Making connections

Duration
60 minutes

Lesson overview
Having examined Earth materials and the rock cycle and how they relate to energy, students consider how everything on Earth is interconnected. They create personal webs to explore how they are connected to the Earth.

Objectives
Students will be able to:
• describe ways everyday objects are connected to the Earth
• identify ways humans are connected to everyday objects
• create a web to describe their personal connections to the Earth
• explain the importance of understanding interconnections

What you’ll need
• four or five graphite pencils with a rubber eraser
• How is a Pencil Connected to the Earth? infographic
• paper and pencils for each student
• computer, projector and screen

Preparation
• Have four or five graphite pencils ready for Activity 1.
• Review the How are Pencils Connected to the Earth? Infographic and have it ready to project for Activity 1.
• Review the lesson notes, including the image of the sample web of personal connections to the Earth and be prepared to share an example with students at the start of Activity 2.
• Have art paper ready for Activity 2.

Lesson notes
This lesson prompts students to draw on their learning from lessons 1, 2 and 3 as they continue to make connections between the Earth’s materials, and their own daily lives and develop a deeper understanding of the interconnectedness of all things on Earth.

As reviewed in Lesson 1, Earth, as a closed material system, is home to numerous, interconnected biogeochemical cycles. From water and seasons, to carbon and fossil fuels, life on Earth depends on the continued cycling of materials and the processes that connect them locally and globally.
The view of Earth as an interconnected whole has been recognized in indigenous cultures for thousands of years. From this perspective, people are considered as important as other living things (but not more so), and sustainability is recognized as necessary to maintain the health of Earth's cycles. Exploring these concepts with students provides an ideal opportunity to explore traditional knowledge, such as the perspectives First Peoples have about the natural world and local environments. Lessons 4 and 5 could be complemented with an investigation of the traditional territories and First Nations in your area, including connecting with Elders and knowledge keepers around place-based learning in your community.

Activity 1 has students drawing on their learning from Lesson 3, where they explored how a pencil sharpener connects to the Earth. In this lesson, students explore how a simple everyday tool—a pencil—connects to the Earth and to us as humans as well. Activity 2 then has students extend this learning by creating their own personal web of connections to the Earth. See the sample web below, with one of the branches using the example of the pencil. The web can grow several ways.

Students will refer back to these personal webs in Lesson 5.

Word list
Earth materials metal eraser rock graphite water interconnectedness wood
Lesson activities

Activity 1: Everything is connected (20 minutes)

- Write the term “interconnectedness” on the board and read students one or both of the following quotes:
  - “In nature nothing exists alone.” (Rachel Carson – an American scientist and ecologist)
  - “There is a cloud floating in this sheet of paper. Without the cloud, there will be no rain; without rain, the trees cannot grow; and without trees, we cannot make paper. The cloud is essential for the paper to exist. If the cloud is not here, the sheet of paper cannot be here either.” (Thich Nhat Hahn – a Vietnamese Buddhist monk)

- Have students offer suggestions of what they think the quote(s) and the term interconnectedness mean. Discuss some responses and offer the following:
  - Everything on Earth is interconnected. We are connected to the Earth and the Earth is connected to us.
  - We depend on basic Earth materials (minerals, rock, water and soil) for the products we use every day.

- One way to explore interconnectedness is to look closely at something familiar and consider what it’s made of and what it’s connected to. Pass a few graphite pencils around the room for students to hold and look at closely.

- Ask students what materials make up a pencil. Record these on the board.

- Ask students to consider how these materials are connected to the Earth, then project and discuss the How are Pencils Connected to the Earth? Infographic.

- Ask students to think about how we’re connected to pencils. A simple response will likely include using pencils to write and do school work; prompt deeper thinking with the following:
  - How are we connected to wood? (paper, tree swings, the lumber to build our homes and schools, etc.)
  - How are we connected to metal? (cars, bikes, spoons, as well as all the ways discussed in Lesson 3)
  - How do pencils get from the factory to our school? (ships/trains/vehicles using gasoline; walk to the store to purchase them, etc.)

- Reiterate when we look closely, we find many more interesting connections than we can see at first.
Activity 2: Personal webs of connections to the Earth (30 minutes)

- Explain to students they will be building their own personal webs with themselves in the centre and branches showing different connections to show how they are connected to the Earth.

- Model this first by using the example of the pencil from Activity 1 and starting to draw a web on the board. With the term “Me” in the centre, start one branch of the web with the term “pencil,” and then build extending branches using one of the materials (like wood or metal). See the image in the lesson notes for guidance. Students could use words or diagrams to build their personal webs.

- Provide students with paper to build their webs and suggest they use a pencil so they can easily make changes as they go along.

- As a starting point for other first level branches, consider some of the following suggestions:
  - Use one of the materials they or another student has brought into class (for Lesson 1) as another branch extending from “Me.”
  - Have students think about items they use every day.
  - Think about how they are connected to Earth’s basic materials (water, rocks, minerals and soil).
  - How are they connected to a favourite possession?
  - Think about connections to what they ate for breakfast, such as where the food comes from, how it was grown or produced and the energy it provides to carry out daily routines, etc.
  - How did they get to school today? What connections can they make along the journey?

- After two or three branches are started, have students talk with a partner to explain what items they started with and why, then continue building their webs. Check in with partner groups and address any questions or provide support for students who are not sure how to get started.

- Consider using the following prompts to help extend their thinking beyond simple connections and add energy to the webs:
  - Where does energy show up in your web? Think about the kinds of energy used every day.

- Have students look at their web to see if they make connections between branches that had different starting points. Explain to students this demonstrates the interconnectedness of all things on Earth.

- While students are working, have some share examples from their webs, explaining how the example connects back to the Earth or how some branches are interconnected with others.

Activity 3: Sharing connections (10 minutes)

- As students are finishing their webs, have them move around the room and look at other students’ webs. Encourage them to find one or two things they find interesting or curious.

- As a class, share some of these observations.

- Ask students to consider the following: why might it be important to recognize how things are connected? When would it be useful to understand or remind others about how things and people are interconnected?

- Have students write down their ideas in their Science notebooks.
Assessment

- Assess students’ understanding of interconnectedness through their observations, examples and discussion in Activity 1.
- Assess students’ ability to apply their understanding of interconnectedness to their lives through their personal webs in Activity 2.
- Assess students’ explanations of the importance of understanding interconnectedness during the discussion in Activity 3 and by reviewing their Science notebooks.

Extensions

- Have students work in pairs to compare their webs looking for similarities (interconnections) between their personal connections.
- Weather permitting, allow students to go outdoors to build their webs, where they can experience the sights and sounds of the natural environment.
- Encourage students to add colour to their webs in ways that highlight the connections they see. These can be posted in the classroom or used to create a “We’re all connected” bulletin board display.

Definitions

Earth materials: the Earth’s crust has four main components, which are referred to as Earth’s materials: minerals, rocks, soil and water

eraser: typically a piece of soft rubber or plastic, used to rub out something written

graphite: a grey, crystalline form of carbon that occurs as a mineral in some rocks

interconnectedness: the quality or condition of being interconnected and interrelated; often linked to worldviews that see a oneness in all things; a relationship between things that recognizes a change in one area can effect change in another area or areas

metal: a solid material that is typically hard, shiny, malleable, fusible and ductile, with good electrical and thermal conductivity

rock: the solid mineral material forming part of the surface of the Earth and other similar planets, exposed on the surface or underlying the soil or oceans

water: the liquid that supports all life on Earth and cycles through the air, rivers, lakes, oceans, land and all living creatures

wood: the hard fibrous material that forms the main substance of the trunk or branches of a tree or shrub