

Cedar Glade Zone Model

OVERVIEW: Students will gain an understanding of the value of specialized areas within major biomes. Our example is the cedar glades of Tennessee's Central Basin within the temperate deciduous forest biome.

GRADE LEVEL: 6 – 8

TIME: At least one class period the demonstration and graphing lesson may extend into another class meeting.

SETTING: Classroom

OBJECTIVES: Student will gain knowledge of the zones of soil within a glade as an abiotic factor and how it may relate to the special characteristics of the glade.

LEARNING STANDARDS CORRELATED: Science GLE 0607.2.3

QUESTION: What abiotic factors contribute in creating cedar glades as a “mini-ecosystem?”

MATERIALS:

Map of cedar glade locations in Wilson and Rutherford Counties

Whiteboard and markers or blackboard and chalk

Colored pencils

Graph paper (1 cm grid)

Graph transparency (1 cm grid)

Wide-mouthed funnel

12 2L soda bottles, empty and clean with labels removed

- Cut the top off 6 of the bottles, at a point where the sides of the bottle become straight
- Cut the top and bottom off the remaining 6 bottles, leaving a cylinder
- Fit the cylinder into the other bottles, resulting in 6 “tall” bottles

Old pitcher to hold soil & pour

Sand or soil

Yard stick

Six index cards with zone # (numbers 1 thru 6)

3x5 Index cards

Access to the internet or resources on plants and animals in the Cedar Glade

Optional Materials: Small limestone slab (size needs to be manageable if passed around class); photos of glade and selected species of each zone, redcedar twig or stick; visual of cedar glade with zones and soil depths indicated

TEACHER PREPARATION:

- Practice demonstration before showing class.
- Handout preparation for student; either laminate a map of cedar glade as a visual or prepare paper copies to pass around.
- Students should already be familiar with biomes, including those with zones (ocean & freshwater-pond).
- Students should already know how to create a bar graph and use graph paper

BACKGROUND: Many of our major biomes contain specialty areas and the temperate deciduous forest is no exception. Tennessee has many such areas including forests characteristic of the northeast, caves, grasslands, and our focus, the cedar glades.

INTRODUCTION: First engage students in a review of what a biome is and characteristics of our biome, the temperate deciduous forest. List together the characteristics of our forest area. Include the abiotic factors.

Pose these questions: What is a cedar tree? What type of tree is it (evergreen)? Why do we have redcedars? Are redcedars deciduous trees? (no) Do you know of areas with cedar trees? Do you know of rocky open areas with cedar trees scattered around?

Remind students now that the term “deciduous forest” is a blanket term for a large area. Like other biomes, we have areas that do not fit the “deciduous forest biome” mold.

One of these areas we are about to encounter is the cedar glade. Before we begin, encourage the students to pay attention since they may live in an area almost like a glade or know where one might be located.

Pass around the sample of cedar (and any other available items suggested). Why the name “cedar glade” for these areas? (wait for responses) Let students know eventually that a glade usually means few or no trees. The word cedar implies what? (cedar trees)

Emphasize that although we call these “cedar glades”, a true cedar glade is mostly an open area with exposed rock and contains different zones of soil depth. Occasionally, a few cedar trees may be scattered where cracks occur in the rock allowing roots to reach deep soil but overall, they are located on the edges of the glade. What abiotic factors might be in a cedar glade? (Let students suggest some) Which might be of more importance than others? (should include rainfall, temperatures, soil depth) Why? Let’s look at one - soil depth.

Procedure:

1. Divide the class into 6 groups. Give each group one of the “tall” bottles prepared for class.
2. Assign each group to be responsible for one of the 6 zones of the glades. Give them the label card for that zone.
3. Using resource material available to the class, each group will determine the soil depth for their assigned zone and fill their bottle to that depth with soil (or sand).
4. Using the internet or other resource material available in the classroom, each student should research 2 organisms that live in their zone of the cedar glade: one plant and one animal.
5. For each organism, the students should include the following on a 3x5 index card:
 - The name of the organism (both scientific and common)
 - A color drawing
 - 5 interesting facts about the organism
6. When all groups are finished, invite each group to come to the front of the room to present their zone model (the bottle with soil) and a sample of the organisms found there.
7. As each group presents, place their model next to that of the previous group, creating a large model of glade zones formed from all 6 bottles in a row.
8. Have the students draw the models, with an indication of soil depths. You can use either graph paper, or draw it directly into the students’ science notebooks.

Cedar Glade Zones:

Zone 1	no soil; exposed rock
Zone 2	0-2” of soil; gravelly glades
Zone 3	2-8” of soil; grassy glades
Zone 4	8-12” of soil; xeric limestone prairie
Zone 5	more than 12” of soil; cedar woods
Zone 6	more than 12” of soil; oak and hickory woods

Extension:

- Compare cedar glades to another biome, such as the boreal forest. Pose the question what climatic or soil conditions might restrict the variety of plant life in other biomes? Remind them of the boreal forest and its characteristic plant being the coniferous trees in high numbers. In a cedar glade, the conditions may be considered even more extreme or harsh (i.e. high temperatures, low amounts of available precipitation), thus competition between species is less common.
- Research the needs of redcedar trees (*Juniperus virginianus*) and focus on the basic soil needed and limestone preference for their success in the Central Basin.
- Research the types of rocky soils in the area.