

Spheres of the Earth

There are four **interconnected** spheres on Earth:

- **biosphere**

- **geosphere**

- **hydrosphere**

- **atmosphere**

Matter **cycles** and energy **flows** through these four spheres.



Spheres of the Earth



Biosphere

The biosphere represents all **living** components on Earth.

Components include:

- all **plants** (e.g. trees, flowers and grasses)
- all **animals** (e.g. birds, mammals and fish)
- all **fungi** (e.g. mushrooms and molds)
- **other examples**

The biosphere can be described as the **total sum of all ecosystems.**



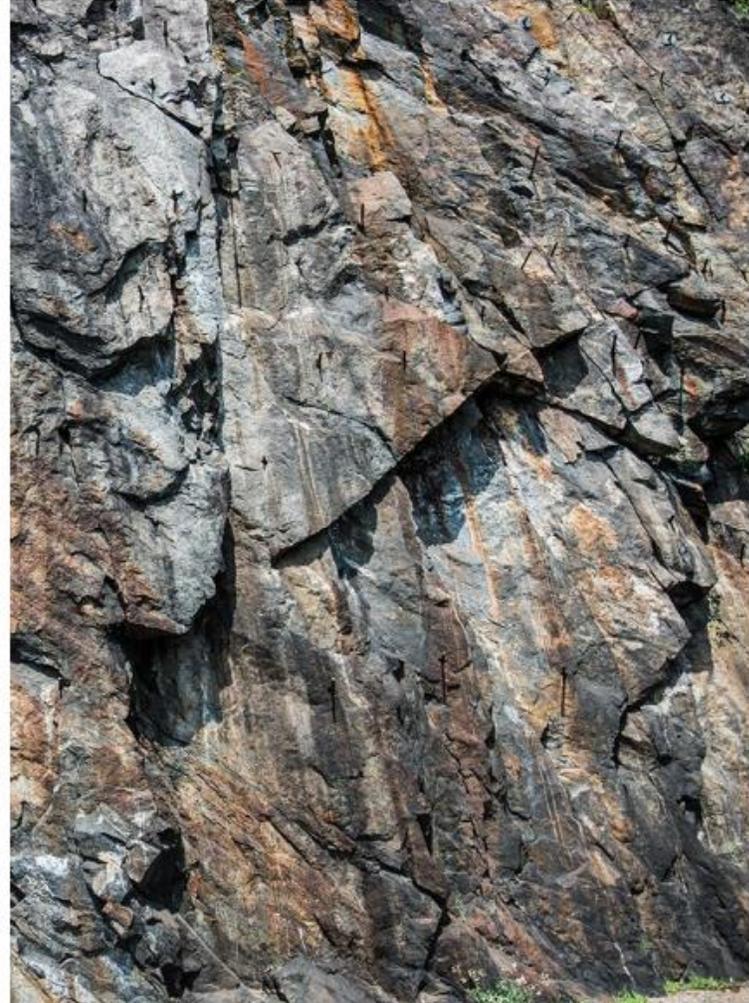
Geosphere

The geosphere represents all **solid land** and **interior** components of Earth.

Components include:

- all types of **rock and minerals**
- Earth's **mantle**
- **other examples**

The geosphere can be described as **the Earth beneath our feet**.



Hydrosphere

The hydrosphere represents all **water** components of Earth.

Components include:

- saltwater bodies (**examples**)
- freshwater bodies (**examples**)

The hydrosphere can be described as **the total mass of all water found on Earth.**



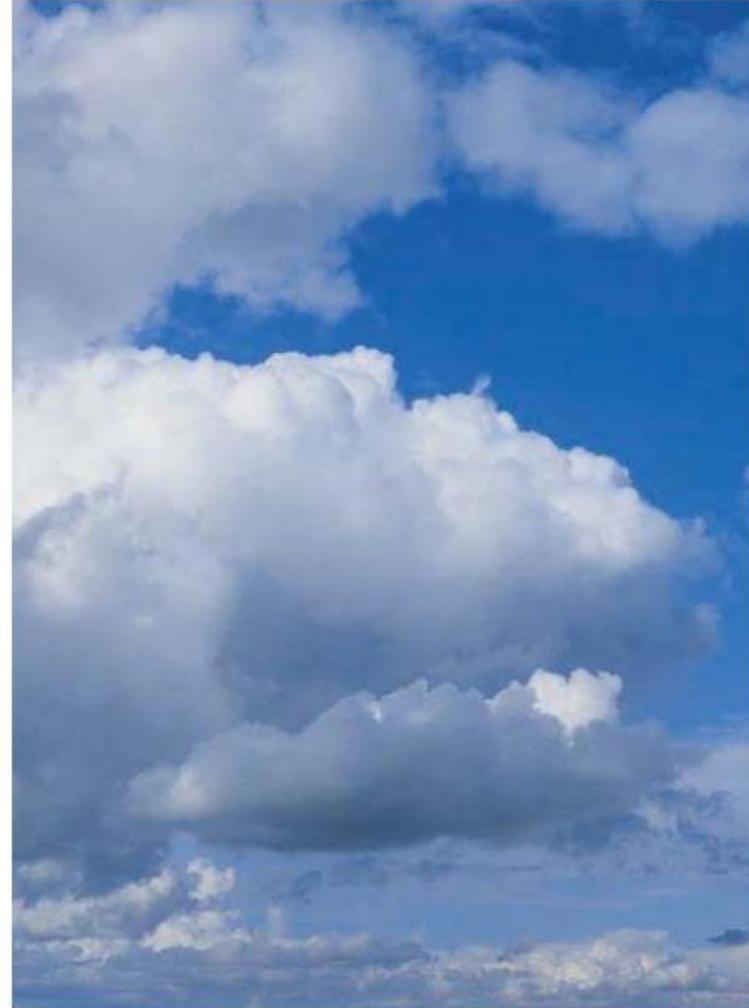
Atmosphere

The atmosphere represents all **gaseous** components surrounding Earth's surface; it's retained on Earth's surface via **gravity**.

Components include:

- oxygen gas (O_2)
- nitrogen gas (N_2)
- **other examples**

The atmosphere protects life on Earth by absorbing UV radiation from the sun, maintaining temperatures and warming Earth's surface.



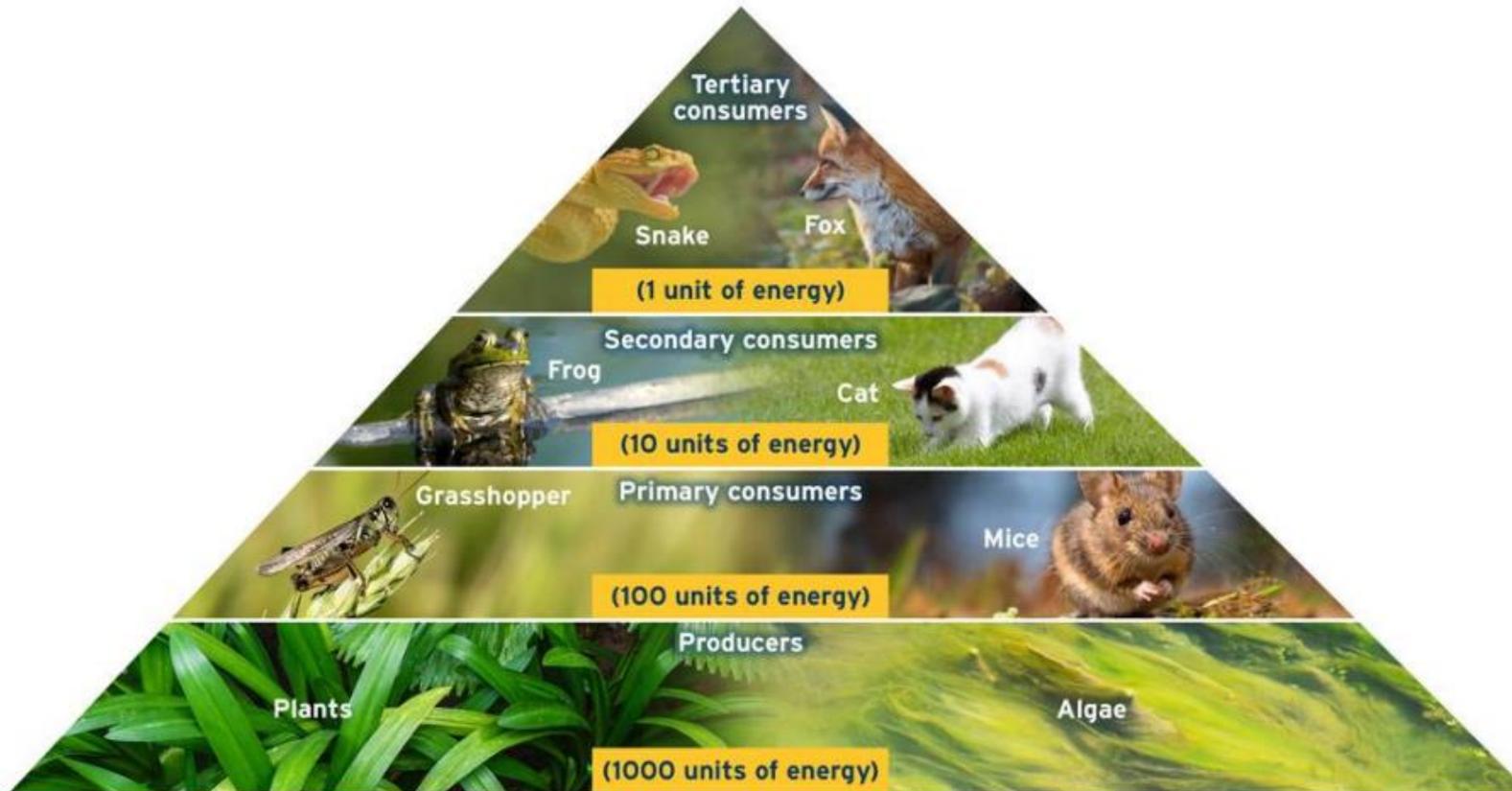
Interconnectedness

- All four spheres are highly interconnected.
 - **dependent** and **internally** connected to one another
 - **examples**
- When one of the four spheres is positively or negatively affected, the other three are also affected.

Energy flow

- Energy flows freely through the four spheres.
- All of Earth's energy comes from the sun.
- Energy cannot be created nor destroyed; it can be transformed and recycled.
- Energy can be stored in different spheres for long periods of time.

Energy flow



Matter cycles

- Different forms of matter continually cycle through the four spheres.
 - Matter cannot be created or destroyed; it can be transformed and recycled.
 - Carbon can move through many different forms:
 - as **glucose** ($C_6H_{12}O_6$) in organic matter
 - as **methane** (CH_4) in decaying matter
 - as **carbon dioxide** (CO_2) in the atmosphere
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Matter cycles

