Grade 7
Example for Place-Based Learning

GRADE 7
Big Ideas for Science

B BIOLOGY

Evolution by natural selection provides an explanation for the diversity and survival of living things.

C CHEMISTRY

Elements consist of one type of atom, and compounds consist of atoms of different elements chemically combined.

P PHYSICS

The electromagnetic force produces both electricity and magnetism.

E EARTH SCIENCES

Earth and its climate have changed over geological time.

HCTF Education

This Example focuses on 2 of the Big Ideas: Biology B and Earth Sciences E.

PLACE: Geological explorations in your region, preferably including fossils.

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1 Experience Place

TONE: open-minded, unburdened, curious and playful

Prior to any guided interpretation of the geology of the region, or oral histories of the local First Nation, allow time for a Walk-About of curious exploration in the schoolyard, school neighbourhood, town and local park looking for signs of change over time. Consider earth materials, buildings, vegetation, natural areas, residential, commercial and industrial development, and natural water bodies. Suggest students keep a written list of observations, perhaps using a map if available to note where evidence of change was noted.

- What looks like a recent change (last few decades)?
- What looks historical (past 100 - 150+ years)?
- What evidence presents indications of traditional First People's occupation and use (1,000s of years)?
- What evidence presents indications of a geological history (10,000 - 4.5 bill years)?

2 Questioning and Predicting

TONE: more focused, curious, reflective

B E Dialogue as a class on the findings from the Walk-About using these questions as a guide or as prompts. Determine the level of understanding within the class on the basis of responses and depth of discussion. What indication is there that change has gone on? What is the time scale of these suspected changes? How can evidence of First People's occupation and annual cycle of activities in this place inform us about changes over time? What evidence is there of Earth's history? And the evolution of the Universe? How could we find out about these changes, both locally and on a planetary level? How does understanding the past inform us of the present? What is species diversity? Species extinction? What is evolution? What is climate change? What is our role in climate change?

To formulate predictions, create questions that are testable, based on the inquiry prompted by the Walk-About and dialoguing on questions presented above.

3 Planning and Conducting

TONE: creative, restrained, calculating, collaborative

B E Students create a mindmap, e.g., using MindMeister, of their apriori or initial understanding of place in the context of historical change, climate change, First People's use of the area, and geological change. Place this within an even larger context of the evolution of the Universe and the creation of Earth and the emergence of life. Determine sources of information, both qualitative and quantitative, to address where life started and how it has changed over time on both a planetary level and locally. Consider the very origins of life within the larger context of the evolution of the Universe. Consider contemporary climate change causes and impacts.

1) Invite an elder to present oral histories of local stories of the origin of life, their traditional use of the land and water, and records of change.

2) Experience a guided interpretive geological investigation in your area to understand the physical evidence of the geological evolution in the area, and also changes on a planetary level. If fossils are present, consider species diversity, evolution, natural selection, and extinction.

4 Processing and analyzing data and information

TONE: observant, methodical

B E Consider what is scientific theory? Consider what is oral history? Gather the evidence, identifying sources of both qualitative and quantitative information. Consider the different time scales in the measurement of change. Collaborate as a class.

5 Evaluating

TONE: discerning, reflective, interdependent, collaborative

B E Draw a revised mindmap with new understandings. Compare the initial and the revised mindmap. Was any information inaccurate in the initial map? What surprised you? What is something you wonder about further? How does the scientific theory of the evolution of the Universe and the First Nation's story of the origin of life inform us? How does Traditional Ecological Knowledge inform us of changes? What evidence is there for the evolution of life on Earth, species diversity and species extinction? What is natural selection and why is it a theory? How is climate change not a theory?

6 Applying and Innovating

TONE: creative, open-minded, interconnected, engaging

B E Around the classroom on the walls, create a timeline, based on scientific theory, drawn to scale, of the major moments in the evolution of the Universe (14 bill years ago), including the creation of matter and energy and life, the creation of Earth, emergence of life on Earth, extinction of life and ongoing evolution of life on Earth. Annotate the timeline with details of the climate and atmosphere during these periods. Detail the last 1000's of years of First Nation activity on the land, coming up to present. Detail the last 200 years of climate, and the last 10 years of climate.

Consider our contemporary practices that negatively impact life on Earth; consider how they could be done differently to support life on Earth; consider traditional aboriginal methods of harvest and practice; consider sustainability and resilience. Pledge one thing you will do to have a positive impact supporting life on Earth?

7 Communicating

TONE: confident, engaging, interpretive, expressive, sensory, using technology

B E **1)** Create a narrative drama expressing the First Nation's local story of origin and changes in their patterns of activities with changing climate.

2) Conduct a "cosmic walk" *https://deeptimejourney.org/wp-content/uploads/2014/04/CosmicWalk.pdf*

3) Share your knowledge