Science

Evolution and Inheritance


Adaptation
twinkl

Aim

- I can demonstrate understanding of the scientific meaning of adaptation.

Success Criteria

- I can understand that adaptations are mutations.
- I can identify adaptive traits.

Variation

Whole Class

What does variation mean?

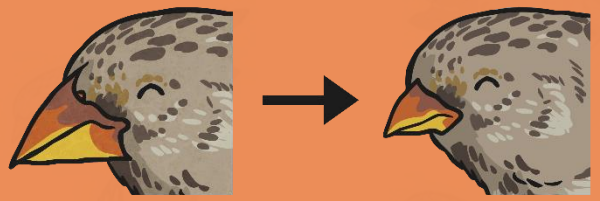
What causes variation?

Inheritance

These are characteristics that offspring **inherit** from their parents.

Adaptation

These are characteristics that are influenced by the **environment** the living thing lives in.



Environment and Habitats

Environment and Habitats

Sometimes the words '**environment**' and '**habitat**' are used as though they have the same meaning. However, there are important differences:

A **habitat** refers to a specific area or place in which animals and plants can live.

An **environment** contains many habitats and includes areas where there are both living and non-living things.

So a bird may live in the woods, its habitat, but its environment could include a stream and a mountain, which are habitats in their own right.

What different types of habitats are there?

Polar regions

Deserts

Coniferous forests

Tropical rainforests

Oceans

Grasslands

Mountains

Remember: an environment is more than one habitat.

Heath

What Does Adapted Mean?

‘Adapted’ means to adjust to new conditions – like a new home or school.

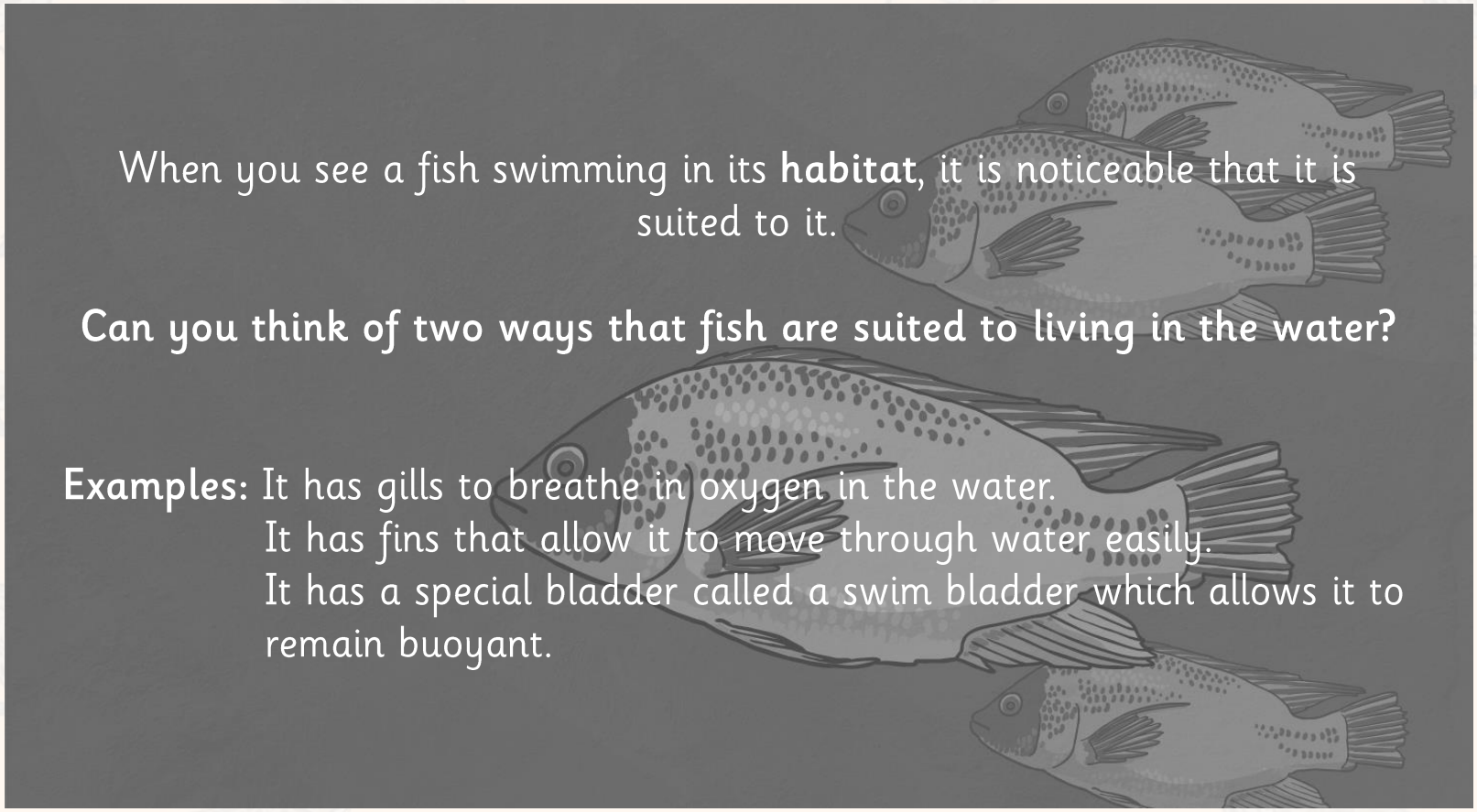
‘Adapted’ is when you turn a book into a TV programme or a film!!

‘Adapted’ means making something suitable for a new purpose - like cutting off the legs of jeans to make them into shorts.

What do you think? Discuss with your talk partner.

Correct Answer: All three of them! But none of these is the scientific meaning.

Adaptation
Scientific Definition

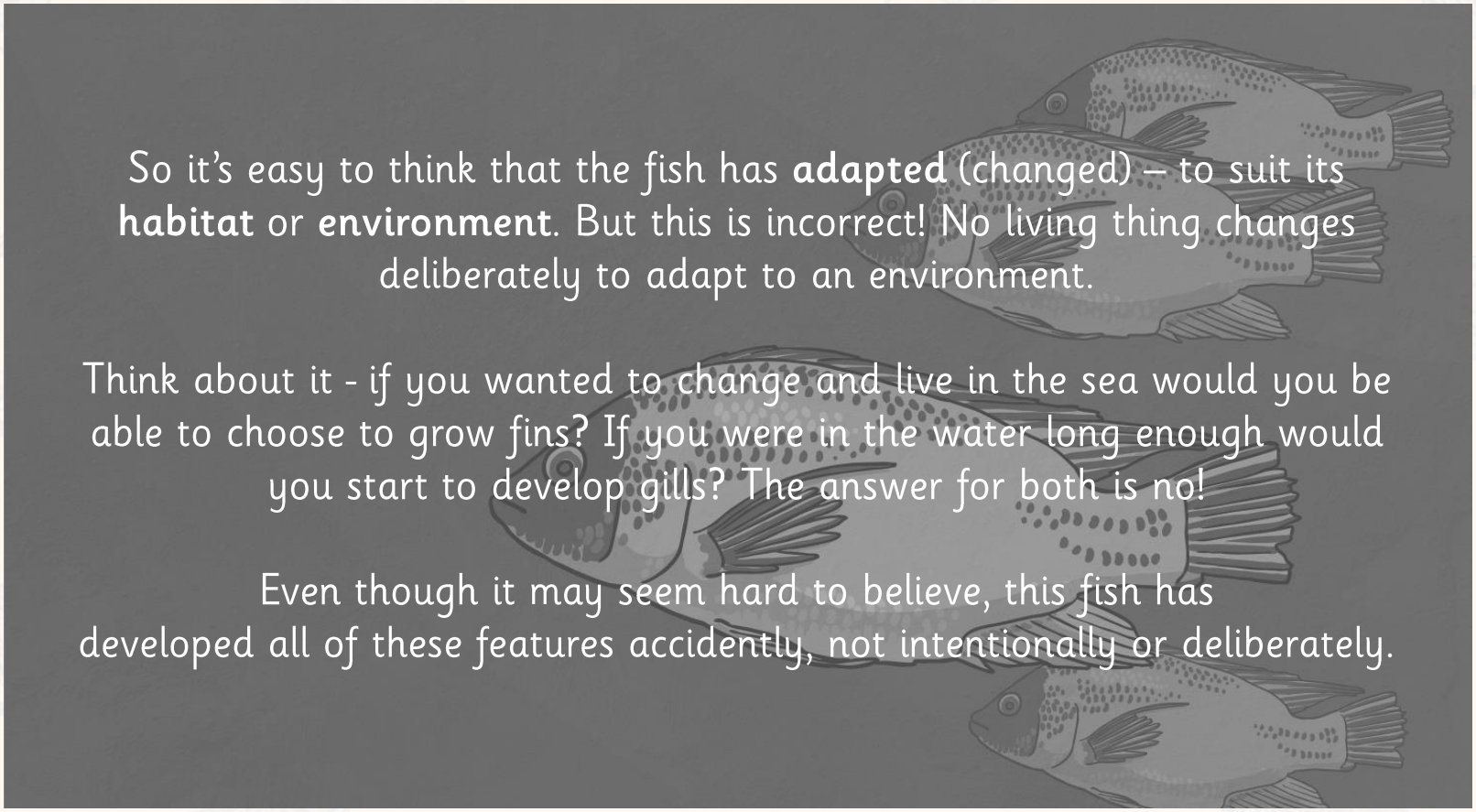


When you see a fish swimming in its **habitat**, it is noticeable that it is suited to it.

Can you think of two ways that fish are suited to living in the water?

Examples: It has gills to breathe in oxygen in the water.
It has fins that allow it to move through water easily.
It has a special bladder called a swim bladder which allows it to remain buoyant.

Adaptation
Scientific Definition

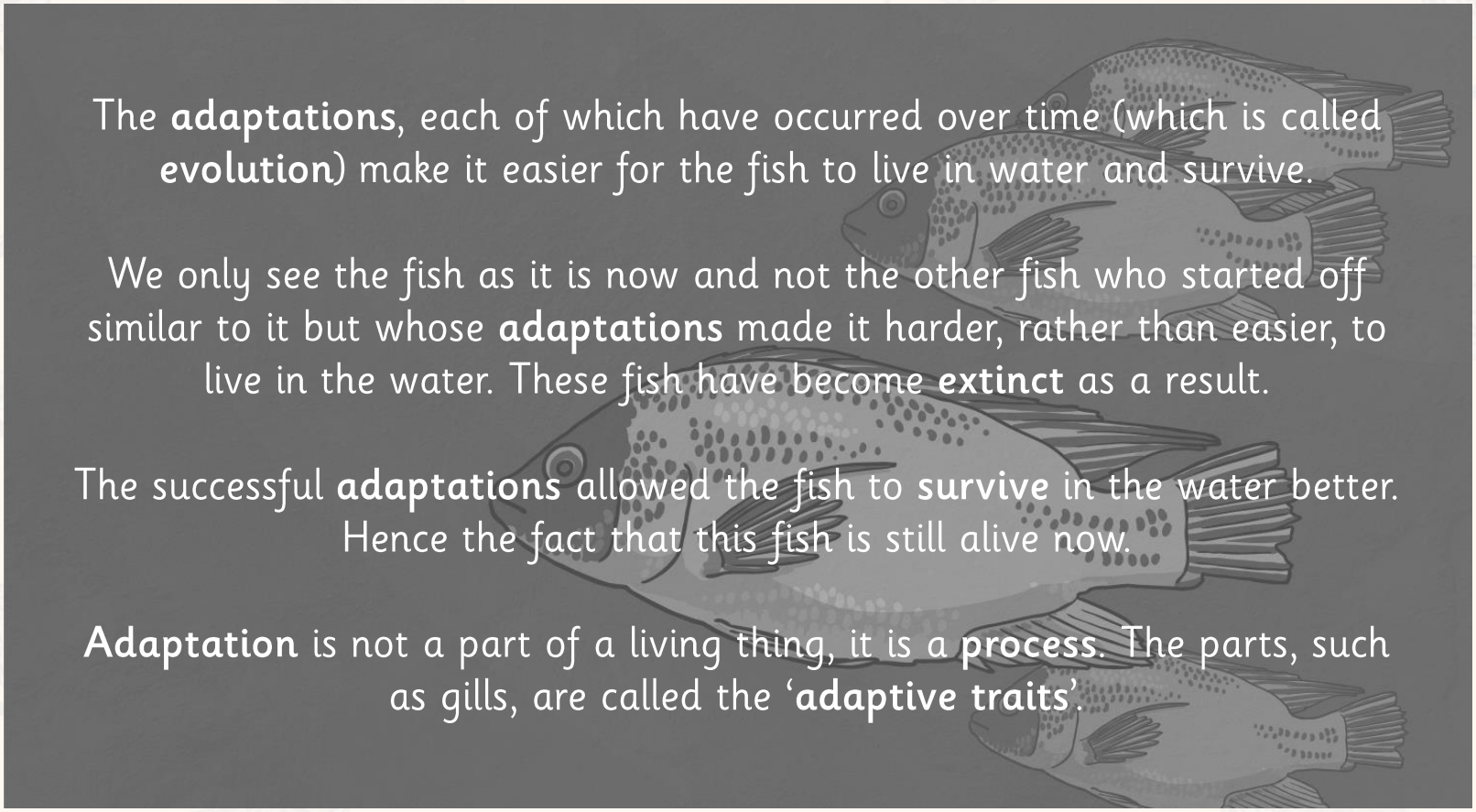


So it's easy to think that the fish has **adapted** (changed) – to suit its **habitat** or **environment**. But this is incorrect! No living thing changes deliberately to adapt to an environment.

Think about it - if you wanted to change and live in the sea would you be able to choose to grow fins? If you were in the water long enough would you start to develop gills? The answer for both is no!

Even though it may seem hard to believe, this fish has developed all of these features accidently, not intentionally or deliberately.

Adaptation
Scientific Definition



The **adaptations**, each of which have occurred over time (which is called **evolution**) make it easier for the fish to live in water and survive.

We only see the fish as it is now and not the other fish who started off similar to it but whose **adaptations** made it harder, rather than easier, to live in the water. These fish have become **extinct** as a result.

The successful **adaptations** allowed the fish to **survive** in the water better. Hence the fact that this fish is still alive now.

Adaptation is not a part of a living thing, it is a **process**. The parts, such as gills, are called the '**adaptive traits**'.

Accidental Adaptations

So how do these random, accidental adaptations occur? The usual cause is random mutations.

We need to go back to our DNA.

Each cell has a copy of the DNA. Random mutations occur when the cell becomes damaged and fails to repair itself completely. Sometimes this failure affects the DNA in the cell.

In this situation, the DNA stays slightly different. When the cell with the mutated DNA replicates, it will do so with the mutation.

Accidental Adaptations

Mutations are not in themselves good or bad. Some mutations have no effect at all! However, other mutations can cause us to lose or gain functions.

One example of this is the ability of humans to drink milk after infanthood.

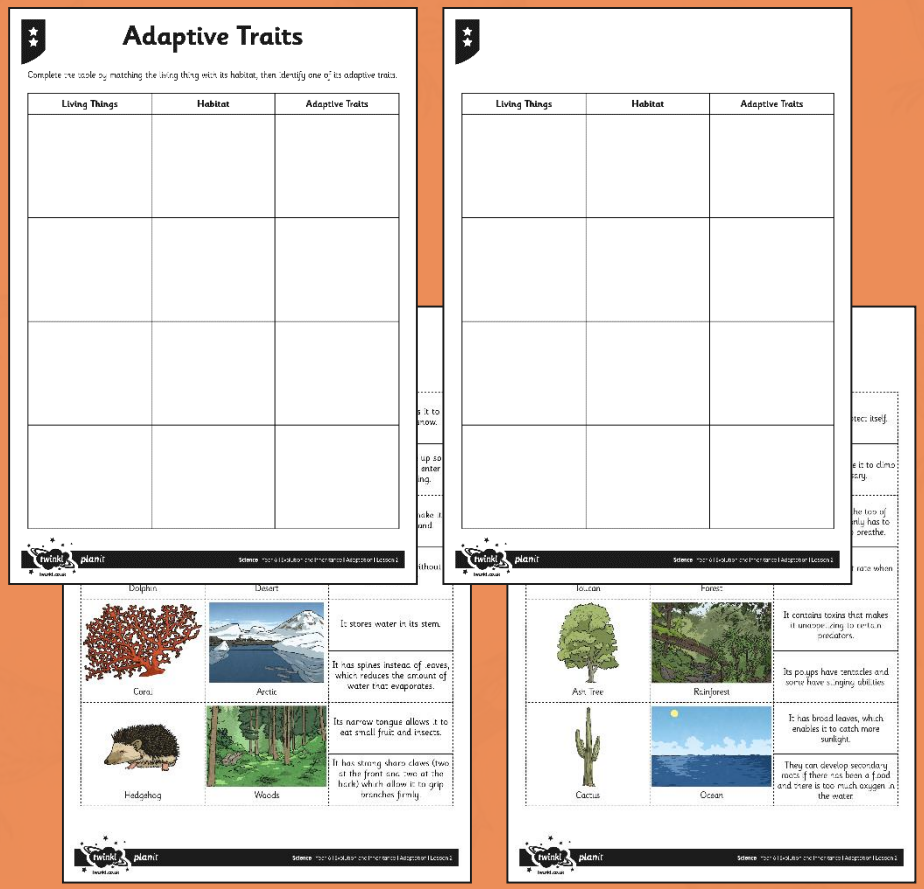
All other mammals stop drinking milk after they are weaned. As they develop they become lactose intolerant (the body stops being able to digest milk).

A mutation in humans has allowed us to carry on drinking milk even after we are weaned as babies. Further mutation means we can drink the milk of other mammals – such as cows, sheep and goats. Again no other mammal does this!

Adaptive Traits

Adaptive traits enable a living thing to survive better in its habitat or environment. As it lives longer, it means that it has a greater chance of reproducing and so the adaptive trait gets passed on.

Your task is to identify adaptive traits in living things.



Humans

What habitats do humans live in?

Are there any habitats they are not able to live in?

Can you identify adaptive traits that humans have which enable them to live in such a range of different habitats and environments?

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