

EXPERIMENT

HOW DO SHARKS BREATHE UNDERWATER?

This experiment illustrates how sharks use their gills to filter oxygen molecules out of the water to breathe.

What do we know?

- All living organism's breathe oxygen.
- Our lungs filter oxygen from the air.
- Sharks live underwater.
- Sharks filter oxygen from the water to breathe using their gills.

Materials

- Clear cup
- Jug
- Coffee filter (representing the gills)
- Coffee granules (representing the oxygen molecules)
- Elastic band
- Water
- Towel (to clear up any spills)



Procedure

1. Add water to the jug
2. Add coffee granules to the jug stir
3. Secure coffee filter over the top of the cup with elastic band
4. Slowly pour the water and coffee granules over the coffee filter



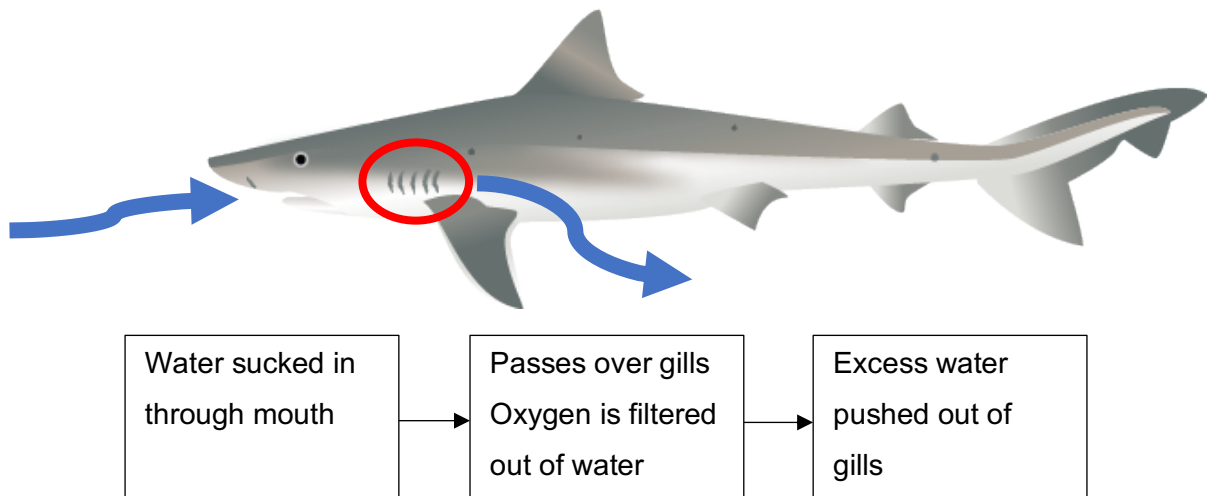
Results

1. Have the coffee granules passed through the coffee filter?
2. Have the coffee granules been captured by the filter?

Why?

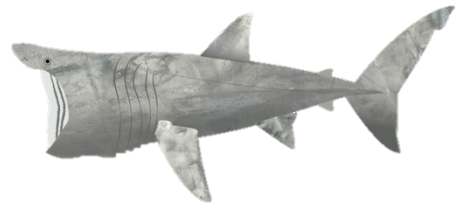
- The coffee granules representing the oxygen molecules have been captured by the coffee filter (i.e. the gills of a shark).
- Water passes through the coffee filter and collects in the cup.

As sharks swim water passes through their mouth and is pushed through their gills. The gills filter the oxygen out of the water. The oxygen is then passed into the blood and travels around the shark's body. The excess water in the gills is pushed out back into the surrounding ocean. This is how a shark breathes underwater.



Fun Facts!

Some sharks, such as the Basking Shark, have to continuously swim to keep breathing! Swimming forwards keeps a continuous flow of water passing through their gills. This method of breathing is called **ram ventilation**.



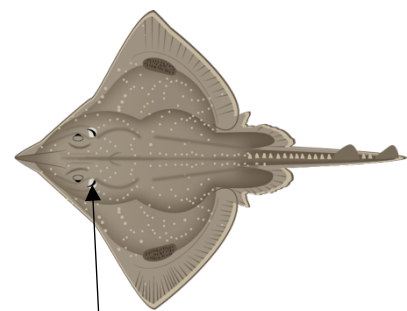
Basking Shark



Small Spotted Catshark

Other sharks, like the Small Spotted Catshark, can lie on the sea floor and breathe without swimming. They breathe by actively sucking water into their mouths using large cheek muscles. The water then passes over their gills. This is called **buccal pumping**.

Very specialised sharks, and all skates and rays have evolved a secondary respiratory organ that allows them to breathe. Flapper Skates spend much of their time on the seafloor with their gills (that are underneath their body) buried in the sand, and so they can't breathe using their gills. They breathe using a **spiracle**. This is a hole behind their eyes that can suck water in and push it over the gills enabling them to breathe, even when their gills are buried in the sand!



Flapper Skate
Spiracle behind eye

Further thinking

1. How do dolphins and whales breathe?
2. Is their method of breathing different to sharks?
3. Why and how is it different?