

STRONG TOWER ACADEMY..... BIOLOGY SS2

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TOPIC : VARIATION

Variation is the differences between individuals within a species. This can be caused by inherited or environmental factors. Variation can be continuous or discontinuous. What is variation?

All people are human. They belong to the same species. Your friends and classmates may have different eye colour and hair colour. Some will be boys and some will be girls. Some will be tall and some will be shorter. The presence of differences between living things of the same species is called variation.

Variation between different species is usually greater than the variation within a species.

Inherited and environmental variation

Some variation within a species is inherited, and some variation is due to the environment.

INHERITED CAUSES OF VARIATION

Variation in a characteristic that is a result of genetic information from the parents is called inherited variation.

Children usually look a little like their father, and a little like their mother, but they will not be identical to either of their parents. This is because they get half of their DNA and inherited features from each parent.

Each egg cell and each sperm cell contains half of the genetic information needed for an individual. When these join at fertilisation a new cell is formed with all the genetic information needed for an individual.

Here are some examples of inherited variation in humans:

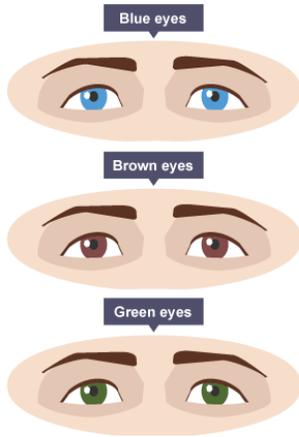
eye colour

hair colour

skin colour

lobed or lobeless ears

ability to roll your tongue



Examples of eye colors inherited



Two ears: one is lobed, the other is lobeless

Having lobed or lobeless ears is an example of inherited variation



Having lobed or lobeless ears is an example of inherited variation

Gender is inherited variation too, because whether you are male or female is a result of the genes you inherited from your parents.

Environmental causes of variation

Characteristics of animal and plant species can be affected by factors such as:

climate

diet

accidents

culture

lifestyle

For example, you will become heavier if you eat too much food, and you will become lighter if you eat too little. A plant in the shade of a big tree will grow taller as it tries to reach more light.

Variation caused by the surroundings is called environmental variation. Here are some other examples of features that show environmental variation:

your language

your religion

flower colour in hydrangeas (these plants produce blue flowers in acidic soil and pink flowers in alkaline soil)

Inherited and environmental causes

Some features vary because of a mixture of inherited causes and environmental causes. For example, identical twins inherit exactly the same features from their parents. However, if you take a pair of twins, and twin 'A' is given more to eat than twin 'B', twin 'A' is likely to end up heavier. Weight and height are common examples of characteristics that are influenced by both genetic and environmental factors.

Continuous and discontinuous variation

Some of the features of the different organisms in a species show continuous variation, and some features show discontinuous variation.

Continuous variation

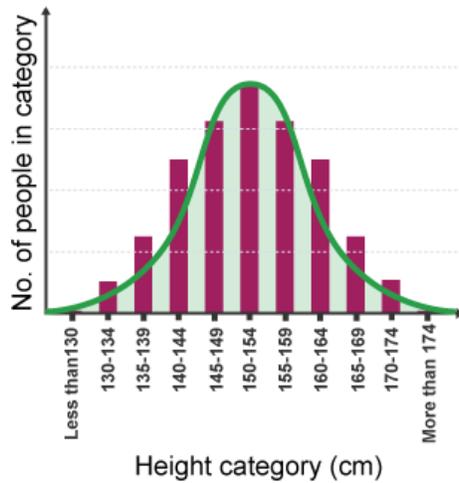
Human height is an example of continuous variation. It ranges from that of the shortest person in the world to that of the tallest person. Any height is possible between these values. So it is continuous variation.

For any species a characteristic that changes gradually over a range of values shows continuous variation. Examples of such characteristics are:

height

weight

If you record the heights of a group of people and draw a graph of your results, it usually looks something like this:



A bar chart to represent variation in height

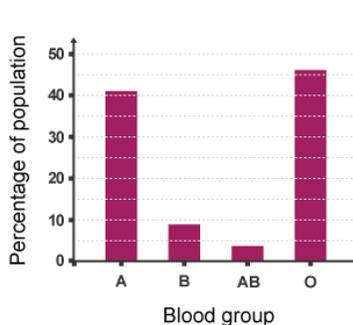
The more people you measure, and the smaller the categories you use, the closer the results will be to the curved line. This shape of graph is typical of a feature with continuous variation. Weight would give a graph similar in shape to this.

Discontinuous variation

A characteristic of any species with only a limited number of possible values shows discontinuous variation. Human blood group is an example of discontinuous variation. In the ABO blood group system, only four blood groups are possible (A, B, AB or O). There are no values in between, so this is discontinuous variation.

Here are some examples:

blood group



sex (male or female)

eye colour

A bar chart to represent the frequency of each blood group in the population