

## Hibernation Workshop

**Question 1:** You are probably familiar with Groundhog Day and that in the Spring groundhogs wake up from their Winter sleep called hibernation. Groundhogs are one of the classic examples used to discuss the topic of hibernation. But what is the actual definition of the term: hibernation. Use your resources and provide a “textbook” definition below.

The period of time in which an animal spends in a dormant state during the winter season.

**Question 2:** What are some of the animals/animal types that hibernate?

Bears, Reptiles, Amphibians, Bats, Groundhogs, Chipmunks, Skunks, Bees, etc.

**Question 3:** Why do Reptiles and Amphibians need to hibernate?

They are ectothermic animals, which means they have no internal control over their body temperatures. Instead, they must depend on the sun and warm air temperatures to power their physical activity and metabolism. In winter, they are not able to actively move around and therefore, they enter into a winter sleep and hibernate.

When snakes hibernate, the location that it sleeps in has a special name. What is the name of this location and does the snake sleep alone in this location?

Hibernaculum. While snakes may hibernate alone, they are more likely to hibernate in large groups that can reach numbers up to several thousand individuals of the same or different species.

**Question 4:** Most frogs survive winters by hibernating under water, in ponds, lakes, and streams. They become cold and dormant. Since water maintain constant temperature zone under the ice, their frog’s body temperature never falls below freezing point. However, the Wood Frog are known for hibernating on land in a different fashion. How do they hibernate and what protects them during this period?

Wood frogs belong to a small group of animals that can allow up to 65% of their bodies to freeze without dying. As the temperature drops below freezing, the wood frog buries itself and produces a chemical in its body that acts like an antifreeze and protects its core body during hibernation. Its breathing and heartbeat can stop.

**Question 5:** Most people know that bears sleep through the winter. But, are bears truly hibernating? What is their sleep called and how does it differ from true hibernation?

Torpor: is a state of decreased activity in an animal, usually caused by a reduced body temperature and metabolic rate. This enables the animal to survive periods of reduced food availability, but permit the animal to wake up quickly and easily. Note: There is a population of black bears that do not sleep through winter and remain active in New Jersey.

What are some other animals go into this torpor state?

Skunks, Chipmunks, Squirrels, Raccoons, Rodents, Bats.

**Question 6:** Many individuals are aware that several bat species hibernate. However, there is a disease that is affecting many bat species and hinders their hibernation. What is this disease called and what does it do to hibernating bats?

White-nose syndrome is a disease that is affecting hibernating bats. It has spread from the northeastern to the central United States at an alarming rate. Since the winter of 2007-2008, millions of bats in at least 33 states and 7 Canadian provinces have died. The disease is named for the white fungus that infects skin of the muzzle, ears, and wings of hibernating bats and causes them to awaken prematurely from their sleep. If no food source is present, they will starve since they are not able to reenter into a hibernated state.

**Question 7:** If you have completed the Insect Workshop, you should be able to guess where this question is going. Insects go through a period of suspend development that is triggered by unfavorable environmental conditions. While performing the same function as hibernation, it has a different name. What is this process called?

**Diapause**

Many kinds of insects experience this process. It can occur in different life stages depending on the insect. Use your resources to find and list some insects that use this process and what stage of life cycle they are in when they do.

Depends on what they find. Examples: Ladybugs as adults. Butterflies as cocoons.

**Question 8:** How do animals that hibernate deep underground and away from outside stimuli know when to wake up?

Animals that conduct torpor wake up periodically and become fully active when the food stores or their fat reserves are gone. True hibernators have an internal clock, a series of chemical reactions controlled by the hypothalamus of the animal's brain. Not all hibernators wake at the same time. The length of hibernation varies by species and habitat.

**Question 9:** Like most activities, there is an opposite strategy to hibernation called "Estivation." Give below a "textbook" definition of this behavior.

A prolonged torpor or dormancy of an animal during a hot or dry period.

What region of the world is this behavior most likely going to be observed in?

Desert regions and other hot tropical areas between the Tropics of Cancer and Capricorn.

What are some species that perform estivation?

Animals that estivate include snails, crocodiles, hedgehogs, tortoises, birds and lungfish. The fat-tailed lemur was the first mammal discovered who estivates.

**Question 10:** As mentioned back in Question 1, Groundhog Day is tied to hibernation. What is the origin of the day?

February 2<sup>nd</sup> is the spring equinox, the midpoint between the winter and spring solstice. The Celts celebrated the day as the beginning of spring. Christianity converted the day into Candlemas and a "sunny" Candlemas meant 40 days of cold and snow. German culture developed their own legend around it by pronouncing the day sunny only if badgers and other small animals saw their shadows. It was German immigrants that settled Pennsylvania in the 18th and 19th centuries. The first official

Groundhog Day celebration took place on February 2<sup>nd</sup>, 1887, in Punxsutawney, Pennsylvania and was the creation of local newspaper editor Clymer Freas, who convinced local businessmen to support the event.

**Question 11:** If a species does not hibernate to meet the challenges of the Winter season, there are two other strategies that it can apply. What are they and explain them?

Migration is seasonal movement of animals from one region to another to take advantage of resources along their route and at their destination site.

Winter Adaptation: The species changes physically (such as a growing a winter coat or changing color) to deal with the challenges of the winter, uses a behavior feature to survive (such as creating a food reserve to eat from, or a combination of both).