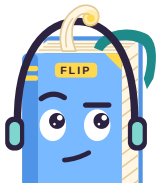
Name _____ Date _____

Adaptation to evolution

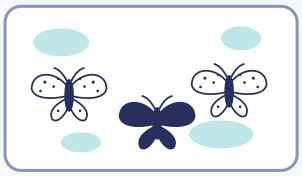
How living things can change over many, many generations.

1 Learn



Young living things look like their parents, but never exactly the same. These differences are called **variation**. Over a very long time, they can change a whole species: that's **evolution**.

Before the 1800s



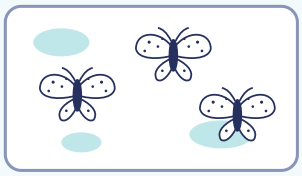
Pale bark with lichen. Birds spot the **dark** moths, so most moths are pale.

Factories, 1800s



Soot kills the lichen and blackens bark. Now **pale** moths are spotted. By 1895, most moths near Manchester are dark.

Cleaner air, 1950s on



Laws cut the smoke and the bark gets paler. Pale moths become common again.

Worked example: the four steps, with the peppered moth

1. Variation
Some moths are born pale, some dark.

2. Survival
On sooty trees, dark moths are hidden, so more of them survive.

3. Inheritance
The survivors have young, which inherit their dark colour.

4. Many generations
Year after year, dark moths become most of the moths.

Flip's tip: one moth can't change colour to match a tree. Evolution happens to a **whole group** over **many generations**, never to one animal in its lifetime.

Warm up: fill the gaps with **variation**, **inherit** or **generations**.

Differences between living things of the same kind are called _____.

Young _____ features from their parents. Evolution takes many _____.

Grown-ups: scientists call this process natural selection. The dark moths didn't turn dark because of the soot: a few dark moths already existed, and they survived better.

Name _____ Date _____

2 Try it together a child and a grown-up, about 10 minutes



Hungry bird

You need: white paper, a dark pencil or pen, child-safe scissors, and a dark cushion, towel or blanket (the tree bark).

1. Cut out about 30 coin-sized moths. Colour half dark all over; leave the rest white.
2. Start with **6 pale** and **6 dark** moths. The "bird" looks away while the other person scatters them on the dark cushion.
3. The bird turns round and picks up moths one at a time while you count slowly to 10 together. Picked-up moths have been eaten.
4. Count the moths left on the cushion. Each survivor has one baby: add a new moth of the **same colour** for each one left.
5. That's the next generation. Swap roles and play again.

Generation	Pale moths at start	Dark moths at start	Pale moths left	Dark moths left
1	6	6		
2				
3				

Grown-ups: pale moths stand out on the dark cushion, so more get eaten, and the dark moths usually take over. Then try a pale sheet or pillowcase. Ask: "Did any one moth change colour?" (No: the group changed.)

3 Practise

A. Number the peppered moth story in order, from 1 to 5.

☐ Dark moths survived, had young, and passed on their dark colour.

☐ Most peppered moths were pale and hid well on pale, lichen-covered trees.

☐ After many generations, most moths near the factories were dark.

☐ Smoke from factories killed the lichen and made the tree bark dark.

☐ Birds could now spot the pale moths more easily and ate more of them.

Name _____ Date _____

B. Tick the right explanation of giraffes' long necks. What is wrong with the other?

☐ **1.** Giraffes stretched their necks to reach high leaves. Their babies were born with the stretched, longer necks.

☐ **2.** Some giraffes were born with slightly longer necks. They reached more food, survived and had more young. Over many generations, necks got longer.

C. Long ago, some foxes in a very cold place were born with thicker fur than others. Explain how, after many generations, nearly all the foxes there could have thick fur.



D. Use the four steps to explain how the pale moths became common again when the air got cleaner.

Challenge

Leo says, "When the trees went dark, the pale moths turned dark to hide." Is Leo right? Explain.

I can... Tick when you can.

- ☐ explain what variation is
- ☐ tell the peppered moth story
- ☐ explain how adaptation can lead to evolution