

LIZARDS AND TEMPERATURE CONTROL

DASHING FROM SUN TO SHADE

ACTIVITY:

Students keep their thermometer "lizards" alive by maintaining a five-degree temperature range as the lizards search for food.

LOCATION:

CESC staff will inform you of the location of this activity.

EQUIPMENT AVAILABLE:

Six thermometer "lizards"
Six sets of wooden insects. (Six insects per set.)

EQUIPMENT BROUGHT FROM SCHOOL:

The leader of this activity needs a watch.
Scratch paper and pencil



WEATHER:

NOTE: THIS ACTIVITY MUST BE CONDUCTED ON A VERY WARM, SUNNY DAY.

Winter is usually not conducive to this lesson.
It is always a good idea to have an alternative plan in case the weather does not cooperate.

ASSIGNMENT FOR GROUP LEADERS A FEW WEEKS PRIOR TO TRIP:

Leader reads all the material about the center.

BACKGROUND INFORMATION:

All animals must maintain body temperatures within certain temperature ranges to stay active and survive. Animals can be divided into two general groups according to the way they maintain their body temperatures.

Warm-blooded animals, called **endotherms** (meaning "inside heat") produce heat within their bodies, which allows them to maintain a fairly constant body temperature, regardless of outside temperatures. Mammals (including humans) and birds are endotherms.

All other animals (reptiles, amphibians, fish, insects, etc.) obtain most of their heat from the environment. These are **ectotherms** ("outside heat"). Many ectotherms regulate their body temperatures by moving into warmer or cooler spots in their environment. Lizards and snakes, for example, alternate between basking in the sun and resting in the shade to keep their body temperatures within the range that permits them to stay active. Ectotherms can also regulate their body temperature by burrowing and by varying the angle of their exposure to the sun.

PREPARING STUDENTS:

Students should practice reading a thermometer at school. The thermometers used in this activity show both the Celsius and Fahrenheit scales. You may use either, but this is an opportunity for students to become familiar with the Celsius measurement because it is used in scientific work.

DIRECTIONS FOR GROUP LEADERS ON TRIP DAY:

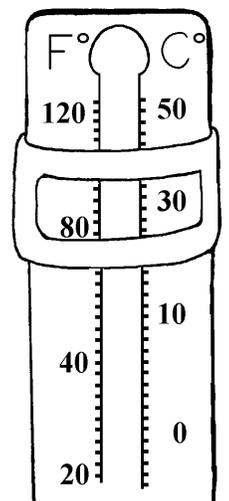
Check the contents of the "LIZARD TEMPERATURES" activity box. Take it to the activity site. At the site, determine the area in which the activity is to take place. If the wash is being used, two lines may be drawn in the soil about 50 feet apart. The students must then stay within that boundary, but may place insects on the sides of the wash, but they must not climb on the sides of the wash. Similar lines may be drawn on a trail, but students must use the shade of plants along the trail and not go off into the desert.

THE LESSON:

1. Arrange the students in teams of two and give each team a thermometer lizard. Give instructions on reading the thermometer.
2. Ask each team to find the highest and lowest temperatures in the activity site.
3. After about five minutes, call the group together. Add the highest temperature to the lowest and divide by two for an average.
4. Instruct the teams to slide the "windows" on their thermometers so that the center of the window is located at the average temperature. This gives a "window" of 5 degrees.

This is how the "window" would look if the average temperature was 30 degrees C.

5. Review the following information with the group:
Humans, other mammals, and birds produce heat inside their bodies and have a steady temperature regardless of outside temperatures. If our body temperatures go up or down, even a few degrees from normal, we can become very ill or die. All other animals, including reptiles, amphibians, fish, insects, etc. get most of their body heat from their surroundings. Today we are going to think about lizards, which are reptiles. On hot days, or while in



the sun, a lizard's body temperature goes up. On cool days, or while in the shade, the lizard's body temperature goes down.

6. Give a set of insects to each team. The color of the set should match the color of the lizard.
7. Explain the activity:
 - a. Each team will place its lizard's food (the insects) in various places within the activity area—in the sun, in the shade, in partial shade.
 - b. The teams have about 15 minutes (or calculate the time remaining and subtract 5 minutes for final discussion) to move their lizards around as they look for their insects. The lizard can eat only one insect every two minutes. Each team watches the thermometer window at all times to be sure the lizard does not get too hot or cold. The top of the red mark should always be visible in the window.
 - c. If the temperature is going too low, the lizard must warm up in the sun. If it is going too high, the lizard must cool down in the shade. Perhaps a partially shady area will be just right as the lizard digests its insect and waits for the next one. The students **MAY NOT** use their own bodies as shade for the lizards.
 - d. When the leader calls out "Insect" the teams move their lizards along the ground to the first insect. The insect is gathered up and the each team decides where the lizard will rest as it digests its food. The lizard may move during this time if the temperature is going too high or too low.
 - e. After two minutes the leader calls out "Insect" again, and the process is repeated.
 - f. After all insects have been "eaten", the students will gather together with the leader and discuss their lizards' search for food.
8. Allow the teams a few minutes to place their insects around the area and begin the game.
9. Discussion questions at the end of the activity might be:

Were you able to keep your lizard within the safe range?
Did any lizard heat or cool too much? If so, what might have happened to your lizard?
Did your lizard have to do a lot of scurrying around to survive?

CLEANUP:

After the last group, COLLECT ALL THE INSECTS from each team. There should be 1 lizard and 6 insects of each color. Replace all materials in the box and set it on the table in Biznaga cabin.