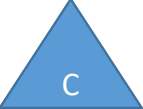
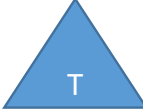
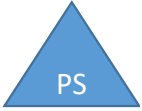


Science 9 Interconnectedness of Spheres

A template based on Understanding by Design

Title of Unit	Interconnectedness of Spheres	Grade Level	Science 9
Subject	Science	Time Frame	20 lessons
Developed By	Brianna Vissers		

Stage 1 – Desired Results		
 Communication	 Thinking	 Personal and Social
<p>Big Idea: The biosphere, geosphere, hydrosphere and atmosphere are interconnected, as matter cycles and energy flow through them.</p>		
Stage 2 – Assessment Evidence		
Formative Assessments 1. Plant Fact Sheet 2. Carbon Sequestration Assignment 3. Reflection Journal: What did I learn today? What questions do I still have? 4. Poster design – Indigenous Garden 5. Soil Lab	Summative Assessments 1. Video Project – knowledge of Indigenous plants, medicinal uses, themes of Interconnectness. 2. Science Story Project 3. Test: Lessons 8-12	Self-Assessment / Peer Assessment Students will provide peer assessment and feedback for poster, video project, and science story project. In addition students will complete self-assessment based on rubric and upload evidence to their freshgrade portfolio.

Sequence of Lessons:

#	Theme	Lesson Activities (Learning Experiences)	Resources
	What is TEK?	<p>Hook: Exploring Questions – What does a person need to know to survive in the modern world? How would you survive if the power suddenly went off for good?</p> <p>How did First Nations survive in their territories from one generation to the next?</p> <ul style="list-style-type: none"> - Develop a list of types of knowledge and wisdom people would need to know. <p>Read introduction to TEK here.</p> <ul style="list-style-type: none"> - Discuss with students why living sustainably on the land was essential for survival <p>Read a story – Clam gardens TEK example Have students fill out Black line master that to explicit think about TEK</p> <p>Reinforce concept of TEK through video: https://www.youtube.com/watch?v=DIGn4yd15_I</p> <p>Go back to the discussion questions from the beginning of the lesson.</p> <p>Impacts of human activity on clam gardens. Extension: ocean acidification causes damage to coral reefs, a key stone species. Impact on ecosystem diversity. https://www.youtube.com/watch?v=GK_vRtHJZu4</p>	Unit 1 – FNCS Science First Peoples Teacher Resource
1	Interconnectedness	<p>http://www.firstvoices.com/en/HULQUMINUM Students explore - link to learn about Coast Salish Peoples.</p> <p>Display poster: understanding environmental health from a first nations perspective Students discuss this poster in groups and identify key themes.</p> <p>Discussion: Theme Interconnectedness Examples from River of Salmon Peoples. Teacher provides the students with promotes. Students discuss in groups.</p>	<p>Poster- environmental health from a First Nation Perspective</p> <p>River of Salmon Peoples (available district resource)</p> <p>First Voices: http://www.firstvoices.com/en/HULQUMINUM</p>

		<p>Students create worldwall of words that related to idea of interconnectedness. Including Indigenous Languages words for interconnectedness.</p> <p>Journal Reflection: What does interconnectedness mean to you?</p>	<p>(ipads)</p> <p>Unit 7 – Interconnetedness of Sphere – Science First Peoples.</p>
2	Family Connections	<p>Individual Thinking and Discussion: What is a world view? What is your world view? How is the world view of most First Peoples like a family relationship?</p> <p>Hook: Video – theme for respect for living and non-living things</p> <p>Discussion points: Discuss the feelings, responsibilities and obligations most people have towards other members of their family. How a belief that everything in the universe – living things, rocks, rivers, lakes and stars – are our relative would affect the way that we treat the environment.</p> <p>Depending on your lesson sequence lesson 2 and 3 can be done as one lesson.</p>	<p>Unit 7 – Interconnectedness of Spheres – Science First Peoples</p>
3	Connections with Nature	<p>Learning Intention: Content Mater cycles within biotic and abiotic components of an ecosystem</p> <ol style="list-style-type: none"> 1. Students look at examples of ecosystems and identify living and non-living compounds. (possible explore local ecosystem here, nature walk) On nature walk students take images of plants, animals, fungi, non-living compounds, sun, water, nutrients. 2. Students create mindmap to demonstrate how these compounds are connected. Discuss consequence of elimination of compounds or imbalances. 	
4		<p>Learning Intention: Content Knowledge of Indigenous plants and medicinal uses</p> <ol style="list-style-type: none"> 1. Video: Indigenous Plants Video Plant Diva 	<p>Book Library</p> <p>Books: Food plants of Coastal First Peoples</p>

		<p>2. Students use available resources and research indigenous plants and medicinal uses</p> <p>3. Students complete fact sheet (Black line master Science First Peoples)</p> <p>Fact Sheet pg. 73 FNCS Science First Peoples Teachers Resource. Blackline master 2-3 – Formative Assessment</p>	<p>Plant technology of First Peoples in BC</p> <p>UBC Indigenous plants Blog – Plant Diva</p> <p>https://indigenousplantdiva.wordpress.com/page/2/</p> <p>Abby Aboriginal education print out</p> <p>Local Native Plant printout</p>
5-7		<p>Learning Intention: Planning Indigenous garden</p> <ol style="list-style-type: none"> 1. Lesson Indigenous garden design and conservation of water (see design a native plant garden worksheet) (formative assessment poster) 2. Extension 1: Soil Lab (formative assessment lab) 3. Extension 2: Planting Seeds to transplant to community garden. <p>Possible Extensions:</p> <ol style="list-style-type: none"> 1. Lori Synder (guest speaker) –Have students complete card and hand made gift!!! 2. Field Trip to UBC farm and walk by Medicinal Connective 3. Field Trip to Stanley Park – nature walk local ecosystems <p>Summative Assessment: Video Project – knowledge of Indigenous plants, medicinal uses, themes of Interconnectness.</p>	<p>Design A Native Plant Unit Plan and Supplies</p> <p>Rubric for video project</p>
8	Connecting Spheres	<p>Learning Intention Content: effects of solar radiation on the cycling of matter and energy</p> <ul style="list-style-type: none"> - Interconnectedness of Earth’s Spheres <ol style="list-style-type: none"> 1. Video: Earth’s System Interact https://www.youtube.com/watch?v=GnEP93QqVXc 2. Sphere stations Activity (at each station have information about each sphere students first go to all 5 stations to study information and then...) <ul style="list-style-type: none"> - 5 pieces of chart paper labelled sun, atmosphere, biosphere, geosphere, and hydrosphere. - Divide students into 5 groups and provide them each a group with a different colour sticky notes. 	

		<ul style="list-style-type: none"> - Students write ways that the subject interacts with the other spheres. 	
9		<p>Learning Intentions: effects of solar radiation on the cycling of matter and energy</p> <p>Chose an ecosystem to focus on (for example local ocean ecosystem)</p> <ol style="list-style-type: none"> 1. Show video of trophic cascade (whales) https://www.youtube.com/watch?v=M18HxXve3CM 2. Have students create trophic organizer including key compounds (energy from sun, nutrients, trophic levels, producers, primary consumers, secondary consumers, tertiary consumers, detrivores). 3. Web of life activity: supplies string and list of organisms (use above example to reinforce concepts) <ul style="list-style-type: none"> - Give each student the name of an organism and one have the sun - Have students prepare cards based on the organism they were assigned - The person holding the sun tosses the string to someone else in the circle, making sure they hold onto the end of the sting. The next student catches the string and tells one way that their organism interacts with the sun. - Eventually a tangled web will be created - Discuss what would happen if one of the objects was removed from the web. How is this similar to a real ecosystem. 	<p>Web of life activity: FNSC First Peoples Science</p>
10		<p>Learning Intention: Nutrient Cycles (carbon cycle and photosynthesis and human actions and impacts)</p> <ol style="list-style-type: none"> 1. Direct Teaching Activity: Carbon Cycle (Science 10 pg. 71-77) <ul style="list-style-type: none"> - How carbon is stored - Photosynthesis - Cellular Respiration 	

11		<p>Learning Intention: Nutrient Cycles (carbon cycle and photosynthesis and human actions and impacts)</p> <p>Carbon Sequestration in Trees (pg. 156) Science First Peoples</p>	
12		<p>Learning Intention: Nutrient Cycles (carbon cycle and photosynthesis and human actions and impacts)</p> <p>Human Activities and the Carbon Cycle</p> <ol style="list-style-type: none"> 1. Focus on increase CO₂ in the atmosphere and impacts on shellfish (ocean acidification) Possible extension: Guest speak – speak about clam gardens and impacts and connections to global warming. 2. Student explore Burrard inlet Action Plan: A Tsleil-Waututh Perspective (Example of Action Plan) 	
13	Summative Assessment	Formal Test on lesson 8-12	
14	End of Year Project (Every Friday starting after spring break)	<p style="text-align: center;">Research Using the 7Es</p> <p>Make your Science Story: Sample Learning Framework on pg. 198</p> <p>Environment, Engage, Explore, Elder, Explain, Elaborate, Evaluation</p> <ol style="list-style-type: none"> 1. Engage – Students pick something that interested them from one of the four elements. What makes a good inquiry question – see handouts from Science 8 binder 2. Mini lesson on the 4 elements and connections from first peoples perspectives <p>Environment: Spring Break Project: explore your local environment – assignment.</p>	