

3.4 Continuous and discontinuous

Learning objectives

After this topic you will be able to:

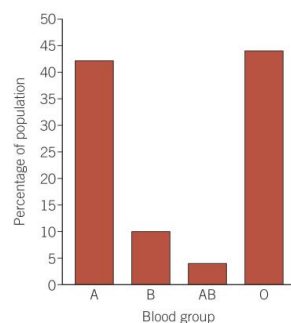
- describe the difference between continuous and discontinuous variation
- represent variation within a species using graphs.

Fantastic Fact

The tallest ever person was Robert Wadlow. He grew to a height of 2.72 m. He could not fit into many houses without ducking!

Key Words

discontinuous variation, continuous variation.



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▲ Discontinuous data is always plotted on a bar chart.

If you look around your classroom at the other students, you will see that some students share the same eye colour but very few are exactly the same height. This is because there are different types of variation.

What is discontinuous variation?

Characteristics that can only result in certain values show **discontinuous variation**. For example, gender shows discontinuous variation. There are only two possible values: you are either male or female.

Other characteristics that show discontinuous variation are your blood group and eye colour.

A State what is meant by discontinuous variation.

What is continuous variation?

A characteristic that can take any value within a range is said to show **continuous variation**. For example, the height of the population ranges from the shortest person in the world to the tallest person. Everyone else's height can be any value in between. This is an example of continuous variation.

Other characteristics that show continuous variation are your body mass, hair length, and arm span.

B State what is meant by continuous variation.

Patterns of variation

To study variation, scientists take measurements of different characteristics within the species. To come up with conclusions, they need to collect measurements from large numbers of the population. This data is then plotted on a graph so that patterns in the data can be easily spotted.

Plotting discontinuous variation

Characteristics that show discontinuous variation should be plotted on a bar chart.

For example, a person can only have one of four blood groups – A, B, AB, or O. These are the only values that a blood group can be, so you should plot a graph with four bars.

● B2 Chapter 3: Adaptation and inheritance

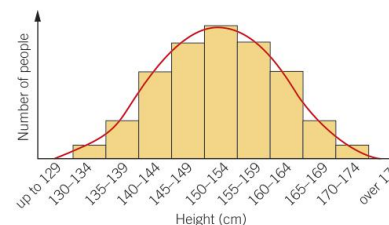
Characteristics that occur only as result of inherited variation normally show discontinuous variation.

C State the type of graph that should be used to plot discontinuous data.

Plotting continuous variation

Characteristics that show continuous variation should be plotted on a histogram. A line is then often added to the chart to make it easier to see the shape of the graph.

Within a population, characteristics that show continuous variation will display a range of measurements from one extreme to another.



▲ Continuous data is always plotted on a histogram.

This type of variation usually produces a curve, which is known as a normal distribution.

Characteristics that occur as a result of both environmental and inherited variation usually show continuous variation.

D State the type of graph that should be used to plot continuous data.

Which graph?

Which type of graph – a bar chart or histogram – would you use for the sets of data below?

- members of your class who have lobed, or lobeless ears
- the length of feet of each of your teachers
- the height of a group of seedlings, planted for a germination experiment
- the number of strawberries per plant, from a sample of 25 plants.

Summary Questions

- 1 🧪 Copy and complete the sentences below.

Characteristics that can only result in certain values show _____ variation. Characteristics that can have any value within a range show _____ variation.

The range of values of a characteristic from a sample can be displayed using a _____.

A characteristic such as eye colour should be displayed using a _____.

Characteristics showing continuous variation, such as body mass, should be shown using a _____.

(5 marks)
- 2 🧪 Classify each of these characteristics into continuous variation and discontinuous variation.

length of arm, hair colour, maximum sprinting speed, shoe size, average leaf size

(5 marks)
- 3 🧪

 - Look at the graph of the variation in heights on this page. Describe the pattern that this variation shows. (3 marks)
 - Explain whether this variation is a result of environmental factors, inherited factors, or both. (3 marks)
- 4 🧪 Explain in detail the difference between continuous and discontinuous variation, using examples of features from the human body.

(6 marks)

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