Exploring BIOMES For MIDDLE SCHOOL
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### Biomes

**What is a biome?**
- large geographical area that has the same kinds of plants and animals throughout

**Name the 6 major land biomes**
1. Tundra
2. Desert
3. Grasslands
4. Rain Forest
5. Coniferous Forest
6. Deciduous Forest

**What are the 4 abiotic conditions which account for different plants in biomes?**
1. sunshine
2. rainfall
3. temperature
4. soil

**What is a dominant plant species?**
- most abundant plant species

**What is climate?**
- weather conditions over a long period of time

**What is a climate graphs**
- show average monthly precipitation and temperature for one year
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does climate affect biomes?</td>
<td>-climate affects where living things survive</td>
</tr>
<tr>
<td>Two important features of climate are:</td>
<td>-temperature -precipitation</td>
</tr>
<tr>
<td>What are adaptations?</td>
<td>-features that help an organism survive in its particular environment</td>
</tr>
<tr>
<td>Describe some adaptations living things make?</td>
<td>-plants become dormant in winter -animals change color -coniferous trees need less water -some animals hibernate</td>
</tr>
<tr>
<td>Where can several biomes occur in a small area?</td>
<td>-mountain ranges</td>
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<td>What is a tree line?</td>
<td>-climate too cold for trees to survive about this line</td>
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<tr>
<td>What is a transition zone?</td>
<td>-zone between 2 biomes that has similarities of both</td>
</tr>
<tr>
<td><strong>What is succession?</strong></td>
<td>-process of gradual change in organisms that make up a community</td>
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<tr>
<td><strong>What is a pioneer species?</strong></td>
<td>-a tough plant found growing in the first stage of succession</td>
</tr>
<tr>
<td><strong>What is a climax plant</strong></td>
<td>-the dominant plant in the final stage of succession</td>
</tr>
<tr>
<td><strong>What is a climax community?</strong></td>
<td>-2 or more species able to survive indefinitely in the same habitat -the final stage of succession</td>
</tr>
<tr>
<td><strong>How long will a climax community last?</strong></td>
<td>-until there’s a catastrophic disturbance in the habitat or human interference</td>
</tr>
</tbody>
</table>
How Humans Change Biomes

How have human activities changed biomes?

- increase in population
- travelling brings new species to areas
- pollution, air and water
- harvesting plants
- hunting animals
Features of Biomes

Tundra

The tundra biome receives very little solar energy. Although the summer days are long the winter days are very short. The growing season is only two months long. The tundra is also known as a ‘cold desert’. It receives only about 12 cm of precipitation in a year and it is mostly in the form of snow. It is very cold in the tundra with temperatures in winter averaging -24°C, and in the summer averaging only 1°C. Because of the cold temperature the soil is frozen permanently at depths below 60 cm. It is soft and spongy near the surface.

Desert

The desert biome receives a great deal of solar energy. While rainfall is very low, averaging slightly more than 1 cm per month, many months may pass with no rainfall at all. Deserts temperatures may average 10°C in the winter and summer averages climbs as high as 30°C. The soil is very poor, both in organic matter and in water holding ability.
**Grasslands**

The grassland biome can occur in different parts of the world and at varying latitudes so the amount of solar energy received can vary, depending upon the specific location. The amount of rainfall is generally about 5 cm each month. The growing season is dependent upon the amount of rainfall rather than upon the temperatures, as in other biomes. Winter temperatures can be cool, averaging -2°C, while summer temperatures average 20°C. The soil has a lot of organic matter and has a moderate ability to hold water.

**Rain Forest**

The rain forest biome receives much solar energy, although the tropical rain forest receives more than the non-tropical rain forest. Rainfall is very heavy, averaging at least 20 cm each month. The biome is located on or near the equator, so the temperature remains about the same throughout the year. The soil is generally poor in organic matter and does not hold water very well.
**Coniferous Forest**

The Coniferous forest biome receives some sunlight every day. It has a growing season that lasts for three to six months. Monthly rainfall averages 7 cm and it receives more snow than any other biome. The winter temperatures are quite cold, averaging only -6°C but the summer temperature averages 12°C. The coniferous needles help the soil to hold water well but the soil is generally low in organic matter.

**Deciduous Forest**

The deciduous forest biome has a growing season of at least five months as it receives even more sunlight than the coniferous forest biome. It averages 9 cm of rainfall each month. Temperatures average slightly above freezing in the winter months and average 24°C in the summer. Because the climax plants in this biome lose their leaves each fall, the soil is rich in organic matter and holds water well.
**What is a Biome**

**Objective:**
- define the term biome
- list the six major biomes on the Earth

**Introduction**

**Strategy: Think, pair, share**

1. Ask students to visualize a desert. Do they see plants growing? If so, what plants do they see. Ask them to share their answer with a partner. Select groups to share responses and list on the board.

2. Ask students to visualize a forest near the school they attend. What types of plants grow there? Ask them to share with their partner and take some responses and list them on the board.

3. Ask students to suggest reasons for the differences in the types and amount of plants. Suggestions to expect should include sunlight, temperature, rainfall, and soil. Explain to students these conditions are known as abiotic (nonliving) factors.

Explain to students that the land areas of the earth can be classified according the abiotic conditions and the types of plants that grow there. Large land areas that have similar abiotic conditions and plants make up a biome.
4. Display or distribute copies of the pictures of the six biomes. Explain to students there are six major land biomes. Actual pictures and cartoon pictures of the six biomes are provided.

**Student Activity**

1. Have students use the page provided to illustrate and label the six biomes.

2. This can be a title page for the unit.

3. An option to the title page option is to have students create a cube and name and illustrate the six biomes on each side of the cube. These can then be hung in the classroom for display.
The Six Major Biomes

Desert

Deciduous Forest

Tundra

Rain Forest

Coniferous Forest

Grassland
The Six Major Biomes

- Desert
- Deciduous Forest
- Tundra
- Rain Forest
- Coniferous Forest
- Grassland
The Six Major Biomes of Earth

- Tundra
- Coniferous Forest
- Desert
- Deciduous Forest
- Grasslands
- Rainforest
Name and illustrate each of the six biomes.

Cut out the cube along the outside edges and fold along dotted lines and assemble into a cube.

Glue along the flaps to attach the cube.
The Effect of Latitude on Location of Biomes

Objective:
- Explain the effect that latitude has on the location of biomes throughout the world

Introduction
Ask student to recall the four abiotic factors that determine which plants will grow in a certain place (sunlight, rainfall, temperature and soil). Now ask students to recall the six major biomes of the earth. On a map, point out the location of the equator. Explain the equator is an imaginary line that separates the earth in the northern and southern hemisphere. Explain the equator is a line of latitude. Ask students what they know about the climate near the equator. Some students will be able to respond that the climate near the equator is hot and tropical. Next, point out the tundra biome in northern North America. Ask the students what they know about the climate near the North Pole. Most students will be able to respond they know it is cold. Point out that as we travel further from the equator, the colder the climate. Also explain that land masses at the same latitude will have similar abiotic conditions because the day length is the same, the sun is the same height in the sky and the temperature is similar. Have students color-code the map on the next page. Help students to realize that latitude is an important determining
factor in the location of biomes. At or near the equator we find the rain forest biome. As we move further we find deserts and grasslands. We then move into the deciduous forest region, then the coniferous biome and finally the tundra.

Put students in small groups and assign group roles. Pose the question, ‘Why does latitude play such an important role in determining the location of biomes?’ Have groups report out. Discuss with students that similar latitudes will have similar biotic conditions. In particular, the amount of sunlight and the temperature are closely related to latitude due to the angle of the sun’s rays as they strike the earth.

**Student Activity**

Have students color-code the locations of the different biomes on the biomes map on the next page. There are questions to follow on the following page.
BIOMES ON THE EARTH

Color Code the Biomes by Number

<table>
<thead>
<tr>
<th>Six Major Biomes</th>
<th>Other Biomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 □ Tundra</td>
<td>7 □ Permanent Ice</td>
</tr>
<tr>
<td>2 □ Coniferous Forest</td>
<td>8 □ Mountains</td>
</tr>
<tr>
<td>3 □ Deciduous Forest</td>
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<tr>
<td>4 □ Rain Forest</td>
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<td>5 □ Grassland</td>
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<tr>
<td>6 □ Desert</td>
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</tbody>
</table>
The Effect of Latitude on Location of Biomes

Group Names

Reader Recorder Presenter

1. In what part of the world is the tundra located?

2. What biome is nearest to the equator?

3. Which biomes are located in the middle latitudes?

4. Which biomes cover the largest land areas?

5. What abiotic conditions are similar for places at the same latitude?
The Effect of Latitude on Location of Biomes

KEY

1. In what part of the world is the tundra located?
   The tundra is located in the northern section.

2. What biome is nearest to the equator?
   The biome is the rainforest

3. Which biomes are located in the middle latitudes?
   The biomes located in the middle latitudes are the grasslands and desert.

4. Which biomes cover the largest land areas?
   The biomes covering the largest land areas are the coniferous forest and tundra.

5. What abiotic conditions are similar for places at the same latitude?
   Day length, height of sun in the sky, temperature
Climate Graphs

A climate graph displays two or more climate variables such as average temperature and average precipitation for a specific place. The data is generally displayed by month and allows for a quick and generalized assessment of the average climate. Therefore a climate graph is an effective graphing tool for displaying the average temperatures and average precipitation of a location.

How To Make a Climate Graph

1. **Divide the x axis into 12 equal segments.** Since the climate graph shows the climate for a region for the year, each segment represents one month. Label the segments with the months of the year beginning with January. If you use the graph paper provided in the package, count over 4 segments before you begin labeling the months of the year. This will center the data.

2. **The right y axis is used for the temperature scale.** Look at the high and low temperature for the data. Find the difference. The provided graph paper has 30 segments for y axis so divide the difference by 30 and decide on an equal division for the 30 segments to represent the temperature range. Number and label the y axis on the right hand side of the graph.

3. **The left y axis is used for the precipitation scale.** The scale will begin with 0. Find the difference between the minimum and maximum amount of precipitation and divide by 30 to decide on the numerical value for each segment. Label and number the scale for precipitation on the left hand side.

4. **Use the data tables included in the booklet to input the data.** Temperature is represented with a line graph. Precipitation is represented with a bar graph.

5. **The line graph and bar graph can overlap.**

6. **Ensure the graph has a title with total annual precipitation include directly under the title.**
## MONTHS OF THE YEAR

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<th>Biomes</th>
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<td>1.8</td>
<td>1.1</td>
<td>1.3</td>
<td>2.1</td>
</tr>
</tbody>
</table>

**Metric System:**  
T = Average Temperature in °C  
R = Average Rainfall in mm
Caniferous Forest Biome

Months of the Year

Temperature in Celsius

Precipitation in mm
Climax Plants and Succession

Objective:
- define the term climax plant

Introduction
Explain to student that within every biome there is a ‘power struggle’ going on. Each biome may have many different plants growing in it, but only one type of plant can be the chief or dominant plant in a given area. Over a long period of time in any given area one group of plants will dominate all the other kinds of plants. These plants are called climax plants. These are the plants that win the power struggle.

Student Activity
Present students with this problem. Suppose that as of today the grass on the school grounds was left unattended. That is, it was no longer cut or weeded. It was just left to go ‘wild’. Put the students into small groups to discuss what would happen to the school grounds. What plants would grow there? What would the school grounds look like in six months? Two years? Fifty years? Have students predict what plant would finally become the climax plant. Have students illustrate their predictions.
Climax Plants – The School Grounds

6 months

2 years

50 years
Climax Plants and Succession
Changes after 6 months should be weeds taking over the lawns. After two years, young trees might take root and start to compete. After fifty years the area might be dominated by climax plants such as coniferous or deciduous trees depending on where the school is located.

Explain to students that the stages they drew for the school grounds is called succession. Scientists call the changes a biome goes through as the plants battle for dominance succession.

Ecological Succession
Is the process in which the community is a particular place is gradually replaced by another community. Succession changes the types of animals, plants and other organisms that are found.

Climax Community
Consists of a set of organisms that are not replaced by new arrivals. It is the stable end product of succession.
**The Water Holding Ability of Evergreen Needles**

**Problem:** Which holds more water – plain soil or soil with evergreen needles?

**Hypothesis:** Speculate which medium, plain soil or soil with evergreen needles, will hold the most water.

**Materials:** 2 styrofoam cups, nail, soil, live and dead evergreen needles, container for water marked at 100 ml, 2 small jars, paper towels

**Procedure:**

1. Label the 2 styrofoam cups A and B. Using a nail, make 4 holes in the bottom of each cup.
2. On both cups mark a line approximately 2 cm or 1 inch from the top.
3. Tightly pack cup A to the line with plain garden soil. Tightly pack cup B to the line with garden soil mixed with dead evergreen needles.
4. Place each cup over a small jar. Pour 100 ml of water into each cup. Allow the water to drain through the holes into the jar.
5. After the water has drained from both cups A and B, measure the amount of liquid.
6. Take two stacks of paper towel with three towels in each stack. Predict which cup of soil will make the paper towels wetter.
7. Dump the soil from the each cup onto the paper towel.
8. Observe which stack of paper towel is wetter.

**Questions**

1. Which cup, A or B, did the water drain through more rapidly?
2. Which cup, A or B, did the most water drain through?
3. Which cup, A or B, made the paper towels wetter?
4. How might the shape of the evergreen needles assist in water conservation?
5. Which cup, A or B, held the most water?

**Conclusion**

Write a conclusion for the lab. State the purpose, reflect upon your hypothesis, describe your observations and answer the lab’s stated problem.
Key

1. The water will drain through cup B more quickly because the evergreen needles make the soil more porous.
2. More water drained through cup A.
3. Cup B makes the paper towel wetter. This is because this soil has a greater water holding capacity than the soil without the needles.
4. The shape of the evergreen needles is a small surface area which cuts down loss of water through evaporation.
5. Cup B held the most water. It had the greater water holding capacity.
Biome Abiotic Conditions

Graphic Organizer Sort

1. Give the students the second page following these instructions. Have them cut out the information squares for the 6 land biomes.
2. Give students the template for the six biomes on the next page.
3. Explain to students they are going to place the information squares into the graphic organizer for each biome. The graphic organizer is arranged by the four abiotic factors discussed earlier: solar energy, rainfall, temperature and soil.
4. Students could glue the information squares into the graphic organizer to keep in their notes.
5. An answer key is provided.
<table>
<thead>
<tr>
<th></th>
<th>Tundra</th>
<th>Desert</th>
<th>Grassland</th>
<th>Rain Forest</th>
<th>Coniferous Forest</th>
<th>Deciduous Forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Energy</td>
<td></td>
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<td>Rainfall</td>
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<td>Temperature</td>
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<td>Soil</td>
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<tr>
<td>Features</td>
<td>Grasslands in different parts of the world receive different amounts of solar energy.</td>
<td>Tropical rain forest receives large amounts of solar energy. Non-tropical rain forest receives less.</td>
<td>Winters shorter than in tundra. Each day receives some sunlight. Growing season lasts for 3 to 6 months.</td>
<td>Receives more solar energy than coniferous forest. Growing season is at least 5 months.</td>
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<tr>
<td>Average in winter: 10°C; Average in summer: 30°C.</td>
<td>Grasslands in different parts of the world receive different amounts of solar energy.</td>
<td>Tropical rain forest receives large amounts of solar energy. Non-tropical rain forest receives less.</td>
<td>Winters shorter than in tundra. Each day receives some sunlight. Growing season lasts for 3 to 6 months.</td>
<td>Receives more solar energy than coniferous forest. Growing season is at least 5 months.</td>
<td></td>
<td></td>
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<tr>
<td>Average in the winter: -24°C; Average in the summer: 1°C.</td>
<td>Averages 1.3 cm per month over a year. Rain may all come in a few heavy rains.</td>
<td>Averages 5 cm per month. Growing season regulated by rainy season rather than temperature.</td>
<td>Average in winter:-6°C; Average in summer: 12°C.</td>
<td>Rich in organic matter. Good water holding capacity.</td>
<td></td>
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<tr>
<td>Averages 1 cm per month mostly in the form of snow.</td>
<td>Receives much solar energy.</td>
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<tr>
<td>Receives much solar energy.</td>
<td>Averages in winter -2°C; Averages in summer: 20°C.</td>
<td>Nearly constant year around Averages about 25°C in tropics, somewhat less outside tropics.</td>
<td>Averages 7 cm per month. No other biome receives as much snow.</td>
<td>Averages in winter: 2°C; Average in summer: 24°C.</td>
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<tr>
<td></td>
<td>Tundra</td>
<td>Desert</td>
<td>Grassland</td>
<td>Rain Forest</td>
<td>Coniferous Forest</td>
<td>Deciduous Forest</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------------------------</td>
<td>--------------------------------------------</td>
<td>--------------------------------------------</td>
<td>------------------------------------------</td>
<td>------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td><strong>Solar Energy</strong></td>
<td>Receives little solar energy; days are very long in summer but very short in winter; two month growing season.</td>
<td>Receives much solar energy.</td>
<td>Grasslands in different parts of the world receive different amounts of solar energy.</td>
<td>Tropical rain forest receives large amounts of solar energy. Non-tropical rain forest receives less.</td>
<td>Winters shorter than in tundra. Each day receives some sunlight. Growing season lasts for 3 to 6 months.</td>
<td>Receives more solar energy than coniferous forest. Growing season is at least 5 months.</td>
</tr>
<tr>
<td><strong>Rainfall</strong></td>
<td>Averages 1 cm per month mostly in the form of snow.</td>
<td>Averages 1.3 cm per month over a year. Rain may all come in a few heavy rains.</td>
<td>Averages 5 cm per month. Growing season regulated by rainy season rather than temperature.</td>
<td>Averages 20 cm per month.</td>
<td>Averages 7 cm per month. No other biome receives as much snow.</td>
<td>Averages 9 cm per month.</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>Average in the winter: -24°C; Average in the summer: 1°C.</td>
<td>Average in winter: 10°C; Average in summer: 30°C.</td>
<td>Averages in winter: -2°C; Averages in summer: 20°C.</td>
<td>Nearly constant year around Averages about 25°C in tropics, somewhat less outside tropics.</td>
<td>Average in winter: -6°C; Average in summer: 12°C.</td>
<td>Average in winter: 2°C; Average in summer: 24°C.</td>
</tr>
</tbody>
</table>
**Symbiotic Relationships in the Biomes**

This is a library research or computer research project. It is designed for one hour including presentations.

1. Introduce the concept of symbiosis and have students copy down the notes onto the worksheet.
2. Cut out the strips with the organisms listed so that you have enough for each student in your class. Make sure you separate the strips down the middle. If you do not need all the slips make sure you maintain the pairs.
3. Put the strips into a paper bag and allow students to draw 1 slip each.
4. Call out the pairs and have the students line-up together, both with the worksheet.
5. The students must go to the library or computer lab and determine:
   1. The type of symbiotic relationship they share.
   2. Give a written explanation of the relationship.
6. This should not take longer than 1/2 hour.
7. Upon return to the classroom, have each pair stand up and present to their classmates stating:
   1. The organisms they researched.
   2. The type of symbiotic relationship they share.
   3. An explanation of the relationship.
Symbiotic Relationships in the Biomes

Symbiosis

A close relationship between 2 organisms in which one organism lives near, on, or even inside another organism and in which at least one organism benefits. The three sub-categories for symbiosis are mutualism, parasitism and commensalism.

Mutualism

Both organisms benefit from the relationship.

Parasitism

One organism benefits and the other organism is harmed by the relationship.

Commensalism

One organism benefits and the other organism is not harmed by the relationship.
<table>
<thead>
<tr>
<th>Capuchin Monkeys</th>
<th>Flowering Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cowbird</td>
<td>Buffalo</td>
</tr>
<tr>
<td>Bee</td>
<td>Marabou Stork</td>
</tr>
<tr>
<td>Microbe</td>
<td>Cactus</td>
</tr>
<tr>
<td>Aphid</td>
<td>Ant</td>
</tr>
<tr>
<td>Oxpecker</td>
<td>Zebra</td>
</tr>
<tr>
<td>Tick Bird</td>
<td>Rhinoceros</td>
</tr>
<tr>
<td>Lodge pole Pine Tree</td>
<td>Pine Beetle</td>
</tr>
<tr>
<td>Sea Gull</td>
<td>Brown Bear</td>
</tr>
<tr>
<td>Ostrich</td>
<td>Wart Hog</td>
</tr>
<tr>
<td>Mosquito</td>
<td>Polar Bear</td>
</tr>
<tr>
<td>Wood Tick</td>
<td>Domestic Dog</td>
</tr>
<tr>
<td>Cattle Egret</td>
<td>Cow [African Ankole]</td>
</tr>
<tr>
<td>Moth</td>
<td>Sloth</td>
</tr>
<tr>
<td>Honey guide Bird</td>
<td>Badger</td>
</tr>
</tbody>
</table>
Symbiotic Relationships in the Biomes

Name________________

Block_______

**Symbiosis**
___________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

**Mutualism**
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

**Parasitism**
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

**Commensalism**
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Organism 1_________________________ Organism 2_________________________

Type of Symbiotic Relationship___________________________________________________

Explanation of how the 2 organisms are related
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
## Symbiotic Relationships in the Biomes Key

Balance in the Biome Habitat – Oh Deer!

A Game for PE

1. Divide the class into four groups.
2. Label one group deer, and the other three groups the environment.
3. Elicit from students what the deer need to survive. Students should be able to determine the deer need water, food and shelter. Explain to students these are the three essentials of habitat.
4. The environment group represents water, food and shelter. Line the deer group up and have them face the environment group.

5. Teach the students that one blast of the whistle means to turn around so they are not facing each other.
6. Both the deer and the environment must choose one of the three essentials of habitat. They must demonstrate what they have chosen. If they have chosen water, their hands are cupped in front of them. If they have chosen food both hands are touching their mouth. If they have chosen shelter their
arms are stretch over their head and clasped together to form a teepee shape.

7. Two blasts of the whistle mean to turn around and face each other. Everyone must maintain their poses for their choice.

8. The deer run to the environment (maintaining their pose) and they must choose a part of the environment which matches their pose. [A deer that chose shelter must choose a part of the environment that chose shelter] They take the environment back with them to the deer line and they become a deer. If there is no part of the environment which matches the deer, the deer dies and becomes part of the environment.

9. Repeat until the habitat is out of balance.

Debriefing
Questions to pose could include:

What did you see? The herd quickly got out of control

What would happen to the deer if there was no more food?
The deer would die which would impact other species.

What would happen to the habitat if the deer all died?
The plants they eat could choke out the habitat, species that eat the deer would die

I have played this game for years and kids love it!

The habitat becomes unbalanced very quickly. It is so fun and it really is a great simulation of balance in the habitat.
1. Describe two ways in which one biome may differ from another.
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

2. How do some plants change the abiotic conditions for other plants in the biome?
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

3. How are some plants better able to survive in a certain biome than others?
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

4. If an area where climax plants were destroyed (by fire or flood for example) is left
undisturbed, what kinds of plants are likely to return to the region?
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

5. Within a biome it may be possible to find several areas of land on which different kinds
of climax plants are growing. How would you explain this observation?
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
6. What abiotic conditions are similar for places at the same latitude?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

7. If disease or over-hunting killed off the deer population in a certain area, how might that affect the other plants or animals in the area?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

**Vocabulary**

Use each of the following terms in a sentence to show that you understand its meaning.

1. **abiotic**
   __________________________________________________________
   __________________________________________________________

2. **succession**
   __________________________________________________________
   __________________________________________________________

3. **biome**
   __________________________________________________________
   __________________________________________________________

4. **climax plant**
   __________________________________________________________
   __________________________________________________________

5. **symbiotic**
   __________________________________________________________
   __________________________________________________________

6. **interdependence**
   __________________________________________________________
   __________________________________________________________
Biomes Review Key

1. Describe two ways in which one biome may differ from another.
   Any two of the following: amount of sunlight, length of growing season, amount of rainfall, average temperature, soil condition, type of climax plant
2. How do some plants change the abiotic conditions for other plants in the biome?
   Can alter the amount of sunlight; root systems can break up soil for other plants; over the years parts of plants may enrich and change the type of soil.
3. How are some plants better able to survive in a certain biome than others?
   The plants that have adapted to the abiotic conditions of that biome will survive.
4. If an area where climax plants were destroyed (by fire or flood for example) is left undisturbed, what kinds of plants are likely to return to the region?
   The same climax plants that were originally there would likely return.
5. Within a biome it may be possible to find several areas of land on which different kinds of climax plants are growing. How would you explain this observation?
   Abiotic conditions vary within the same biome. Moisture, soil conditions, wind exposure, elevation, etc., may all cause a change in the climax plants in an immediate area.
6. What abiotic conditions are similar for places at the same latitude?
   Day length, height of sun in sky, temperature
7. If disease or over-hunting killed off the deer population in a certain area, how might that affect the other plants or animals in the area?
   Animals that rely on the deer as a major food source would starve affecting other animals. Plants that the deer ate would grow and spread choking out others.

Vocabulary

Use each of the following terms in a sentence to show that you understand its meaning.

will vary

1. Abiotic – non-living things in an ecosystem
2. Succession – process by which community is a given place is replaced by another community
3. Biome – large geographical area that has the same type of plants and animals throughout
4. climax plant – dominant plant in the final stage of succession.
5. Symbiotic – relationship between two organisms where one organism benefits
6. Interdependence – ways in which certain organisms assist other organisms of different species.
Biomes Project
Biome Research Project

A biome is a large area with a particular climate and specific variety of plant and animal life. The climate is determined by patterns in temperature and rainfall. Most plants, no matter where they are, have roots, stems, leaves and flowers. These characteristics let them use the sun’s energy to grow, reproduce and affect their biome.

Project Criteria

1. **Title Page:** It must be a colored picture representing your biome.

2. **Introduction:** Include where the biome is found, one interesting fact and why you chose this biome. Describe the land where your biome is found. Are there mountains, plains or prairies, grasslands, swamps, lakes, valleys or anything else?

3. **World Map:** On the map provided, show where your biome is located and how large it is. Using a pencil and a ruler, label all the continents and large bodies of waters. Color the water blue and the land masses green. Include a legend, title and a compass rose.

4. **Plants:** Choose two different plants and describe them and explain their adaptations to the environment. Include a drawing of both plants.

5. **Animals:** Choose two different animals. Explain their adaptations to their environment. Include the food they eat, and other interesting facts. Include a drawing of each animal.

6. **Climate Graph:** Draw a climate graph showing average rainfall (bar graph in blue) and temperature (line graph in red).

7. **Climate:** Tell what the weather is like. Is there seasons? Is it hot, wet, dry, cold, etc.? Explain the climate.

8. **Conclusion**

9. **Bibliography:** You must present your information in this following way:

   Author’s last name, First name. Title of the Book. Page numbers used. Web Page Address (URL) and date you went to the site.
Plant 1
Plant 2
Animal 1
Climate Graph
Climate

Conclusion
# Biome Project Rubric

<table>
<thead>
<tr>
<th>Title Page and Sketches</th>
<th>Self-Evaluation</th>
<th>Teacher Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Title of Biome is attractively lettered.</td>
<td>4 3 2 1 0</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>• Hand drawn illustration and colored in pencil crayon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Sketches for plant and animal are complete and colored</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Content</th>
<th>Self-Evaluation</th>
<th>Teacher Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>All parts of the project are completed and compiled in the correct order.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title Page _____ Introduction _____ Map _____</td>
<td>4 3 2 1 0</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>Plant s _____ Animals _____ Climate Graph _____</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate _____ Conclusion _____ Bibliography _____</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Written Work</th>
<th>Self-Evaluation</th>
<th>Teacher Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Communicates information clearly and expresses ideas that are always well-connected</td>
<td>4 3 2 1 0</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>• Organizes and sequences work logically and neatly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Usually chooses the most appropriate and organized format for their assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Always cites sources accurately and appropriately</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Map and Climate Graph</th>
<th>Self-Evaluation</th>
<th>Teacher Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All continents and major water bodies labeled.</td>
<td>4 3 2 1 0</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>• Map is colored and biome is identified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Climate graph meets criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Both axis are labeled, graph is titled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Precipitation is blue bar graph and temperature is red line graph</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effort</th>
<th>Self-Evaluation</th>
<th>Teacher Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Writing/printing is legible</td>
<td>4 3 2 1 0</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>• Diagrams are carefully drawn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• On task during class time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Evidence that project was worked on outside of class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Project has extra detail</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**KEY:**

- **4** – criteria demonstrated at a strong level
- **3** – criteria demonstrated at a good level
- **2** – criteria demonstrated at a minimal level
- **1** – some evidence of criteria
- **0** – criteria not evident

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Bibliography

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