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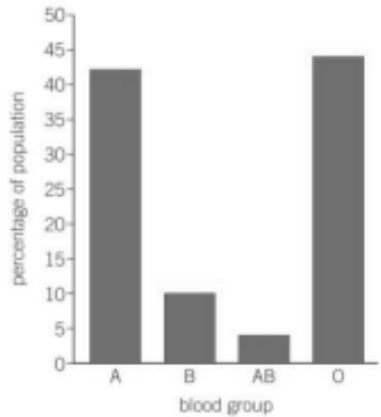
# Variation & Interdependence

1	I can describe and explain how organisms may be affected by their environment, with reference to adaptations
2	I can construct and interpret simple food chains
3	I can discuss the importance of insect pollination and plant reproduction, with reference to human food security.
4	I can evaluate the impact of humans on other organisms, with reference to the accumulation of toxic materials
5	I can state that variation occurs within and between species, and I can describe how variation is caused by inherited and environmental factors
6	I can explain that variation can be continuous or discontinuous, including the use of data

Keyword	Definition
bioaccumulation	The build-up of toxic chemicals inside organisms in a food chain.
community	The collection of the different types of organism present in an ecosystem.
competition	Competing with other organisms for resources.
ecosystem	The living things in a given area and their non-living environment.
environment	The surrounding air, water, and soil where an organism lives.
habitat	The area in which an organism lives.
interdependence	The way in which living organisms depend on each other to survive, grow, and reproduce.
population	Group of the same species living in an area.
predator	An animal that eats other animals.
prey	An animal that is eaten by another animal.
adaptation	Characteristic that helps an organism survive in its environment
continuous variation	Where differences in characteristics between living things can have any numerical value.
discontinuous variation	Where differences in characteristics between living things can only be grouped into categories.
species	A group of living things that have more in common with each than they do with other groups. This allows them to mate to produce fertile offspring.

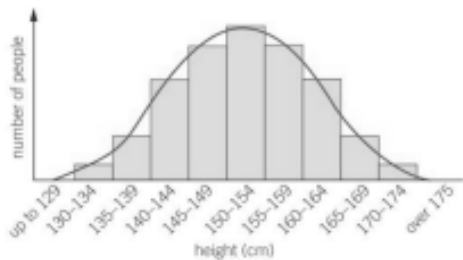
Characteristics that can only have **certain values** show **discontinuous variation**.

Discontinuous variation, such as blood group, is plotted on a bar graph.



Characteristics that can be any value within a range show **continuous variation**.

Continuous variation, such as height, is plotted on a histogram.



**Variation**

The differences in characteristics of living things is known as **variation**.

There is a large amount of variation between different **species**, but within **species** many more characteristics are shared.

Even though two organisms may look the same, they will always have variation between them.

**Environmental factors** can also impact inherited factors, for example a poor diet can affect height or your exposure to the sun can affect skin tone.

Characteristics which are **inherited** and not affected by environmental variation include natural eye colour, blood group and genetic diseases.

Prior Knowledge From KS2:  
*In KS2 you learnt the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, Labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments*

**Adaptations**

**Adaptations** are characteristics which organisms have developed to best survive in their surroundings.

Organisms with the best suited adaptations can breed and pass these on. Those who are not best adapted will die out and not be able to pass on their genes.

Why?  
These processes have allowed scientists to intervene through selective breeding to produce livestock with favoured characteristics. Scientists have now discovered how to take genes from one species and introduce them into the genome of another by a process called genetic engineering.

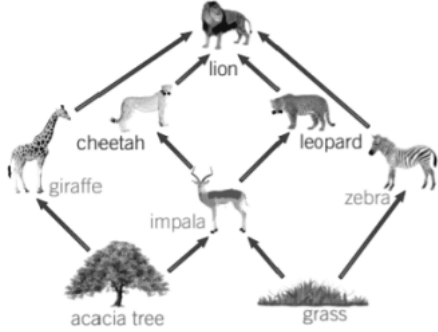
Careers:  
Vet  
Farmer  
Environmental Scientist

**Food Chains and Food Webs**




Food chains show the direction in which energy flows when one organism eats another.

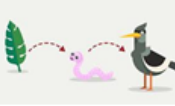

Food webs show how a number of different food chains are connected.

Each food chain will start with a producer—an organism that can convert energy from the sun into chemical energy through photosynthesis.



Future Learning:  
*At GCSE you will understand how the number of chromosomes are halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring. Gene mutations occur continuously and on rare occasions can affect the functioning of the animal or plant.*

Topic	1 Point	2 Points	4 Points	6 Points	10 Points
<b>Variation</b> 	What varies between people? Think about your family, or classmates.	Print out a graph which shows continuous variation. Print out a graph which shows discontinuous variation.	Create a Venn diagram to show environmental, and inherited characteristics.	Write a method on how you could investigate the height of different people at Crompton House.	Collect some data on the eye colours of people in your year group. Put this information into a bar chart.
<b>Adaptations in animals and plants</b> 	How is a polar bear adapted to live in the arctic circle?	Pick either the camel or a cactus. Draw a diagram and label all the adaptations.	Write 4 true or false facts about adaptations.	Describe why it would not be possible for a polar bear to live in the desert.	Pick any environment you want, create an animal or plant that is very well adapted to survive in this environment. Be as creative as you like!
<b>Classifying animals and plants</b> 	What are the five kingdoms of life?	Print out or draw a picture of an invertebrate organism, and a vertebrate organism.	Give an example of an organism from: -Mammals, -Reptiles -Fish -Bird -Amphibian	Write out ten True or False statements on classifying animals and classifying plants.	Create a David Attenborough style documentary describing the differences between mammals, reptiles, fish, <u>birds</u> and amphibians.

<b>Food chains, food webs and bioaccumulation</b> 	Draw a food chain of the following: Caterpillar, leaf, blackbird	Define the terms: Producer, consumer, predator, prey.	Only around 10% of the energy available at one stage of a food chain is transferred to the next level.  If 1000kJ of energy enters a food chain, and the food chain has three links- calculate the energy supplied to the top predator.	Create a food web of your own choice. Pick some animals and research what they eat. Include pictures.	Draw a cartoon strip to show how pesticides can be passed through a food chain. (Bioaccumulation.)  Why do organisms at the top of the food chain experience a worse effect.
<b>Competition and interdependence</b> 	What things do animals and plants compete for in an environment?	Make a set of flashcards for this topic so far.	What is a parasite? Why is this not an example of interdependence.	Research the interdependence between the Canadian lynx and snowshoe hare. Describe what happens to the population of Canadian lynx as the snowshoe hare population: a) Increases b) decreases	Using your knowledge of food chains and interdependence. Write a 500 word essay explaining why life without plants would be impossible. If you use the internet, include where you got your information from.

