

Suggested Sequence

- I. Introduction
 - a. Names of Biomes
 - b. What Am I? biomes
 - c. Elements of a Biome (1 and 2)

- II. Abiotic Sequence
 - a. Soil Composition
 - b. Soil Horizons
 - c. Rock Cycle
 - d. Water Cycle
 - e. Layers of the Atmosphere
 - f. Carbon Cycle
 - g. Nitrogen Cycle
 - h. Greenhouse Effect

- III. Layers of Biomes
 - a. Layers of the Subtropical/ Tropical Forest
 - b. Layers of the Forest
 - c. Layers of the Ocean

- IV. Biotic Sequence
 - a. Chain of Detritivores
 - b. Food Chain/ Food Web of biomes

Introduction to Biomes

Materials

10 triangles from the Ecology curriculum, large Earth overlay

Aims

Direct: Introduce the different biomes of the world

Indirect: Understand why biomes are different in different places

Procedure

1. Lay out the large Earth overlay.
2. "Today we are going to learn about the different biomes of the world. The definition of a biome is a geographical area that has similar characteristics as well as similar plants and animals.
3. There are two things that contribute to these characteristics; they are the interaction between temperature and precipitation.
4. There are three water biomes and 6 land biomes. Let's look at the first biome."
5. Lay out the first triangle. Point out the name at the bottom and the graphic depicting the biome.
6. Describe the climate, temperature and precipitation. (Note that the water biomes do not have precipitation characteristics, but salinity characteristics.)
7. Move up the triangle and show the types of plants and animals that live in this biome.
8. Continue this procedure for each of the biomes.
9. Leave the *elements of a biome* triangle to the last, and place it to complete the decagon. Tell the children that you will discuss this triangle in the next lesson.

Note

The terms used to name the biomes are the ones used by the World Wildlife Federation. Let the children understand that there are multiple names for some of the biomes. Below is a list of names for similar biomes.

Mangrove- estuary, wetlands

Grassland- prairie, plains, savannah

Tropical/sub-tropical forest- rainforest

Follow-up

What Am I? biome stories

What Am I? Biome Stories

Materials

9 biome stories with pictures, labels and definitions

Aims

Direct: Identify the different biomes of the world

Indirect: Understand why biomes are different in different places

Procedure

1. Lay out the pictures of each biome.
2. "Today we are going to practice the different biomes of the world. Remember the definition of a biome is a geographical area that has similar characteristics as well as similar plants and animals.
3. Lay out the pictures of each biome and label each one. (If there is difficulty identifying them, look at the base of each of the triangles from the previous lesson)
4. Read each story and match them to the correct picture.

Note

Point of interest is that in the tropical/sub-tropical forest there is a river. This is important because with all of the rain and the run off, there is often a fresh water river running through the forest. Secondly, the grassland picture shows an area covered with grass and reddish soil. This is not to be confused with the desert picture. The oxidation of the soil (the red color) is a different process than the creating of the biome.

Follow-up

Elements of a biome (1) nomenclature

Experiments for Adaptations and Climate

Elements of a Biome (1)

Materials

Elements of a biome triangle, elements of a biome nomenclature (1)

Aims

Direct: Introduce the elements of a biome

Indirect: Understand the interdependence of all aspects of each biome.

Procedure

1. Lay out the elements of a biome triangle.
2. Take out the nomenclature. "In order for us to study a biome we need to look at all of the elements that are within it.
3. Ecologists look at both biotic and abiotic parts. What do you think the word biotic means? (Yes, it means living.) So what do you think abiotic means?" (non-living)
4. Place out the abiotic picture with the label and definition. "The most important part of these abiotic components is the sun, for without the sun, there would be no light and no heat. However, without the other abiotic components there would also be no life. The sun produces energy that is needed for all of life.
5. The next component is what ecologist term primary producers. These are the plants of the biomes. They take all of the abiotic substances and turn it into living things termed biomass. This means that plants produce energy from non-living materials.
6. The next component is the primary consumers. They are termed herbivores because they consume the plants."
7. Continue with the sequence introducing the secondary consumers and tertiary consumers.
8. When all of the components have been laid out, take one away and see what happens to the rest of the components. (They will have no support for life.)

Note:

This is preparing the children for their work with food web as they understand that each biotic component is giving energy to the next. The ultimate primary source of energy is the sun.

Elements of a Biome (2)

Materials

Elements of a biome triangle, elements of a biome nomenclature (2)

Aims

Direct: Introduce the hierarchy of a biome and that each biome can be divided into smaller parts.

Indirect: Understand the interdependence of all aspects of each biome.

Procedure

1. Lay out the elements of a biome triangle.
2. Take out the nomenclature. "Biomes are large areas of land, and obviously we can't say that all animals and plants live in all of the biome. So ecologists have broken biomes down into smaller parts.
3. "The first one is an ecosystem. This is where the plants and animals *work together* with the abiotic components to make a *stable* system.
4. A disturbance is a natural or unnatural that makes the ecosystem unstable.
5. Continue presenting the different elements in this order:
 - Habitat
 - Niche
 - Fauna
 - Flora

Follow-up

Experiments for abiotic substances

Note:

There are many different ways that you can progress from this point. You may focus on the abiotic sequence, the "layers of specific biomes", then the organic sequence, followed by the food chain/web activities. This allows for the children to do some of the activities while continuing their interest in ecology. However, this curriculum is flexible enough for you to follow the interest of your children.

Soil Composition

Materials

Soil composition nomenclature, magnifying glass, soil from three different locations, paper plates

Aims

Direct: Introduce the components of soil

Indirect: Soil is a product of the Rock Cycle

Procedure

1. Have each child take some soil and place it on a paper plate.
2. Using the magnifying glass, have them “sort” and separate the different components.
3. (Save the biotic components for the next lesson, or add the soil horizon to this lesson)
4. Using the nomenclature, show them the geological terms used to identify the components of soil.

Follow-up

Soil Horizon Nomenclature

Experiments for Rain water and Topsoil

Soil Horizon

Materials

Soil horizon nomenclature

Aims

Direct: Introduce the names used to identify the layers of soil

Indirect: Soil is a product of the Rock Cycle and contains living and non-living matter.

Procedure

1. Have each child take some soil and place it on a paper plate.
2. Using the magnifying glass, have them “sort” and separate the different components.
3. (Save the biotic components for the next lesson, or add the soil horizon to this lesson)
4. Using the nomenclature, show them the geological terms used to identify the components of soil.

Follow-up

Pore Space in Earth Materials Experiment
Rock Cycle Chart
Water Cycle

Earth Cycle Charts

Materials

Rock Cycle Chart, Water Cycle Chart, Carbon Cycle, Nitrogen Cycle

Aims

Direct: Introduce natural abiotic and biotic cycles

Indirect: Show the interdependence between the earth cycles

Procedure

1. These charts may be presented in any order. The children should be familiar with the Rock Cycle and Water Cycle from their work in the Impressionistic Geography Charts.
2. Refresh the children's memory on the terms.
3. Ask how these two charts are linked together.
4. It is best to introduce the Carbon Cycle and Nitrogen Cycles together.
5. Once they have understood the natural cycles, present the Greenhouse Effect chart to show how people have disrupted the natural cycles.
6. As a final activity, have the children demonstrate how all of the cycles are interrelated. Ask what would happen if one part of any one cycle was omitted. What would happen to the other cycles?

Note:

The Rock Cycle chart is just a wall chart with no moveable pieces. It is suggested that the children use this as a model and draw their own rock cycle.

Follow-up possibilities

Water Cycle Experiment

Study of types of rocks

Study of the Greenhouse Effect

Layers of the Atmosphere

Materials

Atmosphere Circles

Aims

Direct: To introduce the terms used to identify the layers of the atmosphere.

Indirect: Understand why greenhouse gases get trapped in the earth's atmosphere.

Procedure

1. Lay out the control circle for all of the layers.
2. "Today we are going to learn about the different layers of the atmosphere."
3. Build the layers from the earth outwards, placing each circle with identifying text underneath.
4. Identify the boundaries between each layer. It is important to identify the temperature of each layer.

Follow-up

Have the children draw each layer and research the different items that are within each layer.

Layers of Biomes

Materials

Parts of a subtropical/tropical forest, Parts of a forest, Layers of the Oceans

Aims

Direct: To introduce the terms used to identify the layers of the each biome.

Indirect: Understand that there are different ecosystems within each biome.

Procedure

1. Lay out the nomenclature cards for each one of the “parts” lesson.
2. Focus on the animal and plant life in each one of the levels.
3. Follow up with task cards if available or ask children to do research on different plants and animals within that ecosystem.

Follow-up

Have the children draw each layer and research the different items that are within each layer.

Chain of Detritivores

Materials

Nomenclature

Aims

Direct: To introduce the terms used to identify the chain of decomposers.

Indirect: Understand the interdependence of all parts of the biome.

Procedure

1. Lay out the nomenclature cards for the chain of detritivores.
2. Focus on the how the animals help to “recycle” many of the biotic components so that they are cycled back into the soil.
3. Ask the children what our earth would be like if we did not have the decomposers. What would happen to all of the “waste” that is produced?

Follow-up

Have the children draw the chain and research the different animals that are within each layer in the previous work.

Experiments for decomposers

Food Chains and Webs

Materials

Animals from any food web biome, cut out arrows, sun

Aims

Direct: To introduce the basic difference between a food chain and food web.

Indirect: Understand that sources of energy are transferred from one organism to another and they are interrelated.

Procedure

1. "Today we are going to talk about how energy is transferred from one organism to another.
2. Do you remember in our previous work (physics/chemistry) when we said that energy could not be destroyed, it just changes form? Well let's look at energy in biotic forms.
3. What are the abiotic forms that allow primary producers to grow? (list abiotic forms and place the sun at the beginning of the chain)
4. Since we have these abiotic components they have created a space for plant to inhabit the biome.
5. Place a picture of a plant from those available.
6. What eats the primary producers? (Children name an herbivore from the pictures available.) Place an arrow going from the primary producer to the primary consumer.
7. The energy from the plant is consumed by the herbivore. Now, what will eat this primary consumer? (Place an appropriate picture from the choices, and place an arrow going from the primary consumer to the secondary consumer)
8. Is there anything that will consume this secondary consumer? (If possible, place a tertiary consumer.)
9. This is called a food chain; it starts with one organism and shows how the energy is transferred from one to the other. But this is not the only way that energy is transferred.
10. In reality there are many things that eat and are eaten. Let's start with the primary producer again. Rearrange the cards and place as many cards out in a web as possible.
11. This is a food web, look at all of the things that are available and that are dependent on each other. What would happen if we took one part of the web out?
12. What happens when we take flora or fauna from one biome and transplant it to another?

Follow-up

Have the children create their own webs. Research each animal or plant to see what it eats or is eaten by. Research what happens when non-indigenous animals are introduced into different biomes.