

Name: Key

4.2 – Earth’s spheres are interconnected
 Science 9, Wolfe 2020

In this section, we will learn a little bit about how different systems on Earth (called Earth’s “spheres” are connected and how they work. All images are taken from BC Science Connections textbook.

Biotic and Abiotic Parts of the Environment

- **Biotic parts:**
 Living parts of an environment
- **Abiotic parts:**
 Non-living parts of an environment
- Biotic and abiotic parts of the environment are connected through the ways in which they interact with one another

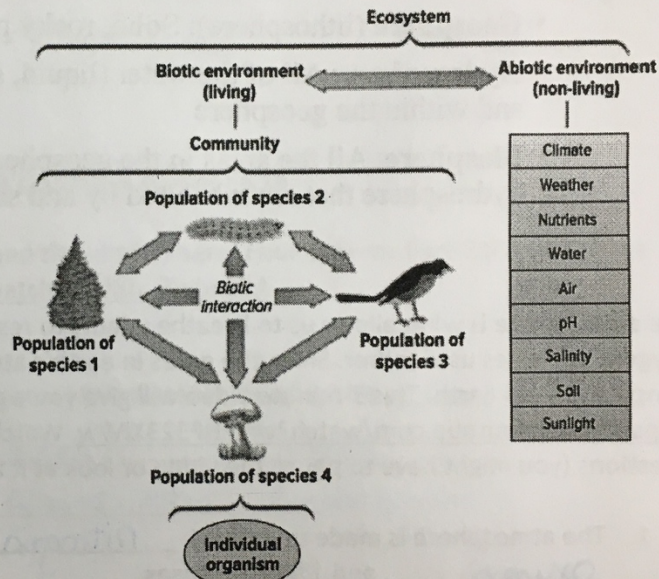


Figure 4.3

In the last section, you chose a biome and looked at some of the weather, plants, and animals in it. All of these things interact to create an **ecosystem**.

Biotic parts of an environment are living. These include plants and animals.

Abiotic parts of an environment are non-living. These include soil, water, and sunlight.

Earth's Spheres (Systems)

Natural processes move matter in cycles from the biotic and abiotic parts of the environment.

At any time, matter occupies one of Earth's four spheres (systems):

- **Atmosphere:** Gaseous part of Earth about 10 km of the surface to hundreds of kilometers higher
- **Geosphere (lithosphere):** Solid, rocky part of Earth
- **Hydrosphere:** All of the water (liquid, solid, gaseous) on and within the geosphere
- **Biosphere:** All the areas in the geosphere, atmosphere, and hydrosphere that are inhabited by and support life

The **atmosphere** is what allows us to breathe, plants to respire (or "breathe") and produce oxygen, and gives us weather. Since the gases in earth's atmosphere also trap heat, it affects temperature on Earth. This 3-minute video will give you a good introduction: <https://www.youtube.com/watch?v=LPHF323XIWw>. Watch it and answer the following questions (you might have to pause the video or look at it again to answer)

1. The atmosphere is made up of 78% Nitrogen, 21% Oxygen, and 1% other gases.
2. It protects us from harmful effects of the sun's radiation while keeping Earth warm through a process known as the greenhouse effect.
3. Clouds and most weather happen in the troposphere, the lowest layer of the atmosphere. 99% of the atmosphere's water stays here.
4. The ozone layer traps UV light and converts it into heat.

Enrichment:

- If you want to see something wild, watch this video from National Geographic in which a person surfs on air <https://www.youtube.com/watch?v=1YAOT92wuD8>
- This video is meant to be an introduction to a whole course on studying the atmosphere, but is worth watching for some impressive scenes. You'll even see the air surfer again! Introduction to our Atmosphere: <https://www.youtube.com/watch?v=l6jIMkPwahQ>

The **geosphere** is the solid part of earth near the surface, the liquid rock (magma) in the mantle, and all the rest of the earth right down to the core.

The **biosphere** is all the living things on the earth's surface.

Watch the following video on these two spheres: Four spheres Part 1 (Crash Course Kids 6.1) (<https://www.youtube.com/watch?v=VMxizWHbyFM>) and answer the following questions: State which sphere each of the following is in. Use "G" for geosphere and "b" for biosphere.

- | | | | | | |
|----------|----------|-------|----------|-----------|----------|
| 1. Rocks | <u>G</u> | Grass | <u>B</u> | Landforms | <u>G</u> |
| Soils | <u>G</u> | Birds | <u>B</u> | Deer | <u>B</u> |

The **hydrosphere** contains all the water on the surface of Earth.

This video discusses the hydrosphere and the atmosphere: Four spheres Part 2 (Crash Course Kids 6.1) https://www.youtube.com/watch?v=UXh_7wbnS3A

1. What are the main sources of water? Salt water is found in the Oceans, and fresh water is found in lakes, rivers, glaciers, and groundwater (underground).
2. Most of the water on Earth is found in the Oceans.
3. Some water is in the atmosphere, stored in clouds, and becomes part of the hydrosphere by falling as rain or snow.

Enrichment:

- This short video talks about how Earth's oceans originated and changed over time: Origins of Oceans (National Geographic) <https://www.youtube.com/watch?v=BvrzM-BavDg>

Earth's Spheres are Interconnected

Earth's spheres interact with and affect each other in different ways

Example: Landslides

- Occur when soil and rock from the geosphere are pulled downward by gravity
- Affects the biosphere (living things that live in or on the geosphere) since they can cause habitat loss

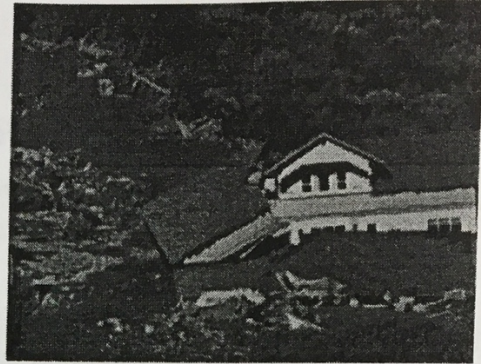


Figure 4.4

You have seen a few examples of earth's spheres interacting with each other in the videos and images above. Give some examples (other than landslides) of two or more spheres interacting. One example is given for you.

Answers will vary.

Event	Spheres	Interaction
Rain falling	Atmosphere, biosphere	Rain lets plants get water they need to grow