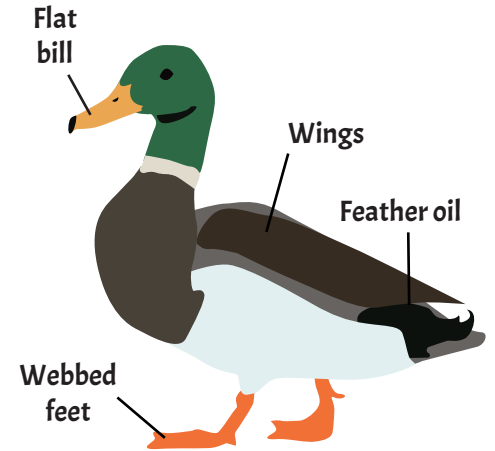


Duck Detective

Animal species change and adapt to their environment to improve their chance of survival. How are ducks adapted to live in a wet environment?

What you'll need:

- Feather
- 4 Cups
- Water
- Pipette
- 2 Rubber bands
- Clear container
- 3 Cotton balls
- Plastic bag
- Paper and pencil
- Cooking oil
- Ice cubes



Ducks live in places with water, like ponds, rivers, lakes, or wetlands.



Water Off a Duck's Back

Ducks feathers are adapted to keep them dry and help them float.

1. Examine the feather. What parts of the feather could help a duck stay dry?
2. Notice how the smooth parts of the feather connect to make a barrier that keeps water out. Gently pull some of the pieces apart. Then stroke the feather to make them “zip up” again.
3. Use the pipette to put drops of water on the feather. What happens?
4. Use the pipette to put drops of water on a cotton ball. What happens?
5. Place a cotton ball in a clear container of water. What happens?



If its feathers become water-logged like the cotton ball, a duck may get too heavy to float. Explore the special way that ducks waterproof their feathers.

6. Empty the oil packet into a cup. Dip a dry cotton ball in the oil, making sure all sides are covered. Place this cotton ball in the water. What happens?
7. Try putting drops of water into the cup of oil. What do you observe?

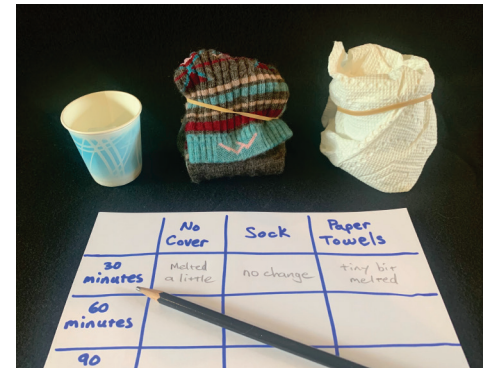
What's happening? Oil repels—or pushes away—water. And because oil is less dense than water, it floats. Ducks spread a waxy oil on their feathers from a special oil gland at the base of their tail. The waxy oil forms a waterproof coating to keep its feathers dry. However, other types of oil—like the oil used in cars—can be very dangerous to a duck. If feathers get soaked in bad oils, they can no longer do their job to keep the duck warm and dry.



Warm and Cozy

The soft, fluffy part of a feather provides insulation—a layer that helps a duck stay warm. Can you find that part of the feather? Insulation works by keeping heat in, like when you wear a coat, or by keeping heat out, like when you put cold drinks in a cooler on a hot day.

1. Find two materials to use as insulation, such as napkins, foil, towel, cotton balls, sock, or a warm hat.
2. Using three cups, place an ice cube (all about the same size) in each cup. You can also fill the cups $\frac{1}{2}$ full of water and freeze overnight.
3. Cover one cup with one insulation material, and a second cup with a different insulation material. If needed, use rubber bands to secure the materials. Leave one cup uncovered.
4. Place the cups in a warm, but not hot, location like your kitchen counter.
5. Check the cups every 15 minutes to observe the ice. Record your results each time, until one cup of ice melts all the way. What did you observe? Did ice melt at different rates? Did one material work better to insulate the ice and keep the heat out?
6. Try repeating this investigation using different materials.

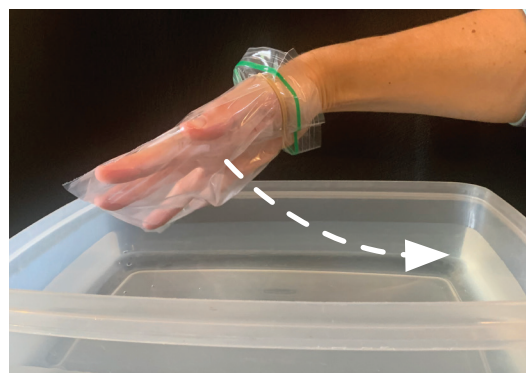


Webbed Wonders

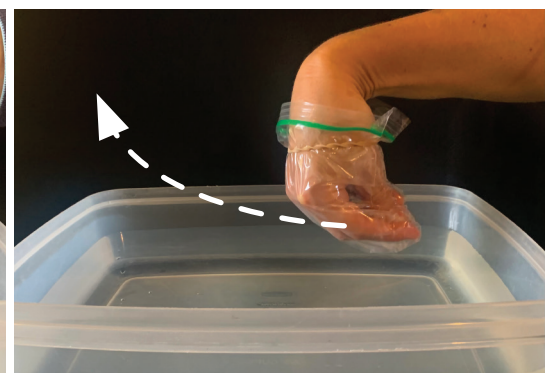
How do a duck's feet help it swim? Fill a sink or large container with water and give it a try.



1. Use the plastic bag and rubber band to make your hand into a webbed foot.



2. Spread fingers wide and "paddle" through the water from front to back.



3. Squeeze fingers together and move your hand forward. Can you feel the difference?

What's happening? Ducks spread their webbed feet wide to push against the water when paddling. They make their feet smaller when pulling them forward, so there is less water resistance. Ducks' webbed feet are an adaptation that helps them move through water.

Why do ducks waddle?

Ducks legs are placed far back on their body for better paddling in the water. This, plus their large webbed feet, make them waddle when they walk.

