



BIOOME

Is Where the ART Is

Fifth-grade students demonstrate their knowledge of Earth's biomes with torn paper art.

By Kelly Gooden

I'm surprised every year when fifth-grade students react to the study of biomes as if they've never given any thought to the differences across parts of the world. Sure, they've all heard of the tropical rain forest and the desert, but it seems as though they think the rest of the world is just some undefined area with climate, animals, and plants similar to what they'd see if they looked outside their own back doors.

I've taught in both grassland and temperate forest areas of the United States, and so far, no student has been able to identify the biome in which their home was located before participating in this unit.

Biomes are a perfect topic for integration—calling upon students to demonstrate knowledge and skills in life science, Earth science, and even geography. I've also added an artistic component with an assessment activity called “Torn Paper Biomes” in which students depict a biome using only paper and glue.

Torn paper art provides an integrated performance task that is an authentic assessment of students' knowledge of biomes. The science assessment is obvious: Do students know the characteristics of their biome or don't they? The art component allows students to show what they know without having to write. Students who struggle with communication due to limited English proficiency or below-level literacy skills can show that the taiga is cool and receives moderate precipitation, has coniferous (evergreen) trees, shrubs, moose, grizzly bears, caribou, and owls—without being tested on their reading and/or writing skills.

As you can see by the colorful images throughout this article, students really take to the project and produce terrific results. Best of all, this successful activity now has me—and my students—looking forward to assessment!

Climate Comparison

The unit on biomes begins with a review of climate (the unit that usually precedes biomes in our school's curriculum sequence). I remind students that *climate* is the measure of weather over a long period of time. They are challenged to think of words that describe climate (such as *hot, dry, cool*, etc.). Finally, I ask them to describe the climate in which we live.

I teach in central Florida, and students generally describe the climate as ranging from cool to hot and experiencing a fair amount of rain. We then talk about other places students have visited. I tell them I used to live in Maryland where there is sometimes snow in the winter, and ask, "Is that similar to or different from Florida?" Students typically comment that while we don't get snow in Florida, snow is another form of precipitation. After learning that there isn't a lot of snow in Maryland, they usually conclude that while the temperature must be colder there, the two places probably get similar amounts of precipitation. In this way, students use their comparison skills to put things (in this case, places) into groups according to

similar characteristics, showing me they are ready to move to the next step in the study, biomes.

What Makes a Biome

Biomes are large regions of land and water characterized by similarities in climate and indigenous organisms. While there is some disagreement among experts about exactly how many biomes there are, the generally accepted list includes *tundra, taiga, temperate forest, grassland, tropical rain forest, desert, saltwater, freshwater, and estuaries/brackish water*.

To facilitate this lesson, I use the Windows on Science "Know Your Niche" unit, a laserdisc that includes photographs and short movies of each biome and the plants and animals that live there (see Internet Resources). I show students a scene from each biome and lead a discussion about the animals and plants they see. Together, we record our observations in an overhead chart (Figure 1). Also, I display a large, laminated world map in my classroom and students, using dry erase markers, label the different biomes.

Deeper Into Biomes

Next, I give each student two blank maps of North America, a climate zone table, and a biomes table (Figures 2 and 3, page 30). I instruct them to color in the climate and biome areas as shown on each table. I ask students to compare areas on the climate zone map to

Figure 1.

Biome chart.

Biome	Examples of plants	Examples of animals	Climate
Tundra	small seasonal plants	caribou, musk ox, grizzly bear	cold and wet
Taiga	evergreen trees	lynx, moose, warblers	cool, moderate precipitation
Temperate Forest	oaks, maples, hickories, mosses, lichens, ferns	rabbits, skunks, deer, chipmunks	moderate precipitation; four seasons
Grassland	tall grass	rabbits, prairie dogs, gophers, bison	warm summers/cold winters; dry
Tropical Rain Forest	three layers of trees; vines, orchids	most diverse; toucan, tree frog, panther, cock of the rock	hot and wet
Desert	cactus, mesquite, creosote	jackrabbit, roadrunner, coyote, lizards	hot days/ cool nights; very dry
Saltwater	seaweed	starfish, cod, zooplankton	saltwater; constant motion; sunlight at surface
Freshwater	duckweed; cattails; grasses	water striders, turtles, bluegills, toads	freshwater; some rapid movement
Estuaries	mangroves, tall grasses	nursery for a lot of water animals; oysters, shrimp	mix of salt and fresh water

areas shown in the same color on the biome map. For example, in the green areas of the climate zone map, there are warm, wet climates, and in the green areas of the biome map there are tropical rain forests.

Next, students read the chapter on biomes in their textbook. Students are a lot more successful in reading and understanding the chapter after they've had time to hear about, see, and discuss biomes beforehand. The textbook also shows other scenes from different biomes. Students see, for example, that the grassland biome as it exists in the midwestern United States has different animals living in it than does the grassland biome or *savannah* of central Africa. In addition, the proximity of Africa from the equator (as compared to North America) makes the temperature range warmer overall. But, while you won't see giraffes or elephants crossing the plains of Kansas or



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get too much snow in Kenya, you will see lots of tall grasses growing in both places.

Students complete other tasks during the unit as well, such as using a microslide viewer to observe organisms from a pond and an ocean community and observing terrariums and aquariums. The final assignment is for students, working in groups, to research each biome using their textbook, trade books, and online resources and become "experts" on their assigned biome (see Resources). Each group then presents their information to their classmates so that everyone has extensive information on each biome.

Assigning Art

As an assessment and to conclude the study, students create a picture of an assigned biome (picked from a hat) using *only* torn paper and glue. You will have to repeat that a number of times. Students will ask things like, "Can we use scissors?" ["No, only torn paper and glue."] "Can we use our pencil to draw something and then tear it out?" ["No, only torn paper and glue."] Familiarize students with the rubric (Figure 4) before distributing the materials.

Figure 2.

North American climate zones.

Area	Climate	Color
1	More than 250 cm rain; warm all year	Green
2	75–250 cm rain or snow; warm summer, cold winter	Purple
3	20–60 cm rain or snow; cool summer, cold winter	Blue
4	10–40 cm rain or snow; warm summer, cold winter	Orange
5	Less than 10 cm rain; hot summer, cool winter	Yellow
6	250 cm snow (25 cm rain); cold all year	Brown

Figure 3.

North American biomes.

Area	Biome	Color
A	Tropical Rain Forest	Green
B	Deciduous (Temperate) Forest	Purple
C	Taiga	Blue
D	Grassland	Orange
E	Desert	Yellow
F	Tundra	Brown

To download maps corresponding to Figures 2 and 3, click on this article at www.nsta.org/elementaryschool#journal.

Figure 4.

Torn paper biomes rubric.

Criteria:

- The picture must be made using only torn paper and glue.
- Evidence of the biome's average temperature must be displayed.
- Evidence of the biome's average precipitation must be displayed.
- At least two examples of plants living in the biome must be shown.
- At least four examples of animals living in the biome must be shown.
- The picture must be completed and ready for submission by the due date.

Rubric:

- If all six criteria have been met or exceeded, the student will earn an A.
- If five out of six criteria have been met, the student will earn a B.
- If four out of six criteria have been met, the student will earn a C.
- If fewer than four criteria have been met, the student will earn a D.
- If no attempt has been made or if no criterion was met in an attempt, the student will earn an F.

Provide students with construction paper and glue as well as a sheet of white tag board (a heavyweight paper available from office/teacher/art supply stores for anywhere from 5 to 10 dollars for 100 sheets). Students should write their name and the name of the biome they've selected on the back of the tag board so that it won't be visible to the person looking at their completed art work. You want the art itself to be able to "tell" what biome it is.

I've had students work in pairs and in groups, but the best results were when they worked individually. Questions tend to emerge as the students work. "How can you SHOW evidence of high temperatures?" As if on cue, another student will inevitably call out, "If it's hot, the Sun is out. If it's really hot, there should be a really big Sun." [Question asked and answered without teacher guidance.] "What if my animal doesn't look like what I want it to?" [Remind students that this is not art class. They will be judged only on the criteria given.] And always from the students who draw the tundra cards: "How do we do this? Everything would be white." Well, not everything...eventually, they answer their own question as well.

Connecting to the Standards

This article addresses the following *National Science Education Standards* (NRC 1996):

Content Standards

Grades 5–8

Standard C: Life Science

- Populations and ecosystems
- Diversity and adaptations of organisms

Assessment Standards

Standard D: Assessment practices must be fair

- Assessment tasks must be appropriately modified to accommodate the needs of students with physical disabilities, learning disabilities, or limited English proficiency.

During the most recent torn paper assessment, I had a student who, despite a clear interest in science, had not passed a text-created test all year, nor had he been able to complete any assignments that involved independent text reading and comprehension. But his picture was a successful and obvious indication that he fully understood the climate and organisms of the saltwater biome. In fact, the only thing "wrong" with his paper was that he had spelled saltwater incorrectly when he wrote it on the back of the paper. He even included darker shades of blue to indicate the layers of the ocean created by the decreasing amount of sunlight in the inter-tidal, near-shore, and open-ocean zones. His success on the torn paper biome also carried over into an enthusiastic expertise about the ocean during a unit we did later in the year.

Science Through Art

When students are finished, they present their artwork to the class. Each student holds up his or her piece while the other students attempt to provide evidence that the picture shown represents one biome or another: "I see a cactus, a rattlesnake, and a bright Sun. I think it's the desert." The presentations provide another informal assessment of students' knowledge of the biomes.

Students also use this opportunity to evaluate each other's work in terms of the rubric: "I only see three different animals." Sometimes the students are correct. Other times the artist will identify something that we thought was a bush as an animal that is indeed native to the biome. Not only do I get to informally evaluate students' knowledge, if I take notes during the presentations, I also have eliminated the need to take time from my schedule to grade the papers—the students have done the work



Torn paper art provides an integrated performance task—and creates colorful classroom art, too.

for me. And despite the initial apprehension, the students thoroughly enjoy the process and seeing the final products on display in the room.

The torn paper art concept can also be used for other topics of study. Instead of having students draw plant and animal cells, for example, they can use torn paper art to demonstrate the differences in the two cell types. Students might use more rigid, straightedge tears to represent the cell wall in a plant cell or use no green (indicative of the lack of cytoplasm) in the animal cell. These artistic choices will demonstrate that students understand the difference between the two cell types.

I have never thought we do enough art in the schools, though most students seem to enjoy it when we do. Nor, have I known too many students who are thrilled by “assessments.” With this activity, however, you can get the best of both worlds! ■

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