

An online exploration  
of the biotic  
communities of  
Arizona with an  
emphasis on  
Mathematics and  
Technology

# Exploring Biomes

## Lesson 1: Mapping Biomes

### LESSON OVERVIEW

In this lesson, students will look at satellite maps of the world, identify similarities among various regions, and attempt to divide the world into biomes based on these similarities.

### SUGGESTED GRADE LEVELS

- 6 – 10

### ENDURING UNDERSTANDINGS

- Climate is the primary characteristic used to divide the world into biomes.

### OBJECTIVES

Students will:

- Interpret and compare maps containing different kinds of data.
- Classify world regions based on similarities in climate.

### ARIZONA DEPARTMENT OF EDUCATION STANDARDS

Grade	Science	Mathematics	Technology
6	S1-C3-01; S4-C3-01	S1-C3-01	None
7	S1-C3-01	S1-C3-01; S4-C4-08	
8	S1-C3-01; S1-C3-05	S1-C3-01	
High School	S1-C4-04; S6-C2-15	S1-C3-01	None

*Note: The full text of these standards can be found in Appendix A.*

### TIME FRAME

- 1 day (45 minutes)

### MATERIALS

- Picture of polar bear
- *Mapping Biomes* worksheet (one per student)
- Markers, crayons, or colored pencils
- Rulers
- Calculators



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### TEACHER PREPARATION

- Make a copy of the *Mapping Biomes* worksheet for each student.
- Gather enough markers (or crayons or colored pencils), rulers, and calculators for students to use. They can share, if necessary.

### SUGGESTED PROCEDURES

1. Show the students the picture of a polar bear. What animal is this? Explain that you have lived in Arizona for a long time and have never seen one in the wild. Why not? Lead this into a discussion about how most plants and animals can live only in certain areas of the world.
2. Introduce the concept of a *biome* by explaining that scientists have divided the world into a number of large geographic regions called biomes. They classify the biomes according to the kinds of plants and animals that can live there. The factor that usually determines which plants and animals can live in an area is climate, hence the idea that polar bears in the wild live in cold regions.
3. Hand out the *Mapping Biomes* worksheet. The students will now have the opportunity to become scientists and map the biomes of the Earth based on climate. Explain that the worksheet shows maps developed with data collected by NASA.
4. Point out that although the data are collected continuously throughout the year, students have been given maps of January 2002 and July 2002. Why were these months selected? They represent typical winter and summer months.
5. Students use the maps to divide the world into five to eight biomes. To do this they must look for areas that have similar temperatures and rainfall. These areas should probably be classified in the same biome, even if they are in different parts of the world. It should be noted that the students have been given maps for vegetation and primary productivity. Although these are not temperature or rainfall, they are indicators of climatic conditions. If you prefer, you could have students use only the maps for temperature and precipitation.
6. When students have determined how they will divide the world, they must color the biomes on the map provided and answer the questions.
7. Collect the worksheet when students have finished.

### ASSESSMENT

- *Mapping Biomes* worksheet

### EXTENSIONS

- Students can use reference materials to help them find one animal and one plant that live in each of the biomes, and identify adaptations that allow them to survive.



## **Appendix A: Arizona Department of Education Standards – Full Text**

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### **Science Standards**

<b>Grade</b>	<b>Strand</b>	<b>Concept</b>	<b>Performance Objective</b>
6	1	3 – Analysis and Conclusions	1 – Analyze data obtained in a scientific investigation to identify trends
	4	3 – Populations or Organisms in an Ecosystem	1 – Explain that sunlight is the major source of energy for most ecosystems
7	1	3 – Analysis and Conclusions	1 – Analyze data obtained in a scientific investigation to identify trends
8	1	3 – Analysis and Conclusions	1 – Analyze data obtained in a scientific investigation to identify trends 5 – Explain how evidence supports the validity and reliability of a conclusion
High School	1	4 – Communication	4 – Support conclusions with logical scientific arguments
	6	2 – Earth’s Processes and Systems	15 – List the factors that determine climate (e.g., altitude, latitude, water bodies, precipitation, prevailing winds, topography).

### **Mathematics Standards**

<b>Grade</b>	<b>Strand</b>	<b>Concept</b>	<b>Performance Objective</b>
6	1	3 – Estimation	1 – Solve grade-level appropriate problems using estimation
7	1	3 – Estimation	1 – Solve grade-level appropriate problems using estimation
	4	4 – Measurement – Units of Measure – Geometric Objects	8 – Compare estimated to actual lengths based on scale drawings or maps
8	1	3 – Estimation	1 – Solve grade-level appropriate problems using estimation
High School	1	3 – Estimation	1 – Solve grade-level appropriate problems using estimation



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## ***Appendix B: Worksheets and Overheads***

The pages that follow contain the worksheets listed below:

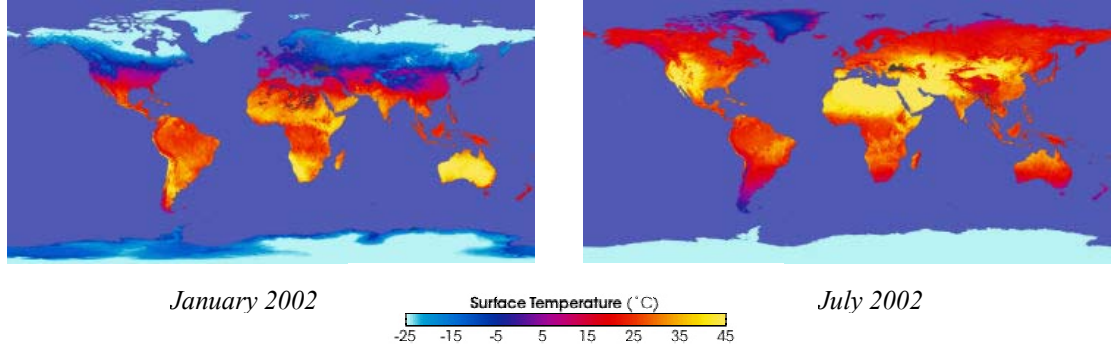
- A. *Polar Bear Picture* – A photo used to get students thinking about adaptation to environments (1 page)
- B. *Mapping Biomes* worksheet – A tool to help students learn how scientists divide the world into biomes (2 pages)



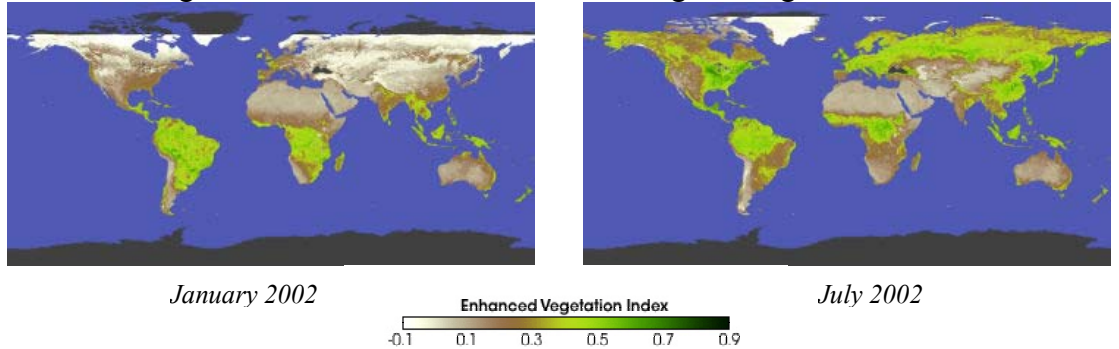
# Mapping Biomes

Use the NASA maps below to help you complete this worksheet.

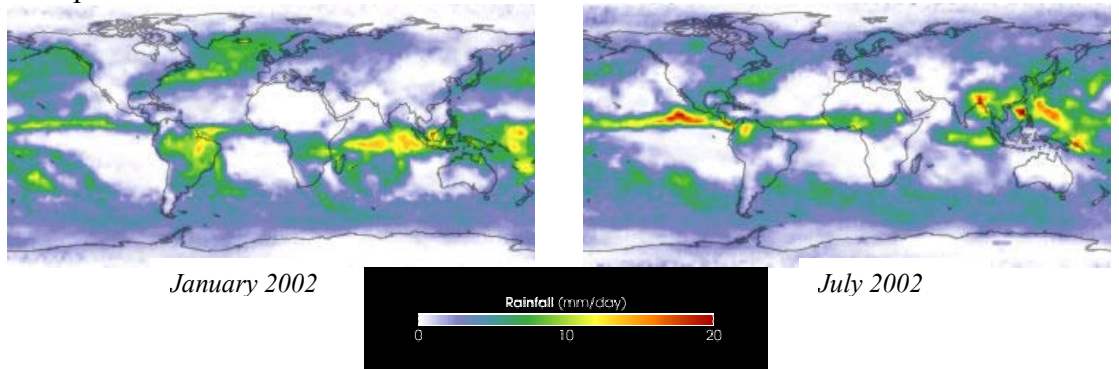
Day Land Temperature – a measure of the temperature of the surface of the Earth



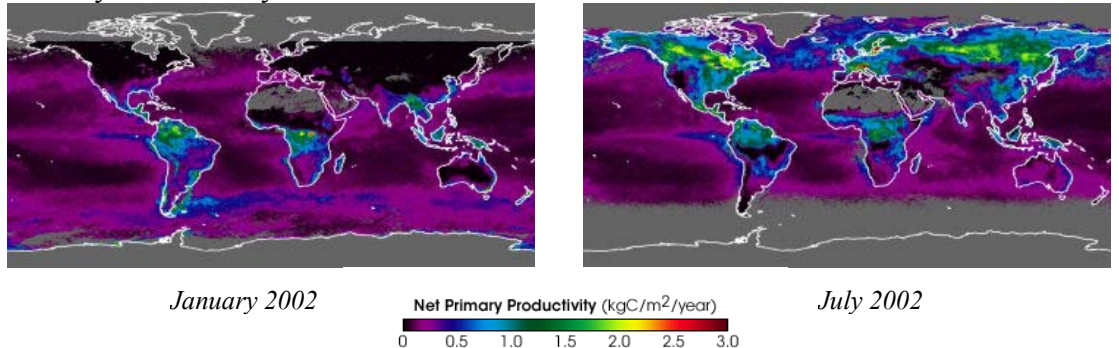
Enhanced Vegetation – a measure of the amount of green vegetation in an area



Precipitation – the estimated amount of rainfall



Primary Productivity – a ratio of the amount of carbon dioxide used and released



## Exploring Biomes

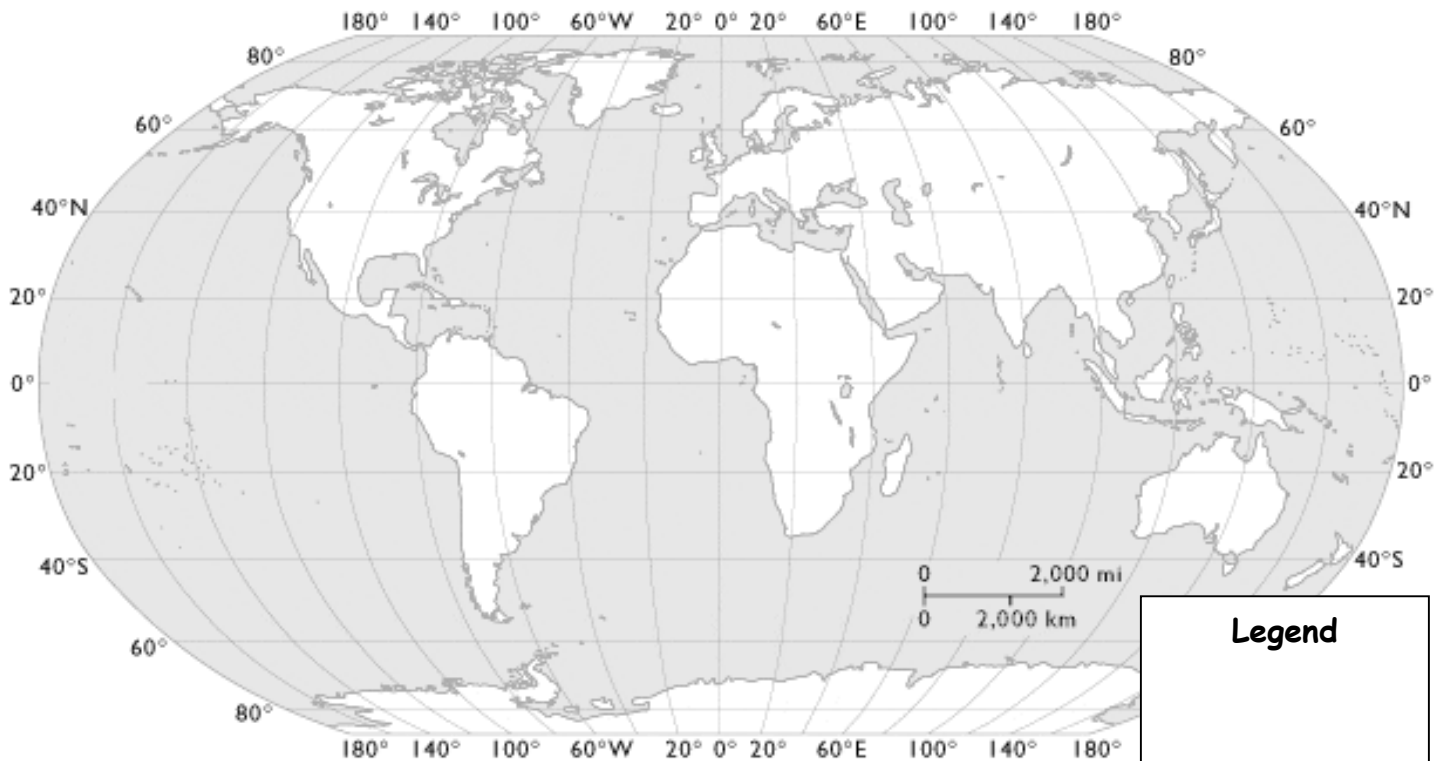
Scientists define a biome as a large community of plants and animals. Biomes are primarily determined by similarities in climate.

The maps on the previous page are provided by <http://earthobservatory.nasa.gov>. They were developed using data collected by satellites and by Earth-based collection devices.

Use the maps to decide where the Earth's biomes are located. Look for areas with similar climate features. Divide the Earth into five to eight distinct biomes based on their similarities in climate. For the purposes of this activity, consider only land. Do not include the oceans!

Color the biomes on the map below, give the biomes a name, and make a legend.

### THE WORLD



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Legend

Answer the following questions based on your map above.

1. Which biome is the largest? Approximately how many square miles is it?
2. Which biome is the smallest? Approximately how many square miles is it?
3. Explain briefly how you divided the biomes.

