Duke Gardens *Winter Fun at Home*

STAYING WARM IN WINTER

How do you stay warm in winter? Do you stay inside and snuggle under a blanket, suit up with a hat and mittens before you head outside, or warm up with a hot drink like tea or cocoa? Learn how a few different animals live during winter, then create, experiment and play to make your own discoveries about the winter season!

HIBERNATION

Some animals, including chipmunks, hedgehogs and some bats **hibernate** over the winter. They prepare during the summer and fall by eating as much food as possible to store as body fat. As day length shortens, they find shelter and become dormant, or inactive, for days, weeks or sometimes, even months at a time. A **hibernating** animal saves energy by slowing down their body systems. Their body temperature drops, they become motionless, and their heartbeat and breathing slow down so that they use very little energy.

Photo by Gilles Gonthier

Photo by US Fish & Wildlife Service/Froschauer

EXPERIMENT

While you are sitting or standing still, put your hand over your heart and feel for your heartbeat. Can you feel it? If you can, how does it feel? Is it beating quickly or slowly?

What do you think might happen after you do some movement? Try doing 10 jumping jacks or another kind of active movement and then feel for your heartbeat again. Does it feel different? Is it similar or different than what you thought might happen?

Movement increases your heart rate. You can't slow your heart beat down like a hibernating animal, but you can speed it up with movement! You should feel your heartbeat slow down when you feel calm and keep your body still.

After you have done some active movement, sit or stand quietly and take some deep breaths. Can you feel your heartbeat slow down?

TORPOR

Some animals experience **torpor**, which is similar to hibernation but only lasts for a few hours or overnight. Some kinds of birds, insects, reptiles and fish enter torpor. Torpor can be in response to freezing temperatures or food shortage. When an animal enters torpor, their body systems slow down and they become inactive, but when temperatures rise or food is available, they can become active again.

Photo by the National Biological Information Infrastructure Project

EXPERIMENT

Hummingbirds are a type of bird that enters torpor. It can take up to an hour for a hummingbird to come out of torpor. As their body temperature begins to rise, it causes their wings to flutter, which generates heat and moves warm blood through their body.

Go outside on a cold day and do some active movement for 30-60 seconds. For example, try flapping your arms as if they are hummingbird wings. Do you feel warmer? Keep moving until you feel warm!

MIGRATION

Photo by Gail Hampshire

Some animals move to warmer locations with more available food in different seasons. Many birds move to warmer climates in the winter. Some fish travel to warmer waters and some swim down into deeper water. Some moths and butterflies migrate, and dragonflies like the wandering glider can migrate very long distances. Earthworms move deeper down into warmer soil. What do you know about animal migration? Have you spotted any migrating birds or butterflies?

ANIMAL OBSERVATIONS

Spend some time outside looking for animals in the winter. If you see any active animals, can you guess what they are doing? Are they looking for food, eating, being still, or doing something else? Draw or write about the animals you see!

ADAPTATION

Some animals remain active during the winter and adapt to the conditions. In preparation for the colder temperatures of winter, some mammals like rabbits and weasels grow thicker fur. Snowshoe hares grow fur that helps them to camouflage in the snow.

Photo by the US Forest Service

EXPERIMENT

How many layers do you need to feel comfortable when it is cold outside? See how many layers of clothes you can wear at once. What do you notice about the layers that keep you the warmest? Can you find layers that help you camouflage in your habitat like a snowshoe hare in the snow?

Honeybees keep their hive at a constant temperature. In the summer, when it is warm, they cool off the hive by fanning their wings. Have you ever used a fan to cool off? When the temperature falls below 55 degrees, honeybees don't tend to leave the hive because they cannot fly very well. Inside the hive, they form a cluster to stay warm. The bees on the inside of the cluster vibrate their wing muscles to generate heat while the bees on the outer edge of the cluster stay still and act as a layer of insulation to keep the heat inside the cluster. Have you ever huddled with someone to stay warm outside?

Photo by Fir0002/Flagstaffotos

Some frogs and turtles burrow into mud at the bottom of a pond where the water doesn't freeze and they can absorb oxygen from water through their skin. Some frogs, including spring peepers, burrow under leaves or into shallow mud. When temperatures drop below freezing, they pump stored sugars through their bloodstream to slow down the freezing process. They can survive being completely frozen for some time. Wooly bear caterpillars can also freeze completely in the winter. In the spring, they thaw out and complete their life cycle when they emerge as an adult tiger moth.

Photo by Melissa McMasters

Photo by Adam Jackson.

EXPERIMENT

Certain things dissolve in water and can slow down water's freezing or melting process. Other substances can be mixed into water but don't work the same way!

Put 1 cup of water into 4 different cups or bowls. Add 1 tablespoon of sugar to one cup and stir it until the sugar is fully mixed into the water. Add 1 tablespoon of salt to a different cup and stir it until the salt is fully mixed into the water. Add 1 tablespoon of flour to another cup and stir it until the flour is fully mixed into the water. Don't mix anything into the last cup of water.

Pour each mixture and the plain water into separate paper cups, sealing plastic bags, or ice trays. It's ok if you don't use all of your mixture, as long as you pour the same amount into each container. Label each container with which mixture it contains: sugar, salt, flour, or nothing. Put all of your mixtures in the freezer for at least a few hours, or over night. They should be completely frozen before the next step.

Take all of your labeled containers out of the freezer and place the ice outside in the sun. Start a timer or write down the time. Then, record the time it takes for each block of ice to completely melt.

Which block of ice was the quickest to melt? Which one took the longest to melt? Did the mixtures melt faster or slower than the plain water? Did all the mixtures take the same amount of time, or were they different from each other?