

# How fish swim!

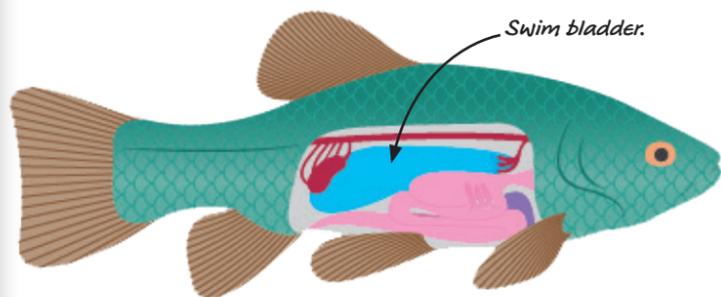
Ever wanted to know how fish get about? Dive in to find out...



All fish use movements of both their **body** and their **fins** to swim. And many species have **special organs** to help their muscle-packed bodies **stay afloat** in the water.

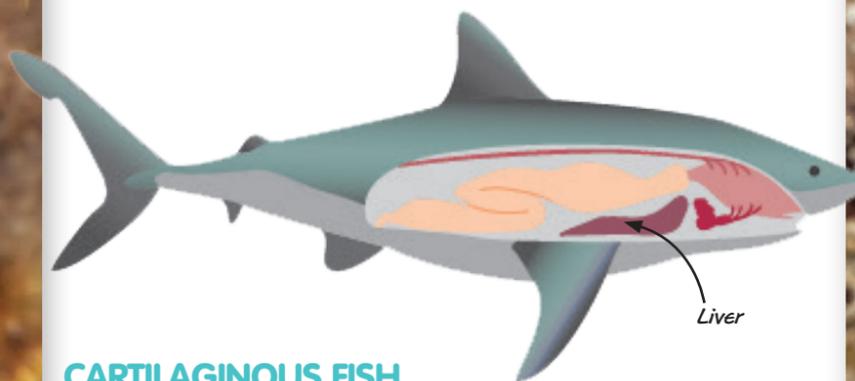
## BUOYANCY

**Bony** and **cartilaginous\*** fish are **denser** than water, so they have **internal organs** to improve their **buoyancy** and stop them sinking!



## BONY FISH

Most bony fish have a **gas-filled sac** called a **swim bladder**, which **inflates** and **deflates** using **gas** from the **bloodstream**. The swim bladder lets the fish move **up** and **down** in the water without using energy for swimming.



## CARTILAGINOUS FISH

**Sharks** have large, oily **livers**. This organ helps to keep them afloat because **oil is lighter than water**. However, most sharks also need to **swim continuously** to maintain their **buoyancy**.

\* Cartilaginous fish have **skeletons** made from **cartilage** instead of bone. **Human noses** and **ears** are also made of cartilage. It's **lighter** than bone. **Sharks, skates** and **rays** are all cartilaginous fish.



**Mandarin fish** (pictured here) aren't protected by **scales**. Instead, they're covered in a **smelly mucus** which deters predators!

The **fastest fish** have **streamlined, rigid bodies** that hardly bend, and **stiff tails** that beat rapidly to generate **forwards thrust**.

**Pelvic fins** can be used to **prop fish up** when they're resting.

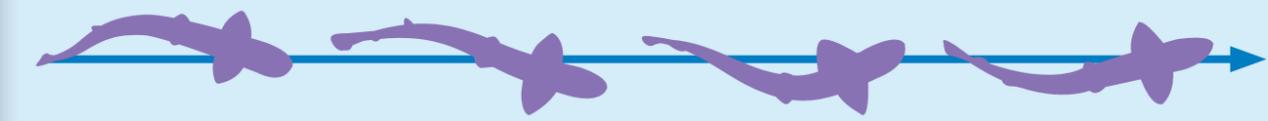
**Pectoral fins** pulse, helping **propel** the fish through the water.

The **large tail fin** sweeps from **side to side**, pushing it forwards.

## CURVY MOVERS

Fish swim using a series of **S-shaped curves** that start at the head and sweep along the body.

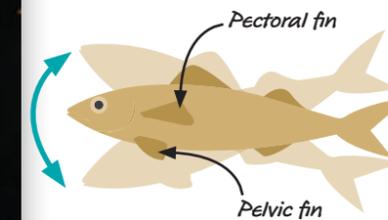
When a curve reaches the tail, the tail moves from side to side, pushing the fish forwards.



- 1 The head moves to one side and the rest of the body follows, creating a curve.
- 2 The curve moves down the body, reaching the tail, which pushes outwards, moving the fish forwards.
- 3 The head turns to the opposite side, starting a new curve.
- 4 The new curve causes the tail to push in the opposite direction before the next curve begins.

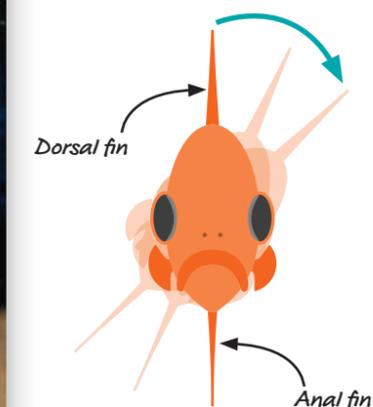
## FIN-TASTIC MOVEMENT

Fish use **fins** for **steering** and **stabilisation** in shifting underwater environments. They can use them to **stay level**, or to **move in different directions** in the water.



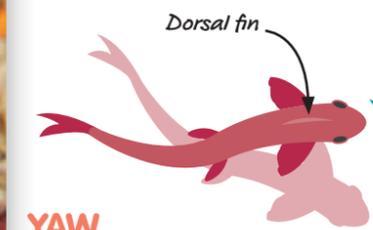
## PITCH

The two **pectoral** and two **pelvic** fins control movement **up** and **down** (**pitch**). Fish can also use these fins to stay level in the water.



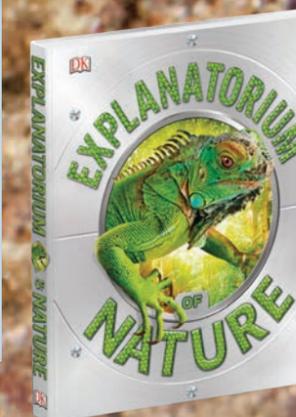
## ROLL

The two **dorsal** and **anal** fins control **rotating movement** (**roll**), and can be used to keep the fish **upright**. **Fast fish** can **flatten** these fins to create more **streamlined bodies**.



## YAW

The **dorsal fin** controls movement from **side to side** (**yaw**), and can keep the fish **pointing in the right direction**.



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