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| Subject: | Forest | Grade: | 6 | Duration: | 2 hours  |

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| Big Ideas: | Summative Assessment: |
| Multicellular organisms rely on internal systems to survive, reproduce, and interact with their environment. (Science, 6) | **Students will ask and answer questions through observation:** * What are some questions you have about decomposing logs & the organisms that decompose them?
* Are humans’ decomposers? Why or why not?
* In what ways is a disappearing log a living system?
* How did I use systems thinking in this field study?
* Use observation and reasoning to make explanations, including a possible sequence of events
* Explore human impacts, and how they can contribute to caring for the temperate rainforest ecosystem
* Demonstrate evidence for various impacts upon fallen logs
* Observation and reasoning to make explanations about what happened to a culturally modified tree (CMT), and compare & contrast with examples of other ‘disappearing logs’ (e.g. forestry practices, and other signs of disturbance including: lightning, fire, wind fall).
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| Unit Understandings: |  | Content: |
| * All organisms are connected and interact with each other (competition, predatory-prey, symbiotic, parasitic relationships)
* Organisms also interact with the surrounding environment (abiotic factors) including energy, water, air and soil.
* How our actions impact an organism’s (positive and negative) ability to survive
* Living organisms have interdependent body systems that interact to sustain life

Using a systems approach, students learn that the log is not really disappearing, It is turning into gases that are part of the cycling of matter in all ecosystems (Reference: BEETLES). |  | The basic structures and functions of body systems: (organism system: plants)* Excretory
* Reproductive
* Hormonal
* Nervous
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| Transfer: |  | Essential Questions: |
| * Understand that a variety organisms rely on internal systems to survive, reproduce, and interact with their environment
* Understand the interconnectedness of all living things
* Connect to place and understand their role and responsibility as stewards of the environment
 |  | * How am I interacting with systems in my everyday life?
* How can changes in the environment affect a community of organisms?
* How do living organisms adapt to, and interact with, their environment?
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|  | Concepts: |  |  | Curricular Competencies: |
|  | * System
* Interdependence
* Environment
 |  |  | * Experience and interpret local environment
* Demonstrate curiosity about the natural world
* Make observations
* Make ethical judgements about events, decisions and actions that consider the conditions of a particular time and place and assess appropriate ways to respond (ethical judgement)
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| First People’s Principles of Learning: |  |
| Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place). **Cheakamus Centre Principles:****Place:** Students will explore and observe about organisms within the pond ecosystem. **Inquiry:** Students will ask and answer questions through observation.**Community:** Students participate in citizen science by sharing data with other field study groups.  |  |
| Core Competencies: |
| **Communication:** * I ask and respond to simple, direct questions
* I am an active listener; I support and encourage the person speaking
* I can recount simple experiences and activities and tell something I learned

**Thinking:*** I can ask open-ended questions and gather information
* I get ideas when I use my senses to explore

**Personal and Social Emotional Learning:*** I can participate in classroom schools, community, or natural world
* I can identify how my actions and the actions of others affect my community and the natural environmental and can work to make positive change
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Field Study Planning:

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| Pre-visit connections: | Resources: |
| **Leading questions to discuss with class prior to visit:*** What is a coastal temperate rainforest?
* What are the characteristics of a coastal temperate rainforest?
* What is a culturally modified tree?

Explore current issues/campaigns related to B.C.s rainforest/logging industry**Please see ‘during visit connections’ below for more ideas to explore before your students’ visit to ODS** | **Websites:*** Sierra Club BC: Eco Map of BC

<https://sierraclub.bc.ca/ecomap/>* Wilderness Committee: B.C. Forestry

<https://www.wildernesscommittee.org/bc_forestry>* Wilderness Committee: Protecting Old-Growth

<https://www.wildernesscommittee.org/oldgrowth>* Ancient Forest Alliance

<https://www.ancientforestalliance.org/>* Raincoast Conservation Foundation

<https://www.raincoast.org/>* Canada’s Forests Teaching Kits:

<http://www.canadianforestry.com/kits/english/index.html>**Books:*** ‘Project Learning Tree’ Curriculum Guide
* ‘Project Wild’ - Habitat Conservation Trust Foundation
* Get Outdoors. An Educator’s Guide to Outdoor Classrooms in Parks, School grounds, and other Special Places.
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| During visit connections: | Resources: |
|  **Introducing the Activity:**“Step into the circle if” about solving mysteries: Gather students in a circle and step into the circle if the statement applies to them, then step back out.* *You have ever watched a detective show or movie.*
* *You have ever lost something & tried to figure out where it went.*
* *You’ve heard the word “evidence”* (ask them to define it)
* *You know what a “suspect” is* (ask them to define it)
* *You’ve ever tried to figure out a mystery* (ask few to share)

Explain that they will be trying to solve a nature mystery. Tell students that they will be acting as detectives today, trying to explain a nature mystery based upon the evidence they find. Hike for a few minutes towards the ‘Cedar Pass Through’. Ask students to find a leaf on the ground. At a clearing, circle-up the group. Introduce a tool & skill needed to help them solve today’s mystery: the hand lens & making observations. Hand out the hand lenses & have students find the ‘sweet’ spot’ (the position of the lens where the leaf is crisp and clear). Introduce how to observe (“I notice”). Ask students to share an “I notice” statement about their leaf. Continue hiking to the decomposing log, & unveil the mystery – “The Case of the Disappearing Log.”*This log used to be a tree. People have been noticing that it, and other logs in the area, is slowly disappearing! It will be your job to figure out what is happening to the log.***Initial Explorations:*** Explain that they will explore and observe the log together, looking for evidence that the log is disappearing.
* While students explore, model & encourage making observations & asking questions (inquiry).
* If students are losing interest, suggest that they change their perspective.
 | **Exploration/discussion routines for in the field:*** [Beetles: Hand Lens Intro](http://beetlesproject.org/resource/hand-lens-intro/)
* [Beetles: Walk and Talk](http://beetlesproject.org/resources/for-field-instructors/walk-and-talk/)
* [Beetles: I notice, I wonder, It reminds me of](http://beetlesproject.org/resources/for-field-instructors/notice-wonder-reminds/)
* [Beetles: Case of Disappearing Log](http://beetlesproject.org/resources/for-field-instructors/case-disappearing-log/)
* [Beetles: Decomposition Mission](http://beetlesproject.org/resources/for-field-instructors/decomposition-mission/)

**Resources at Cheakamus Centre:*** CMT picture/ cedar prayer
* Measuring tape
* Rope
* Egg cartons
* Biodiversity scavenger hunt cards
* Magnifying glasses
* Tree ID Sheets
* Suspects cards
* FBI cards
* Ethnic plant guide book
* Sit pads
* Clip boards
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| **Initial Sharing:*** Bring group back together & tell students to share observations & evidence in pairs.
* Ask a few students to share their observations with the whole group.
* Help students make connections between cause & effect when discussing evidence of the disappearing log.
* Ask students to ‘Turn & Talk’ about possible explanations for what might have caused the evidence they observed.
* Ask a few students to share out explanations.
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| **Meet the Suspects:*** Give each student either an “Evidence” or a “Suspect” card.
* Tell Evidence cardholders to stay put, while Suspect cardholders move around looking for a match.
* Once pairs have found each other, tell them they should share their cards aloud to each other.
* Matched pairs mingle & introduce themselves to other evidence/suspect pairs.
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| **Investigating with a Key:** (bring group to another large log, or tell each team to choose their own log in a designated area).* Tell students they will learn more about possible causes of evidence they have found.
* Explain they will use a key to identify suspects & connect them with evidence.
* Demonstrate how to use the Disappearing Log Key.
* Students use the key in teams to figure out what suspects caused the evidence on the log.
* Encourage students to look for evidence of where the tree stood, make possible explanations for how it fell, and look for the order of suspects & events that affected the log.
* Circulate, trouble-shoot, be a co-investigator, and ask questions.
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| **Discussing Explanations:*** Gather group & ask each team to share their explanations with another team.
* Ask a few volunteers to tell the whole group their explanations & the sequence of what happened to the log.
* Encourage respectful disagreement & ask for alternative explanations.
* Focus the discussion on the relationship between suspects and the environment of the log. Ask:
* *How many different organisms can you think of that might have benefitted from the log you investigated?*
* *What do organisms that are breaking down the log get from the log?*
* Point out that scientists have conversations like this to come up with best explanations.
* *The point of science is to come up with explanations based upon all available evidence. Scientists need to be open to different explanations, and to think critically about each explanation.*
* Describe how thinking about cause & effect relationships helps us to understand what has happened by developing possible explanations.
* *Just like scientists, you observed evidence of what has happened, and then made possible explanations for what caused the effects you observed.*
* *Scientists use the idea of cause & effect to make explanations in all areas of science.*
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| **Wrapping Up – Reflection:**1. Return the students’ focus to the “Case of the Disappearing Log.”
* *What happened to the rest of the matter in the log? Where is the missing wood now? Where could it have gone?*
1. Suggest that some things that happen in nature do not always leave behind observable evidence.
2. Briefly discuss the affects decomposers do will have on the matter from the log (relate to body systems).
* *Decomposers consume food & nutrients from the wood for the purpose of their own survival (i.e. to run their own body systems):*
* *Banana slugs feast on dead leaves & debris from the forest floor. Slugs use a tongue (rasping radula) covered in 27,000 teeth to scrape off pieces of live and dead plant tissue, fungi & bacteria.*

*A slug has two adaptations that allow it to live on land: 1) It carries its aquatic environment in the form of slime. The slime covering keeps the skin from drying out. Slime is toxic, and give protection from predators. 2) Slugs do not have gills, but uses a fleshy compartment that looks like a hump or shoulder (called the mantle) to act as a lung. There is a pore on the right side of the mantle through which air circulates. The breathing hole can open and close and is as a pneumostome.**Banana slugs move along using a muscular foot to crawl along forest floor, on plants & trees.* *Banana slugs use sensory tentacles to feel their way about & for smelling. Eyes are on the ends of tentacles. They do not see in detail, but can sense the intensity of light. The tentacles can move about so the slug can see in all directions. If the slug senses danger, it can pull these tentacles in to protect the eyes. If a predator bites off a tentacle, the slug can grow a new one.**Banana slugs are hermaphrodites –organisms that contain both male & female reproductive organs.** *Fungi – look like plants but are heterotrophs, like animals. Fungi are parasites –organisms that live in or on another organism (its host) and benefits by deriving nutrients at the host’s expense. A fungus must digest food to live, while plants make their own food through photosynthesis. Fungi contain mycelium (threadlike filament) which grows inside the tree, slowly breaking it down. Unlike animals, fungi do not digest food internally. They secrete digestive enzymes so that their food is “digested” outside of their bodies. A fungus then acquires its nutrients by absorption of the digested food through the mycelium. Fungi use asexual reproduction, via spores. Bracket fungi are the fruit of a much larger fungus.*
* *Mosses (bryophytes) Mosses cover trees. Mosses do not have large stems or a trunk to help them grown upwards; they must grow on solid surfaces, like rocks, compact soil or wood. They also do not have flowers or seeds, relying on water or high moisture to reproduce and disperse.*
* *Lichens are found on trees and rocks in the ecosystem.*
1. Reveal that the matter in the log did not actually disappear - -it just changed its form!
* *Scientists know that matter cannot be destroyed, or disappear into nothing!*
* *We do know that matter can change its form – going between solid, liquid, and gas –and that gases can be invisible.*
1. Explain where the matter goes and why it is important for ecosystems.
* *Decomposers are important to ecosystems because they make matter available to plants, which is an important part of matter cycling through ecosystems.*
1. Tell students to keep looking at the other wood in the forest along Cedar Grove for more mysteries & evidence. Locate a Culturally Modified Tree (Suspect: Coast Salish Peoples), Stumps (Suspect: Human), Big Snag (Suspect: Lightning), fallen tree with exposed roots (Suspect: Wind).
2. Walk & Talk questions (in pairs) or final circle:
* *What are some questions you have about decomposing logs & the organisms that decompose them?*
* *What other evidence would you like to explain this mystery?*
* *Are humans’ decomposers? Why or why not?*
* *What helped you learn today?*
* *In what ways is a disappearing log a living system?*
1. Walk & Talk application question: Tell students to imagine they are back at home and their family is worried that your house has some kind of infestation/the wood seems to be decaying. Ask students to discuss with a partner:
* *What evidence would you look for to figure out if the wood is decomposing?*
* *What might the organisms be in the wood of your house?*
1. Revisit the Essential Questions
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| Post-visit connections: | Resources: |
| * Challenge your class or school to get involved in a meaningful action project that encourages tree/forest stewardship.
* Develop a plan of action to address a selected environmental problem or issues related to forests in B.C.
* My special place (Get Outdoors p. 59) students choose and explore a special natural place in their schoolyard, park or other area. They describe the local environmental using sensory details; they reflect on its importance, and they discover their own connections to it. Suggested Reading List about special places and connections (p.63)
 | **Websites:*** Action based campaigns:

<https://www.we.org/we-schools/program/campaigns/>* Canada’s forests teaching kits:

<http://www.canadianforestry.com/kits/english/index.html> |