Unit focus: Evolution
Text focus: Explanation Text (880L)

STAGE 6

What Is Evolution?

When you think about *evolution*, it is very easy to confuse lots of different things. Let's take a look at the main ideas and see how they all fit together.

Evolution is the process of a species changing over time. This normally takes thousands of years to make significant changes. Evolution occurs when an individual living thing is born with a *genetic mutation*. A mutation can be anything that makes it different from the rest of its species. It might have slightly more muscle or less fur, for instance.

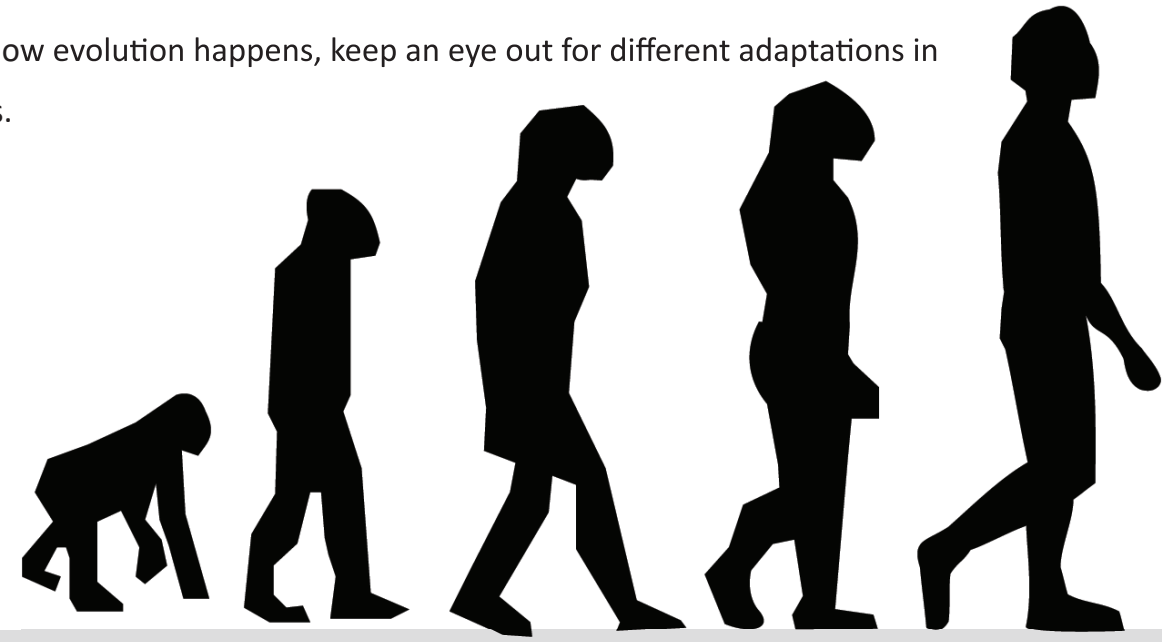
Lots of genetic mutations are bad. If a tiger was born with a muscle deformity, it might struggle to hunt and would die quickly. These mutations often die out with the individual. However, if a mutation gives the creature a *benefit* over the others, then that individual may get an advantage and survive. The genetic mutation might pass on to its offspring. This is called *natural selection* but is often nicknamed "survival of the fittest". It means that the best-designed individuals go on to breed. This is the process that Charles Darwin first described, not evolution.

Because genetic mutations are introduced before birth, an individual can't evolve. Evolution happens to species, not individuals. Sometimes, an individual might change due to their circumstances. Humans who move to high altitude, often develop thicker blood. This is because their body produces more red blood cells to cope with the lower oxygen levels. This is called *acclimatisation* and won't be passed on to their children.

Not all evolution happens at the same speed. The reason that evolution in most species tends to take such a long time is that changes can only be passed on when a species breeds. Lots of species don't breed very often. A female rabbit could have up to 1000 babies in her lifetime, which means that they have a much higher chance of genetic mutation and of them being passed on more quickly. On the other hand, humans might only have 2 or 3 children in a lifetime so adapt much more slowly.

There are some exceptions. Viruses and bacteria evolve exceptionally quickly. Some bacteria can produce a new generation every ten minutes. Each of these is created ready to produce another generation straight away. That means that a single bacteria could produce 280 trillion (that's 280,000,000,000,000) new cells each day! That's over 2000 times more than the total number of humans who have ever lived in the history of the world. This is why scientists struggle to find a vaccine for the common cold or the flu: there are just too many mutations and they evolve too quickly.

Now you know how evolution happens, keep an eye out for different adaptations in different animals.



SUMMARY FOCUS

1. What is the difference between evolution and natural selection?
2. What needs to happen for a genetic mutation to be passed on?
3. Why wouldn't an acclimatisation be passed on?
4. Why might rabbits evolve more quickly than humans?
5. Why is it hard for scientists to develop vaccines for some viruses?

VIPERS QUESTIONS

E Why has the author written some words in *italics*?

V Write a definition for each of the words in *italics*.

E Why has the author used an exclamation mark in paragraph 6?

R Why do some people develop thicker blood?

E Find a word or phrase that is closest in meaning to "a major or important event".

Answers:

1. Evolution is the process of changing over time. Natural selection means that the strongest in a species will pass on their adaptations.
2. It must give the animal a benefit and allow it to survive and breed.
3. It isn't a genetic mutation.
4. They have more children in a shorter space of time.
5. They adapt and evolve too quickly.

E: They are key vocabulary for this topic

V: Look for suitable definitions for each word

E: It is a surprising fact

R: Because they need more red blood cells to cope with the lower oxygen levels at high altitude

V: Significant