



## Activity – Seeking solutions from nature

One way of designing with biomimicry is to start with an engineering problem and brainstorm creatures or systems in nature that have overcome a similar challenge, as they may provide a solution. Let's practice with an example!

**Problem:** You enjoy canoeing, but paddling is exhausting and you want to design a paddle that requires less effort to use. Can you think of any ways to incorporate ideas from the biological world around us to solve this design challenge?



**Tip 1:** Which animals paddle themselves through the water with little effort?

**Tip 2:** How about a duck? How does it manage to glide smoothly in the water?



**Design in Nature:** Swimming birds have webbed feet that act as efficient paddles to propel them forward in the water. Their feet have a high surface area to push against a large volume



of water just like paddles do, and they are efficient because of their light weight since most of the surface area comes from the thin webbing between their bones. In addition, unlike traditional canoe paddles, birds do not need to take



their feet out of the water between strokes because they can fold their feet up when pulling them forward.

A company called Shearwater looked at all these features of bird's feet and used a biomimetic approach to design webbed paddles. Using mechanical engineering and modern material design, they produced a lightweight paddle with a webbed blade that folds inward. This paddle is efficient and smooth because it does not need to be lifted out of the water between strokes.



**Thinking further:** Can you think of another application for webbed paddles?

What about webbed gloves?! Webbed gloves, sometimes used by swimmers, add fabric between the wearer's fingers to enhance propulsion in the water and are another biomimetic design, although these are more closely based off of platypus feet instead of duck feet.