ECTO–EXPERIMENT

Like you, ectotherms die if their body temperature gets too warm or too cold. So ectotherms have several strategies to keep their body temperature within survival range.

You can try it for yourself! Conduct the following experiment.

Equipment and materials needed:

- ✔ **Outdoor thermometer**
- ✔ **One sheet of black paper**
- ✔ **One sheet of white paper**
- ✔ **A bowl, pot or tub of water**

1. Assemble the materials and on a sunny day go outside.

2. The ideal spot for this experiment has a mix of sun and shade.

3. Your job is to keep the body of your thermometer "creature" between 60 and 75 degrees. By moving your thermometer to different locations outside, you should try to keep the temperature in this range. ***Be creative!*** Use the water and paper to help. On a notepad keep track of the temperature and the location of your thermometer. Record the temperature every five minutes, for about a half-hour.

4. Answer the following questions:

A. How long did it take to reach 60 degrees at first? How did you do it?

B. What did you do when the temperature rose too high?

C. What did you do when the temperature dropped too low?

D. Did the temperature ever go below 60 degrees or above 75 degrees? What would happen to animals in the wild that could not stay within their temperature range?

E. How did you use the white paper, black paper and water to help the temperature stay within the range?

F. Describe some ways that you've seen amphibians and reptiles trying to regulate their body temperature.

Adapted from "Hot 'n' Cool Herps," Ranger Rick's NatureScope: Let's Hear it for Herps! Washington, D.C.: National Wildlife Federation, 1987. Adapted for the Pennsylvania Amphibians and Reptiles Curriculum Guide, PA Fish & Boat Commission, with permission of the McGraw-Hill Companies.

Ectotherms and Endotherms

What does your body do to keep you warm on a cold day? How does a dog stay cool on a hot summer day? What does a chickadee do to stay warm on a cold winter day? How does a snake shake off the cold of a spring night?

Your body generates heat when it uses up fuel like fat and carbohydrates. When you get cold, you shiver, and your body "burns up" more fuel. Dogs pant to help stay cool on hot days (you sweat). Birds fluff their feathers to help create more insulation around their bodies to stay warm (you get "goose bumps"). The bodies of people, dogs, other mammals and birds generate their own heat and maintain the body at a specific temperature. That temperature stays very constant and changes only a little when stressed (for instance, you get a fever of 100 degrees—2 degrees warmer than "normal" body temperature). These animals are called *endotherms*. "Endo" means "inner." "Therm" refers to temperature.

Reptiles are ectotherms. "Ecto" means "outer." Their body temperature isn't so steady—it changes with the temperature of the environment. Many people think that the body temperature of an ectotherm is the same as its environment. That's why some call these animals "cold-blooded." Even though the body temperature of an ectotherm is regulated mostly by its environment, internal heat is produced by body functions.

Hold this section up to a mirror to read the answers!

Answers: D. When an animal's body temperature rises too high or goes too low, body processes will stop and the animal will die. E. Water can be used to help cool the thermometer. White paper may be used to reflect the sun's rays and protect the thermometer from becoming too hot. Black paper can be laid over the thermometer to help raise the temperature. Black absorbs all light rays, including infrared or "heat" waves. F. Turtles bask on downed trees, rocks and shorelines. They can also burrow into mud or dead leaves. Snakes find shelter in rock dens where it is shaded and cool. They can also move onto exposed rocks warmed by the sun.