Title:
Biomes and Species Success in Ecosystems

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Abstract:
Biomes are areas found throughout the earth that occupy distinct regions defined by climate, flora and fauna. They include ecosystems in marine, fresh water and terrestrial environments. The diversity of life varies by latitude around the globe, with greatest biodiversity being found nearest the equator. Many species found within Earth's biomes are now threatened or endangered. According to ecologists, current extinction rates are at an all-time high. Habitat loss due to human impact is a major contributor. Your class will participate in a two-part activity. First, students will research world biomes, identify specific flora and fauna and determine where on the Earth they may be found. Research facts and photos will be organized to produce a poster. The second activity applies information gained from the biome research to determine which species of flora and fauna are most important to ecosystem survival. Through collaborative small-group discussion students will decide which species are most likely to become endangered or extinct and diagram the phylogenetic relationship between their example fauna. Students will apply a variety of learning strategies to complete these activities; research, poster-production, cooperative learning, polling, and small-group discussions. As a result of these activities, students will gain improved understanding of the elements of ecosystems within biomes and which example species are most important to sustain ecosystem function and success.

Subject, Grade, Level:
Middle and High School Environmental Science and Biology – General, Honors and AP levels. (Depth of discussion and student response will vary with grade level.)

Learning objectives:
**Identify major terrestrial, marine and fresh water biomes of the world.*

**Discover example flora and fauna of each biome as well as where biomes are located on Earth.*

**Organize all biome research facts on a poster board.*

**Understand that particular species of plants and animals are necessary to sustain an ecosystem within a biome and collaborate with classmates to evaluate ecological importance of species.*

**Understand how scientists arrange organisms in a phylogenetic tree.*

Timeframe:

Activity 1 – ***Biome research and poster production*** *– allow a minimum of one week including at least one weekend from the date assigned until due. The poster project should be announced at the beginning of the instructional unit in which biomes will be taught.*

Activity 2 – ***Small-group collaboration for evaluation of flora/fauna*** *– allow a minimum of a 45-minute class period to complete the collaboration evaluation.*

List of materials:

Computer - for research on biomes and photo resources needed for poster project

Printer – for printing poster materials

Paper (for printer)

Posterboard

Writing utensil and paper for group collaboration

Procedure and general instructions (for instructor). REQUIRED.

Watch treetender video (movie) found on treetender.org while working on this unit and prior to activities, (allow 15 minutes).

Activity 1 –

Biome research and poster production instructions.

1. Inform students of the need to obtain poster board before beginning unit to include biomes. They should have a minimum of one week of outside class time to work on the assignment.
2. Make sure all students have computer and printer resources; either at home or school.
3. Poster instructions for students – attached

   The number of each type of biome (marine, fresh water and terrestrial) may be reduced for students in lower grade levels.

Biome Poster

1. Obtain a piece of poster board
2. You may use internet resources for pictures or information to display the following information:

- ***Three categories of biomes: terrestrial, marine, and freshwater***
- For terrestrial biomes include tropical rainforests, temperate deciduous forests, taigas (boreal forests), savannas (tropical grasslands), temperate grasslands, arctic tundra, tropical deserts, temperate deserts, cold deserts and chaparrals (temperate shrub lands).
- For marine biomes include estuaries, coral reefs, rocky shores (tide pools), mangrove forests and the open ocean.
- For freshwater biomes include lentic zones (lakes and inland wetlands/swamps) and lotic zones (rivers).

3. For each biome identify specific locations where the biome is found (ex. Brazil, Siberia, Ireland, Greece, etc.)
4. For each of the biomes identify characteristics of the environment within the biome as well as organisms that live there – both flora and fauna (plant and animal)
5. Include a minimum of 2 pictures of each of the three classes of biomes (marine, fresh water and terrestrial) – 6 pictures total

Example : Terrestrial Biome – ***Savanna*** (Tropical Grassland)

Location: Common biome found in parts of Africa such as Kenya and Tanzania

Description: Characterized by warm temperatures with alternating warm and dry seasons that may experience several months of little to no rainfall. Grasslands with patches of trees.

Fauna: May include large grazing herbivores such as zebras and gazelles as well as lions, rhinos, giraffes and ostriches.

Flora: Plant-life has deep roots to utilize groundwater supply. Examples are lemon grass, Rhodes grass, Bermuda grass, Acacia Senegal Gum tree and the Baobob tree.

Procedure and general instructions (for students).

Activity 2 –

Small-group collaboration for evaluation of flora/fauna –

Before activity (could be assigned with poster project).

1. Assign each student into a "biome group" with 4 additional students.

For example: tropical rainforest, coral reef, or savannah

2. Assign each student one flora and one fauna species to study. Students should be prepared to defend the necessity of their assigned species within an ecosystem of their assigned biome.

For example: In savannah – flora: Boabob tree, fauna: Zebra

To begin activity:

1. Organize students into biome groups.

2. Biome group leader should be designated as the "treetender" to lead polling, discussions, and facilitate group to record eliminated species and diagram the phylogenetic tree.

3. Each biome group should have a flora discussion first. They should explain why their assigned flora example is important to the function of the ecosystem.

a. After each group member defends the importance of their plant species, the group's treetender polls each group member by ballot to determine which species the group determines to be the least essential in maintaining the function of the ecosystem.

4. Each biome group will have a second discussion about fauna. Each group member should explain why their assigned fauna example is important to the function of the ecosystem.

a. After each group member defends the importance of their animal species, the group's treetender polls each group member by ballot to determine which species the group determines to be the least essential in maintaining the function of the ecosystem.

5. Through group discussion, students will assist their treetender in making a diagram that shows the phylogenetic relationship of their group's fauna (5 organisms total).

6. Treetenders of each biome group will record the species of flora and fauna eliminated from their biomes and submit information to the teacher.

OPTIONAL SECTIONS (other sections you can add if applicable)
Suggestions and materials for assessing student learning

Activity 1 -

Biome poster should be graded for completion. Elements of the instructions found to be missing- such as location, description, photos, and examples of flora and fauna-should result in a deduction of points.

Activity 2-

Group discussion validation will be the phylogenetic tree of species fauna assigned to biome group members as well as identification of the two eliminated species (flora and fauna).

Student data

Activity 2 – Treetender Sheet

Biome Group _____

Treetender _____

Group Members:

_____

_____

List of example fauna species belonging to the group:

_____

_____

Diagram of phylogenetic relationship of example species (indicate relationship of all 5)

Flora Species Eliminated _____

Fauna Species Eliminated _____

Reference list

Student assignments related to the activity

Biome Poster Project

Biome Group Discussion Summary Sheet – submitted by group treetender

Any other appendices appropriate for your particular activity