

# 3.3 Variation

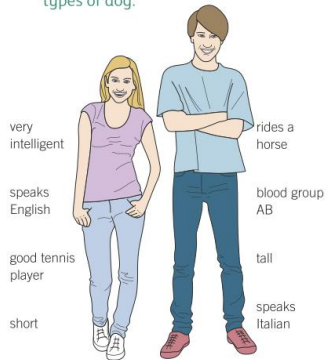
## Learning objectives

After this topic you will be able to:

- describe how variation in species occurs
- describe the difference between environmental and inherited variation.



▲ There is a lot of variation between types of dog.



### Link

You can learn more about how characteristics are inherited in B2 3.5 Inheritance

If you imagine your friends and family, you will picture people who look quite different to each other. For example, people may vary in height and have different colour hair. They have different characteristics.

### How do organisms vary?

Differences in characteristics are known as **variation**.

#### A State what is meant by variation.

It is easy to tell the difference between a dog and a fish. For example, a fish has fins and gills; a dog has four legs and is covered in fur. This is because these organisms belong to different **species**. They have lots of different characteristics.

#### B State what is meant by a species.

However, it is more difficult to tell the difference between two fish. This is because organisms of the same species have lots of similar characteristics. They can mate to produce fertile offspring.

Sometimes a species can be further grouped into types or breeds. These may look quite different but the individuals still belong to the same species. For example, different breeds of dog show great variation but they are all dogs.

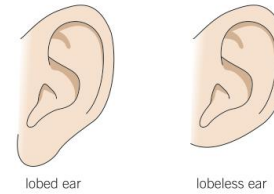
### How do humans vary?

Every human in the world is different – even identical twins differ in some ways. The image opposite shows some of the ways people may vary.

### What causes variation?

Some variation is from characteristics the people have inherited from their parents, such as their eye colour. This is known as **inherited variation**.

Children usually share some characteristics with their mother and some with their father. They are not identical to either of their parents, as they get a mixture of their parents' features. An example of inherited variation is lobed or lobeless ears.



◀ Whether you have lobed or lobeless ears depends on your parents.

#### C State what is meant by inherited variation.

### Environmental variation

Variation caused by your surroundings and what happens to you is called **environmental variation**. For example, your characteristics can be affected by factors such as your diet, education, and lifestyle. A person with dyed hair, for example, has environmental variation.

#### D State what is meant by environmental variation.

Many characteristics are affected by both inherited and environmental variation. For example, you might inherit the characteristic to be tall from your father. However, if you eat a poor diet your rate of growth may be reduced.

Inherited characteristics that are not affected by environmental variation include:

- eye colour
- blood group
- genetic diseases.

### Spelling key terms

There are a lot of long scientific words in this chapter. Can you spell them all correctly? Look carefully at the spelling of the following words for two minutes: species, variation, adaptation, inherited, environmental. Cover the words and ask a partner to test your spelling.

### Key Words

variation, species, inherited variation, environmental variation



▲ These people have environmental variation.

## Summary Questions

- Copy and complete the sentences below.  
The organisms in a \_\_\_\_\_ share many of the same \_\_\_\_\_. They can reproduce to produce fertile \_\_\_\_\_. Differences in characteristics within a species are known as \_\_\_\_\_. Variation can be a result of \_\_\_\_\_ factors or through \_\_\_\_\_ factors. (6 marks)
- Copy and complete the table using the words below.  
**body mass intelligence tattoo blood group eye colour scar**  

Environmental variation	Inherited variation	Both

 (6 marks)
- Explain why identical twins are the best people to study if you want to find out how the environment influences characteristics. (2 marks)
- Explain in detail the difference between inherited and environmental variation. (6 marks)