Cycling 11 as a Step to Align Learning in Secondary Schools with Learning in the ‘Real World’

by

Darryl Dietrich

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Abstract

“If we want young people with the competencies to innovate and make our economy more competitive, we need to model our schools after how innovation actually happens”\(^1\)

~Dr. Pasi Sahlberg (Finnish educator, scholar, and policy advisor)

As I see it, the educational landscape in British Columbia, Canada is contradictory in its present state. Our education system, from the Ministry of Education at the top, down to teachers and students in classrooms, are not preparing students for success in the post-secondary world. There is a disconnect between how people learn after secondary school with how we expect them to learn while enrolled in school.

The goal of this paper is threefold. Firstly, I will critically examine the existing frameworks for education in British Columbia, and propose changes that better align how people learn in formal and informal learning environments. Secondly, I will outline my epistemological stance, and discuss how it differs with the structures currently in place. Thirdly, a learning resource package for Cycling 11 – a new course curriculum written for the Vancouver School Board – will be proposed for educator use. Cycling 11 will be discussed throughout as it provides direct evidence of a solution to what I see as the problem in British Columbia schools.

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Chapter 1: Theoretical: Aligning Learning in Secondary Schools with Learning in the ‘Real World’

Foreword/Preface

I consider myself fortunate to be an educator in the Vancouver School Board (VSB), a position I’ve held for the last 6 years. This project came about from the vast array of personal and professional experiences I’ve had as a teacher, entrepreneur, engineer, and outdoor enthusiast. As a Science and Mathematics educator of adolescent age children, I have the privilege to shape educational experiences that reflect their interests, my experiences, and to build skills and attitudes that I feel will serve them well as they become contributing citizens to our local – and global – society.

I entered the Master of Education program with one mindset and left with a changed view on the aims of education. The existing educational frameworks in British Columbia (BC) will be challenged throughout this paper, and I will propose a new course that aligns with the framework within which my practice resides. As a contributing member to a democratic society, I find it imperative that such frameworks are questioned, and that solutions are proposed to encourage a progressive improvement in our education system, and our population as a whole.

The audience for which this project is completed consists of various stakeholder groups directly affected by the current landscape of education in BC. Specifically, this project is undertaken keeping in mind teachers, parents, and administrators who are affected by decisions made at the school level in education. The intention is provide a space for discussion about how to make the educational experience for students in secondary schools more valuable and relevant to the skills, attitudes, and beliefs that will serve them as they enter their post-secondary years.
Curriculum is a term that will be used throughout this document. A detailed analysis about how curriculum is developed in BC will be discussed in detail in later sections. However, it is imperative to define *curriculum* as it is thought about throughout this project. Educators play a role in making decisions that best facilitate optimal educational experiences and growth for students. More than specific learning outcomes, curriculum is delivered by educators who hold values and political dispositions that affect student engagement and beliefs about their world. Curriculum as discussed in this paper is defined as:

"the skills, performances, attitudes, and values pupils are expected to learn from schooling. It includes statements of desired pupil outcomes, descriptions of materials, and the planned sequence that will be used to help pupils attain the outcomes."\(^2\)

A two-page Executive Summary accompanies this project for distribution to parents, administrators, and teachers from other schools who may be interested in offering the *Cycling 11* course in their school. Please forward any questions or comments about this project to

Background

I have been a Science (Physics) and Mathematics educator at Magee Secondary School in Vancouver, BC for 5 years. Teaching various courses in these disciplines has exposed me to curriculum that BC’s Ministry of Education deems important at different levels, and what is required of students to attain success in various courses. Curriculum includes the values and social skills that teachers share with students, and also includes the content and learning outcomes that are outlined in courses. The UBC Master of Education Program has exposed me to important questions about curriculum – how it is developed and by whom, why it is structured the way it is, and more importantly, what impact I can have as a teacher or an administrator to have a positive impact on learners.

British Columbia is a province of remarkable beauty, a point of pride for the people who live here. Until as recently as 2011, the provincial government branded itself as ‘The Best Place on Earth’, a testament to province’s natural beauty. Administratively, there are 60 school districts, ~40,000 teachers, and over 500,000 students in the public system alone\(^3\). In addition to the publicly funded education system, there are independent schools that are partially funded by the government.

Vancouver, BC is located in the southwest part of the province with a physically active and environmentally conscious population\(^4\). The Vancouver School Board has over 50,000 students enrolled in programs across over 100 schools\(^5\). Magee Secondary School is one of 18 secondary schools in the district. Vision Vancouver is the residing political party in office, led by Mayor Gregor Robertson. A goal of the city is to become the ‘Greenest City in the World’ by

\(^3\) [http://www.bctf.ca/uploadedFiles/Public/Publications/2012EdFacts.pdf](http://www.bctf.ca/uploadedFiles/Public/Publications/2012EdFacts.pdf)  
\(^4\) [http://vancouver.ca/green-vancouver.aspx](http://vancouver.ca/green-vancouver.aspx)  
\(^5\) [http://www.vsb.bc.ca/about-vsb](http://www.vsb.bc.ca/about-vsb)
There are a variety of initiatives in place to achieve this goal, one of which is to decrease automobile traffic and increase the number of trips people make by human power (walk, bike, skateboard, etc.) or public transit. The goals at City Hall align with the Vancouver School Board’s Strategic Plan, wherein one goal is to be “Efficient, Effective and Sustainable”⁶. This Master’s project supports provincial, municipal and School District goals, and is well timed to coincide with each.

Curricular courses in the VSB come in two forms – Ministry level courses and locally developed – Board/Authority Authorized – courses. Ministry level courses have an Integrated Resource Package that contains the Rationales, Curriculum Organizers, and Prescribed Learning Outcomes, among other things. The Rationale pages, however, are somewhat contradictory. Within the Physics 11 and 12 Integrated Resource Package, a rationale is stated as to “provide experiences that help students become flexible and adaptable rather than focusing on acquiring specialized knowledge”⁷. However, in content, the Prescribed Learning Outcomes are quite specialized.

Board/Authority Authorized courses are developed by individual teachers, and reflect curriculum that educators feel is beneficial to students. Teachers have a wealth of subject expertise and interest levels, and it is my goal to explore an area that is meaningful to me but does not yet appear in the secondary curriculum – cycling.

School boards in BC encourage teachers to develop new curriculum that is local and relevant to its student body, and applicable to the geographic, political, and economic circumstances of students in individual School Boards. Equally as important, these local courses

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⁶ [http://www.vsb.bc.ca/sites/default/files/publication-files/VSB_StrategicPlanandgoalsJan302012.pdf](http://www.vsb.bc.ca/sites/default/files/publication-files/VSB_StrategicPlanandgoalsJan302012.pdf)

leverage the interests and expertise of teachers in the district. Recently, a new course proposal was made to the VSB that aligns my personal interests with a topic that is relevant to students and citizens alike in Vancouver.

*Cycling 11* is a new Board/Authority Authorized course. It will be offered to Grade 11 students with the goal of developing practical skills and knowledge that will be useful both during and after secondary school. *Cycling 11* will leverage the resources and facilities that are present in the Magee community, and will be taught by myself and another educator at Magee; two teachers passionate about relevant, lifelong skills to students at our school. It is truly a cross-curricular exploration on a topic that brings student experiences, community involvement, and environmental and social sustainability to the forefront of student learning.

To effectively challenge the norms of curriculum procurement and delivery, it is essential to deeply think about and formalize what is important in the realm of secondary education. This project will identify the theoretical framework within which I worked while writing the curriculum for *Cycling 11*, and identify learning resources and activities to be used while students are enrolled in the course.
Existing Frameworks

“A stable and democratic society is impossible without a minimum degree of literacy and knowledge on the part of most citizens and without widespread acceptance of some common set of values” (Friedman, 1962/2002, p. 86).

Who decides on the common values on which we should stand as a democratic society? These common values are reflected in our education system, and society is remiss if we are to blindly accept our system as gospel. There are many actors in this arena: The Ministry of Education, Corporations, Parents, and Teachers are only a few. Questioning and reflecting on the value propositions that each of these actors offer will help to bring clarity in thought for how to proceed.

Schools operate within a framework that has stood the test of time. In what I will call ‘regular’ public schools, students attend discrete classes in discrete chunks of time, learning about subjects from different teachers as they go through their day. This changes, for instance, in democratic schools like Windsor House in North Vancouver, which subscribes to a more student-centred and democratic environment wherein students determine the shape and schedule of their individual days. Within regular public schools, the logistics and bureaucracy that exist in schools will make it difficult to change how schools are structured; in particular how students go about their day and the classes they are enrolled in. It will be my argument that a balance be struck within the existing framework of regular schools so that learning more accurately reflects how students will learn post-secondary as they become contributing members of society. Sugata Mitra, a professor of Education Technology in the UK argues that the current model of education is an outdated model that no longer works for students in public schools. He provides the
following analogy: “Going back to horse-drawn vehicles is not the solution to our traffic problems and pollution. Beating children into submission will not solve the problem of educational disengagement”\textsuperscript{8}.

To understand, reflect, and build on the historical context of curriculum development, it is important to consider another definition of the term. Null (2008) states that “curriculum development implies the preparation and transmission of knowledge within an institution whose purpose is to educate” (p. 478). The \textit{institution} that he speaks of is quite vague. He could be referring to a Ministry of Education, a School Board, an individual school, or even a training plan for an employee in a corporation.

It is my argument that school boards take on more of the responsibility of curriculum development in their individual district. Why should students in Vancouver have the same requirements for graduation as students in Prince George or Port Hardy? The political, socioeconomic, demographic (and other) issues in each of these communities are quite different, and I find it hard to imagine that we have one set of graduation standards across all students in BC. Whitehead (1929) discussed (a very long time ago) the need for localizing curriculum to a school level where “curriculum [is] based on [a school’s] needs, and evolved by its own staff” (p. 204). Cycling is a topic that is relevant to students in Vancouver, and local to the needs of the district. The localized nature of the subject matter, in addition to its application after secondary school will be discussed in detail in later sections.

\textsuperscript{8} http://www.guardian.co.uk/education/2013/jun/15/schools-teaching-curriculum-education-google
Curriculum reform is not a new idea. In 1949, Tyler (p. 1) argued that curriculum development and plans of instruction should answer each of the following questions:

1. What educational purposes should the school seek to attain?
2. What educational experiences can be provided that are likely to attain these purposes?
3. How can these educational experiences be effectively organized?
4. How can we determine whether these purposes are being attained?

What is of particular interest here is that Tyler mentions the school in curriculum development, returning to the idea of localizing curriculum. Null (2008) writes of Tyler, “The curriculum development process starts, according to Tyler, at the local level with the needs, interests, and goals of school leaders and the communities where they work” (p. 480).

The four questions sit on the mind of educators as units and lessons are prepared. Provided the curriculum documents set out by the Ministry of Education, educators are faced with presenting activities (educational experiences) that are organized and implemented in a way that are engaging, challenging, and rewarding to those learning the material. Assessment of these activities relates to question #4, which is a valuable part of education, but requires a discussion unto its own.

Curriculum development reflects societal values. Null (2008) states that “curriculum must, can, and should change as the fields of political science, economics, and philosophy change” and that “educational institutions be in tune with the needs of society [when making curriculum]” (p. 479). I find these statements to be extremely valuable when exploring how curriculum has changed over time. In my opinion, never has this presented such a challenge
given the rapid change that modern society is encountering, and the unpredictability of today’s working world.

Given the state of the world in the 21st century, curriculum development has many challenges. With the rapid pace of technological development, educators are faced with the task of preparing students for careers that do not yet exist. And we are educating students that are fundamentally wired differently than they were even 20 years ago. Prensky (2001) writes: “Our students have changed radically. Today’s students are no longer the people our educational system was designed to teach” and that “today’s students think and process information fundamentally differently from their predecessors” (p. 1). This presents considerable challenges, but also holds significant possibilities for our system as a whole.
Changing Structures

“The curriculum lists things that children must learn. There is no list stating why these things are important.”

~Sugata Mitra

In its current state, curriculum development in the province of BC is structured top-down, with the Ministry of Education determining the scope of learning outcomes within individual courses. In recent years, the Ministry is striving to affect change in this process, as is evident with the proposal of BC’s Education Plan. As per the Ministry’s website: “The Ministry of Education and stakeholders throughout the province are implementing BC’s Education Plan to help transform education to better meet the needs of all learners.”

A metric commonly used for the ‘educational health’ of a society is the percentage of the population that successfully completes secondary school. To do this in BC means that students receive a Dogwood certificate – a document received for successfully graduating from secondary school. BC’s Ministry of Education wields much power and control of what students learn. The how of student learning comes down to individual teaching and learning styles. For students to be successful in attaining a Dogwood certificate, course requirements are mandated by the province, and must be followed by students, regardless of where they reside or the many other factors that factor into student success. This fact brings forth questions about the legitimacy of the metric, and the process that students are expected to follow through their adolescent years.

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9 [http://www.guardian.co.uk/education/2013/jun/15/schools-teaching-curriculum-education-google](http://www.guardian.co.uk/education/2013/jun/15/schools-teaching-curriculum-education-google)

In support of the Education Plan, the Ministry has released a document titled “Enabling Innovation: Transforming Curriculum and Assessment”, within which reads:

“Through the advice of the provincial advisory group and the feedback from the 12 regional meetings, a clear goal has emerged: the Province needs a more flexible curriculum that prescribes less and enables more, for both teachers and students. It is clear that an education system redesigned with 21st century priorities in mind must remove the barriers that limit teachers' ability to innovate and personalize learning based on students' needs and the community context.”

BC’s Education Plan, as introduced by the Ministry of Education, seems to de-centralize curriculum and put more ownership on classrooms – teachers and students – to achieve desired outcomes. Personalized learning is on the forefront of discussion both in schools and at higher levels, and cannot be ignored as student engagement in curriculum sits at the forefront of teaching goals.

Within the Vancouver context, change is happening as well. In 2010, senior management in the VSB created a Strategic Plan, which outlines the goals and strategies the District plans to employ in the coming years. Goal number one is that “Students are fully engaged in learning”, with a strategy to achieve the goal being to “Develop educational policies and practices that actively engage all students in their learning”12. While the neoliberal discourse is evident by

11 [http://www.bced.gov.bc.ca/irp/docs/ca_transformation.pdf](http://www.bced.gov.bc.ca/irp/docs/ca_transformation.pdf)
12 [http://www.vsb.bc.ca/sites/default/files/publication-files/VSB_StrategicPlanandgoalsJan302012.pdf](http://www.vsb.bc.ca/sites/default/files/publication-files/VSB_StrategicPlanandgoalsJan302012.pdf)
offering choice and marketization of programs, it will allow both flexibility and choice to both students and teachers.

Currently, there is a disconnect between the goals of the province and senior management with what is happening in classrooms. Policies are being created to direct change in schools. However, there is consistent resistance to change on the ground level in schools that has to be addressed in order for these changes to take place. I applaud the efforts of policy makers for building the capacity for change to occur – change that will serve the needs of students and the community well.

The process that the Ministry and the VSB is undertaking aligns with the changing landscape of education in our globalized world. This will allow space for relevant and meaningful courses like Cycling 11 that better reflect the skills and competencies that will serve students well, long after their time in secondary school. To further enable such a change, I posit that the requirements for graduation must provide more flexibility for what students learn. This is an enormous challenge for many reasons, one being the requirements to enter post-secondary institutions, another being the socially entrenched ideas of what is required for graduation, and who decides what that looks like for students.
How People Learn

“Teaching and learning have traditionally been conceptualized as linear, deterministic procedures,” he wrote in a paper on economic competitiveness and education. “Innovation is an organic entity. Teaching and learning in schools should rely on principles of active participation, social interaction and reflection.”

~Dr. Pasi Sahlberg

I learned how to play guitar at the age of 29, long after my formative high school and university years were behind me. With an engineering background, I would consider myself to be a ‘left brained’ individual, with a tendency to solve problems using logic and numbers. With no prior music experience and my ‘left leaning’ brain, learning to play an instrument has been a journey not without bumps and frustration. Reflecting on that learning experience, I realized that my process was anything but linear, and looked quite different than the learning process in secondary schools. I utilized online and print resources, peers, and experts in the field. I practiced at my home, at work, and at a studio. This is all to say: I did not learn from one resource, in one place, from one person. This created a disconnect for me. The question that came to mind was: Why do we expect students enrolled in formal education to learn in ways that do not reflect how people learn after school – the informal environment? In part, the motivation for this project stems from the discrepancy in these methods of learning.

The aforementioned narrative about learning guitar as an adult is merely one example of a learning experience on which I relied when considering what information and methods that I will use to relay information about cycling to students. Before, during, and after working on this
project, I leverage my own experiences to create a classroom environment that will make school fun and engaging. That said, there is a significant question that I feel is important to return to both as an educator and a curriculum designer: *How do people learn?*

An answer to this question is not easy. It is steeped in context, largely dependent on the learner, and may change as people progress through their academic careers. While this question may be a moving target, this Masters program has helped to shape my understanding of the answer and how they apply to the educational landscape in which I currently reside.

Firstly, I feel it prudent to establish a working definition of knowledge, for it is knowledge that people attain in some form or another as they learn, or become ‘educated’. As per the Oxford Dictionary, knowledge is:

> “a familiarity with someone or something, which can include facts, information, descriptions, or skills acquired through experience or education. It can refer to the theoretical or practical understanding of a subject.”¹³

How people acquire knowledge in the secondary school setting, and how that ties to both *Cycling 11* and learning after secondary school is of specific interest to me. Students should be encouraged to build knowledge in ways that model how they will learn after they leave a formal educational setting. This is the framework within which I worked to create *Cycling 11*.

Doll (1993) states, “The great end of education is to discipline rather than to furnish the mind, to train it to the use of its own powers, rather than to fill it with the accumulations of others” (p. 277). Doll follows up by saying, “the statement assumes the “mind” to be a thing (a

vessel to be filled) or an organ (a muscle to be trained) or a living being (a creature with powers to be disciplined)”. I posit that the mind can be considered all three, depending on the situation one is learning in, the context in which learning is taking place, and the individual who is constructing knowledge.

Historically, the way in which secondary schools operate is to treat the mind as a vessel, with teacher-led instruction followed with assessment items that provide data about whether students have in fact ‘learned’ material. This teacher-centred model of education could be argued as the most efficient method for getting through a lot of information. Others may argue that it’s simply for crowd control. Learning, as discussed in the following paragraphs, must be active.

Like all people my experience as a human being plays a part in all other things I learn. Bransford, Brown & Cocking (2002) state “Humans are viewed as goal-directed agents who actively seek information. They come to formal education with a range of prior knowledge, skills, beliefs, and concepts that significantly influence what they notice about the environment and how they organize and interpret it. This, in turn, affects their abilities to remember, reason, solve problems, and acquire new knowledge” (p. 10).

This is a tenet that grounded Cycling 11: that students bring, share, and learn from experiences garnered both inside and outside of the classroom setting.

Before enrolling in the Bachelor of Education program at UBC in 2005, I had never heard of the term constructivism. Throughout that year, the idea of constructivism took hold, and seven years later it drives my approach to teaching. Henson (2010) describes constructivism as “the belief that learning occurs only when the learner ties newly acquired information to previously gained understanding” (p. 4). One of my goals as an educator is to help students
make the link between their everyday experiences and the concepts being studied in school.

Going a step further, I often find myself analyzing my own actions and asking: ‘what experiences have I had that is leading to this emotion/behaviour right now?’ Constructivism is wonderful to watch in young children as they adapt to new tasks and work through problems, building on knowledge they have attained earlier that hour, day, or week.

Bransford et al. (2002) state, “In the most general sense, the contemporary view of learning is that people construct new knowledge and understandings based on what they already know and believe” (p. 10). Referring to Tyler’s second question has become paramount: “What educational experiences can be provided that are likely to attain these (educational) purposes?” Since I feel that knowledge is constructed through personal experiences, it has become the goal of my teaching to provide students with experiences based on what they know and believe. This is exciting and fun in the realm of cycling and physics because of the concrete ties students can make to the subject matter.

As discussed above, course delivery at present day is based on Prescribed Learning Outcomes as set from the Ministry of Education for each course. To achieve ‘success’, students must learn the outcomes through activities and assessment methods laid out by teachers. Bringing student experiences into learning activities takes time, making it difficult to achieve the number of learning outcomes for a course, and to offer students a learning environment that fosters more than memorization and regurgitation.

This is evident if one is to analyze the number of learning outcomes for a given course. As stated in Learn (2012), “there are 164 discrete learning outcomes for grade two” (p. 12), meaning that teachers must subscribe to a curriculum theory of breadth over depth simply to cover the mandated learning outcomes from the Ministry. This framework must change to
reflect the needs of students, and to better align learning that happens in schools with how it happens outside of the formal educational setting.

Coming back to the questions at hand: How do people learn? For me it is the utilization of resources: people, places, and things, that facilitate experiences that students and teacher can relate, as well as exposure to, and personal relation of, knowledge that individuals can use both during and after being enrolled in an educational institution. This is a hard thing to define, since students struggle with how topics learned in school will apply to their lives during and after high school. For example, how can we relate the learning of quadratic functions to student lives during and after high school? The answer is not easy, except to believe that the stretching of one’s capabilities in various subject areas in school, has ancillary benefits to the learning they will do out of school.

A significant assumption is made within the discourse of this text: That a goal of educational institutions is to build learning environments that better reflect how people learn after the formative education years; that students are concerned with the usability of course matter after completion of a course.
Aim of Education

“To have an aim is to act with meaning, not like an automatic machine; it is to mean to do something and to perceive the meaning of things in the light of that intent” (Dewey, 2008, p. 83)

Many toddlers go through a ‘why’ phase. As an educator, I encourage that single word question to always be at the fore of thinking. The purpose, I tell students, is to critically analyze what they’re learning; to think critically.

What is the aim of education? I should begin by stating that this question cannot, and should never, have one distinct answer. Dewey (2008) writes, “A good aim surveys the present state of experience of pupils, and forming a tentative plan of treatment, keeps the plan constantly in view and yet modifies it as conditions develop. The aim, in short, is experimental, and hence constantly growing as it is tested in action” (p. 84).

Scholars and educators alike have attempted to answer this question for a very long time, and the reason I worked towards my answer was to guide my thinking about how Cycling 11 should be structured, and what activities I would design for students.

The words of Plato and Confucius carried significant weight in Western and Eastern circles respectively. In Plato’s Allegory of the Cave, “How could they see anything but the shadows if they were never allowed to move their heads?” While this is extreme, this quote reflects – to a certain extent – how BC’s education system is currently structured. Students enter a system at a young age with not a great deal of flexibility. They are at the whims of teachers and a system in which they follow a distinct path from Kindergarten to high school graduation. This has to change.
My *Aims of Education* are the following:

1. Student engagement through cross-curricular and experiential learning.
2. Foster critical thinking skills to effectively solve problems with and without technology.
3. Foster socially conscious citizenship by learning and sharing knowledge with the local (and global) community.

*Cycling 11* is the answer to what I see is a problem in secondary schools. The following sections analyze *Cycling 11* given the learning foundations laid out above.
Cycling 11

Life is a journey. The path that we take provides ups and downs, fast and slow portions, hard and soft facts, and human interactions that bend our path this way and that to provide a more rich experience. As we embark on this journey we search (and struggle) for meanings, both consciously and subconsciously, within the things that we do and the people we do them with. This helps provide us with feedback to guide future experiences.

The analogy used above relates to my journey through this course, which has been well timed with a curriculum project recently proposed to, and accepted, by the VSB. As an individual with an engineering, math, and physics background, my left-brained nature found this course challenging as I relinquished (or attempted to subdue) my need for practical applications to the theories learned. As this paper was written, it was my attempt to be, at least partially, non-consequential in my thinking. It was my goal to find a balance between the theoretical and practical, by tying perspectives from this course to a school-based project recently completed.

Vancouver is a city that supports and encourages cycling on a scale that rivals other metropolitan centers around the world. It continues to build capacity for cyclists, with major initiatives such as the Greenest City 2020 Plan\(^\text{14}\) and the Transportation 2040 Plan\(^\text{15}\), both of which build capacity for and encourages the use of bicycles as a mode of

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transportation in Vancouver (see Figure 1). These municipal plans will provide a basis for students to build an appreciation for cycling and the political process around enacting change at the political level.

*Cycling 11* is a course will truly change people’s lives. It will provide students will skills, confidence, and technical know-how to be self-sufficient cyclists in a metropolitan city with an outstanding cycling culture. It will encourage physical and mental well being that will provide students balance in their lives, and give them a sense of accomplishment that I believe will be contagious within the networks of people with which they participate.

In addition to the lifelong skills that students will attain around riding and maintaining bicycles, students will also gain an appreciation for the personal health and environmental benefits that they contribute to by cycling versus other forms of transportation. As will be discussed in Chapter 2, Environmental and Social Sustainability comprise two units within they will learn about the political and environment considerations that are accounted for in policy decisions by the City of Vancouver.

**Cycling 11: 3 Rationales**

*Cycling 11* was designed and procured with the goal to *change students’ lives* at the center of the discussion.

*Cycling 11* was formulated on three rationales:

1. Cross-Curricular Learning
2. Experiential Learning
3. Community Involved Learning
Cross-Curricular Learning

“There is little doubt that the way we live our modern lives could be described as cross-curricular. Many of the skills we use in one area of life can be utilized and put to work in another without much planning or forethought. It is interesting therefore that as teachers we are, more often than not, required to teach in distinctly separate topics and themes. Artificial barriers can be created through a curriculum disconnect – barriers that do not realistically represent the nature of twenty-first-century life. However, by applying a theme across two (or more) disciplines we are able to allow pupils the opportunity to form meaningful connections between subjects that better reflect the real world” (Byrne & Brodie, 2011, p. 1)

After the formative educational years, individuals utilize knowledge from many different areas of their life to build new skills. They do this in a cross-curricular fashion, not in disparate subject areas like what is modeled in secondary schools. As contributing citizens to society, people leverage knowledge from all areas of their life to learn new things and make informed decisions.

Learning after school brings together knowledge from many disciplines, not only one subject at a time, which is the model that secondary schools operate in. To bring awareness to cycling issues in a metropolitan city, one must have exposure to the technical and physical world of riding and maintaining bicycles; the science of how bikes operate; and the social and political forces that affect cycling related decisions at a municipal and provincial political level. For
students to learn about all of these subjects discretely does not provide an accurate picture of how to critically engage issues in society.

*Cycling 11* will provide a common theme from which to address cross-curricular learning in secondary schools. The course will more accurately reflect how students will learn in a lifelong manner, as well as model the skills and attitudes that many employers deem necessary for success.

**Experiential Learning**

“Experiential learning is the sense-making process of active engagement between the inner world of the person and the outer world of the environment” (Beard & Wilson, 2006, p. 2)

Providing students with learning experiences that build on prior knowledge is a valuable place to begin. If there are students that haven’t ridden a bike prior to enrolling in *Cycling 11*, they will, at the very least, be able to identify what a bicycle is and what it can be used for. *Cycling 11* endeavors to provide students with hands-on activities that will provide tangible experiences that will allow students to apply knowledge learned both during and after their time in secondary school.

*Cycling* is a physical activity that many people start a young age and continue doing for the majority of their life. This experiential course will allow students to become proficient and self-sustainable with their cycling needs both during and after secondary school. This hands on and skills-based course will allow students to learn about and practice tangible and practical skills around bicycle safety, maintenance, and advocacy.
Community Involved Learning

“Learning is influenced in fundamental ways by the context in which it takes place. A community-centered approach requires the development of norms for the classroom and school, as well as connections to the outside world, that support core learning values” (Bransford et al., 2002, p. 25)

As people grow they continually build a network of people, places and things that become part of their collective community. For students, this community is often limited to those involved with the operation of schools. This includes peers and mentors, all involved in making the school community a productive learning environment.

Cycling 11 will encourage thoughtful involvement of students with the community outside of school. This will help to broaden the individual community of students, and help young people to create and build relationships with those both in and outside of schools.

The course will provide avenues for students to become involved in their communities, communicating with business owners, volunteer organizations, and political bodies at the local and provincial level. Students will build community and school cycling awareness as they apply skills learned to the organization of cycling events within the school, with elementary students at feeder schools, and within their individual communities.

Chapter 2 of this paper will provide educators with learning resources that can be utilized when teaching Cycling 11.
Chapter 2: Practical: Learning Resources for Cycling 11

Learning resources have been developed for Cycling 11 to provide teachers with activities and assessment items that will be useful when running the course. The three rationales for Cycling 11 are that it be:

1. Cross-Curricular Learning
2. Experiential Learning
3. Community Involved Learning

MAIN IDEA: Cycling 11 incorporates all of the ideas mentioned in Chapter 1. Learning should incorporate students’ prior knowledge and prior conceptions. The framework within which students learn will be challenged and modified to fit their individual needs. Cycling 11 will examine an issue from a cross-curricular perspective. Students will be encouraged to engage with their community and businesses that operate in their community. This course will be experiential and problem-based in nature. Every attempt will be made to engage students in their learning.

Because of the many roadblocks that teachers encounter when running a new course, the following activities, resources, and assessment items are provided to make the rollout of the course smooth for teachers in other schools. This will be one avenue that I pursue to disseminate information to other educators both in the VSB and beyond.
**School Transportation Survey**

Goal: To assess a school’s transportation usage, and to provide a year over year metric for transportation use in a school.

The following online survey has been created for distribution to the Magee community in June 2013. Its purpose is to attain baseline data about transportation use by students. This survey may be used year over year to provide metrics about the changing use of bicycles and other transportation options, as well. One goal of Cycling 11 is to decrease the number of students that get a ride to school, to promote self-sustainability and provide students ownership of their actions, as well as to reduce to overall environmental and urban impact that cars have on Vancouver roads.

Magee Cycling Survey – 2013

1. What grade are you in?
   a. 8
   b. 9
   c. 10
   d. 11
   e. 12

2. How far is your commute to school?
   a. Less than 1 km
   b. 1 - 3 km
   c. 3 – 5 km
   d. More than 5 km

3. What modes of transportation do you take to/from school? (Choose all that apply)
   a. Walk
   b. Bus
   c. Bike
   d. Drive
   e. Skateboard
   f. Scooter

4. How do you get to school *most frequently*?
   a. Walk
   b. Bus
   c. Bike
   d. Drive
   e. Skateboard
   f. Scooter

5. Do you own a bike?
a. Yes
b. No

6. If you answered yes to question #5, how often do you ride it?
   a. Every day
   b. 3-4 times per week
   c. 1-2 times per week

7. What do you ride your bike for? (choose all that apply)
   a. Exercise
   b. Pleasure
   c.

8. I am interested in learning how to fix bikes
   a. Yes
   b. No
Cycling in Vancouver has become mainstream. There is virtually nothing you cannot do on a bicycle, including commuting to school/work, picking up groceries, go on overnight camping trips, even biking across Canada or to other destinations is within reach should you choose it to be.

Cycling 11 will prepare you with skills so that all of the above is possible. In addition to learning about the various activities one can do on a bike, you will gain the technical knowledge to maintain bicycles, and learn about the environmental and social sustainability aspects of cycling in Vancouver.

Cycling 11 is structured into 4 units. Topics will be interspersed throughout the year and will be covered in no particular order:

1. **Technical:** Students will become self-reliant cyclists demonstrating knowledge of bicycle anatomy, maintenance, and repair.
2. **Physical Education:** Students learn about road safety, the human body, the importance of cardiovascular health, nutrition, and partake in group cycling rides in an urban environment.
3. **Scientific:** Students learn about & measure gear ratios, pressure, torque, speed, acceleration, force, mechanical advantage, and friction. Students will apply this knowledge to solving kinematics problems relating to the bicycle.
4. **Environmental & Social Sustainability:** Students apply knowledge learned to transportation infrastructure & environmental awareness projects in Vancouver. In addition, students will become ambassadors for cycling, organizing events and advocacy initiatives both in - and outside of - the school setting.

**Expectations**

As a group and individually, we will be riding bicycles. Safety is paramount for both yourselves and other people with whom we will interact on a daily basis. As ambassadors of cycling in the Magee community, there is **zero tolerance** for unsafe practices.
Assessment/Activity Guide

Evaluation in this course will be ongoing throughout the year. Evaluation criteria is weighted as follows:

Assignments 20%
Assignments will vary in type, including but not limited to: Naming parts of the bicycle, Routine Maintenance (changing tire, cleaning a chain), solving kinematics problems, listing key points of Vancouver’s cycling mandate, naming parts of the human anatomy, organization of school cycling events, and portfolios for summative assessment.

Tests/Quizzes 25%
Quizzes are intended to offer formative assessment for students to build knowledge. Tests are intended as summative assessment to demonstrate competence within the various units.

Participation 15%
Participation will include a self-reflection component (guiding questions with a rubric: developing → proficient → accomplished), teacher assessment, and peer assessment.

Projects: Individual & Group 25%
Individual projects will include re-building or designing a bike, designing a greenway, and creating a cycling fitness and nutrition plan. Group projects will include organization of school & community events, interviewing city officials, and planning a class cycling trip.

Journals 15%
Journals will include opportunity for self-reflection (open/free-response), responses to guided questions related to curricular content, current events, field studies, as well as opportunities to provide feedback about course content, delivery, and activities.
**Project: Online Portfolio**

This is your chance to showcase all of the amazing work you will do over the course of the year! Most assignments and coursework will be uploaded to your online portfolio throughout the year.

Your online portfolio can be a blog, webpage, wiki, or other suitable online repository for digital work. You choose whether you’d like it to be public or private (Mr. D needs access though!).

**Journal: Written Responses**

Writing is one of the many ways we humans express ourselves. Writing helps us to formalize our thoughts and reflect on what we’ve learned. Throughout the year you will be asked to respond to guiding questions, articles from the news, and provide written evidence of your learning.

Examples of guiding questions:
- Why are you taking Cycling 11?
- Watch ‘The Story of Stuff’ (http://www.youtube.com/watch?v=gLBE5QAYXp8) and respond to the creators.
- Review the City of Vancouver’s Rationale for separated bike lanes (http://vancouver.ca/streets-transportation/separated-bicycle-lanes.aspx) and counter (write against the proposal) the claims made.

**Journal: QRQ’s**

The purpose of assigning QRQs is three-fold. First, the exercise should help you analyze a reading. Second, QRQs will be distributed to small groups in class to foster discussion. Third, QRQs provide a reflective and a forward-looking look at an issue.

QRQs should be written as a narrative, not a bulleted summary, and should pose critical questions about an assigned reading. Strong QRQs will use ideas from additional resources in ways that illuminate the reflection being developed. Please bring four (4) copies of your QRQs to distribute to peers on the due dates. You are expected to lead a small-group discussion based on your QRQs. Detailed expectations of this assignment will be discussed in class.
Activity: Bicycle Anatomy

Materials Needed:
1. Bicycles for students to handle
2. Worksheet showing a bicycle with spaces to write in parts

Learning about how things work are grounded in language and understanding of the parts that make up a whole. To cook a recipe, one must consider what ingredients are needed to include!

Goal of activity: To be able to label and identify the parts of a bicycle.

Teacher tips:
- Students should first attempt this activity without any additional materials (internet, text, bicycle flyers, etc.)
- Have students label as many bike parts as they can. Students should have access to a bicycle and work in pairs to attempt to name as many parts as they can
- Give students time to play with bikes and label parts on the worksheet
- Once students have labeled as many parts as they can, have students pair up with another group to compare answers
- After ~15 minutes, have students research the parts using smart phones, computers, iPads, or bike flyers
- Have students write answers on the board
- Provide students with correct answers, and discuss the function of key parts
- This activity can be immediately followed with activity: “The Big Three”
Activity: The Big Three

Three of the most important items to maintain on a bicycle are:

1. Inflating tires to appropriate pressure
2. Lubricating a chain
3. Ensuring brakes are in proper working order

Materials Needed:
- Tire pump
- Pressure gauges
- Bicycles for students to work on

Teacher to demonstrate inflating tires, cleaning and oiling a chain, and safety check for braking system.

- Discuss what psi and kPa mean (measurements of pressure \( P = F/A \))
- Show students how to properly secure a bike pump to tire stems (both Presta and Schrader)
- Discuss the reasons why proper tire pressure is important (reduce drag/friction, prolong lifetime of tires, improve handling of bike)
- Discuss how to read proper tire pressure from the sidewall of a tire and why it differs depending on the tire (race, mountain, trials riding)
- Have students check their required pressure on the sidewall of their tire
- Have students check tire pressure using a gauge (same as used on cars)
- Relate the importance of tire pressure and lubrication of chain on bikes to checking tires and oil levels in a car

Lubricating a Chain (Demonstration)

Squeak. Sqeeeeeeaaaaaaak. Sssqqqquuuuuuuuuuuuuuuuuuuuuuuuu. If this is a sound your bike makes, you are working harder than you could be! Every squeak you hear on your bike is sound energy produced. Where does that energy come from? You. Why waste your energy on squeakiness when you can be using that energy to go further or faster? The remedy: find those squeaks and get rid of them! The most common squeaks come from a chain that is not properly cleaned and lubricated.

Materials Needed:
- Rag
- Chain oil

Steps:
1. Clean excess gunk off of chain with rag
2. Apply chain oil for lubrication
Assignment/Activity: Change a flat tire

Oh no! You’re biking home from school when your steering starts to feel sloppy. You look down and low and behold you have a flat tire. Fear not! This is one of the most common maintenance issues that arise.

Goal of Activity: Be able to change a flat tire

Tools needed:
- Tire levers
- Patch kit or spare tube
- Air pump

Steps
1. Remove wheel from bike (shift to smallest cog, open brake assembly)
2. Remove tire from rim
3. Remove tube from tire
4. Repair tube (using patch kit) or use new tube
5. Find and fix the culprit! Check tire, tube, rim, rim tape. Look for pointy objects, small pieces of glass, etc. that may have caused the tube to lose air.
6. Put new tube in tire
7. Replace tire on rim
8. Inflate the tube
9. Put wheel back on bike
10. Test, then ride!

Quiz: Change a flat tire

You will be given a bike with a flat tire. Your job is to get the bike ready to ride.

Activity: Name that tool

Tools will be passed around one by one. Pictures of each tool will also be shown on the screen. Your task is to name it!
Skill Assessment: Load your bike on a bus

Whether it be because of the weather or the amount of time a person has to reach a location, cycling is often paired with another mode of transportation in Vancouver. Fortunately, busses and trains that are operated by Translink offer individuals alternate modes of transport on those cold, rainy days!

All busses in Vancouver are equipped to transport two bikes on the front of each bus.

Magee is located 3.0 km from a bus depot at 41st and Dunbar St. Subsequent to arranging with Translink, the class will travel to a bus depot and practice loading and unloading their bike onto a bus.

Activity: Human Anatomy

- Label the parts of the human anatomy (muscles and bones)
- Create a nutrition plan for a daily bike ride
- Create a nutrition plan for a multi-day bike ride
- Research what muscles are primarily used when you bike. By what percentage more than normal?
- Discuss stretching of specific muscle groups as part of overall body maintenance when riding bikes

Group Project: Run a cycling workshop at an Elementary school

Teacher will initiate relationship with the administration of Maple Grove Elementary school, located adjacent to Magee. In Spring, Cycling 11 students will provide a workshop to elementary students, teaching them about bike safety and safe riding skills.

Organize Bike to School Week Events

Bike to School week (http://www.biketoschoolmetrovan.ca/) takes place in Vancouver, typically near the end of May. Students will host daily events throughout the week, including but not limited to:

- Bike maintenance
- Bike rodeo
- Bike polo
- Slow bike race
**Field Trip: Velodrome**

One style of riding happens indoors on a track. Students will participate in a field trip to the Burnaby Velodrome (http://www.burnabyvelodrome.ca/index.php):

Burnaby Velodrome  
7564 Barnet Rd.  
Burnaby, BC V5A 1E7  
(778) 802-4603

**Technical: Gear Ratios**

Gears are used in machines to make things easier on those using them. Gears are used in cars and bicycles. Your task is to be able to share with your class how gears work on a bicycle and to develop vocabulary around their use. This will include effort force and load force, load and effort distances, and to discuss why gears are important for not only riding bikes, but for use in machines in general.

**History of the Bicycle**

Where did the bicycle come from? Your task is to research the history of the bicycle and present your findings to the class. Your output can be a PowerPoint, prezi, creative display or some other method that you have communicated to Mr. D. It should include where a bicycle came from, who it was first used by, why it was created, and how technology in bicycles has come to impact our modern world.

**Physical: Time trials**

How fast do you bike? One method is to use a computer that tells you how far and fast you’ve gone. How is that calculated? This activity will help you to build vocabulary and understand of the physics of bicycles.
Cycling 11: Final Project

As a final project for Cycling 11, you are tasked with organizing and carrying out a cycling related initiative in either the school community, or that in which you live. This will be an area that you are an expert in by the completion of the course. Your project will be shared with classmates and the school community.

Possible Final Project Ideas

- Run a bicycle repair shop at Magee
- Start a cycling initiative in your community
- Campaign City Hall for a cycling initiative
- Propose a new bike lane in Vancouver

Learning Resources

www.bikepedia.com
Conclusion

“The solution which I am urging, is to eradicate the fatal disconnection of subjects which kills the vitality of our modern curriculum. There is only one subject-matter for education, and that is Life in all its manifestations”

(Whitehead, 1929, p. 198)

At the beginning of this paper, I presented what I see is a problem in secondary education in British Columbia. There is a disconnect between how people learn after secondary school with how we expect learning to happen while students are enrolled in school. The goal of this paper was to question the current landscape of education in British Columbia and to propose changes that I feel better model the skills and attitudes that students will need upon graduating. These changes include engaging students through cross-curricular and experiential learning, fostering critical thinking skills, and to foster socially conscious citizenship. A tool is proposed to achieve these aims in Cycling 11 – a locally developed course that will provide students with skills and attitudes that will benefit them long after they leave secondary school.

Throughout this process I learned that there is much to be done to align learning in secondary schools with how it takes place long term. Realistically, it is an uphill battle. Much work needs to be done at both the macro (policy) level, as well as the micro (school) level to make this happen. A significant shift in thinking is needed, a challenge for any person, let alone an entire system. However, as Sugata Mitra says, “We need to reinvent [schools] for our times, our requirements and our future. We don't need efficient clerks to fuel an administrative machine that is no longer needed. Machines will do that for us. We need people who can think
divergently, across outdated "disciplines", connecting ideas across the entire mass of humanity"\textsuperscript{16}. I would tend to agree.

\textsuperscript{16} http://www.guardian.co.uk/education/2013/jun/15/schools-teaching-curriculum-education-google
References


Appendix A: Cycling 11 Curriculum

CYCLING 11

Preface

During the process of overall course development significant thought and consideration had been given to the needs of our diverse learners as well as the ever-changing landscape of Vancouver (including environmental initiatives, transportation initiatives and the local economy). The course has been designed to reflect some of the core competencies, skills and knowledge that students will need to succeed within the community in the 21st century. The “Rationale” component and the “Unit/Topic/Module Descriptions” outline a variety of learning outcomes that will utilize a variety of learning modalities (visual, auditory, kinesthetic), including a significant emphasis on experiential learning. The assessment component has been designed to closely reflect the core competencies (Communication, Critical Thinking, Creative Thinking & Innovation, Personal Responsibility, and Social Responsibility).

Special Training, Facilities or Equipment Required

Teacher should have experience riding and maintaining bicycles. A physical space for bicycle maintenance and storage is required. It is advantageous for students to have their own bicycle.

Course Synopsis

Cycling 11 will provide students with a wide-ranging skill set, spanning multiple disciplines. At the completion of the course, students will demonstrate knowledge of cycling when viewed through four (4) distinct lenses:

1. Technical: Students will become self-reliant cyclists demonstrating knowledge of bicycle anatomy, maintenance, and repair.
2. Physical Education: Students learn about road safety, the human body, the importance of cardiovascular health, nutrition, and partake in group cycling rides in an urban environment.
3. Scientific: Students learn about & measure gear ratios, pressure, torque, speed, acceleration, force, mechanical advantage, and friction. Students will apply this knowledge to solving kinematics problems relating to the bicycle.
4. Environmental & Social Sustainability: Students apply knowledge learned to transportation infrastructure & environmental awareness projects in Vancouver.
In addition, students will become ambassadors for cycling, organizing events and advocacy initiatives both in, and outside of, the school setting.

By the end of this course, students will:

- Have a deep understanding of the bicycle (mechanics, physics, transportation and recreation)
- Develop action projects that support cycling in the school and community
- Display the leadership skills required for event organization and advocacy
- Understand the meaning and practice of environmental and social sustainability
- Develop and implement a fitness and nutrition plan that will support life-long well-being

This course encourages students to think in a cross-curricular manner, to work closely with the community, and make connections between technical studies, academic courses, and their experiences outside of school. At the completion of the course students will be self-reliant cyclists with broad knowledge of cycling issues in Vancouver.
Rationale:

Rationale #1: Hands on, experiential learning

Cycling is a physical activity that many people start a young age and continue doing for the majority of their life. This experiential course will allow students to become proficient and self-sustainable with their cycling needs both during and after secondary school. This hands on and skills-based course will allow students to learn about and practice tangible and practical skills around bicycle safety, maintenance, and advocacy.

Rationale #2: Cross-curricular connections

Cycling incorporates knowledge and skills that spans many curricular disciplines. This course offers students the opportunity to approach cycling in a truly cross curricular manner, incorporating knowledge and skills attained in physical education, science, and social studies. To become a self-reliant cycling citizen, students require knowledge of bicycle anatomy and maintenance, the importance of cycling for physical fitness, as well as understanding political decision-making with respect to transportation and infrastructure, both in their communities and at the provincial level. In addition to linking various curricular disciplines, student will make connections to subject matter learned both in and outside the school setting that will serve them well in their formative education years and beyond as they become active citizens in the communities in which they live.

Rationale #3: Community Engagement

The course will provide avenues for students to become involved in their communities, communicating with business owners, volunteer organizations, and political bodies at the local and provincial level. Students will build community and school cycling awareness as they apply skills learned to the organization of cycling events within the school, with elementary students at feeder schools, and within their individual communities.
Organizational Structure:

<table>
<thead>
<tr>
<th>Unit/Topic</th>
<th>Title</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>Technical Overview of the bicycle</td>
<td>15</td>
</tr>
<tr>
<td>Unit 2</td>
<td>Cycling Skills</td>
<td>25</td>
</tr>
<tr>
<td>Unit 3</td>
<td>The Science of Cycling</td>
<td>25</td>
</tr>
<tr>
<td>Unit 4</td>
<td>Cycling &amp; Environmental Sustainability</td>
<td>25</td>
</tr>
<tr>
<td>Unit 5</td>
<td>Cycling &amp; Social Sustainability</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

Unit/Topic/Module Descriptions:

**Unit 1:**  Technical Overview of the Bicycle  
**Time:** 15 hours

Curriculum Organizer – Bicycle anatomy  
It is expected that students will:  
✓ Identify the name and function of all parts of a bicycle  
✓ Explain the function and difference of various bicycle types  
✓ Develop an understanding of how bicycle systems (brakes, gears, drive train) work

Curriculum Organizer – Bicycle Maintenance  
It is expected that students will:  
✓ Demonstrate knowledge and vocabulary of the tools needed to maintain a bicycle  
✓ Be able to change a flat tire  
✓ Be able to clean and oil a chain  
✓ Be able to adjust brakes to ensure safe stopping  
✓ Demonstrate ability to diagnose bicycle systems and develop maintenance solutions  
✓ Develop an increased sense of, and appreciation, for self-reliance with bicycles
Unit 2: Cycling Skills

Time: 25 hours

Curriculum Organizer – Cycling Skills and Knowledge
It is expected that students will:
✓ Demonstrate the ability to cycle safely on the road in an urban environment
✓ Design and instruct a basic cycling skills lesson to grade 8 students

Curriculum Organizer – Cycling Fitness
It is expected that students will:
✓ Understand and describe the human physiology and anatomy used in cycling
✓ Understand and describe the fitness components of cycling
✓ Design a training program specific to cycling
✓ Create a nutrition program specific to cycling

Curriculum Organizer – Cycle Touring and Trip Planning
It is expected that students will:
✓ Understand and describe the clothing and equipment required to cycle tour
✓ Understand and apply the principles of map reading, route planning and navigation
✓ Organize a local class cycling trip
✓ Prepare a budget for an overnight cycling trip

Unit 3: Science of Cycling

Time: 25 hours

Curriculum Organizer – Science Applications & Bicycles
It is expected that students will:
✓ Describe gear ratios for bicycles
✓ Explain mechanical advantage and how it applies to bicycles
✓ Effectively use tools to measure and maintain bicycle components
✓ Record measurements of pressure, speed, force, and torque
✓ Measure frame size and frame angles for different types of bicycles
✓ Describe the various materials used in bicycles

Curriculum Organizer – Physics of Cycling
It is expected that students will:
✓ Apply knowledge of the relationships between time, distance, and speed to bicycles
✓ Explain the concepts of force and acceleration as they apply to cycling
✓ Apply concepts of friction to solving bicycle problems including aerodynamics

Unit 4: Cycling & Environmental Sustainability

Time: 25 hours
Curriculum Organizer – Climate Change
It is expected that students will:
✓ Analyze the impact of cycling and other forms of transportation on the environment
✓ Compare and contrast benefits and limitations of various forms of transportation
✓ Research and analyze local, provincial, national, and international climate change policies

Curriculum Organizer – The Livable City
It is expected that students will:
✓ Demonstrate knowledge of Vancouver’s Transportation 2040 plan
✓ Demonstrate knowledge of Vancouver’s Greenest City 2020 Plan
✓ Examine the practice of densification and its impact on active transportation
✓ Assess the local and regional cycling network

Unit 5: Cycling & Social Sustainability Time: 30 hours

Curriculum Organizer – Cycling Advocacy
It is expected that students will:
✓ Design a promotional campaign focused on the benefits of cycling for the school community
✓ Work with the school district to support and promote cycling for all Vancouver students

Curriculum Organizer – School & Community Engagement
It is expected that students will:
✓ Advocate for cycling within the school setting
✓ Organize and develop school cycling events and activities (Bike to School week, bike rodeo)
✓ Design and implement a cycling skills workshop for elementary school students
✓ Take part in a cycling initiative in the community in which they live
Curriculum Organizer – Cycling & the Political Process

It is expected that students will:

- Debate the pros and cons of dedicated cycling lanes in Vancouver
- Write to a political body taking a stance on a cycling related issue
- Interview a local politician or civil servant about cycling issues

**Instructional Component:**

- Direct instruction
- Peer instruction
- Group work
- Self-discovery
- Community involvement
- Guest speakers (Ex: Bike Hub, Pedal, Vancouver City Planners, School Liaison Officer)
- Field trips (Burnaby Velodrome, Vancouver City Hall, Bike rides)

**Assessment Component:**

Evaluation in this course will be ongoing throughout the year. Suggested evaluation criteria is weighted as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Tests/Quizzes</td>
<td>25%</td>
</tr>
<tr>
<td>Participation</td>
<td>15%</td>
</tr>
</tbody>
</table>

Assignments will include a variety of assessments, including but not limited to: Naming parts of the bicycle, Routine Maintenance (changing tire, cleaning a chain), solving kinematics problems, listing key points of Vancouver’s cycling mandate, naming parts of the human anatomy, organization of school cycling events, and portfolios for summative assessment.

Tests/Quizzes are intended to offer formative assessment for students to build knowledge. Tests are intended as summative assessment to demonstrate competence within the various units.

Participation will include a self-reflection component (guiding questions with a rubric: developing → proficient → accomplished), teacher assessment, and peer assessment.
Projects: Individual & Group  25%
Individual projects will include re-building or designing a bike, designing a greenway, and creating a cycling fitness and nutrition plan. Group projects will include organization of school & community events, interviewing city officials, and planning a class cycling trip.

Journals  15%
Journals will include opportunity for self-reflection (open/free-response), responses to guided questions related to curricular content, current events, field studies, as well as opportunities to provide feedback about course content, delivery, and activities.
Learning Resources:

Newspaper and online media about current events.

Separated cycling lanes in Vancouver:
http://vancouver.ca/streets-transportation/separated-bicycle-lanes.aspx

Ride the Road: A Comprehensive Secondary School Bike Education Curriculum:
http://www.vacc.bc.ca/advocacy

The Exploratorium: The museum of science, art, and human perception:
http://www.exploratorium.edu/cycling/

Moving Forward: Improving Metro Vancouver’s Transportation Network:
http://www.translink.ca/~media/documents/bpotp/10_year_plan/2011_supplemental/moving%20forward%20%202011%20supplemental%20plan.ashx

City of Vancouver: 2040 Transportation Plan:
http://vancouver.ca/streets-transportation/transportation-2040.aspx

Clean Air Champions:
http://www.cleanairchampions.ca/

The Story of Stuff:
http://www.storyofstuff.org/

Environmental Learning and Experience: An Interdisciplinary Guide for Teachers

Additional Information:

None