

Finding the Balance

Triangle Game

How does Earth stay alive?

In this activity, students explore real-world scenarios to show how living and non-living things interact within Earth's systems. As events are introduced, students work to understand balance and how changes in one part of the system affect the whole.

The activity can be kept broad or focused on a specific ecosystem (such as wetlands, grasslands, or forests) or a local area (such as a municipality, park, or natural region).



Teachers may choose to discuss the scenarios before the activity to activate prior knowledge, or after the activity to highlight student thinking, reasoning, and connections between Earth's systems.

Instructions

- 1. Prepare materials:** Print **event cards** and **living and non-living things cards** or brainstorm your own.
- 2. Set up the space:** Head to your schoolyard, nearby natural area, or gymnasium. Arrange your group in a circle.
- 3. Distribute cards:** Give each student one living or non-living thing card. Cards may be worn as necklaces if helpful.
- 4. Sort by Earth spheres:** Review the four Earth spheres (Biosphere, Lithosphere, Hydrosphere, Atmosphere). Have students group themselves by sphere, then return to the circle.
- 5. Choose connections:** Ask students to look around the circle and choose **two other cards** they connect with or depend on (for habitat, food, water, energy, or natural processes).
Students should choose only two connections.
Ex) **Snowpack** provides animals like **mice** a place to live and is melted by the **sun**.
Ex) A **cattail** relies on **water** for a resource for life, and **soil** for habitat and nutrients.
- 6. Create triangles:** Once each student has selected two individuals to “keep track of”, instruct the students to spread out in the space so that they create an equilateral triangle (a triangle with all equal sides) using themselves and the two other individuals as “points”. Remember, everyone likely has different “points”, so one person moving in the space will cause others to move as well.
- 7. Find balance:** When everyone stops moving, ask: *Why did we stop?* (The system is balanced.)
- 8. Introduce an event:** Read an event card aloud. Ask students to **identify** which living or non-living things are affected by the event.

Materials:

- 12 or more participants
- Event cards
- Living and non-living things cards
- Large outdoor space or gymnasium

Finding the Balance

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9. **Show impact:** Affected students move to a new spot, causing a chain reaction. Observe how other students must move as well to maintain an equilateral triangle.
10. **Repeat:** Continue for each event.
11. **Reflect:** Discuss how changes in one Earth system affects other systems and the living and non-living things within them.

Key Takeaway: Earth's systems are interconnected. When one system changes, others are affected too. Life is possible because these systems work together, and systems thinking helps us understand the domino effects of change.

Discussion

- Are changes to Earth's systems *good* or *bad*? Explain your reasoning.
- How can *humans* positively or negatively impact Earth's systems?
- To what extent do (we) / (YOU) have the responsibility to prevent changes to Earth's systems? Explain your reasoning.
- How can groups (government, conservation, Indigenous communities, schools) and individuals work together to ensure all of Earth's systems are healthy?

Going Further...

- Have students research real-world events where Earth's systems interact. Ask them to create a short list of examples and explain what happened, which systems were involved, and how each was affected. Use the examples to discuss how changes in one system can impact others.
 - o Ex) On April 29, 1903, part of Turtle Mountain collapsed onto the town of Frank, Alberta, affecting the land, air, water, living things, and people. (Hydrosphere > Geosphere > Biosphere)
- Discuss how, in Western science, some parts of the environment are classified as non-living (such as air, rocks, and water). Compare this with other frameworks, including Indigenous Ways of Knowing, which view these elements as living or having spirit and agency. How might these different ways of understanding the world influence how humans approach conservation and care for the land?
- Instead of using the provided event cards, students create their own triangle by choosing two other living or non-living things they are connected to. Students draw arrows between the three items to show how each one can affect the others. Afterward, students present their triangle and explain a real-world event or scenario that would cause these interactions between Earth's spheres.

Grade 4 Earth Systems Event Cards

These scenarios help students explore how Earth's systems are connected. Students investigate how changes in one part of Earth can affect plants, animals, people, and natural resources.

Spring Melt in the Rockies

Spring temperatures melt snowpack, filling rivers and lakes downstream with water.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Farming and Irrigation in Alberta

Farming uses open fields to plant certain crops and enough water to help them grow.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Beavers Building Dams

A beaver builds a dam to create a wetland with more water upstream and less water flowing downstream.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

A New Provincial Park is Created

A wilderness area in Alberta is designated as a protected provincial park by the provincial government.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Invasive Species

An invasive species enters Alberta waters by hitching a ride on boats, out-competing native species, consuming their resources, and impacting the ecosystem.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Prairie Drought

Southern Alberta is experiencing a long drought, when there are long periods without rain. Water levels are low and communities are asked to save water.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Hot Summer Heat Wave

High temperatures for several days are observed across multiple major cities and rural areas in Alberta.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Deep Freeze

Temperatures drop during the winter months, sometimes, dipping to minus 30 degrees Celsius!

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Chinook Winds

Warm winds sweep across the mountain ranges and the prairies of Alberta causing temperatures above 1 degrees Celsius.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Wetland Drainage

A wetland near a town is being drained to build new houses, changing how water moves through the land.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Wildfire in Alberta Forests

A wildfire is burning in Northern Alberta. People are displaced and smoke is carried across Alberta, making the air unhealthy to breathe for several days.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Traditional Controlled Burn

A controlled burn is used to help grasslands grow healthier, following traditional Indigenous practices.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Building Forts in Forests

A group of children use deadfall from the forest floor to build a teepee-like structure in a forest.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Solar Energy Project

Solar panels are installed on open land to produce clean electricity.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Animal Migration Changes

Some birds arrive earlier in spring than they used to because temperatures are warmer.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Erosion Near Roads

Heavy rain causes soil to wash away near a road, making the land unstable. Flooding occurs in lowland areas.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Windstorm

A windstorm with 130 kph winds knocks over multiple trees in a forest.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Fossil Find

Rain and wind over time reveal a dinosaur skull from the banks of a river.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Glaciers

Glaciers slowly scraped along the landscape, eventually carving out valleys, hills, and lakes long ago.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Coal Mining

Coal is dug out of the ground in mountainous environments with machines.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Forestry

Trees are cut down for industry use leaving bare patches on the landscape in forested areas.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Oil and Gas Development

Drilling for natural gas or oil and creating pipelines to transport it to other places changes natural landscapes.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Weed Pull

Student volunteers remove invasive plants from a natural space near their school.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Community Clean Up

A group of individuals decide to remove litter from their community spaces and dispose of the litter using proper recycling and garbage systems.

- Which Earth systems are involved?
- How could this event affect plants, animals, and people?

Earth Systems Cards – Living & Non-Living Things (Grade 4)

Print this document **one-sided**, cut along the lines, and use the cards for sorting, domino chains, or investigating the interconnections of living and non-living things in Earth's systems.

Spruce Tree	Grass	Wildflower
Moss	Bee	Insect
Frog or toad	Fish	Beaver
Bird Geese, Duck, Songbird	Bird of Prey Hawk, Eagle, Owl	Small mammal Mice, Hare, Squirrel
Large mammal Deer, Elk, Moose	Predator Snake, Coyote, Weasel	People

Soil	Rocks and mountains	Hills and valleys
Salt, Sand, Gravel	Aspen Tree	Lakes
Rivers and streams	Wetlands and ponds	Groundwater
Snow and ice	Air	Sunlight
Temperature	Wind	Rain