

Old Westbury Gardens

Project: Experiment: How do Ducks keep themselves warm and dry in cold water?

Objective:

Many types of **waterfowl**, or birds that swim in water, live in our surrounding neighborhoods. Some **migrate** for the duration of the coldest part of our seasons, but you may notice some remain here throughout the year when they have enough food to keep them nourished. Ducks, one type of waterfowl, live on water and land, so they are in and out throughout the day.

How do ducks stay warm and dry when they are going in and out of the water in such cold temperatures? Today, you will experiment to find out. First, you will explore and observe the ducks at a local park that has a water body, such as a pond or lake. After observing the ducks, you will complete the experiment with simple, household materials by following the steps provided.

Materials:

- Paint brush or qtip
- Dropper or straw
- Small bowl with water
- Cooking oil in a small bowl (olive, vegetable, canola etc.)
- Paper bag or plain sheet of paper
- Scissors
- Pencil



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Experiment: How does a duck stay warm and dry in water?

Step 1. With a pencil, draw two "feathers" on a paper bag and cut them out with scissors.

Step 2. Use the straw to drip some water on the first "feather". This will represent a feather with **preen**. Observe and document what happens to it with water on it. Does the "feather" feel different after adding the water?

Step 3. Use the paintbrush to cover the second "feather" with oil. This will represent a feather without preen.

Step 4. Use the straw to drip the same amount of water on the second "feather" with oil on it. Observe and document what happens to it with oil and water on it. Does the "feather" feel different after adding the water?

Observation and Inquiry:

After observing both "feathers", which one do you hypothesize will keep a duck warm and dry in cold water? Document the differences in the way the water reacted on each "feather".

- Draw your observations of each "feather" in the spaces below:

"Feather" 1- No preen	"Feather" 2- Preened (with oil)

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Note your Observations below:

	Did the water stay on the feather? Yes or No	How did the feather feel after the water was dropped on it? Did it feel the same or different?	Which feather would keep you warm and dry in cold water? Check a box	Other observations you would like to note
"Feather" 1 No preen				
"Feather" 2 Preened (with oil)				

Essential Questions:

After you have spent some time observing ducks and completing the "feather" experiment, answer the following questions:

1. What are two types of waterfowl you have observed?

1.	2.
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2. What were the waterfowl doing? Were they swimming? Making noise? Playing? Preening? Eating?

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3. What was the weather like outside when you observed the waterfowl? Was it warm, cold, really cold, rainy, sunny, etc.?

4. If you were a duck, which feathers would you choose to keep you protected from the cold wet water- the preened (oiled) feathers or non-preened feathers? Why?

When you are in the shower or going for a swim, your hair gets wet and takes time to dry. When a duck is swimming, its feathers stay dry and don't get wet! Ducks have a special gland called the preen gland that produces an oil which they rub all over their feathers with their beaks to create a waterproof effect. The oil creates a protective barrier that helps insulate them from water and cold temperatures. The water can't get through the oily layer so all of the feathers underneath stay dry and keep them warm!

Beneath the waterproof outer feathers is a fluffy, soft layer of down feathers, which also keeps ducks warm. This protective barrier of waterproof feathers is a very effective system, but requires constant maintenance. If you watch ducks and waterfowl in the wild, you will notice they spend a lot of time preening and washing, nibbling their feathers with their beaks for this very reason.

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Vocabulary words:

- Preen- To trim and clean.
- Preen Gland- Gland located above a birds tail that makes an oily substance.
- Insulate- The process of keeping heat, sound, or electricity from spreading.
- Barrier- Something that blocks the way, such as a fence.
- Waterproof- Something that keeps out water, such as a raincoat.
- Waterfowl- Group of birds that live on and near fresh water, including ducks, geese, and swans. These birds have special adaptations, like flat and sensitive bills and webbed feet, that make it possible for them to live in the water.
- Migrate- To move from one region or habitat to another according to the seasons.