

Genes

1. Variation

CONCEPT 2

CAUSE OF VARIATION

NOTES

Causes of variation

Causes of variation can be environmental, inherited or a combination of both.

Characteristics in organisms can be influenced by their environment. For example, plant growth could be affected by the climate. Plants might grow more in warmer, moist and sunny conditions. A person's diet might influence their rate of growth and dentition. Animals competing for food sources might fight and develop scars or wounds. Examples of characteristics that are just caused by the environment might include an accent, speaking French and being able to play the piano.

Characteristics can also be caused by genetic information inherited from parents. These inherited variations cannot be altered. For example, you may dye your hair a different colour, but it will always grow back in your natural colour. Sometimes you can see clear traits in families such as dimples, freckles or nose shape.

Why siblings vary

Even though siblings have the same parents you will have noticed that they can look very different from each other. This is because of how genetic information is organised and passed on from parents to offspring. Genetic information is contained within the nucleus of cells. Sex cells (eggs and sperm) are used to pass on genetic information from parents to siblings. Each egg and sperm cell contain different genetic information. During fertilisation one sperm cell nucleus fuses with one egg cell nucleus. The resulting fertilised cell will contain a random and unique combination of characteristics inherited from the parents. So, offspring may have some similarities to their siblings, but may also look very different.

Genetic or Environmental

Because there is variation of characteristics in species, evolution can happen. Favourable versions of characteristics might enable an organism to survive and reproduce so passing on the genetic information for that characteristic. Over time this can lead to the development of a new species.

There can be some debate amongst scientists as to whether a characteristic is inherited or caused by the environment. There are not many inherited characteristics that are not affected by the environment.

Examples of these inherited characteristics are:

Natural eye colour

Natural hair colour

Inherited diseases e.g. cystic fibrosis

Blood group.

Most characteristics are caused by an interaction of genetic and environmental factors. For example, a person's skin may have birthmarks, freckles and moles but during their lifetime they may add piercings, tattoos and scars may form as a result of injuries. A person's height will also be caused by both environmental and genetic influences. Tallness might run in families but also a diet with sufficient protein will maximise the height reached.