

Earth Systems

atmosphere, geosphere, biosphere, hydrosphere



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Earth Systems

The Earth system is quite complex. Scientists have divided it into four major geological subsystems that make up the natural environment of Earth. These subsystems are sometimes referred to as ecospheres.

The four main ecospheres are the atmosphere, the biosphere, the hydrosphere and the geosphere.

Atmosphere -- the mixture of gases that surround the planet The atmosphere is divided by altitude into different layers. You can see the layers of the atmosphere to the right.

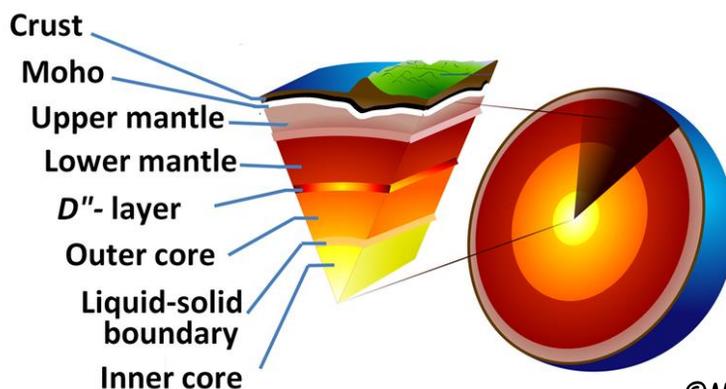
Geosphere --the solid portions of Earth and the layers within the Earth. This includes the rocks & minerals and various landforms. See the illustration below.

Biosphere -- all life on Earth. in other words, all living organisms on Earth, including those on the land, in the water, and in the air. Within the biosphere, living things form ecological communities based on the physical surroundings of an area. These communities are referred to as **biomes**.

Hydrosphere -- all water found on, under, and over the surface of Earth. This includes all of the rivers, lakes, streams, oceans, groundwater, polar ice caps, glaciers and moisture in the air (like rain and snow).

Cryosphere -- those portions of Earth's surface where water is in solid form, including sea ice, lake ice, river ice, snow cover, glaciers, ice caps, ice sheets, and frozen ground

All four major geological subsystems of Earth can function independently from each other, but there is often interaction between them.



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_____ -- the mixture of gases that surround the planet This system is divided by altitude into different layers.

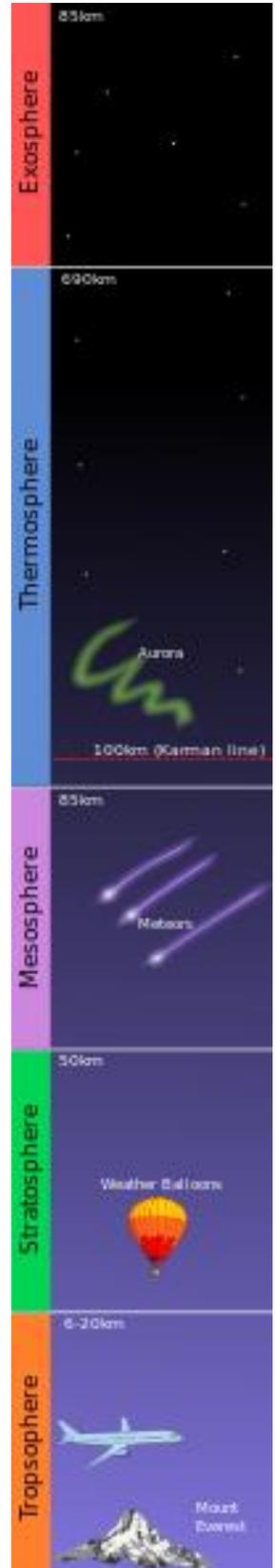
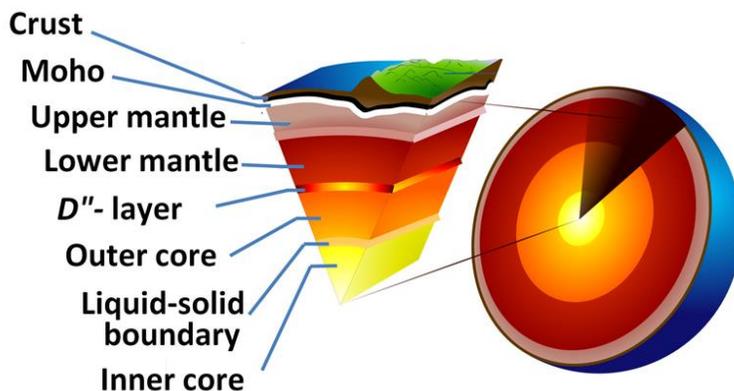
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_____ -- all life on Earth. in other words, all living organisms on Earth, including those on the land, in the water, and in the air. Within this system, living things form ecological communities based on the physical surroundings of an area. These communities are referred to as _____.

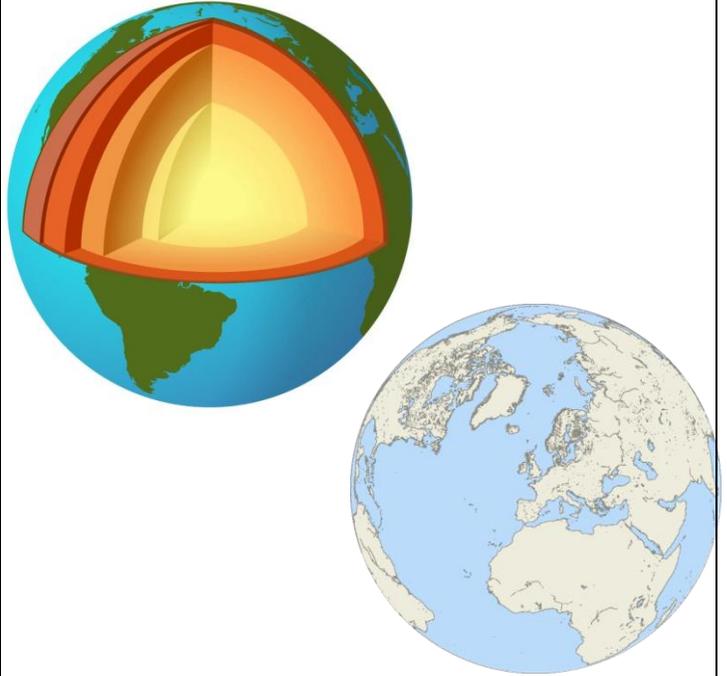
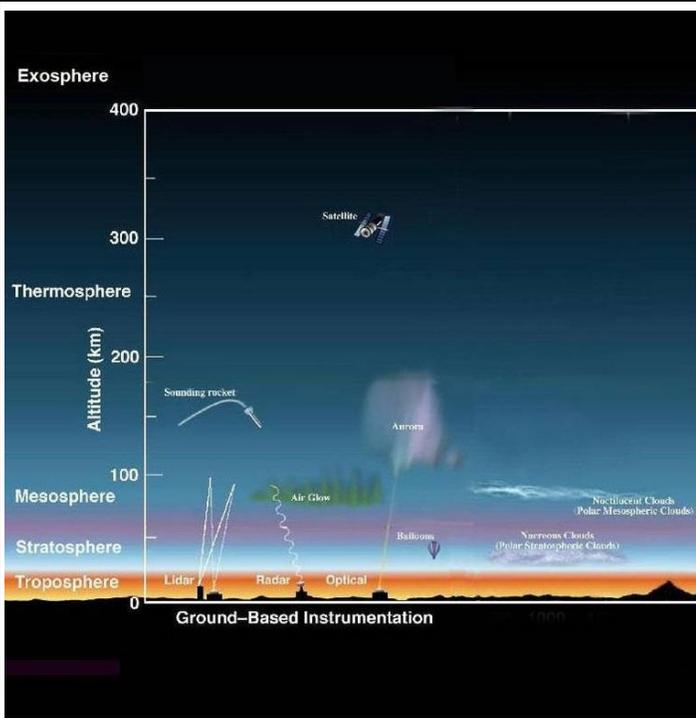
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_____ – those portions of Earth's surface where water is in solid form, including sea ice, lake ice, river ice, snow cover, glaciers, ice caps, ice sheets, and frozen ground

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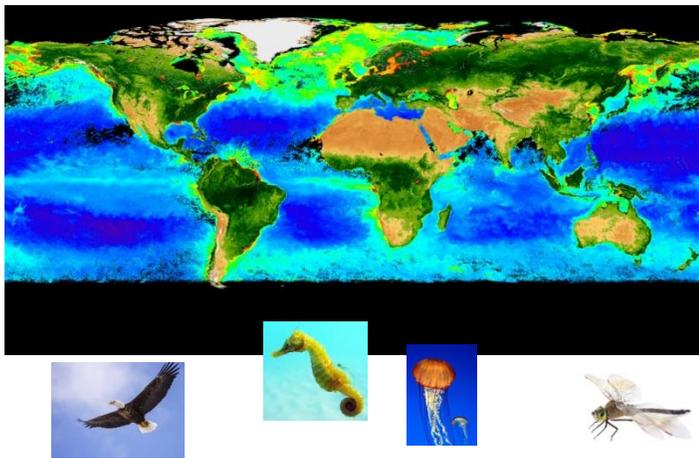


Earth's Systems



Atmosphere

Geosphere

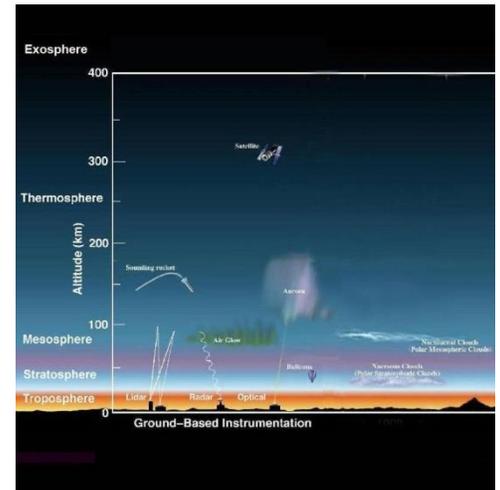
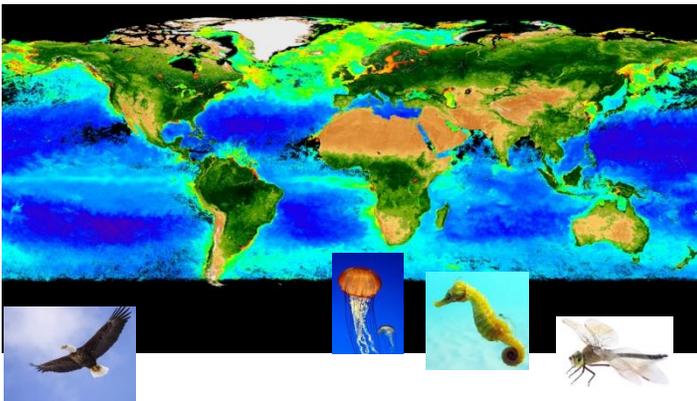
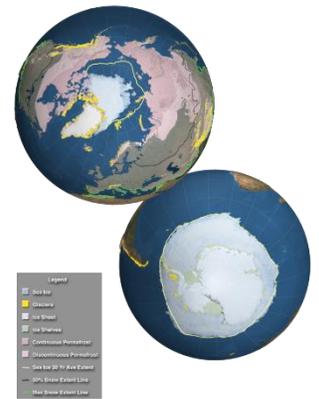
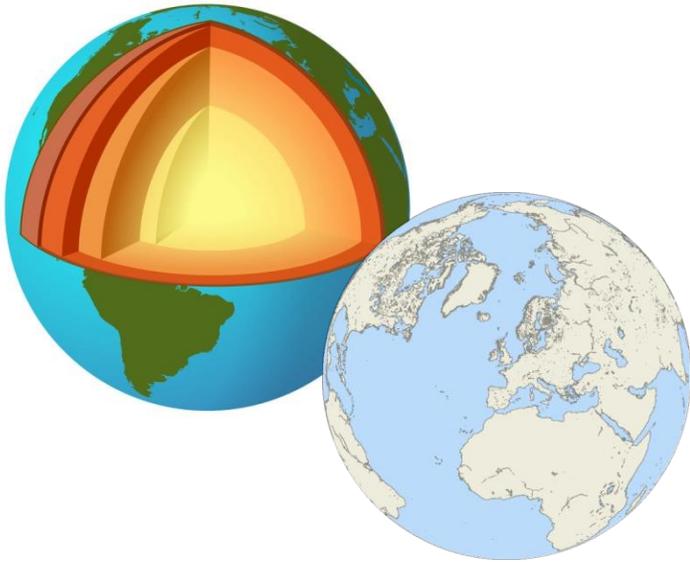


Biosphere

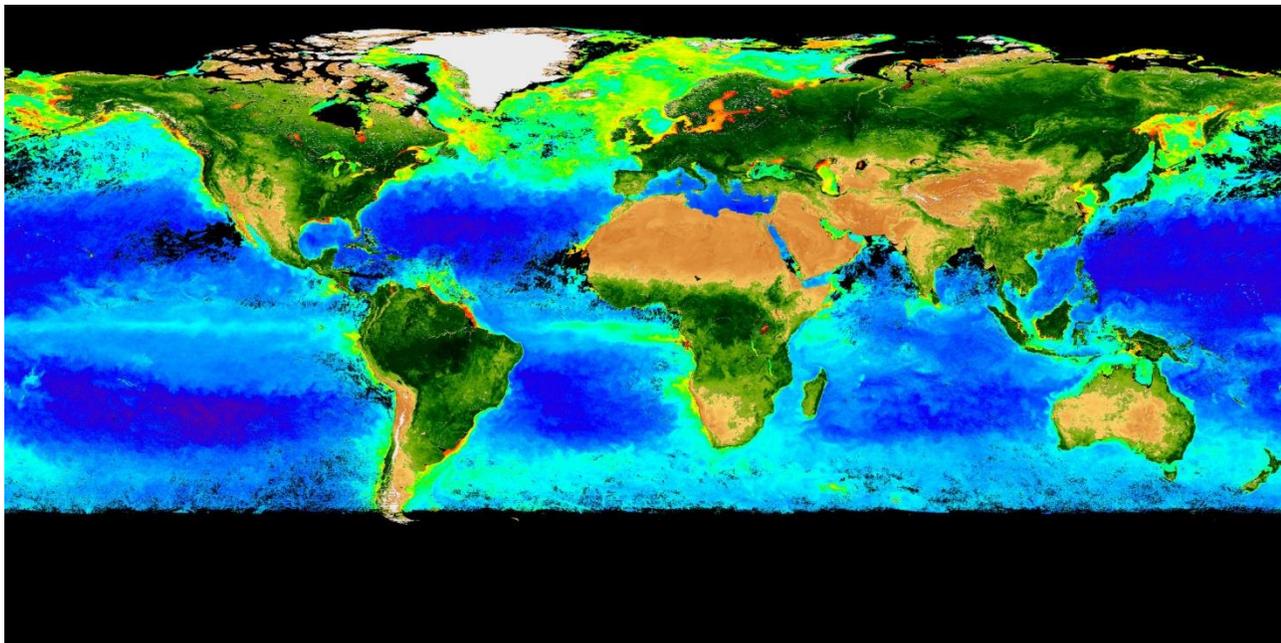
Hydrosphere & Cryosphere

Earth's Systems

What are the 4 major ecospheres? Give a brief description of each:



Biosphere:

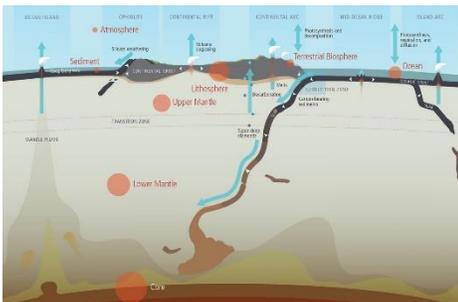
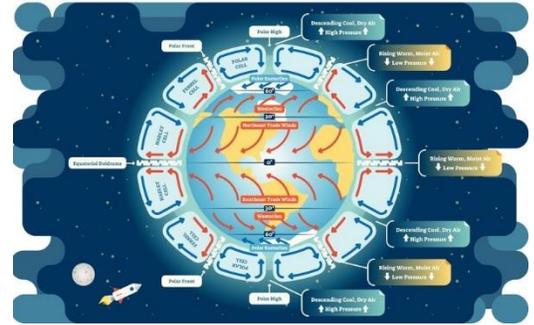


The image above shows the global biosphere from June 2002 measured by SeaWiFS. Data in the oceans is chlorophyll concentration, a measure of the amount of phytoplankton (microscopic plants) living in the ocean. On land SeaWiFS measures Normalized Difference Vegetation Index, an indication of the density of plant growth.

Courtesy of NASA.gov: <http://earthobservatory.nasa.gov/IOTD/view.php?id=2669>

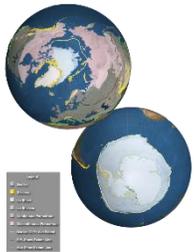
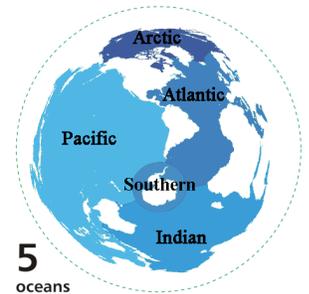
Earth System Scientists

Atmosphere: The atmosphere is the layer of gases that surround the earth keeping the planet warm and providing oxygen for breathing and carbon dioxide for photosynthesis. Scientists who study the atmosphere are called _____
scientists. Those who study the weather are called _____.
 And those who study seasonal variations over months, years or centuries are called _____.



Geosphere: The geosphere includes the interior and surface of the Earth. Both of these are made up of rocks and minerals. The scientists that study this sphere are called _____.

Hydrosphere: This is the part of the Earth that is covered by water. Oceanography is the study of the physical chemical and biological features of the ocean. Scientists who study the oceans include _____ or _____.



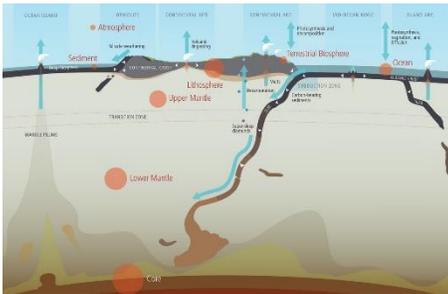
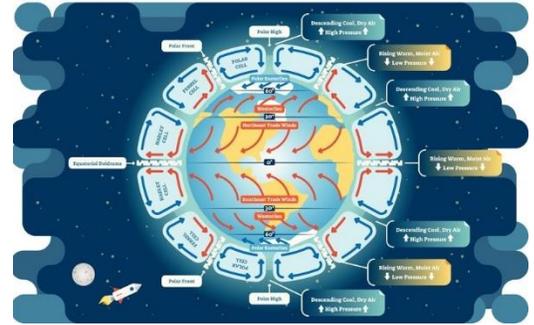
Cryosphere: This includes those portions of Earth's surface where water is in solid form, including sea ice, lake ice, river ice, snow cover, glaciers, ice caps, ice sheets, and frozen ground. A _____ is a person who studies glaciers or more generally an _____.

Biosphere: This is the part of the Earth that can support living life. The *biosphere* extends from underground (down about ten feet where plant roots, animals, insects, bacteria live) and underwater (as deep as the ocean trenches) to higher up in the atmosphere where life (plants and animals down to microbes) can exist. Within the biosphere, living things form ecological communities based on the physical surroundings of an area. These communities are referred to as **biomes**. Scientists that study living organisms and living systems are called _____. Those who study plants are called _____. An _____ is a scientist who studies the relationship of living things with their living and nonliving environment.



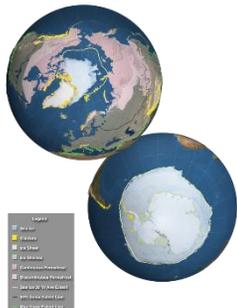
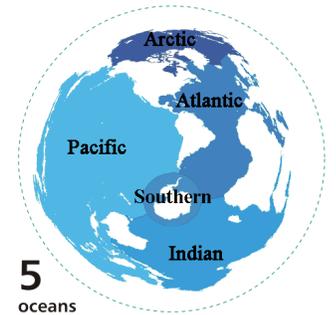
Earth System Scientists

Atmosphere: The atmosphere is the layer of gases that surround the earth keeping the planet warm and providing oxygen for breathing and carbon dioxide for photosynthesis. Scientists who study the atmosphere are called **atmospheric scientists**. Those who study the weather are called **meteorologists**. And those who study seasonal variations over months, years or centuries are called **climatologists**.



Geosphere: The geosphere includes the interior and surface of the Earth. Both of these are made up of rocks and minerals. The scientists that study this sphere are called **geologists**.

Hydrosphere: This is the part of the Earth that is covered by water. Oceanography is the study of the physical chemical and biological features of the ocean. Scientists who study the oceans include oceanographers or marine biologists.



Cryosphere: This includes those portions of Earth's surface where water is in solid form, including sea ice, lake ice, river ice, snow cover, glaciers, ice caps, ice sheets, and frozen ground. A glaciologist is a person who studies glaciers or more generally an Earth Scientist.

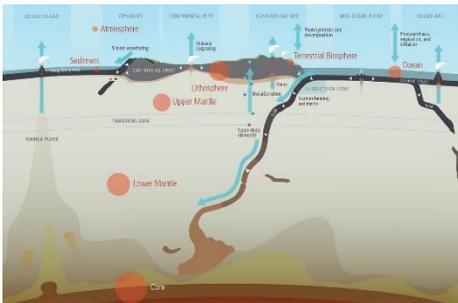
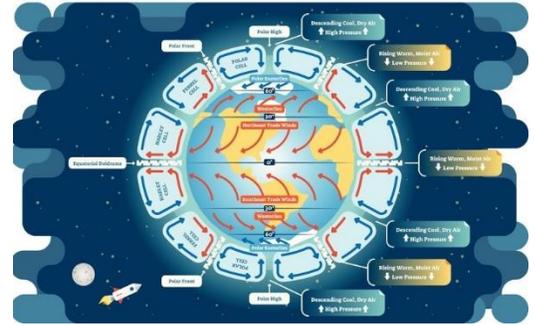
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Name: _____

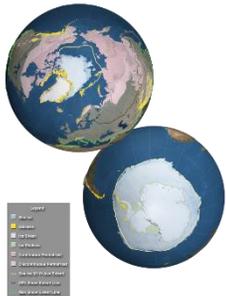
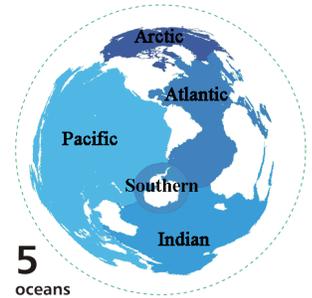
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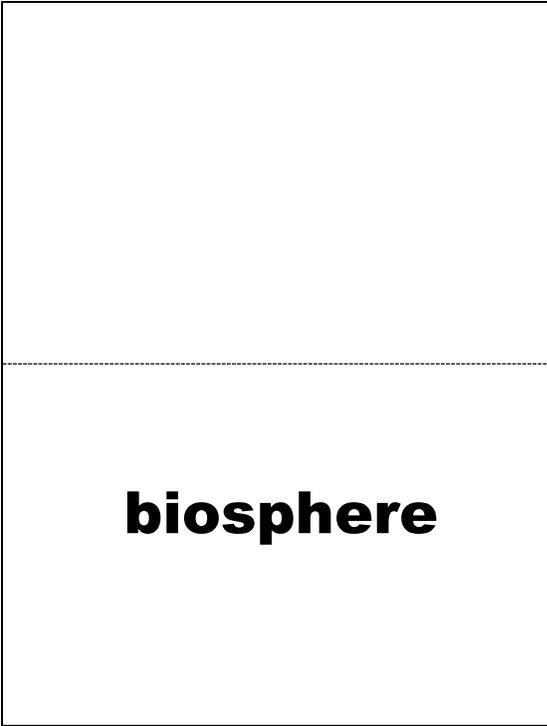
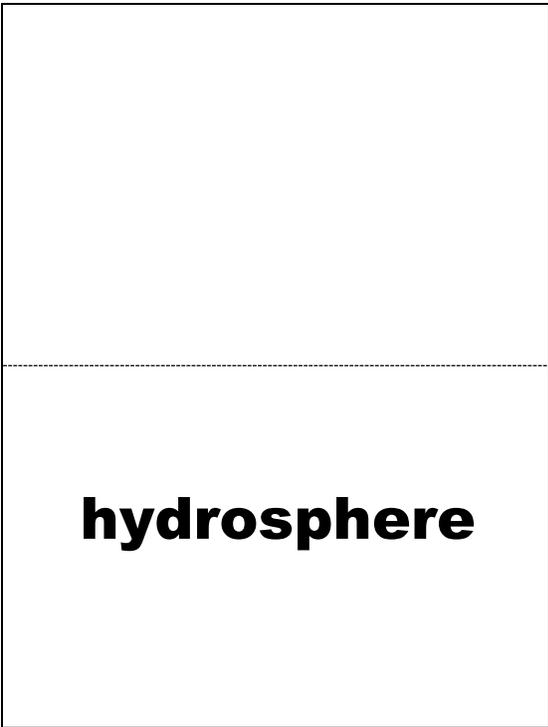
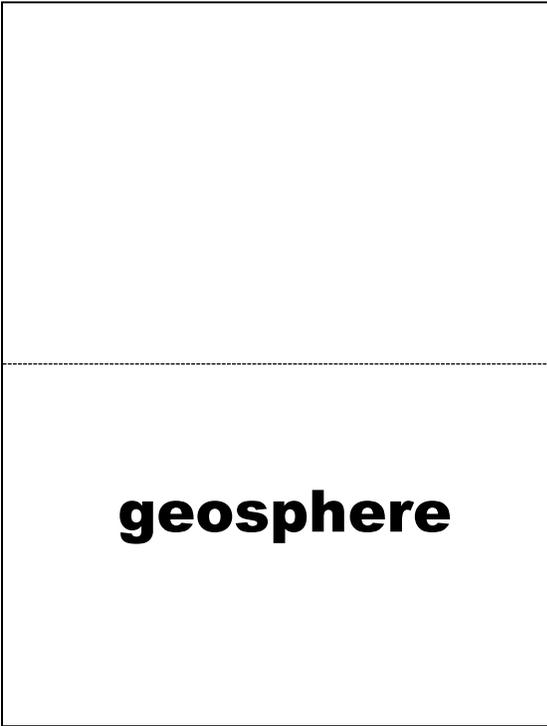
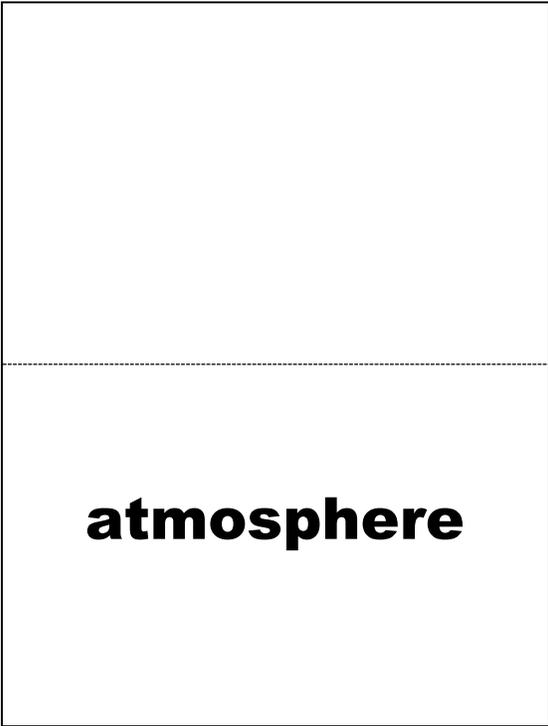
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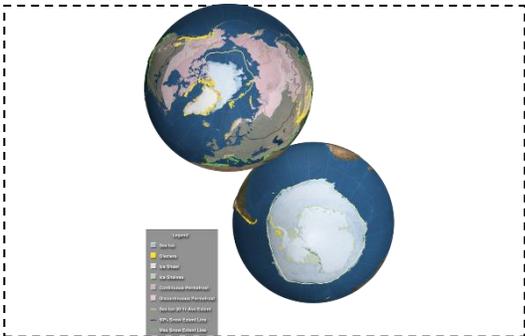
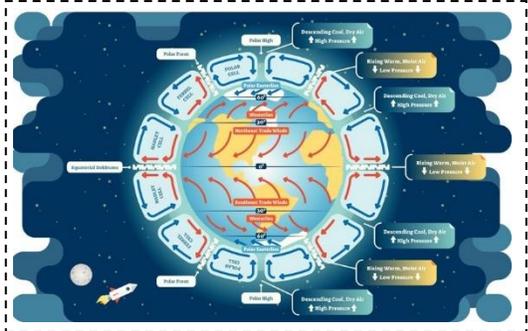




This is the layer of gases that surround the earth keeping the planet warm and providing oxygen for breathing and carbon dioxide for photosynthesis.

This part of Earth's systems includes the interior and surface of the Earth. Both of these are made up of rocks and minerals.

cryosphere



This is the part of the Earth that is covered by water.

This is the part of the Earth that can support living life. This region extends from underground (down about ten feet where plant roots, animals, insects, bacteria live) and underwater (as deep as the ocean trenches) to higher up in the atmosphere where life (plants and animals down to microbes) can exist.

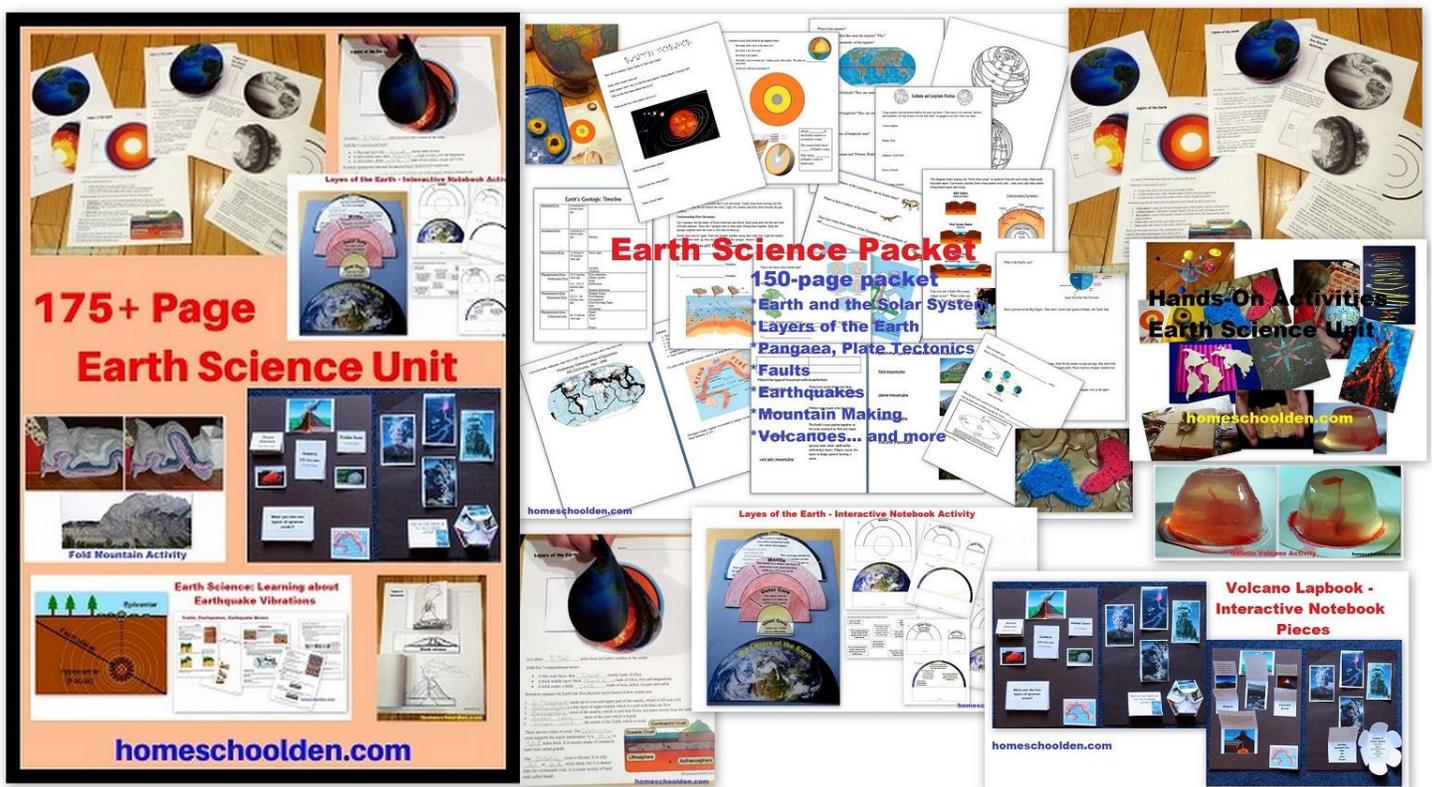
This includes those portions of Earth's surface where water is in solid form, including sea ice, lake ice, river ice, snow cover, glaciers, ice caps, ice sheets, and frozen ground.

We've done units on the basic Earth Systems. Here are more about our science packets and how we covered each sphere:

Geosphere:

We have gone into a lot of depth about the Geosphere -- ie. our [Earth Science Unit](#) where we talked about

- Earth's place in the Solar System
- the layers of the Earth
- Geography Terms: Earth's Axis and the Seasons; Latitude Longitude
- Plate Movement Worksheets, Types of Plate Boundaries
- Earthquakes (and we made our own earthquake shake table!)
- 4 Types of Mountains Worksheets, 4 types of Volcanoes Worksheets, Parts of a Volcano Worksheet



Earth Science Unit

Here are some other quick pics of our Earth Science Unit:

The collage features several educational resources:

- Earth Science Worksheet:** A page titled "EARTH SCIENCE" with various questions and diagrams about the solar system and Earth's layers.
- Earth's Geologic Timeline:** A table listing geological eras and their durations.
- Latitude and Longitude Practice:** A worksheet with a world map and practice questions for finding coordinates.
- Layers of the Earth:** A diagram showing the Earth's internal layers: Crust, Mantle, and Core.
- Pangaea and Plate Tectonics:** A map showing the supercontinent Pangaea and diagrams of plate boundaries.
- Faults and Earthquakes:** A diagram illustrating different types of faults and how they cause earthquakes.
- Mountain Making:** A diagram showing how mountains are formed through tectonic processes.
- Volcanoes:** A diagram of a volcano showing its internal structure and the process of an eruption.
- Other Resources:** Various other worksheets, including one about the Ring of Fire, one about the Big Dipper, and one about the Earth's axis.

Earth Science Packet

150-page packet

* Earth and the Solar System

* Layers of the Earth

* Pangaea, Plate Tectonics

* Faults

* Earthquakes

* Mountain Making

* Volcanoes... and more

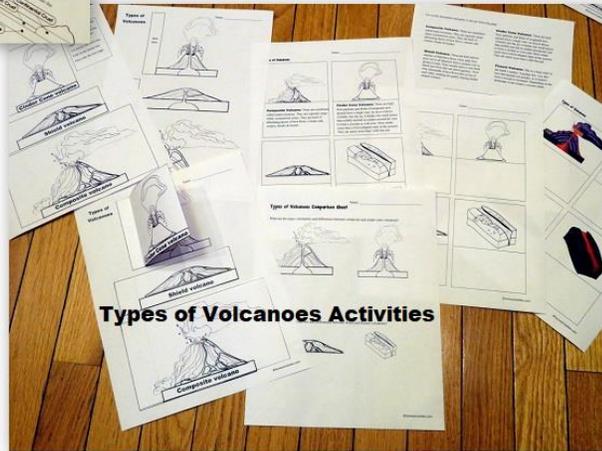
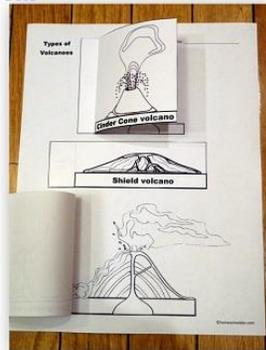


Layers of the Earth Activities



New Activities added to our 100+ page Earth Science Packet!

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Types of Volcanoes Activities



Earth Science Unit

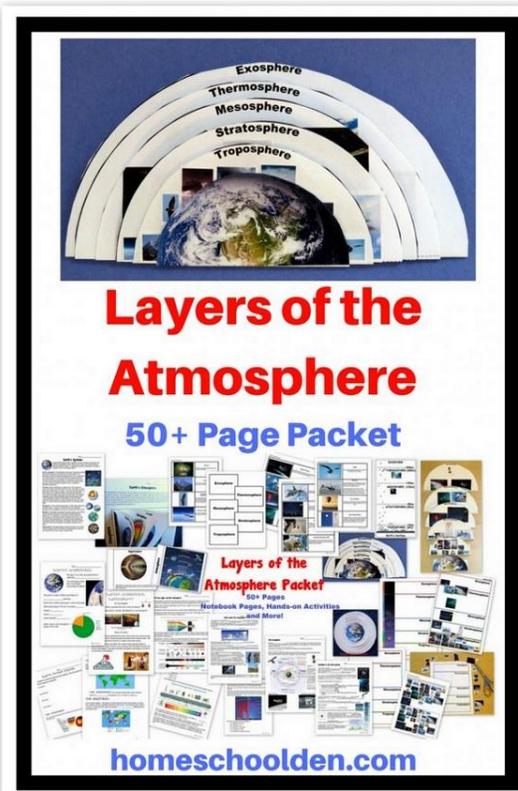
150+ page packet



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Atmosphere:

We also spent quite a bit of time studying Earth's atmosphere and went on to do a weather unit.



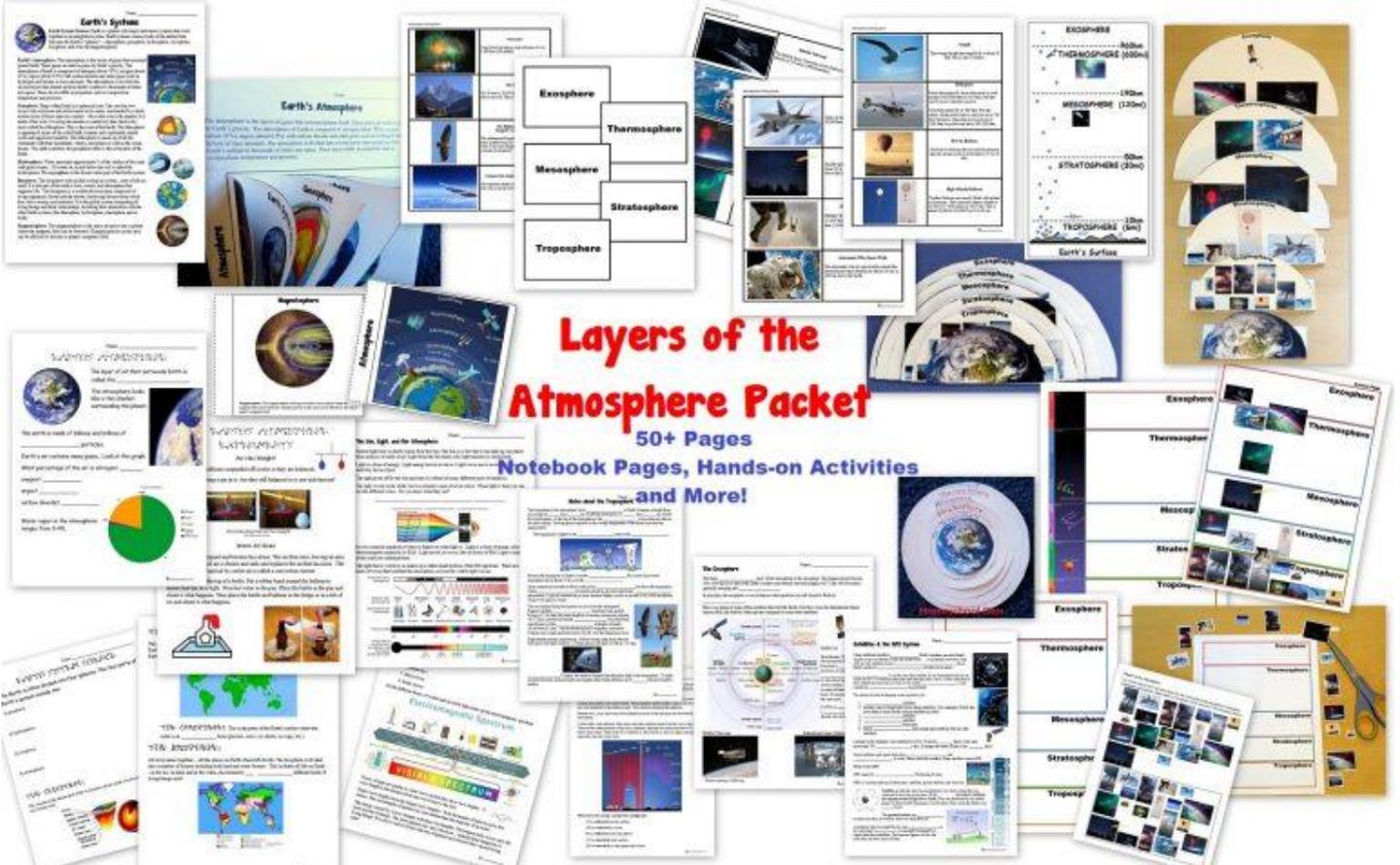
Layers of the Atmosphere
50+ Page Packet

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Earth's Atmosphere Packet
50+ pages
Notebook Pages, Activities and More!

Introduction to Earth System Science & Earth's Atmosphere Notebook Page Activity



Layers of the Atmosphere Packet
50+ Pages
Notebook Pages, Hands-on Activities and More!

Layers of the Atmosphere Note-Taking Page

and/or cut-and-paste notes activity

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Weather Unit

Weather Unit

70 Pages

Learn about Clouds, Weather Fronts, Winds & more!

Types of Clouds Worksheets Global Winds Jet Stream Sea & Land Breezes

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Clouds, Winds and Weather Packet

homeschoolden.com

Biosphere:

The biosphere has to do with living organisms.

When the kids were younger, we did a lot of mini-units on animals – vertebrates/invertebrates, animal characteristics, animal homes, nocturnal animals, domesticated vs. wild animals, animal tracks (and on and on).

These are all included in our [Animal Unit](#):

Animal Unit
100+ Page Packet

Feathers, Fur, Scales, Skin
Animal Characteristics
Types of Animals
Vertebrate Groups
Invertebrate Groups
Domesticated vs. Wild Animals
Animals and their Tracks
Nocturnal vs. Diurnal Animals

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Biology Unit: When the kids were a older (upper elementary/middle school), we did another biology unit and studied the biomes, food webs & food chains, symbiosis and so forth.

Biology Packet
The Biosphere
Biomes, Ecosystems, Habitats,
Biological Interactions,
Feeding Relationships
and more!
60+ Pages

Biomes

Arctic is the polar region at the northern-most part of Earth.

Alpine Tundra is a biome that does not contain trees because of its high altitude. It is a region where it is too cold and windy to support tree growth.

Boreal Forest or Taiga is the world's largest biome. It is characterized by coniferous forests consisting mostly of pines, spruces and larches.

Deciduous Forests have trees that lose their leaves seasonally, usually in autumn.

Deserts are areas where there is little rainfall. Living conditions are hostile for plant and animal life.

Grasslands are areas where the vegetation is dominated by grass.

Tropical Savannas are grassland areas which occur in semi-arid to semi-humid climate in the subtropical and tropical regions.

Chaparral is a region with shrubs and herbs.

Tropical Rainforest is a region where there is no dry season. Tropical Rainforests are located in the equatorial zone and are generally hot and wet.

Biomes

Arctic:

Alpine Tundra:

Boreal Forest or Taiga:

Deciduous Forests:

Deserts:

Grasslands:

Tropical Savannas:

Chaparral:

Tropical Rainforest:

Biome Matching

Chaparral

Tropical Savanna

Arctic

Boreal Forest or Taiga

Desert

Deciduous Forest

Alpine Tundra

Grasslands

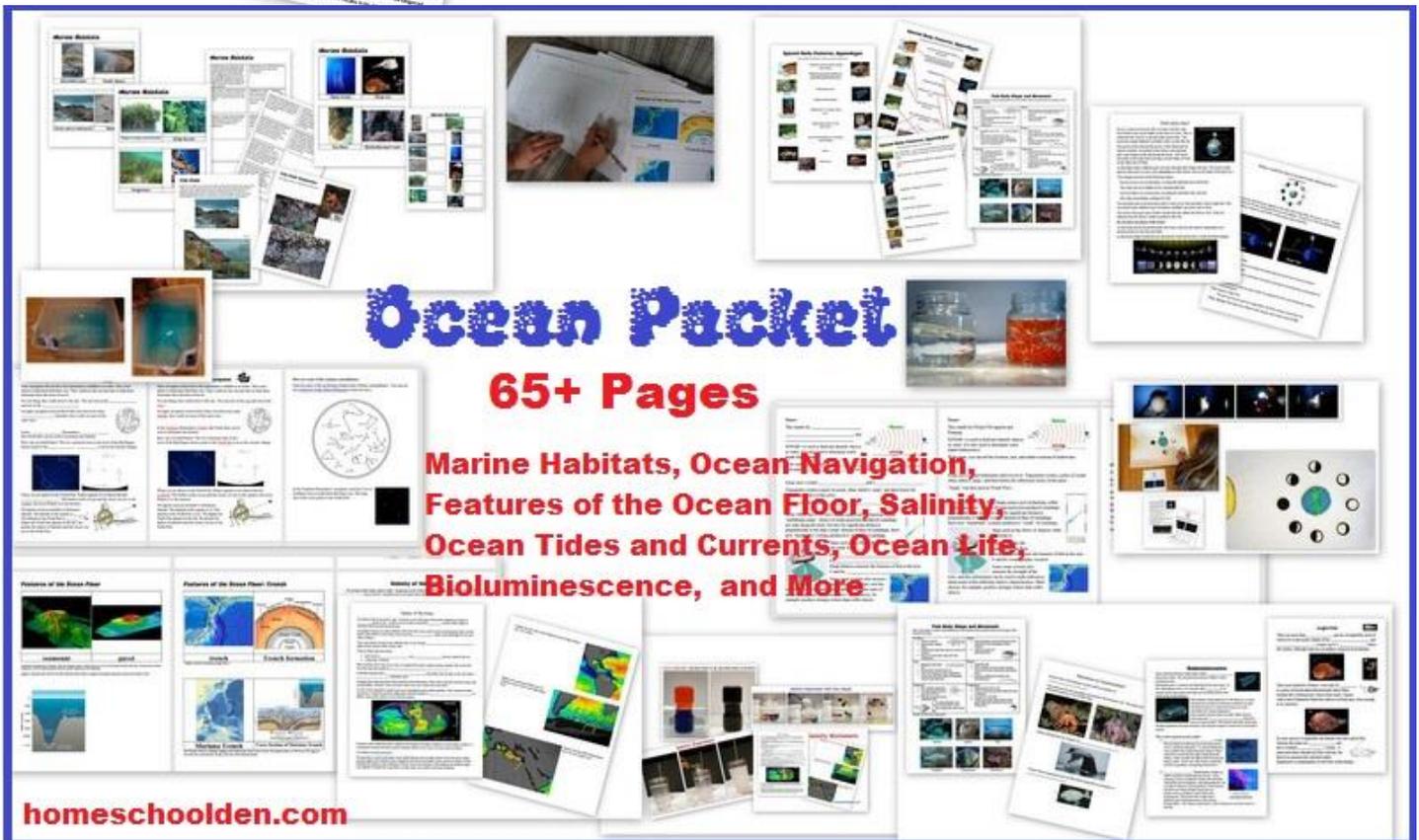
Tropical Rainforest

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Ocean Packet



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Ocean Packet

65+ Pages

Marine Habitats, Ocean Navigation,
Features of the Ocean Floor, Salinity,
Ocean Tides and Currents, Ocean Life,
Bioluminescence, and More

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