BOARD OF EDUCATION OF
SCHOOL DISTRICT NO. 46 (SUNSHINE COAST)

EDUCATION COMMITTEE
AGENDA
January 28, 2015 from 10:30-12:00 p.m.
School Board Office – Gibsons, BC

Introductions

1. International Education
2. School Visit Reflections
3. BAA Course Proposal: Coastal Ecological Stewardship
4. Parent Engagement

School District No. 46
International Education

Update – January 2015

Areas of Update

- Overview of School Year
(enrolment, school start-up, orientation)
- Program Development
(program consultant, future growth)
- Promotion and Recruitment
(website, program enhancements, agents)
- Markets
(english language support, china)

Program Consultant

- Tom Ristimaki

  Focus Areas

  Comprehensive Assessment
  Program Development
  Promotion & Recruitment
  Research & Consulting
  Training & Facilitation

Website

- Overview
- Programs
- Lifestyle
- Community
- Homestay
- Contact Us

SCHOOL DISTRICT NO. 46 (SUNSHINE COAST)
INTERNATIONAL EDUCATION – UPDATE JANUARY 2015

Board/Authority Authorised Course Framework Template

School District/Independent School Authority Name	Sunshine Coast
School District/Independent School Authority Number	School District #46
Developed by	Jay Walls
Date Developed	January 2014
School Name	Pender Harbour Elementary Secondary School
Principal's Name	Paul Bishop
Superintendent Approval Date (for School Districts only)	
Superintendent Signature (for School Districts only)	
Board/Authority Approval Date	
Board/Authority Chair Signature	
Course Name	Coastal Ecological Stewardship
Grade Level of Course	11
Number of Course Credits	4
Number of Hours of Instruction	120 Hours
Prerequisite(s)	N/A
Special Training, Facilities or Equipment Required	Field Studies/Classroom

Course Synopsis	1) To give a systematic approach to learning ecological science through inquiry. 2) To utilize place-based learning for real world science career understanding. 3) To understand biodiversity through System Theory in Science: Biosphere Hydrosphere/Lithosphere/ Atmosphere 4) To connect students with local science/professional experts in their community. 5) To understand Traditional Ecological Knowledge (TEK), and First Nations cultural ecological knowledge relating to self, science and society. 6) To make hypotheses based on critical scientific analysis. 7) To learn the process of creating Ecological Reports 8) To achieve a sense of connection within the scientific community and culture by reporting data and acting as leaders of ecological stewardship outside of the classroom. Human endeavour is marked by the places in which we choose our recreation, practice our careers, and build our residences. If our culture decides that our activities should not unnecessarily harm our world, so that future generations may inherit it intact, it stands to reason that we should instil a sense of stewardship in students with respect to the ecological settings that they affect. Scientific knowledge gained through studies in the field gives us a way to keep our actions in check. This scientific knowledge, and how we interpret it, informs our cultural values of stewardship. The next generation of leaders in our culture will influence this definition and frame what we value. A distinction can be made if we educate students

	to define these values of stewardship from a place of caring rather than a need to merely survive our land use issues. Stewardship cultivated around a desire to preserve the biodiversity and beauty of naturally selected ecosystems should implicitly tend towards management practices that are self-sustaining. The following curricular guide outlines a systematic approach of inquiry, analysis, and synthesis to achieve an awareness of ecological issues through place-based expeditions to ecological zones of interest.

Rationale

The *Ecological Stewardship 11* course is designed as a structured way to guide students through an educational process of experiential scientific inquiry. The inquiries will be guided. The first goal is for students to reach an understanding of what constitutes healthy biodiversity of the ecosystems in their geographical area. The second goal is to have students report their ecological findings in a professional manner. The third goal is to infuse a sense of leadership within the students so that they may become authorities and stewards of their local ecosystems. This sense of stewardship will be fostered through critically acquired knowledge that is personally and culturally relevant. Aboriginal/First Nations perspectives on leadership and archaeological evidence of First Nations' cultures are relevant and will be woven throughout the course implementation.

Place-based learning will be at the heart of the inquiry process and will begin with expeditions into the field to acquire specific scientific information from local ecozones. Local scientific experts will accompany the expeditions. Their expertise will bring the educational inquiry experience to a professional level of knowledge and collaboration, which will bridge the science classroom with science careers.

The concept of an expedition is one of discovery, and the act of discovering inherently coincides with a sense of curiosity, intrigue and wonder, which is at the heart of any inquiry. The discoveries of new places, experiences and knowledge are the building blocks of constructivist philosophies concerning learning. The discovery must be guided, however, to move toward inquiry and local professional experts, as guides in the field, will help students to observe pertinent scientific constructs during their expeditions into inquiry. Relevant botanical, mineral, water, soil and air samples will be gathered and tested in the classroom, lab or interpretive centre.

The scientific expeditions will be influenced by culture. The cultures of the particular local areas of our residence tend to cultivate a sense of ownership/stewardship with relation towards the make-up of the naturally selected ecosystems in those areas, whose beauty should be preserved. Connecting students with this sense of preservation should build a sense of ownership of their culture, and this personal sense of ownership will bring students into a role of leadership. Infused with a sense of leadership in their own culture, the constructs of their ethical awareness should take shape.

Once the field study inquiries are accomplished the next step will be to give their expeditions professional/career oriented purpose. Each expedition will necessitate a photo journal, ecological report and reflection on the experience. At the end of all the expeditions each student will compile their field study photos and reports, complete with synopsis, conclusion and next-step reflections/hypotheses, into a complete Ecological Report on the eco-zones of interest surrounding Pender Harbour Elementary Secondary School. Through this process of inquiring, analyzing and reporting, students become the professional by providing data and reports for their community, thereby promoting and preserving their cultural ecological identity.

Through the collaborative processes described, the course hopes to infuse a lifelong sense of culture, ecological stewardship and ethical leadership in students, since our modern day ecological concerns have inextricable implications towards the preservation of all places and cultures of our world.

Here are excerpts from the most current BC Education Ministry's website describing science education rationale:

> *"The Science curriculum takes a place-based approach to science learning. Students will develop place-based knowledge about the area in which they live, learning about and building on Aboriginal knowledge and other traditional knowledge of the area. This provides a basis for an intuitive relationship with and respect for the natural world; connections to their ecosystem and community; and a sense of relatedness that encourages lifelong harmony with nature."*

> *"The curriculum's intent is to develop scientifically literate citizens who have a critical awareness of the role of science in society, combined with a caring and responsible disposition, and an understanding of the social, ethical, and environmental dimensions of issues. Scientifically literate citizens are able to use scientific evidence, as well as their knowledge from other areas of learning, to develop their own views, discuss and debate, and make informed decisions in their daily lives and about broader issues while maintaining their curiosity and wonder about the natural world."*

What follows is a field studies science curriculum designed to foster scientific critical thinking competencies from real world science activities that take the self in science towards professional communication strategies utilized in our society. The structure of the curriculum begins its organization with four overriding goals to promote local ecological stewardship. Firstly, inquire into what would be a naturally occurring ecosystem in your area that has not been affected by human intervention. Secondly, inquire into ecosystems in your area that have been affected by human intervention. Thirdly, connect students with community leaders in your area to understand the process of how voice can influence societal perspectives relating to your local culturally relevant environmental concerns. And finally, an inquiry into what would constitute a modern approach to the coexistence of humans, technologies and ecosystems in a way that favours the natural world in your locale.

The settings of the place-based learning opportunities further described are in the Coastal Rainforest Ecosystem of British Columbia with particular attention focused on the ecoregions of the Sunshine Coast and Pender Harbour.

Curricular Organizers

From a strictly pedagogic perspective, the course outline and design is modeled after the most current directions prescribed by British Columbia's Ministry of Education relating to science. A top down approach to inquiry is framed with broad competencies utilizing place-based learning to promote career awareness and cultural identity through leadership. A big picture, cross-curricular competency, approach has guided the *Coastal Ecological Stewardship 11* curriculum design. The BC Education Ministry describes these competencies as:

Thinking Competencies: *Critical, Creative and Reflective*.
Personal and Social Competencies: *Positive Personal and Social Identity, Personal Awareness and Responsibility, Social Awareness and Responsibility*.
Communication Competencies: *Language and Symbols, Digital Literacy*.

Place-Based Experiential Modules:

Expeditions 1-4

The Ecozones

The instructional components that follow involve three broad ecological health concerns; **Air Quality, Water Quality** and **Land/Soil Quality.** Two broad themes in student comprehension, the **Qualitative** and **Quantitative** differentiate to help build an aesthetic and analytical sense of the aspects of place**.** Once initial inquiry and subsequent research unfold, students begin to reflect and the **Critical, Personal/Social and Communication** competencies implicitly begin to take place.

An investigation into these broad organizers begins with a coastal ecological issue of concern. The issue will lead the initial phases of inquiry. Questions will be raised, for example: Does the issue concern the abiotic or biotic environment? Is it an issue of quality that has a long-term effect over time, or, are there immediate limiting factors that may cause extirpation/extinction of a species and a subsequent loss of biodiversity? Many questions will arise to guide further inquiry and initial research. At this point the first phase of critical thinking competency begins to form.

Curiosity about the place of expedition will be fostered with the issue of inquiry. Curiosity is put into action while researching topographic maps and road maps of the destination. The inquiry expedition is very specific. The expedition is quick, within one day/one hour, to promote wonder and further reflection after the fact. Students will use technology to find GPS co-ordinates, take photos, which compliment their maps and journal reflections, **(Critical Creative-Reflective, Personal, Communication-Digital competency)**.

Then, back to the classroom and an organized discussion format will take place to promote a type of Peer Instruction. Students describe their unique observations in a group setting to collectively construct a critical analysis of place **(Social, Communication-Language competency**). The collaborative discussions are followed by a more in-depth research of current reports, media coverage, documentaries and streaming clips, to aid critical analysis for their research papers **(Critical Thinking, Personal, Communication-Digital-Symbol competency)**. Each student's paper will be approximately 500 words. The final reflection is lead by the constructs of individual knowledge and experiences gained, the quality and the quantity. The last step in reflection, again, is a group discussion. Directed by questions such as, 'what further hypotheses arise as a result of the knowledge you have gained', and, 'Do you see any further inquiry into the issue of interest'? **(Critical Reflective, Social, Communication competency)**

Expeditions 5&6

Self, Science & Society

These final two place-based expeditions result from the need to go beyond analysis and reflection to the levels of synthesis and evaluation. After students have inquired into knowledge from their experiences in place settings and reflected on new directions of inquiry, what actions could they conduct, or see taking place, in a real world setting? Expeditions 5&6 build on **Critical** and **Communication** competencies giving them purpose. The focus now is on all aspects of **Personal and Social** competency. As students begin to form their connections between self, science and society, they are brought towards the competencies concerned with **Positive Personal and Cultural Identity, Personal Awareness and Responsibility** and **Social Awareness and Responsibility.** In essence, how do they actualize stewardship and lead positive new directions in their culture.

Unit/Topic	Title	Time
Unit 1	<u>Expedition 1: Ambrose Lake Ecological Reserve</u> Purpose: Botanical study of unaltered climax ecosystem Issue: Definition of ecological reserve designation Activity: Freshwater oxygen content/soil-water pH, **Performance skills**: Students will demonstrate an ability to locate botanical/mineral samples of interest in the field. Students will demonstrate an ability to successfully test samples with chemical reagents/digital pH meter. **Communication Skills**: Students will use technology to create maps, written/photo journals and reports to evaluate knowledge and experiences. **Critical Thinking Skills**: Students will demonstrate an ability to analyze data, question and predict to make hypotheses based on findings. **Personal Skills:** Students will begin to hone personal ethical/leadership judgements from place-based experiences and collaborative discussions with peers, community members and local professionals/experts.	15 hr in class: 5 hr in field
Unit 2	<u>Expedition 2: Sakinaw Lake Watershed/Salmon Hatchery</u> Purpose: Investigate limiting factors of Sakinaw Sockeye Issue: Predation/water quality/commercial by-catch Activity: Testing brackish water oxygen content/pH/ecoli **Learning Outcomes:** **Performance skills**: Students will demonstrate an ability to find archaeological sites of interest based on GPS co-ordinates on a map. Students will demonstrate an ability to successfully test samples with chemical reagents/digital pH meter. **Communication Skills**: Students will use technology to create maps, written/photo journals and reports to evaluate knowledge and experiences. **Critical Thinking Skills**: Students will demonstrate an ability	15 hr in class: 5 hr in field

	to analyze data, question and predict to make hypotheses based on findings. **Personal Skills:** Students will begin to hone personal ethical/leadership judgements from place-based experiences and collaborative discussions with peers, community members and local professionals/experts.	
Unit 3	<u>Expedition 3: Caren Range/ Bear Bay Forest</u> Purpose: Investigate Old growth forest/carbon sequestration Issue: Cut-block <u>vs</u> conservation efforts Activity: Tree ring count/Soil sampling/Soil pH **Learning Outcomes:** **Performance skills**: Students will demonstrate an ability to successfully test samples with chemical reagents/digital pH meter. Students will demonstrate an ability to count tree rings to estimate the age of a climax ecosystem. **Communication Skills**: Students will use technology to create maps, written/photo journals and reports to evaluate knowledge and experiences. **Critical Thinking Skills**: Students will demonstrate an ability to analyze data, question and predict to make hypotheses based on findings. **Personal Skills:** Students will begin to hone personal ethical/leadership judgements from place-based experiences and collaborative discussions with peers, community members and local professionals/experts.	15 hr in class: 5 hr in field
Unit 4	<u>Expedition 4: Salish Sea Coal Route/ Britannia Mines</u> Purpose: Research toxic material transport/leaching Issue: Thermal coal transportation through aquatic ecosystem. Heavy metal dust particulate Activity: test for lead/heavy metals in soil samples **Learning Outcomes:** **Performance skills**: Students will demonstrate an ability to successfully test samples with chemical reagents/digital pH meter. Students will demonstrate an ability to analyze transport routes on maps and weather data to locate	15 hr in class: 5 hr in field

	sampling sites. **Communication Skills**: Students will use technology to create maps, written/photo journals and reports to evaluate knowledge and experiences. **Critical Thinking Skills**: Students will demonstrate an ability to analyze data, question and predict to make hypotheses based on findings. **Personal Skills:** Students will begin to hone personal ethical/leadership judgements from place-based experiences and collaborative discussions with peers, community members and local professionals/experts.	
Unit 5	<u>Expedition 5: Local MLA/SCRD/SCCA/Iris Griffith Centre</u> Purpose: Connect with local interest groups/government Issue: learn leadership process of action Activity: Collaborative discussions/process of action **Learning Outcomes:** **Performance skills**: Students will demonstrate an ability to utilize documents, plans, acts and bylaws when reporting their findings. **Communication Skills**: Students will use technology to create written/photo journals and reports to evaluate knowledge and experiences. **Critical Thinking Skills**: Students will demonstrate an ability to analyze data, question and predict to make hypotheses based on findings. **Personal Skills:** Students will begin to hone personal ethical/leadership judgements from place-based experiences and collaborative discussions with peers, community members and local professionals/experts.	15 hr in class: 5 hr in field
Unit 6	<u>Expedition 6: Built Environment: Roberts Creek/UBC/H2PIA</u> Purpose: Investigate pollution free alternative energies Issue: Fossil fuel dependence Activity: Generate hydrogen, build Stirling engine, build magnetic engine, solar photovoltaic lab	15 hr in class: 5 hr in field

	Learning Outcomes: **Performance skills**: Students will demonstrate an ability to build and test technical devices and perform science labs. Students will conduct a photovoltaic solar cell lab to understand the relationship between heat, resistance and current from an engineering perspective. **Communication Skills**: Students will use technology to create written/photo journals and reports to evaluate knowledge and experiences. **Critical Thinking Skills**: Students will demonstrate an ability to analyze data, question and predict to make hypotheses based on findings. **Personal Skills:** Students will begin to hone personal ethical/leadership judgements from place-based experiences and collaborative discussions with peers, community members and local professionals/experts.	
	Total Hours 120	90 hr class/30 hr field

Instructional Component

- Direct teacher based instruction
- Place-Bases field studies
- Local experts/scientists/professionals as presenters and guides
- Experiential learning
- Flexible learning environments

Assessment Component

Assessment for/as learning

- Criterion Based Assessment:
  - Chemical Safety/Reagents
- Performance Assessment:
  - Water/Air/Soil Testing
  - Soil Sampling
- Formative Assessment: Journaling, Photo Journaling

Assessment of learning

- Summative Assessment:
  - Botanical Study
  - Term Paper/Ecological Report

Learning Resource

- Digital Cameras, digital meters, GPS, portable technologies, laptops etc.
- Place-Based Travel to:
  - Ecological Reserves
  - Ecological places of interest
  - Britannia Mines
  - UBC
  - SCRD Office
  - Local MLA Office
  - Iris Griffith Centre Field Studies and Interpretive Centre
- TeacherTube – YouTube videos
- Chemical reagent sample testing
- Numerous local experts
  - Biologists
  - Instructors
  - Community advisors
  - Community professionals
- Numerous documentaries
  - TopDocumentary.com
    - The Story of Science
  - Pod Casts
    - The Fifth Estate
    - Nova
- Current newspaper articles/Media clips
- Conservation Society Letters/Documents
- Government of Canada Website
  - COSEWIC (Committee on the Status of Endangered Wildlife in Canada)
- Ministry of the Environment Website
  - SARA (Species At Risk Act)
  - Ecological Stewardship
  - Ecological Reports

Additional Information

Pender Harbour Elementary Secondary necessitates flexible learning environments at times. Thus, the Coastal Ecological Stewardship 11 course class composition may include grade 10-12 students since it has no prerequisites and is an elective course, as designated by BAA guidelines.

Another intention of the course is to bring about more interest in Science, Technology, Engineering and Math (STEM) subject areas. The Coastal Ecological Stewardship 11 curriculum will introduce a cross-section of biology, chemistry, engineering and physics subject areas used in post secondary and STEM career settings.

A formal presentation will give a broader look into the Coastal Ecological Stewardship 11 curriculum described herein.

Endorsed by John Field (Vertebrate Biologist), the Irish Griffith Field Study and Interpretive Centre, retired science instructor, Capilano University.

Also received with great enthusiasm from senior science teachers in or district.

Endorsed by Principal Paul Bishop, Pender Harbour Elementary Secondary School, SD 46 Sunshine Coast British Columbia.