attempted in this section to suggest some access routes into the kit with links to the curriculum.

Teaching the whole kit
You may of course wish to take the kit as a whole and begin with the Student Background Information. This can be photocopied and critical thinking or analysis questions are dotted throughout this section. The aim of these questions is to engage the students in their reading in a meaningful way that extends beyond comprehension exercises. This section will also build vocabulary and introduce some of the concepts explored in depth throughout the kit. A variety of styles of prose are presented, for example from “Quick Coyote Facts,” to the transcript of an actual interview. As such, this section presents both original sources and secondary sources of information.

The “Be a Scientist” stations included separately in this kit are designed to be used as student-directed work stations for up to 7 groups. They can also be teacher directed. Each one follows the investigative strategy used by a research scientist. Depending on the age and abilities of your class some activities should be modified or substituted. For example, a younger class may have difficulties designing and executing their own attitude survey. It may be best that they use the tabulated data presented.

A Note On Pet Loss
A word of caution! Jean’s Story of pet loss and citizen’s accounts of attacks on pets in the video may trigger emotions of grief or distress in your students. They have been included here for reasons of empathy-building and values clarification. Here are some suggestions to help students deal with the loss of a pet:

- first, examine your own feelings and concepts of death;
- try to understand the student’s concepts or views of death;
- be willing to talk honestly about death — try not to associate death with sleep;
- acknowledge grief and remind them that it is okay to feel sad or angry and to express emotions;
- let the students talk and ask questions — listen actively;
- remember happy and/or special times they had with their pet;
- suggest marking the death with some sort of memorial/tribute;
- share the experiences others have had losing a pet;
- reassure students that they are not to blame for the death of an animal.

The mourning process, with stages that may include grief, denial, anger, depression and guilt, is normal and healthy. The pet may never be forgotten but the pain of the loss will gradually diminish.
The kit follows the Environmental Education model of:

- **Awareness**
- **Appreciation**
- **Understanding**
- **Action**

The students are, therefore, led to Section 4 where they are encouraged, through the model of the work of an Urban Wildlife Committee, to take action themselves, either individually or as a class or group. Many of the Personal Planning learning outcomes can be practised with students developing personal plans. Below is an example of a personal plan contract.

**Other Ways To Use the Kit**

You may find the Teaching Needs chart that follows helpful in choosing a section or sections of the kit that will achieve your teaching needs. Your springboard into using the kit may be a search for relevance or a current issue of concern to you or your students. Some of these that are covered in this kit are listed in the boxes (see chart following page). You may have a split Grade 4/5 class and are wondering how the kit could help achieve learning outcomes for both grades. Or you may be concerned with taking an integrated approach. This kit can follow a Weaving (or Infusion) model for integration but is perhaps most like a Thematic approach. Many activities based on values clarification and feelings towards pets and wild animals address not just curricular integration but also personal integration (that is, students are encouraged to build upon prior knowledge to construct explanations). Use the chart to help in your journey through this kit and to choose what will be relevant in terms of content, time available, skills, interests and abilities.
Personal Study and Action Plan

My chosen action is to:


I plan to begin my plan by:


To help me with this I have asked:


I believe I will need help with:


Agreed:_________________________ Date:_________________________
Teaching Needs Chart

**Project Approach**
(See Appendix A, B, or Urban Wildlife Action - Section 4)

**Scientific Approach**
(See "Be A Scientist activity stations")

**Inquiry or Problem Approach**
(Begin with mind map or Appendix B)

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**Teaching Needs**

**Process/Skills**
(Applications learning outcomes)

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**Environment Themes**
(See Appendix B)

**Key Words/Phrases?**
- diversity
- cause and effect
- change
- impact of humans on the environment
- ecology of the coyote
- work of wildlife biologists
- urban wildlife
- animal characteristics
- predator/prey relationships
- urbanization
- dynamic nature of ecosystems

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**Environment Issues**
(See Appendix B)

**Key Words/Phrases?**
- coexistence with wildlife
- pest control
- humane control
- media attitudes to wildlife
- urbanization and wildlife
- stereotypes of wildlife
- human/animal interactions
- safety

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**IRP Learning Outcomes (PLO's)**
(See Appendix C)

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**Individual PLO's**
(e.g. spring-board into a unit of study)

**Clustered PLO's**
(e.g. is it possible to integrate across subject areas?)

**Scope and Sequence of PLO's**
(e.g. for split grade classes)
Section 2

Coyotes and Urban Wildlife

Background Information for Students
Coyotes — Their Story

Coyotes can live in packs, pairs or on their own depending on the area and what food is available. The coyote is less likely to live in packs than a wolf. Several males will "court" a female. She will choose one and they will stay together for a long time, sometimes for life. Coyotes mate in January or February. Only one pair mates if they are living in a pack. The female is pregnant for 63 days — about 2 months — and then gives birth to 4-6 pups. The number of pups born in any year seems to depend on the available food and the number of coyotes eating that food.

At birth the pups weigh only 250-300 grams — less than a can of pop! They are born blind and cannot move around much by themselves. By the time they are 8-10 days old they can walk, but their eyes don't open until they are about 14 days old, so they may learn to walk before they can see! At one month they can already run, but they remain completely dependent upon their parents for several months. They can grow very quickly and are full grown by nine months.

Both parents are involved in raising the pups. While one stays in the den, the other hunts for food. At first the pups are nursing — taking milk from their mother. At about one month of age either parent will feed them "mouse milkshakes" — food that has been chewed and regurgitated. A little later the parents bring them dead prey to eat — mice or rats for example.

Sometimes the pups can be seen playing near the den. They practice hunting by stalking, pouncing on grasshoppers and other insects, or by chasing sticks, leaves and even golf balls. If there is danger nearby, or if the den gets infested with fleas, the mother may move the pups to a new den.

In the fall most of the pups leave to live on their own. Sometimes a few stay behind to form a pack with their parents. Depending on the availability of food and space, some of the pups will be ready to mate by the next spring. Others will wait until another year has passed.

It is hard to know exactly how long coyotes live in the wild. Scientists found one who lived to be 14½, but they believe most live between 5 and 7 years.
One Study Found...

In a particular coyote population 70% of the animals were under 3 years old.

Now its your turn!

Can you make a calendar of all the things that happens in a year to one coyote from birth onwards?

Living in The City

Food

Like wolves, coyotes use their keen sense of smell to locate prey. They often hunt alone, at night, and may travel for long distances in search of food. They sometimes hunt in pairs or small packs, which enables them to attack larger prey.

One Study Found...

A study in the Fraser Valley of British Columbia in 1980 showed that rodents made up 70% of coyotes' diet in that area. The next most common food was rabbit.

Coyotes are carnivores. Rabbits and rodents — such as rats, mice and squirrels — are their main food supply, but they will also eat other animals as well as fruit, vegetables and other plants. Coyotes have been known to eat raccoons, deer, muskrats, birds' eggs, reptiles, insects, frogs and even fish, if they can catch them. In rural areas, they will sometimes kill and devour sheep. In urban areas, cats and small dogs left outside can become easy prey for coyotes. They also eat garbage that is left outside uncovered.

Habitat

Coyotes are adaptable animals who live in many different environments. They are found from the boreal forests of the Yukon to the desert grasslands of Mexico, from the coast to 5000 metres above sea level. Human activity often helps coyotes. We kill the wolves which prey on them, and we build roads and railways which they use to move into new areas.
Coyotes adapt easily to our golf courses, parks, and backyards, which provide them with almost ideal conditions for shelter, along semi-open areas where they can hunt for prey.

**Shelter**

Coyotes will curl up in almost any concealed and protected spot. Dens are only used when coyotes are raising their pups. Coyotes make dens by enlarging a burrow made by another animal or by digging a new one. They are about 1.5 to 7.5 metres long, with a chamber (room) that is about .3 metres wide and 1 metre below the ground. For coyotes to feel safe, dens must be hidden and close to food and water. Since coyotes can be active during the day or night the decision on where to place the den must be based on who else is in the area and when. You can sometimes find “toys” near the den opening. These might be bones, collars, shoes, etc.

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**One Study Found...**

Researcher Kristine Webber found coyotes dens in the city of Vancouver in places such as:

- under porches
- in abandoned houses and buildings
- under blackberry bushes growing on the sides of steep slopes or gullies

In the country, coyote dens can be found in piles of branches, tree roots, hollow tree trunks, old badger holes, abandoned farm buildings or under berry bushes.

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**Now it's your turn!**

Could a den fit under your classroom? Check out your school yard for any likely spots for a den. Make a list of reasons that a coyote would choose to have a den in your school yard. Make another list of reasons why a coyote would not choose to make a den in your school yard.
Sharing the City

Why are they here?

Coyotes have been expanding their range over the past 100 hundred years. Although coyotes have been in British Columbia for many years they are new to places such as Vancouver. Housing developments, highways and farmland have been taking up more and more of the wild places that used to be Vancouver. It is not surprising that the coyote does well in this new environment. They are a “generalist species” — meaning they can adapt to new places as long as there is enough food and shelter. Cougars are not in the city because, unlike the coyote, they need a huge home range. Since cougars prefer large mammals as prey and are shy of humans, they tend to stay in wilderness areas. Coyotes are different. They prefer small animals and cities have plenty! Golf courses, parks, granaries and fields attract rodents such as rats, mice and squirrels, which are coyotes favourite food.

What are the problems?

Coyotes in a city can cause problems for people. They eat garbage and food left outdoors, and sometimes they eat small pets. (Read Jean’s story “Living with Coyotes” to learn about coyotes in the Southlands neighbourhood of Vancouver). Some people think that coyotes must be trapped and taken out of the city but this is very difficult and ineffective. Poisoning programs to reduce coyote numbers would also kill other wild animals. In the city, these poisons could also be a risk to pets and children. Moving the coyotes to another place is sometimes suggested. Coyotes are clever enough to avoid most traps and even if they were removed, they may be replaced by other coyotes. The problem is merely moved to someone else’s backyard. Also, sometimes the removed coyote is in danger in its new area because the area may be the home range or territory of another coyote. In fact, a large percentage of wildlife that is removed from the city often does not survive. Learning to live with the coyote — or coexistence — seems to be the best answer.
So... How can we Live with Coyotes?

1. Keep pets under your control (dogs and cats on a leash when outside).
2. If you must leave your pet alone outside make sure it is in a secure fenced area.
3. NEVER feed coyotes. We need to keep coyotes wild and not get them used to people and being fed. This is one of the best ways to protect our pets.
4. Be sure you are not feeding coyotes without realising it! Check that:
   - garbage is secure in the garbage container and can't be opened or knocked over
   - you don't have an open compost with fruit or vegetables in it
   - fruit fallen from trees is not left on the ground
   - bird feeders are not overflowing with seeds
   - you don't feed your pets outside or leave their pet food outside
5. Fence your yard.
6. Enjoy coyotes, but from a distance. They are most likely to appear at dawn or dusk in areas where hunting is not allowed and there are plenty of rodents. Even if you don't see them, enjoy their singing!
   NEVER APPROACH A COYOTE.

Now its your turn!

Check your own yard or neighbourhood to see if there are any ways that you or your neighbours could coyote-proof the area. Even if you don't have coyotes, many of the above tips will work for other wild animals that may be causing problems in your area.
Kristine Webber — A Wildlife Biologist in the City!

“Wildlife Studies” can make you think of camps, wilderness and tracking animals for days on your own. Well, this is the story of Kristine Webber who worked as a wildlife biologist in the middle of a big city — Vancouver, British Columbia.

When Kristine was a child on Vancouver Island she became interested in working with animals. She lived next door to a veterinarian and spent much of her spare time helping in the clinic. She mucked out barns, sterilized syringes and microscope slides and took care of animals that were recovering after surgery.

This interest led her to take an Agricultural Science degree at the University of British Columbia, which was foiled by more work in a veterinary clinic, this time in Vancouver. Kristine realised that many people who phoned the clinic were worried about coyotes in their neighbourhood. She tried to find information to give to the callers, but found that little was known about coyotes living in the city.

Kristine saw the need for a research project. She applied to do a Masters degree at UBC so that she could learn more about this fascinating creature that had adapted so well to the city. The other part of the project would be to find ways to teach people how to coexist with coyotes. Some of these people are house owners. Some work on golf courses or in parks such as Stanley Park. Others are students like you. You will meet Kristine and some of these people in the video.

To learn more about coyotes in the city, Kristine had to find out where she could see coyotes, how much space they needed to live, what they ate and what problems they had living in the city. Although it is quite easy to see coyotes in Vancouver, it is not so easy to catch them. Kristine wanted to put radio collars on trapped coyotes so that she could track them. In fact, she had to rely on what did not move! She examined coyote faeces (or scat or droppings) and the stomachs of coyotes who had...
been accidentally killed. She set up a "coyote hotline" so that people could phone in and tell her where they had seen coyotes. A map was made of the sightings, and that told Kristine a lot about where the coyotes were in Vancouver and what their movements were.

The second part of Kristine's work was to find out how worried people were about the coyotes, what they understood about them and what they thought could be done about them. A survey was carried out in Vancouver. From this survey Kristine realized it was important to educate people about coyotes. She began doing this by writing articles for newsletters, giving interviews for newspapers, magazines, radio and TV, and putting her findings on the internet. She visited schools and worked with many organizations and groups that were concerned about coyotes. She also helped with this Coyote Kit so that the work could go on.

Are you surprised by all the different jobs a wildlife biologist can do? Kristine certainly is. She now would like to do more wildlife education because she has found that it is such an important part of helping coyotes and humans live together.

Questions People Ask About Coyotes

Do Coyotes Attack People?

It is very rare that a coyote will attack a person.

One Study Found...

There have only been two recorded attacks on people in B.C. Both attacks were provoked by the people getting too close.

(Bob Forbes, B.C. Ministry of Environment, Lands and Parks, personal communication, 1994)

Coyotes may be provoked if they are feeding and someone gets too close. Or they may become more and more brave around people, especially if they are being fed by them. If they are not frightened by people they may bite, especially if they are hungry. Keep them wild by respecting their wildness and keeping a safe distance. If you are approached by a coyote make yourself seem bigger. Stand tall and act aggressively by waving your arms and shouting.

Do Coyotes Carry Rabies?

Rabies is a disease caused by a virus. It can affect all mammals. It is passed from one animal to another when saliva enters the bloodstream through an open wound — such as when a rabid animal bites another
animal or a person. Symptoms of rabies include: extreme nervousness, paralysis, difficulty swallowing or breathing, and unpredictable behaviour. An animal with rabies may become very aggressive, or it may sit completely still and do nothing. The symptoms only appear during the last 10–12 days of the infected animal's life, and passing on the disease can only occur during that time. The disease is treatable if it is caught early enough. If it is left untreated, the infected animal or person will die.

Rabies is a frightening disease, and some people use the fear of rabies as a reason to rid the city of coyotes. However, no rabid coyote has ever been reported in British Columbia. Fortunately, rabies is quite rare among all animals in British Columbia. Bats and skunks are the only wild carriers of rabies that have been reported here. In the last thirty years, only five domestic animals have contracted the disease.

Rabies Safety Tips

If you are bitten by an animal, try to remember which animal it was, and tell an adult right away. The wound should be cleaned and disinfected, and you should go to your doctor or to hospital immediately. You or your parents must report the bite to Agriculture Canada, your local health department, a local veterinarian, or the police.

Now its your turn!

Do you have any questions that have come up while you have been reading? Write them down. Pick one and work out how you will find the answers. Where will you go? Who will you ask? Who will you get to help you? Make a plan to answer your question.
5. Coyotes (*Canis latrans*) are one species and that means they are a different species from dogs (*Canis familiaris*) or wolves (*Canis lupus*). A species is an animal that can mate with another individual of the same species and produce young that are the same species. Usually two different species cannot breed, which is why you will never see a cat-and-dog-cross. Very rarely, a coyote will mate with a dog or a wolf. They can do this because even though they are separate species they are closely related. The “coydogs” or “coywolves” are not the same species as their parents though. They don’t produce any young themselves, so they are not a species, and they live for just one generation.

6. Coyotes are most active at night, although if they need to they will also hunt during the day. They are not *nocturnal* but *crepuscular*, which means that they do most of their hunting at dawn and dusk.

7. Coyotes hunt alone, in pairs, and occasionally in family packs.

8. In B.C. coyotes weigh between 9 and 14 kg. They can be 75 to 100 cm long and as tall as 60 cm. Their tail can add another 30-40 cm in length. Females are slightly smaller and weigh less than the males.
Quick Coyote Facts

1. Coyotes can run up to 64 km per hour. That means that in the city they would be breaking the speed limit of 50 km per hour!

2. Some packs of coyotes include a "helper female," that instead of having her own litter of pups, helps care for another's offspring.

3. Coyotes can be very difficult to catch once they have learned how to recognise a trap. They have been seen flicking lumps of dirt at leg-hold traps to spring them.

4. The scientific name for coyote is *Canis latrans*, which means "barking dog." Humans have recognized 11 different coyote sounds like howling, barking, growling, etc. These different sounds help them communicate with each other. Different sounds have different meanings.
9. Coyotes live throughout North America from Mexico to Alaska. There are, however, no coyotes on Vancouver Island, the Gulf Islands in B.C., or in Northern Canada around Hudson's Bay. There are coyotes in many parks and golf courses in the Lower Mainland.

10. Both coyote parents help care for the young and may mate for life. When coyotes form packs these consist of a mating pair and the young from more than one generation.

11. Nearly 50 to 70% of young coyotes die before reaching adulthood. Coyotes can be killed by human action such as hunting, trapping or being hit by vehicles. They can also die from diseases such as parvo or canine distemper. Some young coyotes die because they cannot find enough food.

12. Coyotes have very good hearing. Their ears are larger for their size than a wolf's. Their good sense of hearing helps them when hunting. They can pinpoint the exact location of mice, even when they cannot see them! Their keen hearing also alerts them to dangers before they see them.

13. Mother coyotes will move their pups if they feel their den has been discovered by other animals or if the coyote feels threatened. They will carry their pups in their mouths one at a time to a new den that is usually nearby.

14. Coyotes are called opportunists. This means that if an opportunity comes along for a meal they will adapt to it. For example, they will wait at the "back door" of a ground squirrel hole while a badger digs out the "front door". The coyote will pounce on the ground squirrel as it tries to escape while the badger gets nothing for all its hard work.

15. Although coyotes can see well with their yellow eyes in the low light of dusk and dawn, they don't see colours very well. Like humans, they react more to dangers that are moving than to dangers that are staying
still. Coyotes see and hear so well that they have often left an area or hidden before you are close enough to notice them.

16. Coyotes use their excellent sense of smell to locate prey. Strong smells — even bad ones — interest coyotes. They will investigate perfume, wine, strong smelling chemicals and rotting carcasses. One of the reasons for this is that they will eat carrion — dead animals that they didn’t kill themselves.

17. Coyotes mark areas with their scent which is another way they can communicate. Mothers recognise their pups from their smell.

18. Coyotes have a vocal range of more than two octaves, which means that they can make very deep notes and very high notes. They seem to be able to send their call in a particular direction. So it is often hard to tell how far away a howling coyote is. They howl to tell each other about food, danger, to ask for help, to attract mates, to train their young and just for fun. A coyote can recognise the howls of its own pack.

19. A coyote uses its bushy tail for balance when it is running. It usually carries its tail quite low.

20. 90% of the food that a coyote eats is meat.

Now it's your turn!

Which of these twenty Quick Coyote Facts helps the coyote to survive? Which do you think is the most important? Why?

If you have done a mind map for your coyote study can you now add these facts to it?
Jean’s Story — “Living with Coyotes”

Jean Mackenzie lives in Southlands in Vancouver, near the Fraser River. This is how she told her story to a reporter.

Reporter: I understand that you lost a pet to coyotes. Can you tell me a little about that?
Jean: Well I wouldn’t say a pet. I used to have a lot of hens. They were like pets to me though. Now I only have one old one who is about 14 years old. This old hen is quite careful now. One day I woke up at 7am as the dogs exploded into noise. When I looked out the poor old hen was sitting on top of the arbor screeching. And on the other side of the garden fence was a coyote.

Reporter: Did the coyote look scared of the dogs?
Jean: No! Not at all. It acted quite friendly towards the dog but it was really very interested in the hen.

Reporter: Were you worried?
Jean: No because it was only looking for food and I have coyote-proofed my yard so that the coyote can’t get in and my dogs can’t get out.

Reporter: Do you keep the hen in a chicken run?
Jean: No I don’t because I didn’t want to take away their freedom. So I have to make the whole yard safe.

Reporter: Were you worried about your dogs?
Jean: Well you always worry and you have to stay alert. Our dogs are fiesty but small — they only weigh 8 - 10 pounds (or 4-5 kg). Coyotes in our area don’t seem all that interested in large dogs, but small dogs or cats would be interesting.
Reporter: *What do you mean when you say you have to stay alert?*
Jean: Well... you have to have the dogs on the leash of course when you are out walking. The thing is to make sure your dog is always in sight — not trailing behind. I used to hike everywhere with my dogs off the leash but now I don't.

Reporter: *How would you feel if one of your dogs was taken by a coyote?*
Jean: I'd feel terrible of course. Guilt-ridden. Blame myself because it would have been some fault of mine if it did happen. My neighbour lost a little dog that way and she was really upset.

Reporter: *Can you tell me what happened?*
Jean: Well she had a little Jack Russell terrier and she adored the dog. I think she was quite a lonely person. She lived alone. Anyway one night she came home and had lots of parcels and bags in her arms. It was about 9:30pm. She thought the dog was with her as she came through the door but it had got left outside. Then she heard the screams. It could only have been a few minutes. When she went outside she found some bits and pieces and the collar. She knew that the coyotes had taken him. It couldn't have been another dog because coyotes eat everything.

Reporter: *How does she feel about it now? Does she have a new pet?*
Jean: No, she never replaced the dog and now she has left Vancouver. I felt sick for her. I knew her loneliness and the dog was all she had. I think she blamed herself.

Reporter: *Are there many coyotes in your neighbourhood?*
Jean: Oh yes! I can still remember the first time I saw a coyote here. I was so excited. I love to see wild animals surviving in the city. I love their singing too! People know I'm interested in coyotes. When one of my three little dogs died last year lots of people kept coming up to me asking whether a coyote had taken my little dog. They always seemed relieved when I said it had died of old age. But you know not all pets that get taken are taken by coyotes. Sometimes it is other dogs. Maybe bigger dogs or strays.

Reporter: *So neighbours don't always agree about the coyotes?*
Jean: No they don't! It all got very heated when there were a lot more coyotes about. That must have been about 1993. We saw more than we had ever seen before or since. There were lots of complaints. The media were here. Some people wanted to gas the coyotes. Then Kristine Webber started her project and everything has calmed down now.

Reporter: *Why is that do you think?*
Jean: Well people know more about coyotes now. They know what will work and what doesn't work.

Reporter: *Have there been any benefits to having the coyotes here?*
Jean: Do you mean apart from watching them and listening to them?

Reporter: *Yes — anything else?*
Jean: Oh yes! There is a stable and riding school here and the rats were always
in the feed bins and all over the place. We do try to keep the feed more safe now but since the coyotes came I haven't seen a single rat! They must have eaten them all!

Reporter: Thank you, Jean, for telling us your story.
Jean: Hope it helps. The coyotes are here and they are here to stay. There seems to be enough food. But I don't know if I would be quite so happy if there was a pack of wolves living here!

Now its your turn!

What do you think Jean's attitude is to coyotes? Is it the same for all wild animals? Explain your answer.

Coyotes' “Relatives” in Canada

The table on the next page shows how scientists group coyotes with other animals to see which other animals are similar to them.

This system sometimes changes as we learn more about the earth and the animals that inhabit it. Here is what the groupings mean:

A species is the separate animal that can only mate with a member of the same species to produce young that are like their parents. Human beings are a species and they produce babies that are also human beings. Differences such as colour of eyes, skin, height, hair are not differences that make a new species. So you, your parents, and all your human friends are belong to the same species.

A Genus is the group of animals that have lots of similarities with each other. They look alike and may eat the same kind of food, but some of their behaviours might be different. If two animals from the same Genus but not the same species mate and have young, usually that young will not be able to have young of its own. Members of the genus Canis are all about the same size of animal as well.

A Family again includes all of the look-alike animals with some bigger differences. For example foxes can be very much smaller than coyotes, dogs or wolves and so they are not in the Genus but are in the Family.

They all belong to the Order of carnivora which means that they are all meat eaters.

This sorting out process is called taxonomy.

Now its your turn!

Each of the boxes in the Table has a space to fill in. Can you add another animal or animals that belong in each box?

Can you do the same classification for humans?
Species: Canis latrans
- coyotes

which belong to:
Genus: Canis
- coyotes
- wolves
- dogs

which belong to:
Family: Canidae
- coyotes
- wolves
- dogs
- foxes

which belong to:
Order: Carnivora
- coyotes
- wolves
- dogs
- bears
- raccoons
- weasels
- cats
- seals

which belong to:
Class: Mammals

which belong to:
Phylum: Chordata
Further Reading

Glossary

adaptable  able to change to fit the situation

burrow  a hole or tunnel dug out by an animal to make a home to live in

canine teeth  four long teeth (fangs) at the corners of an animal's mouth, used for catching prey and tearing meat

carnivore  an animal whose diet is mostly meat

carrion  the meat of a dead animal

coydogs  the offspring of a coyote and dog

den  the dwelling (home) of an animal, sometimes a hole or cave

diurnal  active during the day

habitat  the natural surrounding that provides an animal with its food, water and shelter

home range  the geographic area in which an animal lives and travels during one year

mammal  a warm blooded animal whose young nurse from their mothers.

nursing  when young pups drink milk from their mother

nocturnal  active at night

pack  a group or family of animals that live and hunt together

predator  an animal that hunts other animals for food

prey  an animal that is hunted by other animals

omnivore  an animal that eats both plants and animals

rabies  a disease caused by a virus that can affect all mammals

rural  small settlement areas (towns, villages, etc.) outside city boundaries; areas in the countryside

sample  a gathering of data (measure) of a smaller part of a population

scat  droppings or faeces

scavenger  animals that eat dead animals they did not kill
track pattern  a series of prints (4 or more) made by an animal on the ground

urban  a city environment

Glossary Extension

carrying capacity  the maximum number of animals that can survive on the resources in a given area
carnassials  the row of teeth found behind the canine teeth. They are used to move side to side to tear through meat and bone
crepuscular  active at dawn and dusk
electron microscope  a powerful microscope used to study small specimens in detail. It provides magnification up to one million times stronger than an optical microscope
imprint  a young animal bonds with the first moving individual it encounters (usually the mother)
predation  hunting animals for food
octaves  sound scale — animals can make very deep notes and very high notes
opportunists  when an opportunity comes along for a meal animals will adapt to it
random  to select without order
regurgitate  to vomit or throw up food
respondent  a person who fills in a questionnaire
straddle  the width distance between two prints of an animal made on the ground
stride  the length between prints of an animal walking, measured from the centre of each print
taxonomy  a method scientists use to sort out and group similar animals
territory  the area that an animal lives in and may defend (smaller than a home range)
Section 3

Coyote Activities

The Coyote Activities in this section are primarily teacher-directed activities with some choices for different grade levels or abilities. They include activities that could be typically called Language Arts, Math or Social Studies. They vary from activities for individual students such as "Mixed-up Info" to whole class games such as "Coyote and the Hare." The activities are grouped into styles of lessons and approaches, but can of course be mixed or done in any order. The groupings are:

- Background Classroom Coyote Activities
- Attitudes and Values Activities (including a media analysis file)
- Math Activities
- Coyote Ecology Activities — building an understanding of coyotes' lives.

- Background Activities
  - Coyote Cousins
  - Mixed-up Info
  - Coyote Crossword
  - Keep Me Wild
  - Draw a Coyote-Friendly City

Students will need access to the Background Information for Students (Section 2) and the Coyote poster (included in this kit) to help them with some of the activities. Students will extend their knowledge of coyote characteristics by comparing them with other wild and domestic canids. They will examine coyote behaviours and evaluate the appropriateness of keeping coyotes as pets. They will gain further knowledge and vocabulary through these mainly language arts-based activities. The Draw a Coyote-Friendly City or the Mixed-up Info activities can be used as a means of assessing students' understanding.

Inquiry Strategies:
Each activity could be introduced using the following suggested focus questions:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Focus Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coyote Cousins</td>
<td>Is a coyote a dog?</td>
</tr>
<tr>
<td>Mixed-up Info</td>
<td>(not applicable)</td>
</tr>
<tr>
<td>Coyote Crossword</td>
<td>(not applicable)</td>
</tr>
<tr>
<td>Keep Me Wild</td>
<td>Would a coyote make a good pet?</td>
</tr>
<tr>
<td>Draw a Coyote-Friendly City</td>
<td>What would a coyote-friendly city look like?</td>
</tr>
</tbody>
</table>
Coyote Cousins

Activity Outline:
“Coyote’s Cousins” compares wild and domestic canids, and describes some of the coyote’s closest relatives. Four breeds of Canadian dogs are profiled.

Focus Question: Is a coyote a dog?

Learning Objectives:
- develop an understanding of the relatives of coyotes, both wild and domestic.
- learn about the process of selective breeding
- develop and enhance research and drawing skills

Materials:
- copies of Coyote Cousins and Canadian Dogs worksheets (following pages)

Procedure:
Have students do the activity sheets Coyote Cousins and Canadian Dogs. Initiate a discussion about the differences between wild dogs and domestic dogs. This could lead to a discussion of appropriate and inappropriate pets. Further discussion on the differences between coyotes, wolves, and jackals can lead to individual research projects on a related canid.
Activity Sheet

Coyote’s Cousins

Like coyotes, the wolf, jackal and fox are wild animals. They are all wary of humans, and behave very differently from domestic dogs. Draw or paste a photocopy picture of each animal beside the description.

Jackal

Jackals live in Africa, southeastern Europe, and southern Asia. They are thought to be very closely related to coyotes, but they cannot interbreed, because they live so far apart. Jackals hunt in family groups, and are most active at night. They also scavenge after larger animals to eat the meat left behind. They are not fierce fighters; they play dead to defend themselves, and can even slow their heartbeats to be more convincing.

Fox

Red foxes are found throughout most of North America. They live in all parts of Canada except southern Alberta, southwestern Saskatchewan, and the B.C. coast. Foxes cannot interbreed with coyotes, so they are not as closely related to them as wolves and dogs are. They hunt alone or in pairs, and are most active at night. In the daytime they hide in burrows. Foxes are smaller than coyotes; they grow to 1.1 m long (tail included) and 36 cm in height (at the shoulder). They do not usually travel more than 1.5 km from the den. A female fox (a vixen) has 4-9 pups each year. The pups are also called cubs or kits. Foxes bark, yelp, and sometimes howl.

Wolf

Grey wolves live in all parts of Canada except southeastern Alberta, southern Saskatchewan, and southwestern Manitoba. They hunt in packs, and are most active at dawn and dusk. Wolves are bigger than coyotes; they can grow to 1.9 m long (including tail) and stand .76 m high at the shoulder. They travel at night to hunt, and on occasion might travel as much as 20 km. Wolves in packs hunt deer, moose, elk, mountain sheep and caribou. These large, hoofed animals are called ungulates. A female wolf has 6-7 pups each year. They usually live 8-9 years, although some have lived 14 years.
Canadian Dogs

Domestic dogs have been bred to live with humans. Adult dogs often behave like the puppies of their wild relatives; they wag their tails, whine and whimper, even when they are grown up. Dogs have been bred into a wide variety of shapes, sizes, colours, and personalities. Below are four breeds of dogs from Canada. Draw or paste a photocopy picture of each animal beside the description.

**Canadian Eskimo dog**
- **Type:** Originally bred as a sled dog.
- **Origin:** From eastern Siberia this breed dates back nearly 2000 years.
- **Size:** Large, 35 kg; 60 cm high (at shoulder); 125 cm long (including the tail).
- **Personality:** Gentle and brave, tend to be independent; strong pack instincts, even tempered.
- **Coat:** Dense coat up to 15 cm thick with wiry guard hairs. The coat is usually a mix of white, buff, red, grey and brown.
- **Notes:** The people of the Inuit call this hearty dog Qimmiq; able to survive in -70°C or colder; very strong and hard-working; pull sleds on hunting expeditions; howl instead of barking.

**Labrador Retriever (Lab)**
- **Type:** Originally bred as a rescue and hunting dog.
- **Origin:** Believed to be descended from the Viking bear dog and the Mastiff.
- **Size:** Medium-sized, 22 – 38 kg; 58 cm high (at shoulder); 120 cm long (including tail).
- **Coat:** Short, straight, dense fur; comes in solid black, chocolate, and a range of yellows from copper to cream.
- **Personality:** Labs are intelligent, even-tempered, dependable dogs willing to please. They are friendly and love to play with children.
- **Notes:** Labs are excellent swimmers. Their short dense fur allows for quick drying especially in icy conditions. Labs make excellent family dogs and are easy to train.
**Nova Scotia Duck Tolling Retriever**

Type: Originally bred as a hunting/retriever dog.

Origin: Yarmouth County Nova Scotia, 1800's.

Size: Medium-sized, 20 kg; 48 cm high (at the shoulder).

Coat: Wavy coat with a bushy tail; fur is reddish, orange or copper colour with white markings on chest, feet, tip of tail and sometimes on face; pink noses and yellow eyes.

Personality: Friendly, patient and gentle; loyal to their owners.

Notes: Lure ducks by running up and down lakeshore with bushy tail in the air; good swimmers; catlike skillfulness and playfulness; known for their intense stare. "Tollers" have webbed feet.

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**Newfoundland**

Type: Originally bred as a rescue dog.

Origin: Uncertain; thought to have been crossed with a Mastiff-type dog and a Viking bear dog hundreds of years ago on the east coast of Canada.

Size: Large, 65 - 75 kg; 69 cm high (at the shoulder); 61 cm long.

Personality: Patient with children; loyal and affectionate.

Notes: Bred and trained to help fishermen. They bark when they spot reefs. Their webbed feet make them excellent swimmers. Some have rescued people who were drowning.
Mixed-up Info

Activity Outline:
This reading and writing activity measures and reinforces students' basic knowledge of coyotes. It is directly linked to the poster and Background Information sheets.

Learning Objectives:
- vocabulary acquisition
- research skills

Materials:
- copies of the Mixed-up Info worksheet (following page)

Procedure:
In the activity sheet text about coyotes, there are twenty-two “mistakes,” which are underlined. The children are required to find the correct words in the information provided in the Background Information section and a vocabulary list is included on the activity sheet. To make the activity more challenging, cover this list prior to copying. The sentences of the text are not identical to those found elsewhere in the kit, so students have to use comprehension skills to find the answers.

Coyote Crossword

Activity Outline:
The crossword puzzle provides a review of new vocabulary associated with coyotes. The Background Information and the poster contain all of the terms used.

Learning Objectives:
- access, evaluate, and utilize information effectively
- vocabulary acquisition
- research skills

Materials:
- copies of the Coyote Crossword worksheet

Procedure:
To make the activity more challenging cover up the words at the bottom of the activity before photocopying.
Mixed Up Info

Oops! Someone wasn’t paying attention. The text below contains a lot of mistakes. Can you correct them? Using the Background Information sheets about coyotes, substitute the correct words for the underlined ones. Write your answer above the incorrect word. (Hint: If you see an incorrect word more than once, then the answer would be the same.)

Coyotes live in **South America**, from Argentina to Brazil. They live in many different habitats, including farmland and cities. Coyotes may travel a very long way each night as they search for **nickels**. They do most of their hunting at **noon** and **midnight**. To locate prey in tall grass or moving in tunnels below the surface of the ground, coyotes use their sharp sense of **thinking**. Because coyotes eat mostly animals, they are called **fussy**. Coyotes talk to each other by **phone**, to tell each other about food or danger. Like their senses of **thinking** and smell, coyotes’ vision is excellent, but they don’t see **bulldozers** very well.

Wolves, **cows**, and **pigs** are closely related to coyotes. Some people want to get rid of coyotes that live near them, because they cause problems. Coyotes sometimes eat **dimes** and **nickels** left outdoors, and steal people’s **silverware**. Removing coyotes from urban areas might actually increase the number present, however, because others will move into the available **apartments**. In order to live with coyotes, we should keep small pets indoors, and walk dogs on a **pond**. Don’t feed coyotes, because they might become dependant on humans for **nickels**. To keep coyotes out of your yard, you should build a **scarecrow** at least 2 m tall. Observe coyotes through **marbles** from a distance. Never approach a coyote!
Coyotes are part of the urban wildlife community. Test your knowledge by completing the Coyote Crossword.

Across
1. Awake during the daytime; asleep at night.
3. A female fox.
5. The whole geographic area where a species might be found is called a home _______.
7. A baby fox or cat.
9. A masked animal that coyotes sometime eat which is quite common in a city.
11. The Latin name for coyote.
14. A baby coyote, wolf, or dog.
15. A baby wolf or bear.
17. An animal whose mother was a coyote and whose father was a dog.
18. Mice and rats belong to this Order of animals.
19. How coyotes communicate to one another.
20. The area a species inhabits.
21. A relative of the coyote, this animal’s coat can be either red, grey or white.

Down
2. An animal that eats meat is carnivorous, an animal that eats plants and animals is _______.
4. A disease that can affect any mammal and which is almost always passed on by biting.
6. The area guarded by an individual animal or a family.
8. To eat meat that is left from another animal’s kill.
10. Awake at night; asleep in the daytime.
12. A hunted animal.
14. A family group of coyotes, wolves, foxes or jackals that hunts together.
16. An animal whose mother was a coyote and whose father was a wolf.
17. A very wily animal that escapes most traps set for it, and which makes a good living in the city or country.
**Keep Me Wild**

**Activity Outline:**
The needs of a wild coyote are assessed in order to lead the group into a discussion on the subject of keeping wild animals as pets.

**Focus Question:** Would a coyote make a good pet?

**Focus Question:**
Would a coyote make a good pet?

**Learning Objectives:**
- develop an understanding of the needs of wild animals
- compare and contrast the needs of wild and domestic animals

**Resources Required:**
- poster paper
- pens and markers
- references and pictures of dogs and coyotes (optional)

**Procedure:**
Have the students discuss the behaviour of a coyote in the wild and list, on a chalk board or paper, all the behaviours as they are discussed. Some important suggestions include:
- find and catch food to eat, e.g. rodents, berries, crayfish
- roam freely for long distances
- find a den
- play
- find a mate
- raise young
- be around other coyotes
- protect itself from dangers, e.g. other predators, humans

In turns, have students come up to the board and cross out an action that a coyote could not do if it were caged and kept as a pet. Discuss the importance of not having wildlife as pets and explain how to act responsibly around wildlife. For example: do not feed wildlife; call a wildlife expert if you see a starved or injured animal; and observe wildlife from a distance. Other wild animals can be substituted for coyotes.

**Extensions**
As a follow up activity, have the children form small groups and develop their own poster that describes or shows the differences between domestic dogs and coyotes. The poster can focus on their physical as well as their psychological differences. The results of the posters can be presented to the group as a whole and displayed to discuss common themes.

*Based on the activity *Let Me Stay Free*, NAHEE, P.O. Box 362, East Haddam, CT 06423-0362*
Draw a People and Wildlife-Friendly City

Activity Outline:
Coyotes are probably here to stay. If we are going to accept coyotes as residents of our cities, we may have to change our attitudes, some personal habits, and the appearance of the city. The drawing activity that follows allows students to create their ideal coyote and people friendly city.

Focus Question: What would a coyote and people friendly city look like?

Learning Objectives:
- understanding concepts of coyotes and humans living together in an urban environment
- creating tolerance and the understanding of differences
- group dynamics and conflict resolution
- imaginative minking skills

Resources Required:
- question cue cards (see worksheet)
- poster paper
- markers, crayons, pencil crayons, etc.

Procedure:
This is a two-part activity. The first part explores attitudes toward coyotes, while the second has groups of students create posters of a coyote-friendly city.

Begin by dividing the class into small groups. Have a student from each group randomly select one or two of the question cue cards. The questions are listed below (and on a separate worksheet). Have the students discuss the questions and come to a consensus on recommended action. Each group reports its conclusions. Take this opportunity to assess the students' attitudes towards sharing the urban environment with coyotes. These discussion cards should enable students to visualize components that make up the coyote/human urban environment.

Cue card questions:
1. Should there be coyotes in the city or should we remove them all, and make sure that none get back in? Why?
2. If you were a farmer and you thought that coyotes had been stealing your sheep, what would you do?
3. Should there be wildlife sanctuaries where people are not allowed? Why?
4. Should we feed coyotes so they become more tame? Why?
5. How are coyotes different from people? In what ways are they like people?
6. Coyotes and dogs are “cousins,” but they behave quite differently. How does a domesticated animal, like a dog, differ from a wild animal, like a coyote?

7. Should coyotes be kept in a zoo? Give reasons for your answer.

8. What would you do if you were walking in a park and a coyote appeared on the path in front of you?

9. How can you coyote-proof your pets and your home?

10. If you saw a coyote pup in the street and it looked hurt, what would you do?

Step two: Have the students remain in their groups. Provide each group with a poster sheet and have them draw a coyote-friendly city. You may find it useful with younger students to start off this section of the activity with a chart on the board listing the important components needed for a city to be coyote friendly.

**Variation:**

An alternative to making posters is creating a class mural by having each group of students draw sections of the mural where coyotes can be found in the city. For example, create separate sections on the mural, title each section as follows: park, industrial area, golf course, ravine, houses, shops, wilderness, etc. As a class, students produce a mural illustrating a friendly coyote city. This could become the coyote corner backdrop in the classroom.
1. Should there be coyotes in the city or should we remove them all, and make sure that none get back in? Why?

6. Coyotes and dogs are cousins, but they behave quite differently. How does a domesticated animal, like a dog, differ from a wild animal, like a coyote?

2. If you were a farmer and you thought that coyotes had been stealing your sheep, what would you do?

7. Should coyotes be kept in a zoo? Give reasons for your answer.

3. Should there be wildlife sanctuaries where people are not allowed? Why?

8. What would you do if you were walking in a park and a coyote appeared on the path in front of you?

4. Should we feed coyotes so they become more tame? Why?

9. How can you coyote-proof your pets and your home?

5. How are coyotes different from people? In what ways are they like people?

10. If you saw a coyote pup in the street and it looked hurt, what would you do?
Coyote Attitudes and Values Activities

• Attitudes and Values
  - Coyote Myths – “The Dead Whale”
  - Coyotes on TV
  - Media File

The following activities use language arts and visual arts to analyse cultural and media attitudes to animals. Through these activities students will construct explanations of why some animals appeal to them and others don’t. Research has shown that humans use visual cues from faces as a primary way to communicate. Animals that don’t have recognisable faces are often not as appealing. We are also programmed to be protective towards small bodies with large heads and big eyes — yes BABIES! Animals, and cartoons of animals, with these features are inherently more appealing. However, cartoonists often take it one step further and put faces on animals that don’t have recognisable faces normally and in addition use this as a vehicle to give animals human emotions, attitudes and values. Animals are neither good nor bad — they have strategies to survive.

The Media File is a collection of articles, clippings and headlines randomly ordered as if they just came out of a file cabinet drawer. Students are asked to sort them and critically assess the contents for bias, accuracy and consequences. One of the articles (article 1) is about salmon while another (article 2) is about coyotes preying on cattle. Students are asked to read the articles and comment on how the two different species are portrayed. The worksheets provide critical thinking questions.

As an ice-breaker activity for this section, form pairs with one child holding a file folder or piece of paper in front of his or her face so that no visual cues are given. Then ask the children to carry on a conversation about their day so far. Hold a discussion about how their conversation differed from one held face-to-face.

Inquiry strategies:

Each activity could be introduced using the following suggested focus questions:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Focus Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coyote Myths</td>
<td>Why do some myths have animals as the main character?</td>
</tr>
<tr>
<td>Coyotes on TV</td>
<td>Why do we think some animals are &quot;cute&quot; and others are not?</td>
</tr>
<tr>
<td>Media File</td>
<td>How does the media affect the ways we think about animals?</td>
</tr>
</tbody>
</table>
Coyote Myths — “The Dead Whale”

**Activity Outline:**

“The Dead Whale” is a reading and creative writing exercise. It centres around the Tsimshian legend “The Dead Whale” as retold by nature writer Barry Lopez. The story illustrates a cultural view of Coyote as the “trickster.” (See Coyote Myths — Activity Sheet.)

**Learning Objectives:**

- discover and respond to creative and imaginative expression
- cross-cultural understanding
- value cultural identity and diversity
- understanding of historical significance of animals in human culture

**Resources Required:**

- Coyote Myths worksheet (following page)

**Procedure:**

Have students complete the worksheet and lead a discussion on cross-cultural views of coyotes. After discussing the story, direct the students through the study questions. Some further activities are suggested there. The Resources Section lists other sources for First Nation’s animal stories and imagery.
Coyote Myths — “The Dead Whale”

Myth and Mystery

The stories that we call myths and legends are found in many cultures. Sometimes these stories describe how the world began. They might tell the history of a people or place, or they might contain information or warnings. These stories are often very old, and they often have animals in them — our ancestors not only depended on animals for food and clothing, they learned from animals too and embedded them within their cultural beliefs.

In North American Native culture, animals are often seen as close relatives of humans. They might be teachers, or guardians — or mischievous tricksters — as in the story “The Dead Whale”, below, from the Tsimshian people of B.C.

The Tsimshian Tradition

The Tsimshian are a Native people who live on the northwest coast of British Columbia between the Nass and Skeena Rivers, near the town of Prince Rupert (see if you can find it on a map of British Columbia). For thousands of years, they have passed on their history, beliefs and culture to their children through myths and songs performed at ceremonies such as potlatches, and around longhouse cooking fires. Some of the stories are funny, some are scary, and some are mysterious. The Tsimshian people continue this tradition today, as they work to preserve their rich culture for future generations.

Activity

“The Dead Whale” is a Tsimshian legend that portrays the Coyote as a trickster. Read the story and then answer the study questions.

The Dead Whale

A Tsimshian legend retold by Barry Lopez

Coyote was having very bad luck hunting. He couldn’t catch anything. He was coming along through the woods next to the ocean when he saw a lot of people had gathered around a big whale that had beached on the sand. It was a good fat whale with plenty of meat. Coyote changed himself into a raven and flew over the people, saying “Gulage, aga dze el ban!”

The people stopped cutting away the meat and looked up at the raven. They became very worried. Coyote flew around staring down at them.

The next day a number of gamblers got together at one place in the village. Coyote was sitting in with them but they didn’t recognize him. He had changed himself. They thought he was a stranger from another tribe.

The gamblers began to talk about what the raven had said the day before. Coyote asked what it was the raven had said. One of the gamblers said, “He flew over the dead whale yesterday in a circle and said ‘Gulage, aga dze el ban!’ He did this two or three times, then flew away to the east. ‘Oh, I see, I know what this means. Where I come from we are always talking to the ravens. He was saying ‘Maybe a disease will come to this village in a few days.’”

People were troubled when they heard this. The chief sent a crier out to tell all the
people they were moving the village. They all got ready and the next morning they moved away.

After that, Coyote made his home in the chief’s lodge. He cut up the whale meat and fat and stored it in the other lodges. He filled up the four biggest ones. Coyote stayed around there for a long time eating whale meat and fat.

**Study Questions**

1. Why do you think that coyotes were considered smart or tricky?

2. Was the coyote in this story acting in a way people would consider positive or negative? Why?

3. What event in Tsimshian history might this story be explaining?

**Other Activities**

1. Identify a local natural landmark and invent a myth to explain how it got that way. For example, a local mountain top might look like the shape of a mountain goat, or an island in a lake might look like the back of a turtle.

2. Create masks and costumes and a script to dramatize the story.

3. Think of something odd, mysterious, or surprising. Write your own coyote story or myth to explain that event. For example, maybe Coyote was behind all the things you misplace — maybe even your homework! — or perhaps coyote is somehow responsible for all the leaves falling off the trees in the autumn.

"The Dead Whale" was taken from the book, *Giving Birth to Thunder, Sleeping with His Daughter: Coyote Builds North America* by Barry Lopez. Reprinted with permission of Andrews & McMeel. All rights reserved.
Coyotes On TV

Read the following article, and think about the animals you see in cartoons and in television shows.

Wile E. Coyote — A Coyote’s Secret Shame

Beep! Beep! The Roadrunner speeds away as once again he outwits the blundering Coyote. We love to watch how Wile E. Coyote makes a fool of himself again and again. He is always hungry, always trying to catch the Roadrunner for dinner. Of course, he never wins.

While it is true that real coyotes spend most of their time hunting, they are much better at it than the cartoon suggests. It just takes a long time to catch and eat 19 rats, if that happens to be the day’s menu. Coyotes have lots of clever hunting strategies. Sometimes, one coyote chases an animal towards another coyote waiting in the bushes to catch it. Coyotes also know that if they see certain birds circling in the sky, it means that something has died that they might be able to eat, so they follow vultures to dinner. They are also very good at escaping people who are trying to catch them. Whole hunting parties that have gone out especially to catch coyotes have come back without even one. We had better not believe that coyotes are as stupid as the one in the cartoon, because if they were, what would that make us?

The cartoon also makes the coyote into the villain who tries to eat the heroic roadrunner. Real animals are neither good nor bad. When coyotes eat rabbits and deer, they are just surviving; many of us survive by eating hamburgers. We don’t do it just to kill cows. It is important to remember that there are other animals that hunt coyotes. Wolves, bears and people all hunt these hunters.

Although the Roadrunner cartoon may be funny, real coyotes are not stupid, clumsy, or bad.

Now it's your turn!

Watch a cartoon show that has animals as characters. Take notes about each animal’s voice, appearance and actions to try to understand how that animal is depicted. Some of these questions might help:

• Do the cartoon animals behave like real animals?
• Do they look like real animals?
• What is the animal like, according to the T.V. show (good, bad, stupid, clever, greedy, sleepy, weak, aggressive, heroic...)?
• If the T.V. animals are not like the real ones, why do you think the writers or artists of the programme did not portray the animals realistically?
Now its your turn!

In the boxes below paste or draw pictures of 3 different animals that people don't normally like. Then next to it draw a cartoon picture of the same animal but this time make it “cute,” “happy,” “clever” or “brave.” The example of the spider may help you.

<table>
<thead>
<tr>
<th>Real picture of animal</th>
<th>Cartoon-style drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td></td>
</tr>
</tbody>
</table>

Now ask your friends or family which picture they like best and why. Why do you think that cartoonists give faces, large heads and large eyes to animals? Do you think that animals can feel emotions?
The Media File is a collection of articles, clippings and headlines randomly ordered as if they just came out of a file cabinet drawer. Students are asked to sort them and critically assess the contents for bias, accuracy and consequences. One of the articles (article 1) is about salmon while another (article 2) is about coyotes preying on cattle. Students are asked to read the articles and comment on how the two different species are portrayed. The worksheets provide critical thinking questions.

As an ice-breaker activity for this section, form pairs with one child holding a file folder or piece of paper in front of his or her face so that no visual cues are given. Then ask the children to carry on a conversation about their day so far. Hold a discussion about how their conversation differed from one held face-to-face.
Memorandum

Date: October 4, 1996

To: All Reporters

From: The Editor

RE: Are we fair or biased when we have animal stories?

cc: Editors, Mr. C. Black

I got a phone call yesterday from an angry wildlife expert. She said that our reporting on coyotes showed a "negative" attitude. So I think we should look carefully at this matter to see if she is right.

You have 2 tasks:

A) i) Sort out the 3 pages of newspaper headings into a table:

| positive | negative | don't know |

ii) Then for each heading circle the one word that makes it positive or negative.

iii) Can you change that word to put the heading into the other column?

iv) Which column had the biggest print (or type)?

B) Look at Article 1 and 2 and answer this question:

"Why do we consider returning salmon but not coyotes, a miracle?"
Coyotes bring howls from some cat lover

Puil declares war on the urban coyote

Mangy coyotes on the prowl in Marpole

Today's coyote: Closer, louder, bolder and too smart to be trapped

Coyotes on increase in Fraser Valley

Coyote mauled a 2-year-old in Marpole

U.S. Sanctions a Poison Device to Kill Coyotes

Killer coyotes believed gone

Coyote woes plague Alberta

The last laugh on feline prey

Coyotes feast on feline prey
Brave coyotes roam residential streets
COPS IN COYOTE STANDOFF
Wile E. Coyotes prowl park

Coyotes stalking pets in Dunbar. SPCA says cat-owners told to watch for coyotes

Tot savaged by coyote at picnic area

Coyote Is Being Used as a Scapegoat

Biologists Defend Eastern Coyote

West Van to deport pet-killer coyotes

Cold snap causes starving coyote to prey on Kerrisdale area pets, biologist warns

Magnet fails in attraction for coyote

NEWS

\textbf{\textless} COYOTE ATTACK

Family fears for others after dog killed

\textbf{\textless} Coyote Is Being Used as a Scapegoat
Surrey fears coyote attack

Coyote is here to stay

Raccoons, coyotes not likely to prey on people

Big scare given

3 charged in killing of coyote

By Coyote

Coyote shot in ditch

Wily coyote

Preying on

B.C.'s sheep

Cross-bred

Wild coy-dogs

Her howl against coyote led to a dead-end trail

Wily coyote thrives in East

Coyotes given home

Coyotes prey on house cats

Park coyotes grow bolder

Hungry coyotes spotted in district

Media File

Surrey cats disappearing
Coyotes most deadly predator for U.S. cattle

By Robert Lewis
Freelance writer

WASHINGTON, D.C. — Coyotes are blamed for killing nearly 70,000 cattle and calves in the United States last year, the U.S. Department of Agriculture reported.

The wily prairie canine killed more than three times as many cattle and calves as the 19,700 head that rustlers stole in 1995. But neither of these two scourges of popular cowboy fiction came close to matching losses to U.S. farmers and ranchers caused by other hazards.

Figures from Alaska were not included in the totals.

Based on dollar values, coyotes accounted for 55 percent of total losses due to predators. Man's best friend, the domestic dog, placed second with 18 percent. Mountain lions and bobcats were next at seven percent, and wolves and bears with slightly over two percent for each. Losses due to "other predators" made up 16 percent of total predator losses.

Total losses from all predators in the U.S. were valued at $39 million (U.S.), of which a little under $22 million was attributed to coyotes.

The leader of the other causes of death was respiratory problems, accounting for 27 percent of the total value. Next was digestive problems at 18 percent, followed by "unknown causes" at 16 percent, "calving problems" at 15 percent, "other causes" at 12 percent, and weather at 10 percent.

Poison accounted for one percent and theft made up four-tenths of one percent.

The USDA's report is based on a random sample of about 50,000 farm and ranch operators early in January.

The survey and 24-page report were initiated by Congress in response to concerns of farmers and ranchers about the extent of predator damage to livestock and its potential rise as public sentiment grows to favor measures to protect wildlife and predator numbers increase.

A USDA report says coyotes accounted for 55 percent of total losses due to predators, costing ranchers $22 million.
Scientists estimate that 30,000 salmon are filling spawning beds that have been empty for 88 years.

MARK HUME
Vancouver Sun

It has been said that extinction is forever, but on a glacial river in southern British Columbia, fisheries scientists — with help from nature — are proving the saying wrong.

In what is being described as "something of a miracle," an estimated 30,000 sockeye salmon are returning to the Upper Adams River this fall, filling spawning beds that have been empty for 88 years.

"It's great. I'm really excited about this," said Ian Williams, a freshwater biologist at the federal Pacific Biological Station in Nanaimo.

Williams, who has spent much of his professional life working and dreaming about restoring the once-great Upper Adams run, said that with a return of 30,000 salmon, the department of fisheries and oceans have achieved a critical mass.

"Now that we've reached that level, it's possible to double it and double it again," said Williams.

"I believe we can see six to 10 million salmon returning to that river."

The Upper Adams stock was wiped out in 1908 when a logging company built a dam at the outlet to the Lower Adams River.

Spawning salmon stacked up so deeply below the dam that loggers told stories of walking across the river on the fish. When the dam was opened, it was to send a flood of water down the river to flush log jams to the mills far downstream. Those floods blew away millions of spawning salmon. The logs, grinding and digging into the gravel beds, killed many more.

In 1922, the logging company ceased operation — and in 1945, the dam was finally removed.

While the sockeye survived in the Lower Adams, eventually building up to support runs of 10 million salmon, the Upper Adams fish seemed gone forever.

Starting in 1950, the department of fisheries began efforts to reintroduce sockeye from other systems. But although millions of salmon fry were released, only a handful ever returned. By 1980, the run stood at just 560 fish.

In 1984, biologists tried an experiment. Williams explains:

"A small but healthy run of sockeye had managed to get re-established in the Momich-Cayenne system, which is on East Adams Lake. We don't know for sure where those fish came from, maybe strays from the efforts being made on the Upper Adams.

Please see Return, A11
Salmon crossed to restock area

"We took females from the Cayenne and crossed them with some of the males that had returned to the Upper Adams."

"The thinking was that the males were adapted to the Upper Adams — so we'd have half the genetic material."

The females provided something that was in rare supply on the Upper Adams itself — fertile eggs — and they were hardy fish that had proved they could survive the long journey up to Adams Lake from the West Coast.

Four years later, the department of fisheries saw 7,169 sockeye return to the Upper Adams — and Williams knew a miracle was possible.

In 1992, the Upper Adams run fell back to just a few thousand fish — but that was a year of massive over-fishing on the coast. Williams suspects the run was coming back strong, but got knocked out on the way.

This year, fishing pressure was low, both in the ocean and throughout the Fraser River system, as fisheries managers began putting a new emphasis on conservation.

"DFO placed a high priority on restoring these stocks this season," said Al Lill, chair of the Fraser River panel for the fisheries department.

"We told the Americans we wanted to make a special effort to protect the Upper Adams stock and we won their support."

Also supporting DFO's effort were Canadian commercial fishers, who agreed to forgo fishing opportunities at sea, and aboriginal fishing groups that could have hit the salmon as they made their way up the Fraser and Thompson Rivers, to reach Shuswap Lake, and then the Adams River.

The result — a flood of fish passed through the Lower Adams late this summer, went up through Adams Lake, and began to appear on spawning beds in the Upper Adams River. The fish have now spread to spawning beds that haven't been used since the dam was built in 1908.

"The exciting thing," said Williams, "is that once you reach a number like 20,000 to 30,000, you get to a level where there's enough fish to start rehabilitating the spawning beds themselves."

"We saw that on the Horsefly River (where runs went from 1,000 to 2.5 million in a few cycles after being chronically depressed.) Now we're seeing it on the Upper Adams."

"It's something of a miracle, really."

Williams, who is nearing retirement, said the goal now must be to keep shepherding the run through the commercial and aboriginal fisheries for a few more cycles.

He said that once a run of two million fish has been established, the volume of carcasses that washes out of the river after spawning will fertilize Adams Lake, stimulating a much higher survival rate among the young salmon.

When that happens, he says, the run can rapidly build to 10 million salmon or more.

In the early 1900's a fisheries officer who toured the Upper Adams region described it as an incredible place where fish crowded into every bit of available spawning water, in what may have been the greatest salmon run in B.C.

Lill said the Upper Adams isn't the only success story this fall.

The Nanika River, a tributary of the Nechako River, south of Burns Lake, also has a run estimated at 30,000 sockeye.

Previous runs to the Nanika have been in the order of about 9,000 fish.
Coyote “Be a Scientist” Activities

• “Be a Scientist”
  – Not In My Neighbourhood!
  – How do you feel about Coyotes in your Backyard?
  – Coyote Characteristics
  – How much space do you use?
  – Making Tracks
  – Urban Coyote Diet Dilemma
  – Hair of the Dog?

These seven activities are designed as self-directed student workstations. Taken as a whole they follow a scientific method of inquiry. Scientific inquiry is integrated into every grade of the K-7 Science curriculum, with the scope and sequence being built up every year. By grade 4, students can be expected to be able to predict results of an experiment, follow a procedure, use appropriate tools, construct simple definitions, demonstrate an ability to recognise a valid interpretation of their results and present their conclusions. Of course the “experiments” do not need to involve a full laboratory, white coats, Bunsen burners and bubbling chemicals. Three experiments are presented here:

1) Modelling of an event difficult to see in real life
a) Since it is difficult for researchers (let alone school children!) to radio-collar coyotes, the concept of home range is modelled by the students measuring their own home range. Record keeping, measurement and synthesising information are the processes that are performed in this experiment. Grade 5’s and older should to be able to design their own experiment and identify and test a prediction. The relevance of this experiment to students’ own lives may encourage better understanding than a complicated experiment whose rationale might be lost in the methodology.

b) Not many students will be able to work out the speed of a coyote walking, jogging or sprinting. The “Making Tracks” activity uses a methodology similar to that used by palaeontologists to discover how fast dinosaurs must have been able to travel. Again, the experiment is designed around the students' own experience. This can become a multi-variable experiment if the students consider more than distance and time travelled. If they can observe quadrupeds (4 legged animals), or if they consider length of leg etc., they can begin to understand the complexities of real experiments.

Investigating the use of models as experimental tools is a learning outcome for grade 7’s.

2) Developing a classification system based on second hand data
Electron microscopes photos of hairs from coyote prey are used in this activity. The magnification of 250x is of course much greater than a normal classroom microscope. However, once the children have examined their own hairs and
discussed scale factors, the relevance of this activity will become clear and motivational. It is forensic science for coyote detectives!

Use of microscopes as a scientific tool is a learning outcome for Grade 6's

3) Testing reliability of data

Scientists in the natural sciences often have to train themselves to be good observers of animals that are difficult to see.

By building full-scale outlines of models of coyotes and animals similar in size and shape, students test their ability to differentiate between animals in a sightings survey. By including variables such as daylight, closeness of animal, comparisons with other animals and percentage of the animal visible, students design and conclude what types of sightings will be the most accurate.

These activities follow the research project of Kristine Webber. You may want to either give the students her biography to read or the Student Background Information (Section 2).

Note: You may want to get the students to keep a journal of their travel for a week before beginning this section.
Not In My Neighbourhood!

Teacher:
Students are to map sightings on a street map. They are then to sort the sightings by day of the week and time and infer from this some human and coyote behaviours.

You will need:
• photocopies of Vancouver map (included)
• calendar for 1996
• photocopies of worksheets

Optional
• students could gather their own wildlife sightings — maybe even develop a wildlife “hotline” in the school.
• average dusk and dawn times for each month

Contents:
• Worksheet 1
• Information Sheet from Kristine Webber
• Map/Sightings record

"Be A Scientist"
Information Sheet

My research revealed that coyotes are cautious animals. When they are out hunting they stay close to bushes and shrubs so that they can quickly hide if they feel in danger. Their coat also helps to hide them. Many people don’t see coyotes. Some confuse them with dogs.

So, some people don’t believe coyotes are found in cities. Others believe coyotes are in parks or golf courses but not in their neighbourhood.

Another common idea is that coyotes only come out at night. Coyotes mostly hunt at dusk and dawn, but can be seen at any time of the day.

I wanted to show people that coyotes are in most parts of the city and are out at any time of the day.

What I did:
I was lucky because many people had already heard about my project and so I got a lot of calls with sightings of coyotes. So I set up a special “Coyote Hotline.” When people called I asked them where they had seen the coyote (the nearest cross street or road junction), the time of day that they saw the animal and any other details that they had. Then I plotted all these sightings on a large map.

What I found:
The table on the next page shows some of my results for only one part of Vancouver. The calls I received did show that coyotes were in most neighbourhoods in Vancouver. They also showed that coyotes could be seen any time of the day.
Worksheet 1 — Not in my neighbourhood!

After reading the information sheet, use the table of sightings on the Vancouver map to answer the following questions:

1. Do you know the day of the week for each of the sightings? Do you think it would make a difference? Why?

2. Sort the sightings out into time of day. When were most coyotes seen?

3. Do you know when dawn and dusk are approximately for each month? How could you find out? Are most sightings around dawn or dusk?

4. For each of the sightings can you guess what the humans might have been doing?

5. Now plot each of the sightings on the map. Do you notice any groupings of sightings? Where are they near to?
### Some Coyote Sightings in Vancouver, B.C. in 1996

<table>
<thead>
<tr>
<th>Location</th>
<th>Day of the Week</th>
<th>Time</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 12th Ave. &amp; Wallace St.</td>
<td></td>
<td>10:00 pm</td>
<td>Jan. 10</td>
</tr>
<tr>
<td>2. Yew &amp; W 35th Ave.</td>
<td></td>
<td>7:00 am</td>
<td>Jan. 25</td>
</tr>
<tr>
<td>3. Yew &amp; W 49th Ave.</td>
<td></td>
<td>2:00 pm</td>
<td>Aug. 23</td>
</tr>
<tr>
<td>4. 42nd &amp; Alma St.</td>
<td></td>
<td>11:00 pm</td>
<td>Jan. 31</td>
</tr>
<tr>
<td>5. Camosun &amp; W 34th Ave.</td>
<td></td>
<td>5:00 pm</td>
<td>Feb. 4</td>
</tr>
<tr>
<td>6. S.W. Marine Dr. &amp; Kullahun Dr.</td>
<td></td>
<td>8:00 am</td>
<td>May 10</td>
</tr>
<tr>
<td>7. Musqueam Park &amp; W 46th Ave.</td>
<td></td>
<td>6:30 am</td>
<td>Oct. 1</td>
</tr>
<tr>
<td>8. Blenheim St. &amp; W 51st Ave.</td>
<td></td>
<td>2:00 pm</td>
<td>Aug. 17</td>
</tr>
<tr>
<td>9. S.W. Marine Dr. &amp; Blenheim St.</td>
<td></td>
<td>4:15 pm</td>
<td>June 11</td>
</tr>
<tr>
<td>10. W 33rd Ave. &amp; Dunbar St.</td>
<td></td>
<td>5:45 am</td>
<td>June 21</td>
</tr>
<tr>
<td>11. W 16th Ave. &amp; Discovery St.</td>
<td></td>
<td>12:30 pm</td>
<td>April 6</td>
</tr>
<tr>
<td>12. W 29th Ave. &amp; Camosun</td>
<td></td>
<td>7:30 pm</td>
<td>Oct. 10</td>
</tr>
<tr>
<td>13. W 16th Ave. &amp; Imperial Rd.</td>
<td></td>
<td>9:00 am</td>
<td>Sept. 25</td>
</tr>
<tr>
<td>14. Memorial Park &amp; W 33rd Ave.</td>
<td></td>
<td>3:00 pm</td>
<td>May 2</td>
</tr>
<tr>
<td>15. W 16th Ave. &amp; Crown St.</td>
<td></td>
<td>8:45 am</td>
<td>Mar. 19</td>
</tr>
<tr>
<td>16. S.W. Marine Dr. &amp; MacDonald St.</td>
<td></td>
<td>5:30 pm</td>
<td>July 11</td>
</tr>
<tr>
<td>17. W 16 Ave. &amp; Camosun</td>
<td></td>
<td>4:30 pm</td>
<td>April 8</td>
</tr>
<tr>
<td>18. W 49th Ave. &amp; Dunbar St.</td>
<td></td>
<td>10:30 pm</td>
<td>June 21</td>
</tr>
<tr>
<td>19. Memorial West Park</td>
<td></td>
<td>2:30 pm</td>
<td>Sept. 14</td>
</tr>
<tr>
<td>20. W 35th Ave. &amp; Camosun St.</td>
<td></td>
<td>8:00 am</td>
<td>Jan. 15</td>
</tr>
</tbody>
</table>
How Do You Feel About Coyotes In Your Backyard?

Teacher:
In this section students are given a hands-on introduction to opinion polls and attitude surveys as tools for scientific investigation. Topics covered include types of questions and their uses, sampling methods, and the tabulation and presentation of results. Along the way, they also will explore their own and others' ideas and attitudes to wildlife.

After reading coyote researcher Kristine Webber's narrative about a survey she created, and completing the accompanying exercises, students will be ready to design and carry out their own survey.

Equipment needed:
• photocopies of Research Assignment Sheets and Work Sheets
• if you chose a telephone survey: a phone and directory
• graph paper for tabulation and/or presentations
• other presentation materials, depending on format

Optional:
• It can be interesting for teams to poll on different aspects of an issue and share the results in a display or presentation to the whole class.
• Students might survey and compare responses from certain subsets of the population — girls and boys, for example, or young people and grown ups.
• We have focused on the issue of "problem" wildlife, but of course the methodology could be applied to any number of other issues.

Contents:
• Research Assignment
• Worksheet 1
• Worksheet 2
• An abridged version of Kristine Webber's survey

"Be A Scientist"
Research Assignment

TO: Research assistants

FROM: Kristine Webber

“Problem wildlife” complaints to the Provincial Government, the SPCA and Vancouver City Council are increasing. Many of these complaints are about coyotes.

People seem to be worried about their pets, and whether coyotes can hurt people. However, no one has ever asked how the public actually feels about coyotes living in the city. From newspaper and TV news reports, it seems that everyone is against coyotes. To find out if this is true I surveyed people. I need your help completing the results and then I'd like you to do your own survey.

What I've done so far:

I wanted to find out four basic types of information:

**Attitudes** — how people feel about coyotes in the city;

**Awareness** — what they know about coyotes;

**Management** — what they would like to see “done” about the coyote “problem”;

**Information** — some background and personal information about the people who answered the questions (respondents).

After I worked out the questions I wanted to ask, I designed a survey. I had to then decide who to ask. These people are called the respondents. I questioned people from different areas, ages, ethnic backgrounds, and genders so that I obtained a sample of people from the Vancouver area. I couldn’t ask them all! I also want to know if special groups of people feel differently about coyotes. For example, are the attitudes of pet owners different from the general public? What about people who are interested in wildlife? What are their feelings toward coyotes?

To find out what the general public thinks, I conducted a phone survey. I flipped through the Vancouver phone directory and chose people anywhere on a page. Then I phoned and asked them the survey questions. This is called a random survey. That way I asked people from all over the city — not just my friends or people I knew! To find out what pet owners thought, I asked some of the veterinarians to help. They gave the survey to their clients to complete. To find out how wildlife enthusiasts felt, I gave surveys to different naturalist clubs in the area.
Here is one of my questions that I asked about dealing with wildlife problems. This is an example of a multiple choice question, because people choose their answer from a list:

**Wildlife Management Question:**
When there is a complaint about an urban wildlife animal, who should deal with it? (Please ✔)

- SPCA
- Provincial Government
- Veterinarians
- Wildlife Rescue centres
- Municipal Government
- Other, Please list: ______________________________

![Note: Can you please finish this table for me? K.W.](image)

<table>
<thead>
<tr>
<th></th>
<th>General Public (Telephone survey)</th>
<th>Veterinarian Clinics</th>
<th>Wildlife Groups</th>
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<tbody>
<tr>
<td></td>
<td>Number of answers</td>
<td>Percent of total</td>
<td>Number of answers</td>
</tr>
<tr>
<td>SPCA</td>
<td>56</td>
<td>28%*</td>
<td>100</td>
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<tr>
<td>Veterinarians</td>
<td>6</td>
<td>1%</td>
<td>15</td>
</tr>
<tr>
<td>Municipal Government</td>
<td>54</td>
<td></td>
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<td>Provincial Government</td>
<td>52</td>
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<td>125</td>
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<tr>
<td>Wildlife centres</td>
<td>16</td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Total number of people</td>
<td>200</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Here is how to complete the Table:

1. Add the numbers in a column and put the total at the bottom. This is the total number of answers to that question. (I've done the first one.)

2. Then take each number in the column and make it into a percentage: e.g. 56 divided by 200, then multiply by 100 = 28%*

3. To double check, add the column of percentages to see if they add up to 100% (or very close!)

4. Once the whole table is complete you can compare columns or even graph the results.

"Be A Scientist" — How Do You Feel About Coyotes 150
**Pet Question**

To find out if pet owner’s attitudes to coyotes are different from non-pet owners, I had to ask people if they had pets. As I was looking for a simple yes/no answer, I used a closed question:

Do you have pets?  □ Yes  □ No

I have nearly finished the table below. Can you complete it for me? KW.

<table>
<thead>
<tr>
<th></th>
<th>General Public</th>
<th>Veterinarians’ Clients</th>
<th>Naturalist Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of answers</td>
<td>Percent of total</td>
<td>Number of answers</td>
</tr>
<tr>
<td>Yes</td>
<td>77</td>
<td>44%</td>
<td>240</td>
</tr>
<tr>
<td>No</td>
<td>98</td>
<td>56%</td>
<td>10</td>
</tr>
<tr>
<td>Total number of people to answer</td>
<td>175</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Here is where I start to look at people’s attitudes. This rated response question asks people how they feel.

**Attitude Question:**

Circle the response which best represents your attitude toward coyotes in the Lower Mainland?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Dislike</td>
<td>Dislike</td>
<td>Neutral</td>
<td>Like</td>
<td>Strongly like</td>
</tr>
</tbody>
</table>

"Be A Scientist" — How Do You Feel About Coyotes
<table>
<thead>
<tr>
<th></th>
<th>General Public</th>
<th>Veterinarian Clinics</th>
<th>Wildlife Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of answers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly dislike</td>
<td>12</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>Dislike</td>
<td>24</td>
<td>34</td>
<td>3</td>
</tr>
<tr>
<td>Neutral</td>
<td>90</td>
<td>70</td>
<td>12</td>
</tr>
<tr>
<td>Like</td>
<td>39</td>
<td>83</td>
<td>18</td>
</tr>
<tr>
<td>Strongly Like</td>
<td>8</td>
<td>43</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What does this table tell you about who likes coyotes and who does not?

I have a few more questions I need help with (answer them on a separate sheet):

- Can you please present the data in Question 2 using a bar graph?
- Also, write down one or two main conclusions that can be stated from the information in each table. For example, what can we say about the people surveyed from veterinarian clinics and their attitudes toward coyotes?

Finally, I'd like you to do some more surveying. The worksheets on the next two pages will help you to get organized, and I've given you the survey I developed as an example.

- K.W.

P.S. I really look forward to reviewing your results when I get back. Isn't science fun!
Worksheet 1 — Designing your own survey

Answering the following will help you prepare your own survey.

**What do you want to know?**

1. What animals do you want to ask people about? (Have you heard anybody say they’ve had a problem with a certain animal?)

2. What attitudes do you want to find out about? Make a list of some of the ways people feel about animals:

3. Who are you going to ask? Make a list:

4. How are you going to ask? (For example by phone, personally, or by mail? (Try to think of the problems with the different ways and what would be best for you.)

5. Where and when are you going to ask? (Remember to try to get people when they have time and are not too tired. Why do you think this is important?)

6. How many people are you going to survey? (Try to ask at least 10 or more.)

7. How long do you think it will take to complete the survey?

Well done — you have almost completed the planning of your survey!
Now it's time to write the questions. You could look at the sort of questions I used in my survey and use some of them if they fit your plan, or could create your own. Follow the steps below:

Step 1. Write down all the questions you could ask.

Step 2. Now mark each question Open, Closed or Choice.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Open (Write their whole answer down)</th>
<th>Closed (Yes or no answers)</th>
<th>Choice (From a list of answers)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Use extra paper to write more questions if necessary)
Step 3. Work out what type of question you have based on answers you expect. The best surveys have many closed or choice questions. It's easier to look at the results! If you have too many open questions, omit some or change them into closed or choice questions.

Step 4. Practice your survey with a fellow student. Are the questions clear? How long does it take to complete your survey? It is a good idea to keep it to about 5 minutes.

Step 5. Now you are ready to do a neat copy of your survey! When you approach people to participate in your survey, explain first what you are doing, and how long it will take to answer the questions. Afterwards, remember to thank people for their time!

Step 6. Write a report on the results of your survey. Looking at the work we did on my questions will help you present your results in table or graphs.

"Be A Scientist" — How Do You Feel About Coyotes
Urban Wildlife Survey

Part A — General Information

For the purposes of this survey, Urban Wildlife is defined as any non-domestic mammal or bird that lives within an urban setting.

1. Please check any of the animals you have seen in the Lower Mainland in the past year:

- squirrel
- shrew
- rat
- mouse
- mole
- raccoon
- seagull
- eagle
- hawk
- crow
- starling
- duck
- songbird
- bat
- coyote
- deer
- swan
- cougar
- wolf
- skunk
- muskrat
- pigeon

other: __________________________

2. Please list any of the above animals that you consider “pests” or that cause you concern.

______________________________________________________________

3. Identify in general terms why these animals cause you concern from the reasons provided:

- personal safety/health
- pet’s safety/health
- children’s safety/health
- property damage
- other, please list __________________________

4. Do you place your garbage out the night before your garbage collection? ☐ Yes ☐ No

5. Do you have an outdoor compost? ☐ Yes ☐ No

   If yes, is it open? ☐ Yes ☐ No

6. Do you have pets? ☐ Yes ☐ No

   If yes, do they go outdoors? ☐ Yes ☐ No

   If yes, are they ever fed outdoors, or on the porch? ☐ Yes ☐ No

7. Have you ever tried to dissuade wildlife from entering your property/place of residence?

   ☐ Yes ☐ No

   If yes, identify the method(s) used

   - body language (loud threatening display)
   - use of objects (throwing rocks, etc.)
   - fencing
   - other, please describe __________________________

   Were you successful? ☐ Yes ☐ No
8. When there is a complaint about an urban wildlife animal, who should take the appropriate action to deal with the problem?
- SPCA
- Veterinarians
- City/Municipal Govt.
- Ministry of Environment, Lands & Parks
- Non-profit Wildlife Rescue Centres
- Other, please list: ____________________________

9. Have you ever asked for assistance or information from any of the above agencies with wildlife concerns?  
- Yes  
- No
If yes, please list which agencies and indicate whether you were satisfied with their response.

__________________________________________________________________________________________________________________________________________

10. Are there adequate agencies/individuals within the city to address any wildlife concerns you might have now or in the future?  
- Yes  
- No  
- Unsure
If unsure, explain why.

__________________________________________________________________________________________________________________________________________

11. Is there a need to make information about urban wildlife more readily available to the public?  
- Yes  
- No

12. Check the method you feel most appropriately addresses “problem wildlife” (i.e. those animals causing concern)?
- Relocate animals
- Humanely destroy
- Public education
- All of the above but depends on circumstances
- Other, please describe below:

__________________________________________________________________________________________________________________________________________

13. Does urban wildlife enhance your life in the Lower Mainland?  
- Yes  
- No

14. Are you willing to modify your lifestyle or habits in order to maintain or enhance wildlife activity within the city?  
- Yes  
- No  
- Unsure
If unsure, please explain.

__________________________________________________________________________________________________________________________________________
**Part B — Coyotes**

15. Are you aware that coyotes are present in the Lower Mainland?
   - [ ] Yes  [ ] No

   If yes, please answer the following questions.

16. Circle the response which best represents your attitude about coyotes in the Lower Mainland.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly dislike</td>
<td>dislike</td>
<td>neutral</td>
<td>like</td>
<td>strongly like</td>
</tr>
</tbody>
</table>

17. Explain why you feel this way about coyotes in the Lower Mainland:

   ____________________________________________________________

18. Have you seen a coyote(s) in the Lower Mainland in the past 12 months?
   - [ ] Yes  [ ] No

   If yes, Date: _______ Time of day: _______ Number of coyotes: _______

   Location of sighting (include cross-street):
   ____________________________________________________________

19. Please check the response which best answers this statement: "I feel the population of coyotes in the Lower Mainland is..."

   - [ ] increasing  [ ] decreasing  [ ] staying the same  [ ] unsure

20. Please circle your best estimate of the average body weight of an adult coyote

   - [ ] 0 - 8 kg (0-17 lb.)  [ ] 8-14 kg (17-31 lb.)  [ ] 15-22 kg (33-48 lb.)
   - [ ] 23 - 30 kg (50-66 lb.)  [ ] 31 - 38 kg (68-84 lb.)  [ ] more than 38 kg (84 lb.)

21. Do you have any specific concerns about/for coyotes in the Lower Mainland?
   - [ ] Yes  [ ] No  If yes, please identify those concerns:
     ____________________________________________________________
     ____________________________________________________________

22. Do you feel that the coyote population in the Lower Mainland is “a problem”?  
   - [ ] Yes  [ ] No

   Please explain:
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
Coyote Characteristics

Teacher:
Students will become familiar with the visible characteristics of coyotes, construct actual size outlines from information given, develop a scientific experiment to test accuracy of sightings, and test a hypothesis in cooperation with the class.

You will need:
• large sheets of newspaper, cardboard, black paint, brushes, and a tape measure or ruler
• table or floor space
• photocopies of Worksheet, Record sheet and Information sheets
• access to outdoors

Optional
• Student Background Information
• Coyote Cousins activity
• Teacher-prepared animal drawings can be used to save time and ensure consistency

Contents:
• Worksheet 1
• Group record sheet
• Information sheets — Animal Outlines
• Drawing With Grids

"Be A Scientist"
Worksheet 1 — Coyote Characteristics

Was that a coyote I just saw?

Before biologists begin to observe wildlife, they have to train themselves to be able to correctly identify animals. As it is, they may only ever get glimpses of them! It might be dark, the animal may be hiding in the bush or it might be moving quickly. How can they be sure it was a coyote?

It gets harder when biologists have to rely on sightings made by other people — maybe they actually saw a dog. In this exercise, you will participate in an experiment to test your group’s or class’s ability to identify a coyote’s shape under different conditions.

1. Creating your hypothesis

In this experiment we are trying to answer the question:

“How often can people correctly identify a coyote?”

To begin, guess how often you think the class will correctly identify a coyote, and circle that percentage:

10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

This guess is called your theory or hypothesis — and that’s what we will test in the experiment. To add interest, circle the percentage of times you think you will identify a coyote correctly.

2. Creating your test materials (we suggest you do this in teams of about 4 students)

• Make full size outline drawings of a coyote, a fox, Canadian Eskimo Dog, and Labrador Retriever. You can find out the correct height and length by looking in the “Coyotes’ Cousins” activity and the Student Background Information section. The Drawing With Grids sheet will help you to make accurate drawings.

• Paste your outlines onto large sheets of cardboard to make strong silhouettes of the animals. Make them able to stand up by attaching a stick or a cardboard stand to the back.

3. Think about where you will place your drawings, and how difficult you will make it to see them. Will you choose...

• full view of animal or half hidden view?
• short glimpse of animal or a long look?
• one animal at a time or two or more at a time?
• placing them all far away or closer, or some closer than others?

If there is time, you could plan to do two different arrangements and test for each.

4. Now you are ready to carry out your experiment! If you are in a team, two students can place the drawings and two can organize the rest of the group or class to make their guesses and record the results on the following chart:
**Group Record Sheet — Coyote Characteristics**

Fill in the recording sheet for your group's part of the experiment. People will either get a right (✓) or wrong (✗) answer when they guess which is the coyote.

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Right (✓) answers</th>
<th>Wrong (✗) answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.g. Group 1: Coyote part-hidden behind dumpster</td>
<td>✓ ✓ ✓ ✓</td>
<td>✗ ✗</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Questions (answer on a separate sheet)**

1. What percentage of the class got the correct answer to your group's part of the experiment?
2. How did the class do as a whole?
3. Was your hypothesis correct?
4. How many correct answers did you get?
5. Would a wildlife biologist be interested in the results of this experiment? Why?
6. If Kristine Webber received 100 phone calls from people saying they saw a coyote, how many do you think were correct. Explain your answer.
**Information Sheet — Drawing Grids**

Using a grid helps to make accurate enlargements of drawings:

1. Select drawing to be enlarged.

2. Add a grid to the drawing — using light pencil or on a sheet of tracing paper laid on top and taped in place.

3. Make a grid that is the size you want to enlarge to, with the same number of lines. Copy the contents of each square on the small grid to the corresponding square on the larger one.
Information Sheet — Animal Outlines

"Be A Scientist" — Coyote Characteristics
How Much Space Do You Use?

Teacher:
Students are asked to create tables of data, map using a street map and calculate irregular areas. In addition, grade 6/7 students are to measure distance, use the map scale, construct a circle and calculate its area.

You will need:
• photocopies of local map (with scale for grade 6/7)
• photocopies of worksheets

Optional
• creation of a travel log for a week prior to doing this work station
• class compilation of results to compare guesses with average calculated home ranges

Contents:
• Memo from Kristine Webber — Information Sheet
• Worksheet 1
• Worksheet 2
• Class/group record sheet
• Assignment from Dr. Wolfe

"Be A Scientist"
Research Information

TO: Research assistants

FROM: Kristine Webber

I have found that it is extremely hard to measure the home range of a coyote. Coyotes probably have very different home ranges depending on whether they are male or female, the time of year, how far they have to go for their food, whether the female has a litter, and how old the pups are. Coyotes living in the city probably have very different home ranges than coyotes in rural areas.

With radio collars, it is possible to track an animal’s movements — but you first have to trap the animal. I have been unable to catch a coyote. They are very good at detecting traps and avoid them.

Another way to track them might be to follow them — but you can imagine how difficult it could be to follow a coyote to find out its home range! Maybe we need to look more closely at our own home ranges to see what patterns we have and see if that might help us understand a coyote’s home range?

By the way, if Professor Wolfe contacts you, please tell her that we couldn’t use the radio collars. He may ask you to explain why?

Thanks,
-KW.

Above: Picture of a wolf being fitted for a radio collar.

Below: This wolf in Minnesota can be tracked because of signals coming from the radio collar.

"Be A Scientist" — How Much Space Do You Use?
Worksheet 1 — How Much Space Do You Use?

All animals have a home range, which is the area they use to find food, water, shelter, and to raise a family. You have a home range too. It is the area that contains the places you usually visit for food, friends, school, and activities.

1. Make a guess!
Circle the size of area that you believe you use as your home range, and add this to the chart for the whole class:

- <1 km²
- 1-5 km²
- 5-10 km²
- >10 km²

2. What shape do you imagine your home range is?
   a) Draw your idea of your home range in the space below.
   b) Mark (X) your home on it,
   c) Mark your school on it,
   d) Mark any other place that is important to you that you visit regularly and if you know,
   e) Mark which way is north.

3. How often do you visit these places? Place a ✓ in the appropriate box:

<table>
<thead>
<tr>
<th></th>
<th>Every day</th>
<th>Once a week</th>
<th>Once a month</th>
<th>Once a year</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shops/mall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friend's/relative's house</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurant/fast food</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video store</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Worksheet 2 — How much space do you use?

Now its time to accurately map your home range and test your ideas.

1. On the photocopy of a street map of your area find your house first and mark it with an “★.” This is probably close to the centre of your home range.

2. Then using the table on Worksheet 1, mark in all the places you regularly visit. You may have to keep a travel log to help you or ask where some of the places are. How would you locate them on the map? Do you know the names of the streets?

3. Now try to join up all the furthest places from your home to form a rough circle. Is your home in the centre? Describe the shape you have drawn in the space below:

4. Try to find a way to measure the area of your shape. How many square centimetres is it?

— Grade 6/7 —

5. Take the most distant place from your home that you visited. Measure how far it is from your home. Use the scale on the map to tell you this distance in kilometres.

6. Draw a regular circle around your home range: use the distance between your home and the furthest place as the radius of the circle. Find the area of this circle.

7. Compare the area of your regular circle with the irregular shape and with your estimate of your home range from Worksheet 1. What do you notice? Why are there differences?

8. Read the memo on page 93 from Professor Wolfe and fill out the report.
Class/Group Record Sheet

Mark your guess for your home range on the table below:

<table>
<thead>
<tr>
<th>Table of Range Guesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 km²</td>
</tr>
<tr>
<td>Tally</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

In the space below write down your home range area that you calculated and then compare your group's or class's areas. How accurate were the guesses? (Write your ideas on a separate piece of paper)
TO: Research assistants

FROM: Professor Wolfe, UBC Animal Sciences Department

I understand that Kristine Webber is away tracking dingoes in the Australian Outback. Well, I need some answers now about why she hasn't got the home ranges of coyotes worked out yet. In her absence, can you tell me what problems you think wildlife biologists might have in calculating the home range of coyotes? Please fill out the report below.

Coyote Home Range Report

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________
Making Tracks

front paw = 6.5 cm long
back paw = 7 cm long

Coyote tracks are actual size.

Teacher

In this section students will become familiar with the characteristics of animal tracks, develop a scientific experiment to measure stride lengths at different speeds and estimate stride length for a coyote travelling at 50 km/hr.

You will need:
• photocopies of worksheets
• stopwatches, tape measures
• 10-20 metre space to measure stride length

Optional:
• drawings of animal tracks at a range of different scales

Contents:
• Worksheet 1
• Worksheet 2
• “Naturalists have found” — information sheet

“Be A Scientist”
Worksheet 1 — Making Tracks

1. Is it a coyote paw print?
Look at the shape and sizes of the prints below and describe the differences between the coyote, the fox and the raccoon.

<table>
<thead>
<tr>
<th>Coyote</th>
<th>Fox</th>
<th>Raccoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length: 7 cm</td>
<td>Length: 6.5 cm</td>
<td>Front paw: Length: 6.5 cm</td>
</tr>
<tr>
<td>Width: 5.7 cm</td>
<td>Width: 4.5 cm</td>
<td>Width: 6.5 cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Back paw:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length: 10 cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Width: 5.7 cm</td>
</tr>
</tbody>
</table>

2. Sometimes one print is not enough!

Dogs' paw prints can be similar to coyotes. However, they walk differently. To the right are tracks made by a walking dog and a coyote. How would you describe the differences to someone over the phone who had just found a trail. Look at the pattern of the prints. Can you draw the next print of each?

---

"Be A Scientist" — Making Tracks
Worksheet 2 — Making Tracks

Palaeontologists can now work out how fast dinosaurs could run! They use fossil prints. Then they measure the stride length. Four a two legged animal a stride is the distance between one foot making the first print and the next foot making a second print. With 4 legged animals the stride is measured as the distance between the back foot making the first print and the next back foot making a print. Palaeontologist compare this with a living animal whose speed they can work out. They have to take into account the size of the animals as well. Even though you are a two legged animal and have five toes (not four like a coyote) you can use yourself for this experiment.

1. You will need:
   • tape measure
   • stopwatch
   • recording sheets
   • an area longer than 10 metres

2. In your group you will have to decide who is doing what! The jobs are:
   • timer (with stopwatch)
   • foot counter
   • distance measurer
   • test subjects — at least 3 people to walk, jog and run

3. a) How fast are you expecting a walk to be? (Try metres/sec)
   b) How fast are you expecting a jog to be?
   c) How fast are you expecting a sprint to be?
   d) For each speed, guess how many strides will be taken in 10 metres.

4. a) Mark out a 10 metre length.
   b) Ask each subject to walk along the 10 m length while one person counts the number of times their feet touch the ground, and another person records the time.
   c) Record the result in a table.
   d) Repeat the experiment for jogging, and then for sprinting.

5. Repeat the experiment for 20 metres. Were the results as you expected?

6. What did you find out? In your group, use 3 different ways to let people know about your results (HINT: Can you average? Can you graph the results? Can you make the table less complicated?)

7. Why is it useful to have at least 3 people do the experiment?
"Naturalists and trackers have found":
Every animal can make a track to follow. If they step in wet sand, mud or snow you can work out which animal it was, where it was going and sometimes how fast it was travelling. You might also be able to tell if it was alone or if the trail is used regularly by that animal or animals. Some trackers can even tell if the animal was injured or not!

Below are some tracks of coyotes moving at different speeds:

Coyote walking: notice that the coyote places its back foot directly on top of the track of the front foot making a straight trail.

Coyote trotting

Coyote travelling at a slow lope or slow run

As a coyote speeds up from a trot or lope, the track it leaves becomes straighter.

Coyotes don't wander about much, unlike some other animals. The skunk zigzags across a track checking out everything on either side!
Next time you spot animal tracks in the snow or mud, try to work out what it was doing.
Urban Coyote Diet Dilemma

Teacher:
Students are asked to be diet detectives! After interviewing each other they will analyse data from Kristine Webber's coyote diet study and reconstruct the last 24 hours of one coyote. Finally, they are asked to write a letter to the SPCA making recommendations based on the research.

You will need:
• photocopies of worksheets
• graph paper

Optional:
• Predator Math worksheets
• Garbage for our Grandchildren activity

Contents:
• information sheet from Kristine Webber
• worksheet 1
• worksheet 2
• Publishing your results worksheet

"Be A Scientist"
Worksheet 1 — Your Diet

1. In pairs, interview each other about the food you have eaten in the last 24 hours. Here are some questions to help:

a) What was the most recent thing you ate? How long ago was that?

b) It can take up to 4 or 5 hours to completely digest a meal depending on what was eaten and how big a meal it was. Do you think there is anything undigested in your stomach? What is it?

c) What did you eat during the last 24 hours? Include snacks.

d) Sort all the food eaten in the last 24 hours into food groups, and guess how much of each group you ate:

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Guess % of whole diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrates</td>
<td></td>
</tr>
<tr>
<td>(cereal, bread, rice, pasta, pizza, etc.)</td>
<td></td>
</tr>
<tr>
<td>Vegetables/Fruits</td>
<td></td>
</tr>
<tr>
<td>Dairy products</td>
<td></td>
</tr>
<tr>
<td>(milk, cheese)</td>
<td></td>
</tr>
<tr>
<td>Meat and Alternatives</td>
<td></td>
</tr>
<tr>
<td>(beef, chicken, fish, beans, eggs, tofu, peanut butter, etc.)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>(candies, soft drinks, chocolate, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

e) Design an experiment to find out how much you ate from each food group in a day. How would you choose a typical day?
Worksheet 2 — Coyote Diet

Read the information sheet and then look at the tables of scat and stomach contents. Twenty different coyote scat samples were examined as well as 10 stomach contents of coyotes accidentally run over by cars.

<table>
<thead>
<tr>
<th>Sample number</th>
<th>Cat</th>
<th>Dog</th>
<th>Bird</th>
<th>Small mammal</th>
<th>Grass</th>
<th>Fruit/Seeds</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>whisker</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>bone bits, pits</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>9</td>
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<td>10</td>
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<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>cherry pits (6)</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>lemon seeds</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>bone bits, pits (20)</td>
</tr>
<tr>
<td>15</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>claw, bone bits</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>small tooth, bone bits</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td>plastic bag bits</td>
</tr>
</tbody>
</table>

1. Choose one of the animals (1-20) and by looking at their scat contents write a “hunting for food” story as the coyote may have told it.

2. Compare your coyote story with other students in your group. Which coyote was the best hunter? Why?

3. If coyotes mostly eat meat, why was there so much grass and seeds?

4. Draw a bar graph to show what coyotes eat using both tables.

5. What do the tables not tell us? (Hint: Look at the questions on worksheet 1.)
<table>
<thead>
<tr>
<th>Sample number</th>
<th>Cat</th>
<th>Dog</th>
<th>Bird</th>
<th>Small mammal</th>
<th>Grass</th>
<th>Fruit/Seeds</th>
<th>Opossum</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>rodent skulls</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>chicken foot</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>4</td>
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<td></td>
<td></td>
<td>ant</td>
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<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
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<td>✔</td>
<td></td>
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<tr>
<td>6</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>bone bits</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td>rat</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td>plastic bag</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The stomach contents tells you what the coyote was eating most recently. For each of the 10 coyotes write a one sentence report which includes when the coyote last ate, what he or she ate, and whether the coyote was a good hunter or not.

1. 

2. 

3. 

4. 

5. 

6. 

7. 

8. 

9. 

10. 

"Be A Scientist" — Urban Coyote Diet Dilemma
Information Sheet

"Kristine Webber found":

In some diet studies of rural and wild coyotes researchers have found a lot of small mammals remains such as mice and voles. Small mammals can make up to 70% of a coyotes diet. However, we don't know exactly what urban coyotes eat. They are frequently blamed for missing cats and small dogs. But how many pets are they really eating? One of the reasons we don't have this information is because there have been few urban coyote studies. Another reason is that it is difficult to find out what a wild animal is eating. Coyotes are carnivores — they eat meat and since they are so adaptable it is not surprising they eat cats and small dogs when the opportunity arises.

I decided to try to find out what coyotes were eating in Vancouver.

One of the ways I found out what coyotes had eaten was to examine the contents of their stomachs. This was done but looking at the stomach of dead coyotes. (Most coyotes were killed in collisions with cars.)

In most cases it was pretty easy to see what was in the stomach. In one stomach we found several small mammals, in another we found the skin (and hair) of an opossum, and in another we found a whole chicken foot.

Another way to find out what a coyote has been eating is by working backwards: through looking at what is in the scat (faeces) that the coyote has left. I gathered coyote scat on known tracks and around den sites. The scat was collected using rubber gloves, and then it was heated to a very high temperature to kill any bacteria that could be harmful to me.

It is important to be careful when examining dead bodies or collecting scat. Wearing gloves, washing with disinfectant, and using high temperature ovens are only some of the safety procedures. If you find a dead animal do not touch it or pick it up, it takes special training to handle bodies safely.

In the scat I saw bits of bone, hair, fruit pits, plastic, vegetable pieces and other foods. I could tell what the coyote had eaten by looking at these things. Sometimes I had to be a bit more of a detective! Bones I compared bones that were already known, kind of like matching the pieces of a jigsaw puzzle. The hairs were the most fun though.

Every single person has their own fingerprint. Animal hairs are like fingerprints, except the pattern on the animal hair is the same for the whole species. For example, the pattern on the shaft of a hair of a cat is very different from that of a mouse or a raccoon. You don't need a microscope to see all the differences between a mouse and a cat hair. You can also use the hair length and colour as a clue. Mice have very short hairs with special banding or stripes on them. Cats have much longer hairs. I used the way the hairs looked to find out what the coyote had eaten. If I found a scat full of mouse hair I knew it had eaten a mouse!
Making Others Aware of Coyotes

1. Based on what Kristine has found in the scat and stomach contents, what advice would you give to pet owners?

2. Make a poster that warns pet owners about coyotes living in your area? Where could you post it so people would see it? Be sure you have permission before you put your poster up.

3. Write a letter to the SPCA or humane society in your community mentioning this research and the possible dangers to outdoor pets. Suggest that they pass on this information to people who adopt pets. If possible include a copy of your poster?
Students are asked to compare hair shaft scales with regular polygons. The concept of tessellation — covering a surface by repeated use of a single shape — is introduced, enabling students to create a tessellated model of an animal hair shaft with scales.

**You will need:**
- toilet paper or paper towel rolls
- scissors
- glue
- photocopies of worksheets

**Optional**
- examination of own hair under a microscope
- examination of artist M.C. Escher's use of tessellation

**Contents:**
- "Kristine Webber found" — Information Sheet
- Worksheet 1
- Worksheet 2
- electron microscope pictures

"Be A Scientist"
Worksheet 1 — Comparing Hair Scales

Look at the electron microscope pictures on the information sheets. Each of the pictures shows a part of the hair of an animal magnified 400 times. Each hair has overlapping scales on it, and each animal has different shaped scales.

Compare the hair scales with these shapes and complete this table:

<table>
<thead>
<tr>
<th>Shape</th>
<th>Name of Shape</th>
<th>Animal with hair scale most like this shape</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Square" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Rectangle" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Triangle" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Parallelogram" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Trapezoid" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Hexagon" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Pentagon" /></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Simplifying the real outline of the shapes helps us to describe them to other people. It also makes it easier to tessellate with them — to tessellate is to cover a surface with repetitions of the same shape.
Worksheet 2 — Working with Shapes

1. Look at the electron microscope pictures. Draw a simple version of the shape of one of the hair scales in this rectangle.

Try adding on more hexagons to this example tessellation:

2. Using your picture of a hair scale try to fill up the box below so that there are no spaces between the shapes. Make your shapes large enough that you can easily cut them out, as in the example above.

scale shapes:

3. Now make cutouts of your scales and cover a toilet paper or paper towel tube with them. Spiral the scales around the tube, and overlap the rows as shown in the photos.

4. Look at your tube. Do you have as many scales going around the tube as in the real hair?

5. Can you think of other examples of tessellation patterns in nature?

"Be A Scientist" — Hair of the Dog
Research Information — Hair of the Dog

TO: Research assistants

FROM: Kristine Webber

When I looked at the stomach contents or scat of coyotes to see what they had eaten, I sometimes found hairs. But hairs from which animals? A hair is like a tube with scales attached to it and it is different for every species of mammal. I had to use an electron microscope to see the scales because ordinary microscopes are not powerful enough to show their patterns very well.

Electron microscopes are so big that the one I used took up a whole room! First I had to take a small piece of hair and coat it with gold powder. Then it was placed in a special chamber from which the air has been pumped out. The small piece of hair is then sprayed with a beam of electrons. The electrons bounce off the hair and the "pattern" that they make is what I could see on a screen. We took "pictures" of those patterns. These pictures showed us a hair 400 times its real size. That is like the hair on your arm being thicker than your fingers!

Six examples of animal hairs are shown here. The first page of this assignment shows a coyote hair. How do you think it got into the scat or stomach of a coyote? (Hint: think about some animal behaviours.)

Your assignment is to complete the exercises on Worksheets 1 and 2. You'll end up making a model of the microscope structure of the surface of an animal's hair — we are going to need these for some veterinarians when I get back.

-K.W.

P.S. Don't you just love that word, *tessellation*?
Norway Rat

Grey Squirrel

Domestic Short-hair Cat

Deer Mouse

Dog

"Be A Scientist" — Hair of the Dog
Coyote Math Activities

• **Math Activities**
  - Predator Math
  - Predator Math2
  - Coyote Code

The following Math activities are designed to integrate further detailed knowledge of coyotes and in particular, their diet. Critical thinking and analysis questions are placed within the worksheets so that students not only think about the relevance of their results but also strategies they used to get an answer.

The learning objectives of all three activities is to recognise and understand the connections between various forms of knowledge.

**Predator Math (grade 4-5)**

Predator Math consists of word problems related to coyotes. The first four problems require simple addition, subtraction and multiplication. Problem 4 is more difficult; it could require a two-step solution of addition and division. Students are encouraged to explain how they reached their answer and how else they could have got to the answer.

**ANSWERS:**
1. 126 voles
2. a) 18 pups, b) 108 pups, c) 90 pups
3. a) 28 kg, b) 42 kg, c) 112 kg
4. 6 coyotes

**Predator Math2 (grade 6-7)**

Predator Math2 consists of a progressive series of word problems that has a student build up an understanding of the use of mathematics in researching the diet of a coyote. The students work from the number of voles a coyote eats in one day to the number of sheep that a coyote eats in one year. The fact that the answer is a fraction of a sheep leads to an analysis of the meaning of the results as well as an analysis of the methodology. It can be linked to the role play activity "Points of View" or the "Be a Scientist" activities.

**ANSWERS:**
1. a) 126 voles, b) 558 voles, c) 6570 voles
2. 328500gms or 328.5 kg, rounded to nearest kg = 329kg
3. 0.658kg rounded to nearest kg = 1kg which is...
4. a) 1/45 of a sheep.

**Coyote Code (grade 4-5)**

This worksheet tests addition and subtraction of two digit numbers, multiplication up to the 6 times table and division problems using a single digit divisor.

**ANSWER:** THEY HAVE A HOWLING GOOD TIME.

Further math activities such as shapes and data analysis are contained within the "Be a Scientist" workstations.
**Predator Arithmetic**

1. A biologist discovered that a coyote ate 18 voles in one day. If the coyote ate the same number every day, how many voles could he or she eat in a week?

2. Female coyotes on average give birth to 4-6 pups each year. However, dens have been found with as few as 3 newborn pups up to as many as 18 newborn pups. Since the mother coyote only has 8 mammary glands to feed the pups, how do you think there were 18 in the den?

   a) If one coyote gave birth to 3 pups every year for 6 years, how many pups would she have given birth to in total?

   b) How many pups would another coyote have given birth to if she gave birth to 18 every year for 6 years?

   c) How many more pups would a coyote have given birth to if she had 18 a year for 6 years, instead of 3 a year for 6 years?

   d) Do you think all the pups in a litter survive to become adults? Which coyote's pups are more likely to survive: the pups from the litter of three or the pups from the litter of 18? Explain your answer.

3. A male coyote in B.C. weighs about 14kg.
   a) How much would 2 coyotes weigh?

   b) How much would 3 coyotes weigh?

   c) How much would 8 coyotes weigh?

4. Sandy weighs 38 kg. Diana weighs 46 kg. If they both stood on one side of a very large scale, how many coyotes would have to stand on the other side to balance them. (Do you think it would be a good idea to try this at home?)

   Explain how you got to your answer. Can you think of another way to get to your answer.
Predator Math

1. Biologists are interested in how much food coyotes eat. It may depend on the
time of year and how much food is available. Kristine Webber
discovered that one coyote which had died at midday had 9
voles in its stomach. If we believe that it was still going to eat
that day we could say it had 18 voles that day. If the coyote
ate the same amount every day, and ate nothing else,
   a) how many voles could it eat in one week?
   b) how many voles could it eat in all of July?
   c) how many voles could it eat in a year?
   d) Do you think a coyote would always eat 18 voles a day? Explain your answer.

2. a) If the average vole weighed 50 gm (= 0.05kg), how many kilograms of food did
the coyote in question 1 eat in one year? Round your answer to the nearest 10 kg.

   b) Why would a biologist be interested in the number of kilograms of food a
coyote ate in one year? (HINT: How much does a cat weigh?)

3. A different biologist discovered that sheep make up 0.2% of a Fraser Valley
coyote's diet. Using the ROUNDED total yearly weight of food from question 2,
how many kilograms of sheep could the coyote eat in one year? Round this
number to the nearest kilogram.

4. a) If the average sheep weighed 45kg, how many sheep could the coyote eat in
one year? Use the ROUNDED answer from Question 3, and express your answer
as a lowest term fraction.

   b) What does the answer from question 4 a) tell biologists about coyotes and
their eating of sheep? What new questions come from these calculations?
Coyote Code

To answer the riddle you must answer the problems below. Each answer equals a letter. Place the letter above the correct number at the bottom of the page to solve the riddle (HINT: some letters come up more than once in the sentence).

"What do city coyotes do on the weekend?"

\[
\begin{align*}
23 & \quad 67 & \quad 91 & \quad 52 \\
+ 45 & \quad + 12 & \quad + 26 & \quad + 39 \\
\hline
68 & \quad H & \quad M & \quad D \\
\end{align*}
\]

\[
\begin{align*}
45 & \quad 82 & \quad 23 & \quad 35 \\
- 14 & \quad - 57 & \quad - 19 & \quad - 27 \\
\hline
W & \quad A & \quad I & \quad N \\
\end{align*}
\]

\[
\begin{align*}
4 \times 4 & = \\
3 \times 6 & = \\
5 \times 4 & = \\
6 \times 6 & = \\
\hline
E & \quad T & \quad V & \quad Y \\
\end{align*}
\]

\[
\begin{align*}
20 / 4 & = \\
15 / 5 & = \\
\hline
L & \quad O \\
\end{align*}
\]

THE 36 79 25 20 16 25 79 3 31 5 4 8 68

68 3 3 91 18 4 117 16

Why else do coyotes howl?
**Coyote Ecology Activities**

- Coyote and the Hare
- Coyote's Hunt!
- Barking Dog Game
- Garbage for our Grandchildren
- Coyote Neighbours
- Points of View
- Walk on the Wild Side
  - a) Birds and Bugs Nature Exploration
  - b) Map Making Activity
  - c) Word Pictures

The following *ecology-based* activities will enhance students' perception of the coyote (or any wild animal) as a part of an ecosystem. Concepts dealt with are:

- predator/prey relationships
- habitat, i.e. food, water, shelter
- seasonal changes in an ecosystem
- opportunism in wildlife
- wildlife communication and safety
- biodegradable vs. non-biodegradable additions to ecosystems
- “management” of wildlife populations.

Ecology is a major topic in the K-7 curriculum. Teachers may also incorporate these activities into their work on Social Studies (community problems, environmental issues).

These activities compliment the “Be a Scientist” work stations and Math Activities. They are based on role play, debate, research and observation. Most would be more effective if taught outdoors (even in the school yard!).

The Urban Coyote Video provides a good introduction to these activities. Students will not only be able to hear some of the coyote sounds but also meet people who fit into the groups for “Points of View.”
Coyote and the Hare

Activity Outline:
In this predator/prey relationship game, children play a wildlife version of freeze tag. Children acting as snowshoe hares collect habitat tokens from three stations that represent water, food and shelter. Other children are selected to act as coyotes that try to capture as many hares as possible by tagging them. Population levels of coyotes and hares are recorded after each round to show changes in the population demographics. Variations that deal with the effect of natural and human interventions on wildlife are suggested.

Learning Objectives:
- Prey and predator relationships are complex with multiple variables.
- Human and seasonal interventions affect wildlife populations.

Resources Required:
- Open playing field
- Class set of tokens to represent food, water and shelter
- 4 helpers for food, water, shelter and home stations
- Class set of arm bands (some different colours)
- Whistle (optional)

Procedure:
Begin with a brief discussion of the basic needs of a snowshoe hare, including range, food, water and shelter that together form a habitat. Discuss the hares' predators, such as owls, hawks, wolves, people and coyotes. Note that, all but humans rely on capturing prey like the snowshoe hare for survival.

Set up and rules of play:
Using a diamond similar in size and layout to a baseball diamond, set up three stations representing food, water and shelter plus a home base. Make sure there is sufficient space for students to run between each station.

A large group of students acts as the hares. They start at a home base and run to each of the three different stations. Each hare has to collect one food, one water token and one shelter token to live through each round. A round can represent a day in the life of a hare. A whistle can be used to signal the beginning of each round. A group leader at each station provides the appropriate food, water or shelter token for the hares to collect.

The children can run to each station in any order and finish by returning safely to the home base after collecting tokens from all three stations. The hares that make it safely to the home shelter survive to play the next round.

For the first round of play, two children are selected to act as coyotes using arm bands to identify them. The coyotes try to tag as many hares as they can, with tagged hares having to stand frozen and out of that round of play. Each of the three stations has a "home free" zone around it where the hare cannot be tagged.
Establish a 10 second time limit for staying in the "home free" zone.

After each round, the tagged hares become coyotes and the coyotes that were unable to tag anyone become hares. Play continues until one population decreases or the time is up.

After the last round of play discuss the cyclic nature of predator prey relationships. The total numbers of hares and coyotes after each round can be charted on a large graph to visually demonstrate this relationship. The children can provide feedback on what it was like to act as a hare or a coyote and the characteristics needed by these wild animals in order to survive.

**Variations**

A number of variations can be incorporated to demonstrate human and seasonal influences on wildlife populations. For example, you could designate one round as taking place in winter. Since snowshoe hares have the advantages of white fur for camouflage and large feet that act as snowshoes, they survive better in winter. Coyotes are not as well adapted for deep snow and must only walk for this round. The next round might be spring. This time the spring runoff washed out and flooded an area of the field, thus limiting their habitat space for running.

As an example of human intervention, hunters may be introduced into the game. Select two people to play hunters. They are allowed to tag either hares or coyotes to eliminate them from that round of play. Another human intervention could involve new housing developments. An area of the field can be designated out of bounds due to development, so that one of the stations is blocked off denying hares access to one of the tokens.

*Adapted from Quick Frozen Critters, Project Wild, see references section.*
Coyote's Hunt!

Activity Outline:
This activity examines the coyote's diet using role playing and observation techniques.

Learning Objectives:
- strengthen observation and recording skills
- gain empathy through role playing
- become knowledgeable about an urban coyote's diet

Procedure:
This activity may be done as a homework assignment or as an out of class excursion. One of the most important things that scientists do is observe nature. Although it is not safe to approach coyotes, we can still make some useful observations about coyote food sources.

Begin by discussing what coyotes like to eat. Have the students role play, either by asking them to believe they are a coyote and they need to find food to eat, or asking them to be a scientist observing a coyote's habitat trying to determine what the coyote diet may be.

Option 1:
Have the students, on their way to and from school, make a list of all the things they see that coyotes could eat. Once a list of about 20 different "foods" is constructed ask the students to cross off all the items that they would not want coyotes to eat (for example: people's pets, garbage...). Look at the list and see what is left. Pose the questions: Are there many "good" foods for coyotes to eat near where you live? Do you think that coyotes would find enough to eat in your area if the human sources of food were taken away?

Option 2:
Have the students make a poster, either showing the foods that would be good for coyotes to eat (for example: berries, rats...), or showing how they could stop coyotes from eating the foods that they crossed off the list.
Barking Dog Game

Activity Outline:
This is a class activity using coyote vocalizations as a means of communication.

Learning Objectives:
- listening and oral communication skills
- enhance cooperative learning through group work

Procedure:
Coyotes communicate with one another about food, danger, territory, mating, and injuries. They also greet each other and sing together. In this game students will try to communicate ideas using only coyote sounds. The list below (Swanson, 1994) shows some common noises and their meanings. Write this on the blackboard and have students practice the calls while examining the situations when these calls might be made. For example, a coyote has found some carrion and wants to tell her mate where she is or a coyote has been surprised by a person looking for a lost golf ball.

Variation:
In pairs or small groups have students invent some other coyote-like noises, and then try to have a conversation. Some or all of the groups could act out their coyote conversations in front of the class. See if the class can understand the conversation. It would help if students created a dictionary of their noises on the blackboard first.

Sound | Meaning
--- | ---
**(short distance)**
growl or huff | to threaten
woof | threaten or alarm
yelp (yi-eee) | to alarm
whine or woo-oo-ow | greeting

**Background:**
The scientific name for coyote, Canis latrans, means barking dog. The howls of coyotes sound lonely and haunting. It is difficult to know how many coyotes are howling at once or how far away they are. As a result, a lot of folklore has developed on the subject. One story says that coyotes howl down badger holes to confuse listeners about their position. Another asserts that coyotes have to jump up and down quickly so that their chests vibrate in order to howl at all. These two stories are not true, but coyotes' howls really are amazing. Coyotes have a range of more than two octaves when they howl!

Sound | Meaning
--- | ---
**(long distance)**
bark or bark–howl | threaten or alarm
howl | contact or respond
yip–howl | contact or greet
Garbage for our Grandchildren

Activity Outline:
This activity involves examining consumption patterns and waste disposal. Most of us are more conscious of our garbage today than we were ten years ago. As a result some people have a compost bin, several recycling bins, and a “regular” garbage container all cluttering the space under the sink. For others the effect has been only to produce a feeling of uneasiness at throwing a piece of slightly used, white paper into the garbage.

Learning Objectives:
- to become aware of the garbage we create as individuals and note alternatives
- practice observation and recording skills

Resources Required:
- plastic gloves, a ruler and tongs
- plastic bag full of garbage

Procedure:
Begin this topic on garbage by asking the students to help you investigate the classroom garbage can. Demonstrate how to observe and record the garbage without touching it, for example, using gloves and a ruler to search. Then ask the students to do the same activity at home, for as many days as you find appropriate. At the end of the time period have each student create a chart with their findings by listing the garbage items recorded that are degradable, and which are not degradable and will be with us for hundreds of years. Determine the number of students that have blue boxes and recycle and/or have composts. Do you see less garbage on these lists?

An alternative activity would have students imagine that space aliens or some future earth species are studying the archaeology of the twentieth century. If they start digging in our garbage dumps what will they find? What garbage items from your list would they find? What will they think our civilization was like?

Follow-up:
Once students are familiar with garbage contents, we can discuss how our garbage might affect wildlife. Begin with a plastic bag filled with garbage such as, a plastic six-pack holder, pop can tabs, battery, balloon, fishing lines, etc.. Take one item out of the bag at a time and ask the students how each item could affect wildlife and how to prevent it. An example would be birds getting tangled up in fishing line — the solution, to cut up the line into small pieces and seal them in a small plastic bag to ensure the pieces do not get blown away in the wind. Conclude the lesson with one of the following:

- Make posters to put up in the neighbourhood alerting people to the dangers of garbage to wildlife;
- Prepare a display of garbage hazardous to wildlife for an environmental fair or to present to other classrooms;
- Invite a wildlife rehabilitator to the class.
Coyote Neighbours

Activity Outline:
Coyotes are not the only wild animals that make their homes near people. This is a class activity in which students are divided into groups and research another wild animal that may be seen sharing the coyote's urban environment. Each group will produce a work station for the class to use.

Learning Objectives
- strengthen research, library skills
- enhance cooperative learning through group work
- expand knowledge of urban wildlife

Resources Required:
- library books
- magazines
- Bristol board or cardboard
- markers, crayons, etc.
- glue, tape

Procedure:
Brainstorm types of urban wildlife found locally. Divide the class into groups of five students. Have each group choose, or you assign, a wild animal that they might find in a local park. Have them research how it lives, in the wild and in the city. What does it eat? Where does it live? How does it raise its young? If it lives in a group, does it cooperate with other members of its group? What is its most unusual feature or behaviour? How does it interact with humans? (See Resources section for reference material.)

Have each group present their findings by creating a work station for the class. At each work station have the students construct a display illustrating their animal and providing background information.

Variations
You may want them to design activities such as a fact sheet, crossword puzzle, or a true and false questionnaire, so that the other groups can visit each work station and learn about a new urban wild animal. You could design an evaluation sheet and have each group evaluate their peers' work stations.
Points of View

Activity Outline:
Points of View is a role play simulation exercise using a civic forum to arrive at consensus and compromise over the issue of coyotes in the city.

Learning Objectives:
- empathy skills through role play
- cooperative learning
- oral presentation / debating skills
- understanding of decision making processes in civic politics

Resources Required:
- viewing of coyote video (optional)

Procedure:
As a class, brainstorm to make a list of all the people who might be affected by coyotes, for example: farmer, pet owner, vet, parent, wildlife officer, conservationist, etc.

Move into small groups, each group representing one of the people from the list, and choosing a point of view about coyotes that seems likely to be different from those of the other groups. Hold a debate between or amongst groups. One fun way to do this is to pretend to hold a town council meeting. The teacher is the Mayor. He or she has decided that there is so much public awareness of coyotes in the city that something must be done. Each group represents a different interest. You must try to persuade the Mayor of your group's point of view. Each group will speak for about five minutes, during which time each group member should take a turn speaking. After everyone has spoken, take a few minutes to consider what you have heard. Each group will then speak for one minute to sum up its argument or to rebut something that the other groups have said.

There are several ways to resolve the matter. Students could suggest some possible compromises and then vote, or the teacher could decide how a mayor or city council would decide to deal with the coyotes, given the information presented by the class. Your class could even write a letter to your mayor if you come up with a novel solution.
Walk On The Wild Side

a) Birds and Bugs Nature Exploration

Activity Outline:
This activity is composed of three parts, each of which can be done individually (with slight modification).

The first, is a short nature walk in a forest setting. The intent is to directly experience and participate in nature for a purpose other than recreation. The second activity has students exploring their school grounds by mapping their school yard and determining how to make it more wildlife friendly. The final activity is a nature reflection exercise involving the creation of a poem about nature.

Learning Objectives:

- nature appreciation and human connections to nature
- develop nature observation and recording skills and nature etiquette that promotes preservation
- develop skills in map making and surveying
- exercise writing and listening skills through poetry

Resources Required:
For walk:
- a natural wooded area
- nature field guides for birds, animals, plants and insects
- magnifying glasses and/or “bug boxes”
- a white piece of cloth (approx. 1 square metre)
- life size bird drawings or picture cutouts (optional)

Journals and Maps:
- pencils
- coloured markers
- white paper (8.5”x11” paper for journals; 11”x17” for map)
- stapler

Procedure:
Journal Making

Before the students go on their nature exploration have them create nature journals. By folding four sheets of paper in half and stapling, a booklet is formed. The students may decorate and label their journal cover (title, picture, date, name, class). On the first page have the students list what they think they may see on their nature exploration. The rest of the journal may be filled on the walk — students could record the animals and plants they discover by making an inventory list, diagrams, leaf or bark rubbings, or descriptions.
Nature Walk

At the beginning of the walk tell the students that they are naturalists for their school. Describe the role of a naturalist as a person who observes and records information on plants, animals and their environment. Explain some nature etiquette: be quiet on the walk so as not to scare any wildlife away, walk only on the trail so that the forest floor is not damaged; when spotting a bird, or any natural object of interest, stop and put a hand up until everyone sees the object. Bring along nature field guides to help the students identify any plants and wildlife that are discovered.

What to talk about along the walk? If you use the bird cut-outs stop and discuss the bird species such as, name, where it feeds, what it eats, adaptations, etc. Bird species found in a B.C. Coastal Hemlock forest include the Sparrow, Dark-Eyed Junco, American Robin, Swainson's Thrush, Black Capped Chickadee, American Crow, Stellars Jay, Hairy Woodpecker, Great Horned Owl, and Cooper's Hawk. The trees or plants near the birds can be discussed as to their names and how they function in a forest (i.e., canopy vs. the undergrowth, shelter in dead trees, decaying vegetation and fungi supporting the food chain, homes for insects, food for birds, etc.) Also, a white cloth and bug boxes can be used to observe the insects and spiders found in the forest. Place the cloth under a small shrub, gently shake the branches and observe the insects or spiders that fall on the cloth. Differences between spider and insect anatomy and the role of insects and spiders in the forest and as food for birds can be discussed. Make a point of returning the animals unharmed to their original location.

b) Map Making Activity

You may not have access to an urban forest and may want to have the students explore their school grounds. Students can create a map of the school grounds and record the plants and animals they see. A class discussion could take place on how to naturalize the grounds in order to attract wildlife.

During the school yard exploration students can pace off distances or use a tape measure to create a scale map of the school yard. Once back in the classroom, they can work in small groups or individually to create a ‘good copy’ of their maps. Describe the basic requirements for a map, such as a title, legend, border, scale and indication of north. Instruct the students to record on the map all the natural features they discovered on their tour of the grounds. When the maps are completed, discuss how the grounds can be made more ideal for the wild plants and animals. Let the children express their ideas on naturalizing the grounds by making a new map, posters, or writing a report.

Some schools may incorporate the children’s vision by carrying out a school ground naturalization project. For more information seek the help of an organization such as the Evergreen Foundation (listed in the Resources section of the guide).
c) Word Pictures

Activity Outline:
Nature is a source of creative inspiration for many gifted writers and artists. Using the Japanese Haiku form of poetry students create an image of nature with words. A Haiku uses simple direct words without extra imaginative references such as metaphors or similes. A proper Haiku usually consists of 3 lines, with 5 syllables in the first line, 7 in the next and 5 in the final line. However, for beginners it may be easier to count words than syllables. Students can follow the structure of 5 words, 7 words and 5 words per line.

Learning Objectives:
- creative self-expression
- understand different modes of creative literary expression
- gain an aesthetic appreciation for nature

Resources Required:
- “Word Pictures” worksheet (following page)
- nature poetry (optional)

Procedure:
Option 1: Read to the class examples of Haiku. Write the line structure on the board and discuss. You may wish to do one together to begin with. You can provide the first line and have students volunteer the remaining lines. Have students sit quietly for a moment to picture in their minds the nature image or experience they wish to write about. Share finished poems with the class, display them, or make a booklet for parents (or as a gift to a visitor to the class). If students experience difficulty getting started, a webbing exercise around an animal or an aspect of nature may help elicit descriptions and characteristics of that key word. Students may also use their nature journals (previous activity) to use as inspiration and to record the Haiku.

Option 2: Have students follow the instructions on the worksheet to create their Haiku based on their own experience of either the nature walk (preceding activity) or from inspiration gained by reading nature poetry (see references at bottom of page). This activity links with the “Brainstorm About Coyotes” suggestion in the “Getting Started” section.

References:
Booth, David and Bill Moore, Poems Please!: Sharing Poetry With Children (Markham, ON: Pemboke Publishers), 1988.
Till All the Stars Have Fallen, David Booth, ed. (Toronto: Kids Can Press), 1989.
Levy, Constance, I'm Going To Get A Worm Today and Other Poems.
Word Pictures Worksheet

You don't need a camera to capture an image you want to remember from your nature walk. You can make a snapshot with words by writing a Haiku.

Haiku, a form of poetry from Japan, is specially suited to images of nature. A haiku is made up of 3 short lines using simple wording. Below are some examples of Haiku poetry.

Haiku Example:
by Jacquie Pearce

Above our heads
wittering birds spiral down
through cedar branches

On the first day of spring
buds bursting
on the maple tree

Write a Haiku.

__________________________________________

__________________________________________

__________________________________________
Coyote Math Activities

- **Math Activities**
  - Predator Math
  - Predator Math2
  - Coyote Code

The following Math activities are designed to integrate further detailed knowledge of coyotes and in particular, their diet. Critical thinking and analysis questions are placed within the worksheets so that students not only think about the relevance of their results but also strategies they used to get an answer.

The learning objectives of all three activities is to recognise and understand the connections between various forms of knowledge.

**Predator Math (grade 4-5)**

Predator Math consists of word problems related to coyotes. The first four problems require simple addition, subtraction and multiplication. Problem 4 is more difficult; it could require a two-step solution of addition and division. Students are encouraged to explain how they reached their answer and how else they could have got to the answer.

**ANSWERS:**
1. 126 voles
   2. a) 18 pups, b) 108 pups, c) 90 pups
   3. a) 28 kg, b) 42 kg, c) 112 kg
   4. 6 coyotes

**Predator Math2 (grade 6-7)**

Predator Math2 consists of a progressive series of word problems that has a student build up an understanding of the use of mathematics in researching the diet of a coyote. The students work from the number of voles a coyote eats in one day to the number of sheep that a coyote eats in one year. The fact that the answer is a fraction of a sheep leads to an analysis of the meaning of the results as well as an analysis of the methodology. It can be linked to the role play activity "Points of View" or the "Be a Scientist" activities.

**ANSWERS:**
1. a) 126 voles, b) 558 voles, c) 6570 voles
   2. 328500gms or 328.5 kg, rounded to nearest kg = 329kg
   3. 0.658kg rounded to nearest kg = 1kg which is...
   4. a) 1/45 of a sheep.

**Coyote Code (grade 4-5)**

This worksheet tests addition and subtraction of two digit numbers, multiplication up to the 6 times table and division problems using a single digit divisor.

**ANSWER:** THEY HAVE A HOWLING GOOD TIME.

Further math activities such as shapes and data analysis are contained within the “Be a Scientist” workstations.
Section 4

Urban Wildlife Action
Urban Wildlife Action

Do Not Disturb!

Observing Wildlife Without Harming

No one likes having their space messed up by someone else — whether it's their bedroom, play room, sports field or classroom. The same goes for animals. They don't want people dumping garbage or destroying their space.

The rules for observing wildlife are simple. Leave wildlife alone. Whatever you discover should be left where it is — not just for others to enjoy, but because it has a role in nature.

Nature Observer's Rules:

- Be careful where you step, nature is all around you
- Only walk on established trails
- Ride mountain bikes only on designated trails
- Don't approach wild animals. Getting too close to animals can be dangerous to you and the animals. Animals such as nesting birds, rabbits, and deer are easily stressed by people.
- Keep pets on leashes or leave them at home. Dogs like to chase things and can easily injure or kill a wild animal.
- Always leave the place you visit the way you would like to find it – clean of all garbage
- The only souvenirs you should take from nature are photographs and memories.
- Report people abusing nature. If you see others bothering animals or dumping garbage report them to the police or your nearest conservation officer.

Now it's your turn!

Option 1: Make a list of all the ways you could encourage people to follow the Nature Observer's Rules. Then reorganize them from most useful to least useful and explain why.

Option 2: Go for a walk with a friend and list at least 5 examples you see of people, pets, cars or businesses harming or threatening nature. Make a decision to do something about at least one of them.
Don’t Feed the Animals!

Whether you are in a city park or on a mountain top – don’t feed wild animals no matter how friendly or hungry they seem. In the city of Vancouver, it is against the law to feed wild animals in parks, on streets or sidewalks – on any city-owned land!

Feeding animals creates overpopulation problems. This is because animals have ways of regulating the number of offspring they have based on the available food supply and the number of predators. The term for this is carrying capacity. This means that in a given area only a certain number of animals can live because of the available food supply. If people interfere in this process by feeding a select group of animals, an imbalance occurs. When there are too many animals in a small space, such as ducks in a pond, the chances of disease spreading are much greater – both to the ducks and to people. Also, the animals become a problem for people because the animals must find homes and they move into our spaces.

Also, when there is an overpopulation of one animal species more predators are attracted to the area, such as coyotes. If animals such as ducks or squirrels lose their predator instinct (fear) because of our feeding them, they become easy prey to predators like coyotes, hawks and owls. We are not helping wild animals by feeding them.

The best thing for animals is to make our parks, back yards and school grounds nature sanctuaries where animals can live and feed on natural sources of food.

Tips For Viewing Wild Animals

- Most animals are active early in the morning and at dusk
- Check the season – different animals are only out at certain times of the year
- Keep silent and still – most animals will stay away if you make any sounds
- Use a covered or protective blind to view animals – let nature come to you
- Be patient – animals are cautious, waiting to move only when they know it is safe
- Using binoculars and magnifying glasses helps to get closer to nature
- Bring a field guide to help identify what you see

Now it's your turn!

1. Choose a place in your city or neighbourhood where there is wildlife habitat. Observe it in the early morning and evening to see what species inhabit it.
2. Work with teachers and parents to create a wildlife viewing area at your school. (It can be as simple as protecting an area with some trees and shrubs that birds like to inhabit.)
3. Design a logo or symbol to put on signs at wildlife viewing sites that will let people know not to just where but how to view.

Animal Homes

Help, There's A Skunk Living Under My Porch!

Animals need warm, protected places to sleep and live just as we do. Nests, ant hills, squirrel's nests, and burrows are all places where animals live. Sometimes they make their homes in places that are not convenient or desirable – like attics or under porches of people's houses.

Urban wildlife will take advantage of any warm, dry and defensible area that is made available to them. The best protection against any unwanted wild guests is to change your home to limit their access.

Here are some suggestions from the Urban Wildlife Committee of Vancouver.
House:
- Keep roof in good repair. Check for loose shingles and rotten areas.
- Keep gutters clean and in good condition.
- Cut back overhanging tree branches to limit access.
- Cap chimney with heavy wire mesh.

Yard:
- Keep garbage well contained or inside. Mask odours with bleach.
- Trim low shrubs near the house.
- Stack wood piles off the ground.
- Do not feed any wildlife such as raccoons or squirrels.
- Check house and shed foundations and under decks for access points.

Pet Protection:
- Keep pets inside at night.
- Feed pets inside.

Trapping and relocating an animal is not a long term solution to the problem. Once a wild animal is removed, another will soon replace it, especially if nothing is done to change the home. The relocated animal may also have a hard time adapting to a new area where they have to compete for limited food with the animals that already live there.

If you do find a nest or den in your home, first check for babies. Leave babies and mother alone until the young are old enough to leave on their own. Adult animals can be encouraged to leave, and preventative repairs can then be done.

Now its your turn!

Can you create a slogan to help the Urban Wildlife Committee get its message across to other students?

“Hey! An Injured Animal!”

If you come upon an injured animal and your immediate response is to help — good for you. The animal needs help, but you should not attempt to handle an injured animal yourself. Call for help from an adult.

Handling injured animals is a risky job that should only be done by people trained and equipped to do so. Even an injured mouse can give a nasty bite. The animal doesn’t understand your intentions and most animals will react as though they are being attacked. They may fight with teeth and claws, unless they are so hurt they cannot defend themselves.
The injured animal needs proper attention as quickly as possible. If the animal can be easily handled, have an adult take the animal to a wildlife agency, the Society for the Prevention of Cruelty to Animals (S.P.C.A.) or to a veterinarian qualified to tend to wildlife. Remind the person to wear gloves, a long-sleeved shirt and boots, and to use a towel or blanket to wrap the animal. This will protect the person and the injured animal from further injury.

If the animal is large or very active do not attempt to capture it. Call a wildlife agency to attend to the animal. If possible, try to control the animal and monitor its movements until help arrives. Always move slowly and act calmly. Do not shout or make loud noises. Keep people from crowding too close to the animal because it is already very frightened from the injury.

Never attempt to treat an injured animal yourself. All wild animals have special diets and care needs. For example, feeding inappropriate foods such as bread, cookies, or milk could further harm the creature. There are other reasons for not trying to treat animals yourself. Some animals may be sick with a disease that could be passed to people. Also, there is the risk of releasing an animal back to the wild that has a disease that could spread to other wildlife. Trained wildlife rehabilitators check the health of the animal and treat any injury or disease before it is released.

Animals can also imprint on people, meaning they become dependant on people for their food and protection. This prevents the animal from ever being released back into the wild.

Lastly, it is against the law to keep wild animals in captivity for more than 24 hours without a special permit. Native birds and mammals cannot be kept as pets. This law is meant to protect both people and wild animals.

A Bird Hit Our Window!

In urban areas birds sometimes hit windows and appear injured or be unconscious. In most cases, the bird will recover in a short period of time. You can place the bird in a protected place, perhaps near some rocks or shrubs and watch to see if it revives. It may take anywhere from 15 minutes to half an hour.

If the bird has an injury to its wings or feet, or does not revive within an hour after hitting the window, it needs expert help. Prepare a box lined with a towel or paper towel (not wool as the bird's feet might get tangled). Approach slowly with a towel or soft cloth in hand. Drop the cloth over the bird so that you can gently pick it up. Place the bird in the box. Cover the box.

Do not attempt to feed or give water to the bird. Transport it to a care facility as soon as possible.

Always wash thoroughly after handling a wild animal. Be especially careful to wash any saliva the animal may have left on your hands as there is always a possibility the animal could have rabies (see our rabies section). If
you are bitten or scratched by an animal tell an adult, wash the wound right away and visit your doctor immediately.

Now it's your turn!

To help prevent birds from hitting the windows in your school or home cut out animal shapes and place them on the windows. This will help birds recognize windows?

Hey! I found a baby animal!

You should leave orphaned animals alone. When in nature the rule is to look, learn and leave alone. (If it is a bear cub or other predator species, leave the area immediately. You are in danger if you remain close to a predator’s young.) Every animal has different ways of caring for its young; Typically, parents of wild animals will hide their young while they go out to look for food. Touching a baby animal or even getting too close will leave human scent on or near the animal. This may scare the parents away, so stay clear. The animal’s best chance for survival is to remain where it is – untouched. If you were to take a baby animal home and call a wildlife agency they would tell you to return the animal to the exact same spot you found it. This is because they know that the parents of the animal are likely to come back and care for their young.

If you are concerned that the animal truly has been abandoned, note the location of the animal and leave the area. Come back in 12 hours and see if the animal is still in the same location. If the animal is still there (and is not living in a den or burrow) then the animal may well be abandoned. Have an adult call your local wildlife authority and ask them what to do.

Cool! A baby bird

When it comes to birds, scent is not the most important issue – it is the stage of the bird’s development. If you find a baby bird don’t immediately pick it up. Stop and look at it closely. If it is a bird with feathers, it is likely a fledgling. Chances are the parents know the bird is out of the nest because it is ready to leave the nest. The parents are probably close by gathering food and will return to feed the young bird. The parents may even be calling and squawking near by, alarmed at you being so close to their
young. The best action is to leave the area and make sure cats are inside. Most birds do not have a well developed sense of smell (exceptions are turkey vultures, buzzards, eagles, and gulls). Therefore, most birds are not affected by human scent. A baby bird (one with almost no feathers) that has fallen from a nest can be safely returned to the nest without fear that the parents will reject it. Have an adult put the bird back in the nest, as great care must be taken that the bird is not injured. If it is not possible to safely reach the nest, contact your local wildlife shelter for advice.

Now it's your turn!

Now that you have learned so much about coyotes and urban wildlife help other people learn as well. Your mission is to encourage coexistence with wildlife! You could develop a personal plan to take action at home or in your street. Or a group (or the whole class!) may want to look at a plan for your school. You could prepare a display or an urban wildlife fair.

Some Careers with Animals

Do you want to work with animals? Here are examples of some jobs you might consider...

Veterinarian

Veterinarians provide medical care to animals — pet, farm and wild animals. They also tell people how to care for their pets. They treat many kinds of diseases and also perform operations on animals including spaying and neutering. Many veterinarians are also trained to care for injured wild animals. Becoming a veterinarian usually requires eight years of university training — similar to becoming a medical doctor for humans.
**Animal Health Technician**

After two years of college training an animal health technician may work as an assistant to veterinarians. They may work in SPCA shelters, private practice, research, wildlife facilities, zoos, veterinary laboratories, government agencies, and feedlots. They work with a wide range of animals — domestic, exotic, and farm animals.

**Society for the Prevention of Cruelty to Animals (S.P.C.A.) Worker**

The S.P.C.A. is an organization that takes care of animals that are lost, injured or unwanted. They also try to prevent people from mistreating animals. Most S.P.C.A. workers are employed in an animal shelter, looking after the animals and trying to find homes for them. Other S.P.C.A. workers are trained as Special Provincial Constables to investigate acts of cruelty to animals.

**Wildlife Rehabilitator**

A wildlife rehabilitator rescues injured wild animals and nurses them to health in order to return them back to their natural habitat. Working closely with veterinarians, rehabilitators provide 24 hour care administering medication, feeding animals, and giving them exercise. During an oil response crisis wildlife rehabilitators are at the scene cleaning oiled birds. Other duties may include observing and recording information on wildlife, preparing reports for government officials, and providing educational material to the public. A wildlife rehabilitator might take a 2 year college course in wildlife management or as a biological technician, or an animal related science.

**Zoo Keeper**

Zoos often have different specialists to look after mammals, reptiles, and birds. Zoo keepers are usually experts in at least one of these areas and help take care of animals. Their duties include feeding, weighing, bathing, and monitoring the health and behaviour of animals in the zoo. They may also administer medicine to sick animals. A zoo keeper requires a university science degree specializing in biology, and/or an animal technician diploma from a college.

**Dairy Farmer**

Depending on the size and mechanization of the farm, dairy farmer duties may include: milking cows, cleaning milking machines, tending to sick cows, computer use to manage the business of the farm, and maintaining and repairing equipment. Some dairy farmers grow corn and alfalfa to feed their cows. This work requires a tractor and other expensive equipment, fertilizers and seed. Courses in agriculture and business are useful, though direct experience working on a farm is the best training.
Conservation Officer

A conservation officer is responsible for the management and protection of wildlife. They might monitor the population of a species of animal, investigate the trade in wildlife products, or patrol wildlife areas making sure animals are not hunted or removed illegally. To be a conservation officer requires a university science degree, usually in biology.

Marine Mammal Trainer

Marine mammal trainers take care of dolphins, seals and whales. They work in an aquarium caring for the animals, and training them to respond to human commands. Marine mammal trainers may also assist in marine mammal rescues. Trainers would require a university degree in marine biology including courses in animal behaviour.

Animal Illustrator/Artist

An animal illustrator is an artist who creates pictures of animals for books, greeting cards, posters and advertisements. Illustrators have to research the animals they are drawing. This may involve obtaining dried species specimen trays from museums, going to the library for books on the animals’ behaviour and image, or simply walking outside and doing some sketches. Many illustrators work independently selling their work to companies and organizations. Some animals artists are self-taught but going to art school at university or doing a commercial art degree at a technical school makes a person more qualified and adaptable as an animal illustrator.

Pet Groomer

A pet groomer bathes, combs, and clips pets – mostly cats and dogs. These animals enjoy flea shampoo, nail clipping, and getting their ears cleaned. Groomers also may participate in dog shows. There are colleges and technical schools offer grooming courses, which also include management and shop setup. These courses are usually a few months long.

Heritage Interpreter

Heritage interpreters help the public understand and appreciate nature, wildlife and our heritage. They can work in a variety of places such as parks, museums, aquaria or may even lead expeditions and tours of wildlife-rich remote areas.

Naturalist

Many people are naturalists as a hobby, and their expertise is based on direct observation and reading about animals and their habitats. Some people study biology at university to become professional naturalists.

Other Animal Careers

Aquarium worker, breeder, fish and wildlife biologist, migratory bird bander, nature interpreter, microbiologist, nature photographer, outdoor guide, trainer, zoologist and fisheries technician.
Example Careers in Environmental Conservation

Environmental Engineer
Environmental engineers help companies to prevent and clean up pollution. They the way water moves through the ground, and how chemicals can affect wildlife. Some environmental engineers design ways to clean up dirty water before it gets to the ocean or into the water we drink. Others show factories how to clean up the smoke that comes from their chimneys to help to keep our air clean.

Urban and Land Use Planner
Planners decide how people are going to use land. They usually work for the government. Planners may decide which land is to be saved for parks or as wildlife areas. They decide how many roads there will be and where they will go. Some make long term plans about how to fit all of the people into a city or other area without destroying wild areas.

Other Careers in Conservation
Chemist, civil engineer, environmental officer, fish and wildlife biologist.

Now its your turn!

Pick an animal related career that interests you and interview someone in that field. Ask them what special training or experiences are important for their position. Share your findings with your class.
Further Reading About Coyotes


Section 5

Resources
Books

Fiction:


After Samantha hits a bird with a rock, she finds herself turning into a bird and experiences things from a bird's perspective. This is a fictional story with nonfiction information side bars about birds. Samantha learns about backyard birds and the dangers they face in cities and on the migration.


Coyote Cry tells the story of a boy's growth from hatred to understanding. He lives on a sheep farm with his grandfather. One night a coyote attacks the sheep and steals the farm dog's new pup. The boy wants to hunt the coyote to kill it, but his grandfather, who is more attuned to his environment, explains why the coyote is not the enemy.


Survival is a never-ending struggle. Two Coyotes is a snapshot of coyotes' lives in the wild. The story spans one year, but the author emphasizes that surviving one year does not guarantee continued survival through the next. A rather bleak look at the lives of coyotes, Two Coyotes might upset some children, but teachers should point out that the coyotes did survive the winter and that each new day is a triumph. This story is suitable for grades six and seven.


Fire Face is the retelling of a Californian native legend stressing the importance of the natural world and our need to live cooperatively with it. Detailed watercolour illustrations bring the tale to life.

King, Thomas, Illus. by William Kent Monkman 199_. A Coyote's Columbus Story.

This offbeat coyote legend puts a new twist to the history of Columbus's arrival to North America. It is unusual to see elements of modern dress, technology and customs in a traditional-style legend, yet the overlap of worlds is in keeping with Coyote's traditional ambiguous and playful nature. This picture book is a good starting point for an exercise in creating new legends to explain things in today's world.


Coyote is a trickster, a lecherous villain, and the saviour of the human race. In Giving Birth to Thunder, Sleeping with his Daughter, Barry Lopez retells a series of First Nations legends in which Coyote plays a number of different roles. The stories are disparate in length as well as subject. The reading level is intermediate and up, but teachers may feel that some of the stories would be more appropriate for older readers.


Coyote Steals the Blanket is a story with a moral: Don't take what does not belong to you, and don't be arrogantly proud. The large, colourful pictures would interest primary students, and the story is simple. Coyote steals a blanket for a cloak and is chased around by a large rock until he gives it back.


A version of the Coyote legends retold for children, Tales from Native America emphasizes Coyote's travelling. In each story he makes "tracks, tracks, tracks," much as real coyotes do. The colloquial style and simple line drawings will appeal to intermediate students. The moral or point of the stories is often unclear, as the focus of the book is more entertainment than education.

A young girl and her mother notice the wild creatures living in their city neighbourhood. Although this is a picture book directed at primary age children, the nature details in the text and the vibrant illustrations will capture the imaginations of older students as well. Students with patience and an interest in visual games will be challenged to find hidden letters within the illustrations. The book includes factual details on the animals at the end of the story.


Meet Tricky Coyote! consists of four short stories with obvious morals. The author has included the source and context of each story for the teacher's benefit. The colloquial text is printed in large type, with colourful illustrations. Primary and intermediate students may enjoy reading this book by themselves.

Non-Fiction:


Wild Dogs is a general reference book covering the 8 species of foxes, wolves, and coyotes in North America. The spectacular colour photographs and easy to read text make this a perfect reference for intermediate students.


Keepers of the Animals is not just an activity book. Each chapter begins with a legend and then discusses the concepts arising from it. The authors have provided an extensive set of activities to help children understand the real animals and processes depicted in the stories. The tone of the book emphasizes the interconnectedness of nature. The legends are written at an intermediate reading level, but teachers could read them aloud to younger children. Students of all ages will enjoy the stories, information and activities. The volume is probably best used selectively by the teacher to add richness to a study of animals, nature, or human-animal relationships. See also Keepers of the Plants and Keepers of Life.


An ideal book for mature grade seven or older students interested in understanding how a rehabilitation hospital functions and to discover what it would be like to work as a wild-bird rehabilitator. The book consists of true stories about wild bird patients including loons, pelicans, herons, ducks, geese, hawks and more, that Kit Chubb and her husband nurtured back to health and released back into the wild. This book would tie in well with a career planning unit.


Grades 5 to 7. Alligators, Raccoons, and Other Survivors contains practical information about urban wildlife, human-animal relationships, protected animals, and "pest" animals. Both Canadian and American examples are used. Although the reading level is upper intermediate, the information could be used at any grade level.


The Nature of Coyotes contains amazing photographs of coyotes. The text is informative without being tedious. Teachers may want to guide students through the later part of the book, however, since the author moves from fact to unsourced opinion.


A good general reference suitable for grades 4-5.

Living with Wildlife answers all sorts of questions about urban wildlife. Developed by the California Centre for Wildlife, this 340 page book is a hands-on reference detailing how to deal humanely with over 100 species from raccoons and skunks to coyotes and cougars. Even birds and rodents are covered. Included are chapters on making your yard wildlife-friendly, securing your home from wildlife intrusions, and caring for wildlife in distress. Living with Wildlife provides a positive resource of information for intermediate level teachers and students who are researching wildlife.

This general reference is suitable for all intermediate level students.

Students will enjoy the short essay-style descriptions of how ten different animals have adapted to life in Canadian cities. Swanson highlights each animal's most characteristic feature, from coyote song to skunk smell. She also shows how the behaviour of urban animals is related to their behaviour in the wild, and includes anecdotes to illustrate the ways in which animals incorporate artificial objects into their lives. Illustrated.

This activity book helps kids explore the natural wonders in their own back yards whether they live in the city or the country. The book examines creatures such as slugs and insects that are often overlooked.

Written for an intermediate level audience Coyotes describes the physical characteristics, family structure, and hunting methods of coyotes. Plenty of colour photographs illustrate the major topics.

**General Reference Books**


This book provides comprehensive information on mammals in Canada. There are photographs and illustrations of animal tracks throughout. It is considered one of the most thorough and respected books on Canadian animals.

**Videos**

Veterinarian and animal behaviour expert Dr. Michael Fox describes the behaviour patterns, communication, and emotional states of dogs and relates this to wolves. Best suited to upper intermediate and beyond. Cost: $20.00US Item Number: AV13-P. HSUS, 2100 L Street, NW, Washington, DC 20037.

Pets and Their Wild Relatives — 1989 (15 min) National Geographic Society.
Early Intermediate
This video compares and contrasts pets to their wild counterparts. Widely available at local libraries. Cost: $96.75 Item Number: AS1369. 1-800-268-2948 (toll free 9:00-4:30
Those Wonderful Dogs — 1989 (59 min.) National Geographic Society
This engaging video portrays the close relationship between humans and domestic dogs. The abilities of sheepdogs, rescue dogs and assistance dogs are featured. Widely available at local libraries. Cost: $29.25 Item Number: A51408. 1-800-268-2948 (toll free 9:00-4:30 EST) National Geographic Society, Educational Services, Suite 210, 211 Watline Ave. Mississauga, Ontario L4Z 1P3.

Wild in the City — 1985 (15 min) National Film Board.
This video provides an overview of wildlife found in the city of Vancouver, B.C. Birds such as starlings, pigeons, gulls, ducks, geese and owls are featured, as are urban mammals including skunks, raccoons, bears, coyotes, and deer. It is ideal for intermediate audiences.

Environmental Education Journals/Resources

Clearing: Environmental Education in the Pacific Northwest (5 issues per year)
This journal is a collection of ideas, activities and resources for teaching about the environment. Contact: Environmental Education Project, 19600 S Molalla Ave, Oregon City, OR 97045 (503) 656-6155 (Fax is same). Cost: $20CND/yr.

Green Teacher (5 issues per year)
A Canadian journal for environmental educators, Green Teacher features practical and theoretical articles on subjects ranging from social justice and peace education to humane and environmental education. The articles are directed to teachers of all grade levels. GT: 95 Robert St., Toronto, ON M5S 2K5 (416) 960-1244 fax (416) 925-3474. Cost: $27.00/yr.

Green Brick Road
Green Brick Road is a non-profit group acting as a distributor of environmental reference material specifically to educators. Their free catalogue lists hundreds of theme units, books, games, etc., designed for classroom use. Green Brick Road, c/o 8 Dumas Court, Don Mills, ON M3A 2N2 1-800-477-BOOK.

Rubber scat, and rubber paws for making tracks can be purchased from:
Acorn Naturalists
17300 East 17th Street, #J-236
Tustin, CA 92680
Phone: (800) 422-8886
Fax: (800) 452-2802

Coyote Websites

Coyote Facts — ngp.ngpc.state.ne.us/wildlife/coyotchtml
This page by the Nebraska Game and Parks Commission provides general information on coyotes — their appearance, distribution, abundance, habitat, habits, foods they eat and mortality rates. An added feature is a sound file you can download to hear a coyote howl. Some of the information pertains only to coyotes in Nebraska.

Urban Coyote —
www.interchg.ubc.ca/kwebber
This site explains why coyotes are in the city of Vancouver, British Columbia. It provides a general description of coyotes (through photographs and text) — what they eat, when they are active, and how people can co-exist with coyotes.

Wildlife, B.C. Ministry of Environment, Lands and Parks —
This site provides information on conservation issues, habitat status and provincial wildlife statistics. The site
also provides links to other sites on environmental issues such as water and air quality.

Urban Wildlife/Animal Related Organizations

Wildlife Education Classroom Programs

**Canadian Wildlife Federation**
2740 Queensview Dr.
Ottawa, ON K2B 1A2
Phone: 1-800-267-2286 (ON, QUE, Atlantic Provinces)
1-800-563-9453 (rest of Canada)
Fax: (613) 721-2902
Website: http://www.toucan.net/cwf-fcf/cwhomc.html

Wildlife programs include Habitat 2000, where students use a hands-on approach to wildlife habitat conservation; and Project Wild (see below for details).

**Evergreen Foundation**
Suite 106 - 163 West Hastings Street
Vancouver, B.C. V6B 1H5
Phone: (604) 689 - 0766
Fax: (604) 689-0768
E-mail: info@evergreen.ca
Website: http://www.evergreen.ca

Provides workshops for teachers, administrators, and parents on school ground naturalization. Learn how to restore and protect natural areas in the urban environment through education and community action.

**Fisheries and Oceans**
Salmonid Enhancement Program
555 W. Hastings St.
Vancouver, B.C. V6B 5G3
Phone: (604) 666-6614

The Salmon Enhancement program enables students to learn about the life cycle of a salmon by having them raise salmon fry in the classroom for release to the wild.

**Federation of British Columbia**

Naturalists
321-1367 West Broadway
Vancouver, B.C. V6H 4A9
Phone: (604) 737-3057
Fax: (604) 738-7175

Promotes understanding and enjoyment of nature through educational field trips, camps, lectures, and publications.

**Northwest Wildlife Preservation Society (NWPS)**
Box 34129, Station “D”
Vancouver, B.C. V6J 4N3
Phone: (604) 736-8750
Fax: (604) 736-9615
Email: nwps@direct.ca

NWPS offers 10 different slide shows to elementary audiences including topics such as endangered wildlife and bears in B.C. NWPS encourages balanced wildlife management programs which preserve healthy wildlife systems.

**Wild Education**
Ministry of Environment, Lands and Parks
300–1005 Broad Street,
Victoria, B.C. V8W 2A1
Phone: (604) 356-7111
Fax: (604) 356-0985
or toll free call Enquiry BC at 1-800-663-7867 and ask for Project Wild

The programs include: Project WILD, Backyard Biodiversity, Ground Truth Studies, Naturescape, Waterstewardship, Wildlife Trees in B.C. and Protected Areas. Teachers who participate in a workshop receive comprehensive teacher’s manuals with classroom activities. (All grade levels.)

**Stanley Park Ecology Society**
Nature Experience and Conservation Committee
P.O Box 5164
Vancouver, BC V6B 4B2
Phone/Fax: (604) 688-2055
Phone/Fax: (604) 689-0612 (Ed.)

Conducts programs for students to encourage understanding of wildlife. Supports and participates in wildlife conservation and survival programs.

**Sage Foundation**
Offers the Destination Conservation program for schools - a practical, activity-based three-year program that enables students to take a hands-on approach to environmental education in their school, while reducing school operating costs.

Rainforest Reptile Refuge
1395 176th Street
Surrey, B.C. V4P 1M1
Phone: (604) 538-1711
Elementary/Intermediate classes may visit this shelter for neglected and abused reptiles and amphibians or sponsor a habitat at the shelter. This non-profit facility provides care, rehabilitation, conservation and public education.

Vancouver Aquarium
Stanley Park
P.O. Box 3232
Vancouver, B.C. V6B 3X3
Phone: (604) 631-2512
Fax: (604) 631-2529
The Vancouver Aquarium offers many school based programs including a mobile aquarium which visits school districts to enable students to study intertidal organisms.

Vancouver Regional S.P.C.A.
Branch Youth Program
1205 East 7th Ave.
Vancouver, B.C. V5T 1R1
Telephone: (604) 263-4963 or 323-2775 Fax: (604) 263-4918
The Youth Program consists of humane education workshops, volunteer work, summer camps, school programs, and youth club activities available to students in the Lower Mainland. The school visitation program is for all grade levels and offers an opportunity for students to have direct contact with dogs.

World Wildlife Fund Canada
Suite 504, 90 Eglinton Ave East
Toronto, ON M4P 2Z7
Phone: 1-800-26-PANDA E-mail: general@wwfcanda.org
Offer elementary level Schools for Wildlife programs. Students learn about Canadian endangered species, rainforests, and conservation through fact sheets, posters, activity books and videos.

Organizations that Provide Information Resources

Animal Alliance of Canada
#101 - 221 Broadview Street
Toronto, ON M4M 2G3
Phone: (416) 462-9541
Produces a newsletter called Take Action with current information on animal issues, often featuring Canadian wildlife. Animal Alliance is an activist animal organization committed to the preservation and protection of all animals and to the promotion of a harmonious relationship between people, animals, and the environment through research, education, advocacy and legislation.

B.C. Ministry of Environment, Lands and Parks Wildlife Branch
Lower Mainland Regional Office
10334 – 152 A Street
Surrey, B.C. V3R 7P8
Phone: (604) 582-5224
Provide information pamphlets on bears, raccoons, and coyotes. The Wildlife Branch of Environment Canada manages the province's wildlife resources for the benefit and enjoyment of current and future British Columbians by maintaining an optimal balance between ecological, cultural, economic and recreational needs.

Canadian Federation of Humane Societies (C.F.H.S.)
#102 - 30 Concourse Gate
Nepean, ON K2E 7V7
Phone: (613) 224-8072
Fax: (613) 723-0252
Email: cfhs@magi.com Website: http://infoweb.magi.com/~cfhs
C.F.H.S. is a national animal welfare umbrella organization representing over 100 humane societies across Canada. For over 35 years, CFHS has worked with government and industry on a wide range of animal welfare issues. They produce fact sheets and newsletters on animal issues, including urban wildlife.
Environment Canada
Canadian Wildlife Service, Pacific and Yukon Region
P.O. Box 340
Delta, B.C. V4K 3Y3
Phone: (604) 946-8546
Fax: (604) 946-7022
Provides information booklets on what we can do for wildlife, and the benefits of wildlife. They also have pamphlets on urban wildlife such as coyotes, wolves, cougars, bats, and black bears.

The Fur Bearers — Association for the Protection of Fur Bearing Animals
2235 Commercial St.
Vancouver, B.C. V5N 4B6
Phone: (604) 255-0411
Provides teachers with background information fact sheets on methods of trapping used in Canada and the United States, statistics on the number of animals being trapped and hunted, updates on legislation, etc. Objective is to end the trapping of animals for their furs.

Vancouver Humane Society
Box 18119
Vancouver, BC V6M 4L3
Phone: (604) 266-9744
Provides background information on urban wildlife and other animal issues. They are an action group encouraging individuals, organizations and government to take responsibility for the welfare and rights of domestic and wild animals.

Government Wildlife Departments Emergency Numbers

Fisheries and Oceans
Hot-line Phone: 1-800-465-4336
Report provincial incidents of fishing or marine violation, in particular B.C. salmon, hazardous discharge into storm drains, and fish kills.

B.C. Ministry of Environment, Lands and Parks Wildlife Branch
Conservation Officer Service
Phone: 1-800-663-9453
Hot-line Phone: 1-800-663-9453
Rescues large wildlife such as, bears, coyotes, cougars, and deer. There are various district offices located throughout B.C. - dial the toll free number and they will automatically connect you to the correct office in your area.
References


Appendix A

Activity Characteristics
### Appendix A
Activity Characteristics

<table>
<thead>
<tr>
<th>Activity Name</th>
<th>Activity Style</th>
<th>Location in Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Coyote Video</td>
<td>Comprehension / class discussion</td>
<td>Separate in kit</td>
</tr>
<tr>
<td>Wild, Wily Coyote Poster</td>
<td>Comprehension / individual research tool</td>
<td>Separate in kit</td>
</tr>
<tr>
<td>Student Background Information</td>
<td>Reading of introductory information for students. Critical thinking and analytical questions</td>
<td>Section 2</td>
</tr>
<tr>
<td>Coyote Cousins</td>
<td>Research / reading</td>
<td>Section 3 – background</td>
</tr>
<tr>
<td>Mixed-up Info</td>
<td>Comprehension</td>
<td>Section 3 – Background</td>
</tr>
<tr>
<td>Coyote Crossword</td>
<td>Vocabulary acquisition</td>
<td>Section 3 – Background</td>
</tr>
<tr>
<td>Keep Me Wild</td>
<td>Brainstorm and class discussion</td>
<td>Section 3 – Background</td>
</tr>
<tr>
<td>Draw a Coyote-Friendly City</td>
<td>Small group discussions, poster presentations</td>
<td>Section 3 – Background</td>
</tr>
<tr>
<td>Coyote Myths—&quot;The Dead Whale&quot;</td>
<td>Reading / comprehension and creative writing and dramatization of stories</td>
<td>Section 3 – Attitudes &amp; Values</td>
</tr>
<tr>
<td>Coyotes on TV</td>
<td>Media Research / Analysis Cartoon drawing</td>
<td>Section 3 – Attitudes &amp; Values</td>
</tr>
<tr>
<td>Media File</td>
<td>Analysis of media attitudes, language arts</td>
<td>Section 3 – Attitudes &amp; Values</td>
</tr>
<tr>
<td>&quot;Be a Scientist&quot; Workstations</td>
<td>7 self-directed group workstations or investigations listed below:</td>
<td>Section 3 – Science</td>
</tr>
<tr>
<td>• Not in My Neighbourhood</td>
<td>Mapping, measurement of area and analysis</td>
<td>Work stations kits</td>
</tr>
<tr>
<td>• How Do You Feel About Coyotes In Your Backyard?</td>
<td>Attitudinal survey design / implementation and/or analysis of results</td>
<td>Work stations kits</td>
</tr>
<tr>
<td>• Coyote Characteristics</td>
<td>Designing and implementing a simple scientific experiment</td>
<td>Work stations kits</td>
</tr>
<tr>
<td>• Urban Coyote Diet Dilemma</td>
<td>Analysis of experimental problems, using evidence to create a story</td>
<td>Work stations kits</td>
</tr>
<tr>
<td>• Hair of the Dog</td>
<td>2D shape analysis and manipulation using electron microscope photos, leading to construction of model</td>
<td>Work stations kits</td>
</tr>
</tbody>
</table>

continued next page...
<table>
<thead>
<tr>
<th>Activity Name</th>
<th>Activity Style</th>
<th>Location in Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>How Much Space Do You Use?</td>
<td>Mapping and area measurement</td>
<td>Work stations kits</td>
</tr>
<tr>
<td>Making Tracks</td>
<td>Hypothesis creation, testing and conclusions</td>
<td>Work stations kits</td>
</tr>
<tr>
<td>Math Activities</td>
<td>Maths worksheets with critical thinking questions</td>
<td>Section 3 – Math Activities</td>
</tr>
<tr>
<td>Coyote and the Hare</td>
<td>Predator / Prey role-play game with graphing extensions</td>
<td>Section 3 – Ecology Activities</td>
</tr>
<tr>
<td>Coyote’s Hunt</td>
<td>Observational research and analysis of results</td>
<td>Section 3 – Ecology Activities</td>
</tr>
<tr>
<td>Barking Dog Game</td>
<td>Role play of coyote sounds and behaviours</td>
<td>Section 3 – Ecology Activities</td>
</tr>
<tr>
<td>Garbage for Our Grandchildren</td>
<td>Observation / recording and charting results</td>
<td>Section 3 – Ecology Activities</td>
</tr>
<tr>
<td>Coyote Neighbours</td>
<td>Small group research and presentation of worksheet activities developed for their peers. Peer evaluation</td>
<td>Section 3 – Ecology Activities</td>
</tr>
<tr>
<td>Points of View</td>
<td>Values and attitudes role play with conflict resolution</td>
<td>Section 3 – Ecology Activities</td>
</tr>
<tr>
<td>Birds and Bugs Nature Exploration</td>
<td>Outdoor observations with journals, map-making and poetry</td>
<td>Section 3 – Ecology Activities</td>
</tr>
<tr>
<td>Urban Wildlife Action</td>
<td>Reading / comprehension and synthesis skills, e.g. community action, school display or fair, personal plan development</td>
<td>Section 4 – Urban Wildlife Action</td>
</tr>
</tbody>
</table>
Appendix B

Inquiry-Based Teaching Strategies
### Appendix B

#### Inquiry-Based Teaching Strategies

**a) Foundation studies**

<table>
<thead>
<tr>
<th>Themes</th>
<th>History of Coyotes in North America</th>
<th>“Be a Wildlife Biologist”</th>
<th>Physical Characteristics</th>
<th>Behavioural Characteristics</th>
<th>Coyote Ecology (e.g. population dynamics, home range, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus Question</strong></td>
<td>Why didn't coyotes always live in Vancouver, B.C.?</td>
<td>What do we know about urban coyotes?</td>
<td>What is the difference between a coyote and a dog?</td>
<td>How have coyotes managed to live in the city?</td>
<td>Could coyotes take over my neighbourhood?</td>
</tr>
<tr>
<td><strong>Additional Resources</strong></td>
<td>See Resources Section</td>
<td>Guest Speaker – see Resources Section, Careers – see Resource Section</td>
<td>Pets and Their Wild Relatives video</td>
<td>Pets and Their Wild Relatives video</td>
<td>Project Wild Activities Book a Nature Program or walk</td>
</tr>
</tbody>
</table>

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## Appendix B

### Inquiry-Based Teaching Strategies

**b) Issues/Attitudes studies**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Myths / Stories and Stereotypes</th>
<th>Coexistence / Control of Urban “Pests”</th>
<th>Attitudes / Values Analysis</th>
<th>Media Analysis</th>
<th>Urbanization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus Question</td>
<td>Why is Coyote portrayed as wily or trickster?</td>
<td>What is an urban “pest”?</td>
<td>Does everyone feel the same way about coyotes?</td>
<td>How does the media show coyotes and why?</td>
<td>Why are Coyotes in the City?</td>
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<td>Activities</td>
<td>Coyote Myths – “The Dead Whale”</td>
<td>Urban Coyote video</td>
<td>Draw a Coyote-Friendly City</td>
<td>Media file</td>
<td>Coyote’s Hunt</td>
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<td>Coyotes on TV</td>
<td>Coyote – A Life Story</td>
<td>How do you feel about coyotes in your backyard?</td>
<td>Coyotes on TV</td>
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<td>Local Coyote video</td>
<td>Jean’s Story</td>
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<td>How much space do you use?</td>
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<td>See References in the Resource Section</td>
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<td>Local newspapers</td>
<td>Urban Coyote Video, Ground Truth studies from Wild Education</td>
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Appendix C

Intermediate Curriculum Links with the Coyote Kit

This appendix is organized by grades 4 to 7.

The B.C. Curriculum links to the Coyote Kit are designed using the following format:

**Major Subject Clusters (e.g. Science)**

- Major Topic in a Subject (e.g. Applications of Science)
  - Sub-Topic in a Subject (e.g. Adaptations of Organisms)
  - Individual Learning Outcome (e.g. identify and sort quadrilaterals, such as squares, rectangles, parallelograms and trapezoids)
# Grade 4 Curriculum Links to Coyote Kit

<table>
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<tr>
<th>Science</th>
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<th>&quot;Be A Scientist&quot;</th>
<th>Math Activities</th>
<th>Ecology Activities</th>
<th>Action Section</th>
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**Applications of Science**

**Life Science:**
- Adaptations of Organisms

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<th>Background Activities</th>
<th>Attitudes &amp; Values</th>
<th>&quot;Be A Scientist&quot;</th>
<th>Math Activities</th>
<th>Ecology Activities</th>
<th>Action Section</th>
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</table>

**Applications of Social Studies**

**Environment**
- demonstrate an understanding of Aboriginal peoples' relationship with the land and resources
- analyse how people interact with their environment, both past and present

**Mathematics**

**Number Operations**
- demonstrate and describe the process of addition and subtraction of numbers up to 10,000, using manipulatives, diagrams, and symbols
- demonstrate the process of multiplication (three-digit by one-digit numbers), using manipulatives, diagrams and symbols
- demonstrate the process of division (two-digit by one-digit numbers), using manipulatives, diagrams, and symbols
- recall multiplication and division facts up to 81
- justify their choice of method for multiplication and division (using estimation, calculators, mental mathematics, manipulatives, and algorithms)

**Shape and Space (Measurement)**
- especially lengths and area learning outcomes
- read and write time using am and pm

**Shape and Space (3-D Objects 2-D Shapes)**
- identify and sort specific quadrilaterals, such as squares, rectangles, parallelograms, and trapezoids

*continued next page...*
### Grade 4 Curriculum Links to Coyote Kit Continued...

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<th>Math Activities</th>
<th>Ecology Activities</th>
<th>Action Section</th>
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<td>• describe the position of an object on a grid using columns and rows</td>
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<td>• trace a path on a grid or map using oral or written instructions (and vice versa)</td>
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<td>• create images that express personal identity – in response to distinct art styles from a variety of cultures, artists, and periods co-operate in developing a group display</td>
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<td>* compare and contrast the sensory systems of humans with those of animals</td>
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<td>* demonstrate an understanding of the concepts of sustainability, stewardship...</td>
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<td>* assess the effects of lifestyles and industries on local and global environments</td>
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<td>* especially lengths and area of irregular shapes learning outcomes</td>
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<td>* build, represent, and describe geometric objects and shapes</td>
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<td>* classify and name polygons according to the number of their sides (3, 4, 5, 6, 8)</td>
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<td>* cover two-dimensional shapes with a set of tangram pieces</td>
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<td>* recognize tessellations created with regular and irregular shapes in the environment</td>
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<td>* use co-ordinates to describe the position of objects in two dimensions</td>
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| Physical Education | | | | | | |
| Movement (Alternative-Environment Activities) | | | | | | ✓ |
| • demonstrate activity-specific motor skills in a variety of alternative environments | | | | | | ✓ |
| • participate safely in activities in a natural or alternative setting | | | | | | ✓ |

| Visual Arts | | | | | | |
| – Image-Development and Design Strategies (Perceiving/Responding) | | | | | | ✓ |
| – Image-Development and Design Strategies (Creating/Communicating) | | | | | | |
| • draft ideas for images using observation, memory, and imagination | | | | | | ✓ |
| • develop and make personally meaningful images: - using a variety of image-development techniques and design strategies - in various forms and styles - for specific purposes - that solve design problems considering form and function - that engage more than one of the senses | | | | | | ✓ |
| Context | | | | | | |
| • compare the distinctive styles, materials and process of artists from various cultures and historical periods | | | | | | ✓ |
# Grade 6 Curriculum Links to Coyote Kit

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<td>• convert between commonly used SI units of length, mass and capacity</td>
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<tr>
<td>• identify transferable skills that are developed through school, and through recreational, cultural, sports, and extracurricular activities and interests</td>
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<table>
<thead>
<tr>
<th>Physical Education</th>
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<th>Math Activities</th>
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<td>Movement (Alternative-Environment Activities)</td>
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<td>• demonstrate activity-specific motor skills in a variety of alternative environments</td>
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<tr>
<td>• participate safely in activities in a natural or alternative setting</td>
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<tr>
<td>Visual Arts</td>
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<tr>
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<tr>
<td>Context</td>
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<td>• demonstrate an understanding of the influence of personal, social, historical, and cultural contexts on artists and their images</td>
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</table>
# Grade 7 Curriculum Links to Coyote Kit

<table>
<thead>
<tr>
<th>Science</th>
<th>Student Info</th>
<th>Background Activities</th>
<th>Attitudes &amp; Values</th>
<th>“Be A Scientist”</th>
<th>Math Activities</th>
<th>Ecology Activities</th>
<th>Action Section</th>
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<tbody>
<tr>
<td>Applications of Science</td>
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<tr>
<td>Life Science:</td>
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<td>– Ecology</td>
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<tr>
<td>• describe all organisms in terms of their roles as part of interconnected food webs</td>
<td>✓</td>
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<tr>
<td>• describe ways in which species interact with each other</td>
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<tr>
<td>• determine the limiting factors for local ecosystems</td>
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## Social Studies

<table>
<thead>
<tr>
<th>Social Studies</th>
<th>Applications of Social Studies</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>• gather and record a body of information from archeological evidence, historical documentation, and secondary print, non-print and electronic sources</td>
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<tr>
<td></td>
<td>• generate and justify interpretations drawn from primary and secondary source</td>
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## Mathematics

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<tr>
<th>Mathematics</th>
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<tbody>
<tr>
<td></td>
<td>– Number Operations</td>
<td></td>
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<tr>
<td></td>
<td>Shape and Space (Measurement)</td>
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<tr>
<td></td>
<td>• measure the diameter, radius and circumference of circles and generalize the relationships</td>
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<tr>
<td></td>
<td>• solve problems involving circles (radius, diameter, and circumference)</td>
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<td></td>
<td>Statistics and Probability (Data Analysis)</td>
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</tbody>
</table>

| Language Arts | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## Personal Planning

| Personal Planning | Making Plans and Decisions | Implementing and Monitoring | Career Exploration | | | | |
|-------------------|----------------------------|-----------------------------|-------------------|---|---|---|
| | ✓ | | | | | | |

continued next page...
### Grade 7 Curriculum Links to Coyote Kit Continued...

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<tr>
<td><strong>Active Living</strong></td>
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<tr>
<td>• identify factors to consider when planning outdoor activities and the impact of physical activities on the environment</td>
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<td>• participate safely in an outdoor experience</td>
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<td>• identify possible purposes for the creation of given images</td>
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<tr>
<td>• evaluate their own use of image-development techniques and design strategies</td>
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<td>• develop and make images—using a variety of design strategies and sources of imagery, individually and in combination—using some elements from a variety of styles—that solve complex design problems considering form and function—for specific purposes</td>
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