Science - Autumn Term 1

Body Systems

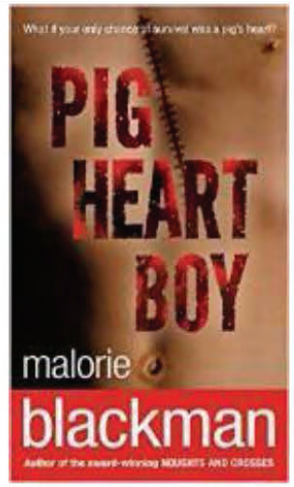
How many chambers does the human heart have?	Answer
What are the three different types of blood vessels in your body called?	Answer
What does blood do?	Answer
Why is exercise important?	Answer
How does nutrition affect our brain and behaviour?	Answer
Why is water important in keeping our bodies healthy?	Answer

Animals including Humans: Circulatory System Knowledge Mat

Subject Specific Vocabulary

blood vessels	Blood vessels are a series of tubes inside your body. They move blood to and from your heart.
drugs	A drug is a chemical that is not food and that affects your body. Some drugs are given to people by doctors to make them healthy.
atriums	The atriums are the two upper most chambers of the heart. Blood is pushed from the atriums to the ventricles.
William Harvey	Was the first person to accurately describe the function of the heart and the circulation of blood around the body.
Cardiovascular	The blood circulatory system (cardiovascular system) delivers nutrients and oxygen to all cells in the body.
ultrasound	An ultrasound machine uses sound waves to take pictures of the inside of the body.
cardiologists	A cardiologist is a doctor with special training and skill in finding, treating and preventing diseases of the heart and blood vessels.
capillaries	Capillaries are very thin blood vessels. They bring nutrients and oxygen to tissues and remove waste products.
pulse	Your heart has to push so much blood through your body that you can feel a little thump in your arteries each time the heart beats
ventricles	The ventricles are the two lower chambers in the heart.

Interesting Book



Important facts to know by the end of the circulatory system topic:

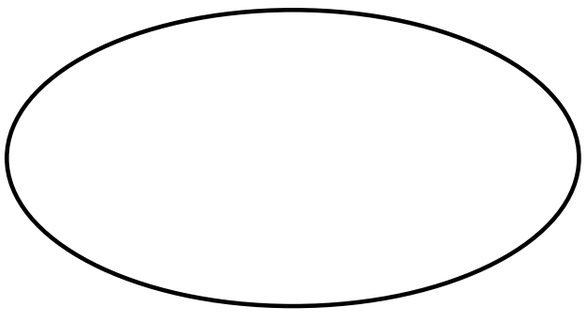
- **Identify and name the main parts of the human circulatory system.**
- **Know the function of the heart, blood vessels and blood.**
- **know the impact of diet, exercise, drugs and life style on health.**
- **Know the ways in which nutrients and water are transported in animals, including humans.**
- **Know who William Harvey was.**

Sticky Knowledge about the circulatory system

- ❑ Your heart will beat about 115,000 times each day. Your heart pumps about 2,000 gallons of blood every day.
- ❑ The entire trip around your body only takes blood about 20 seconds in total. Blood is what is used to transport oxygen, waste, nutrients, and more throughout the body.
- ❑ The circulatory system includes the heart, blood vessels and blood, and is vital for fighting diseases and maintaining proper temperature.
- ❑ Because your heart is crucial to your survival, it's important to keep it healthy with a well-balanced diet and exercise, and avoid things that can damage it, like smoking.
- ❑ Your heart affects every part of your body. That also means that diet, lifestyle, and your emotional well-being can affect your heart.

National curriculum	Living things: body systems
Year 5	describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
Year 5	describe the life process of reproduction in some plants and animals
Year 5	describe the changes as humans develop to old age
Year 6	describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
Year 6	give reasons for classifying plants and animals based on specific characteristics
Year 6	identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
Year 6	recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
Year 6	describe the ways in which nutrients and water are transported within animals, including humans

Mind Map



Before starting the topic, add what you already know.

What is this picture telling me?

How many chambers does the human heart have?	Answer
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Science - Autumn Term 2

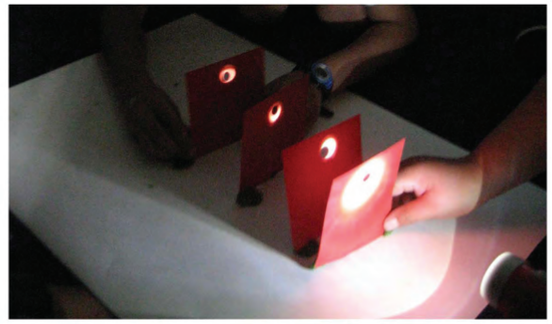
Light

Describe the way light travels.	Answer
What is a shadow?	Answer
What is a rainbow?	Answer
What happens to a beam of light when it hits water?	Answer
What is a periscope and how does it work?	Answer
Where does light come from?	Answer

Knowledge Organiser – Light (Science Year 6)

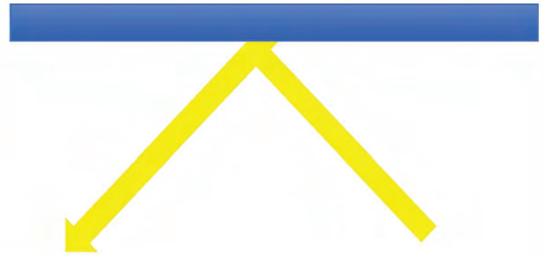
Key Vocabulary	Definition
Absorb	To take in.
Light rays	Imaginary lines used to explain how waves of visible light move.
Reflect	To cast light back from a surface.
Straight	To move in one direction only.

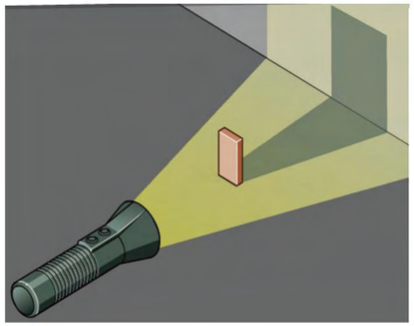
Light travels in straight lines.



You should have found out that light can only travel in a straight line. The light was mostly blocked by the card but some of the light travelled through the holes and you could see it come out the other end.

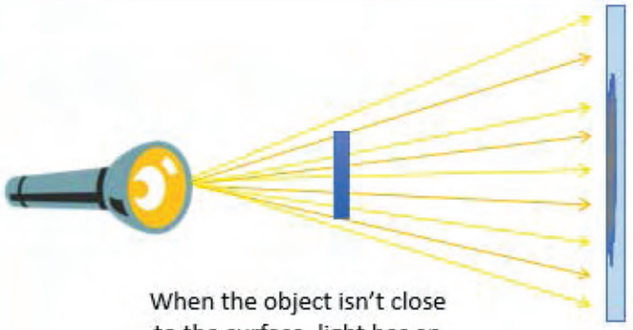
Light reflects off a mirror like a ball hitting a hard surface. The angle it hits the mirror at is the same that it is reflected at.



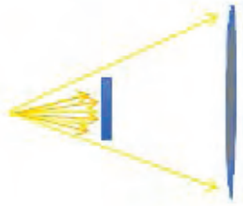


Light travels in straight lines. Some objects will form a shadow when light hits them. This is because they block the light. Shadows are the same shape as the object that casts them.

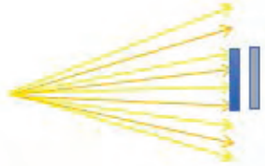
This is because light travels in straight lines and cannot bend around an opaque object in their path. A concentrated light source casts a sharp shadow.



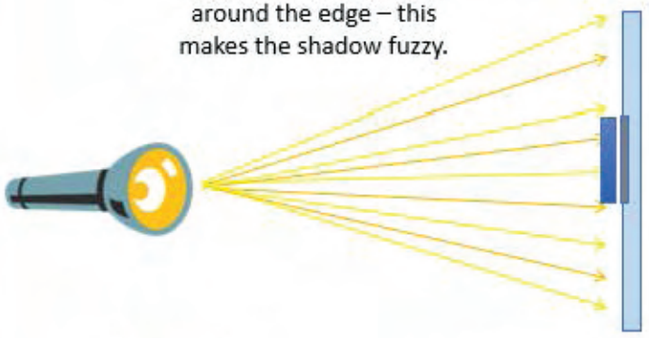
When the object isn't close to the surface, light has an opportunity to spill and bounce off other objects around the edge – this makes the shadow fuzzy.



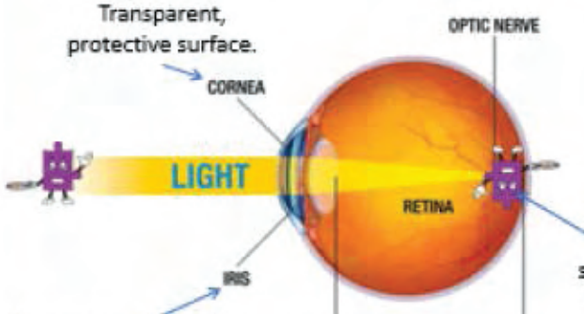
Fuzzy shadow.



Sharp, clear shadow.



The closer the object to the surface the less light is able to reflect and bounce behind. This means the shadow is sharp.



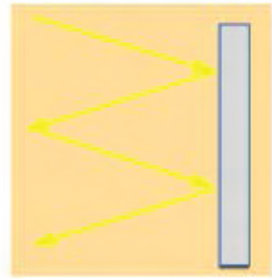
Light sensitive cells send an electrical signal down the optic nerve to the brain.

The coloured part of the eye. It controls how much light is let into the eye.

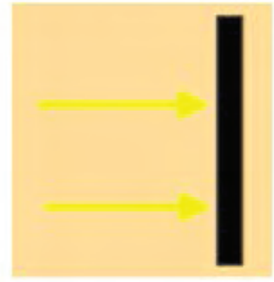
Focuses light onto the back of the eye (the retina).

The image appears upside down because light rays cross each other in the eye. The brain interprets the image so that we see it the right way up.

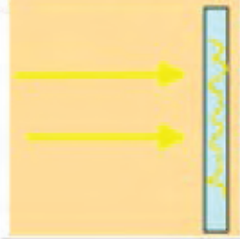
Shiny and light objects reflect light.



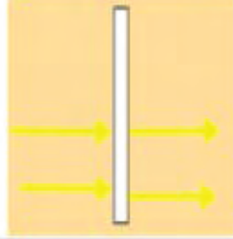
Dark objects absorb the light. They look black.



Translucent objects let some light through. For example, tracing paper.

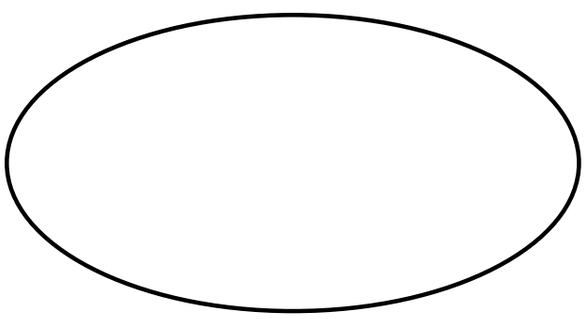


Transparent objects let most of the light through. For example, glass.



National curriculum	Light
Year 3	recognise that they need light in order to see things and that the dark is the absence of light
Year 3	notice that light is reflected from surfaces
Year 3	recognise that light from the sun can be dangerous and that there are ways to protect their eyes
Year 3	recognise that shadows are formed when the light from a light source is blocked by a solid object
Year 3	find patterns in the way that the size of shadows changes
Year 6	recognise that light appears to travel in straight lines
Year 6	use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
Year 6	explain that we see things because light ravels from light sources to our eyes or from light sources to objects and then to our eyes
Year 6	use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Mind Map



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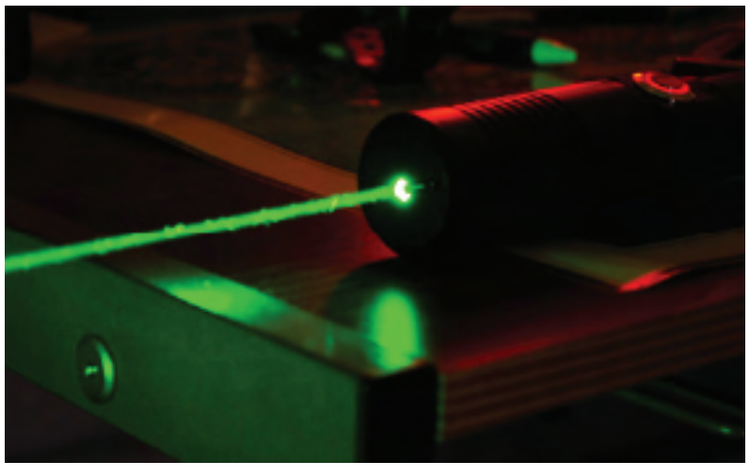

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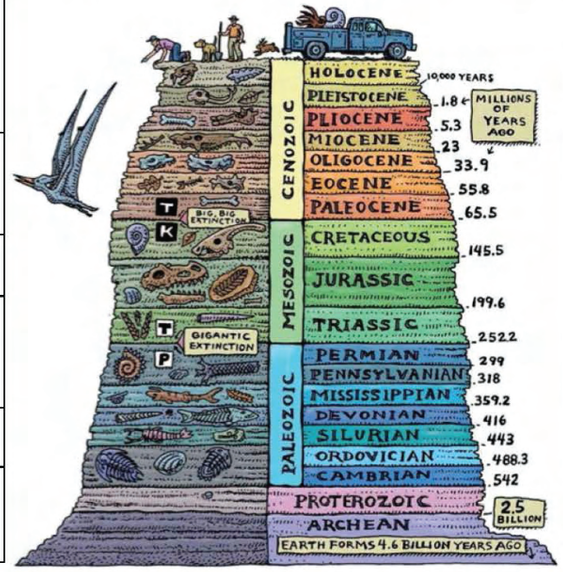
Science - Spring Term 1

Evolution and Inheritance

What does the term evolution mean?	Answer
What are 'offspring'?	Answer
What can we learn from studying fossils?	Answer
In science, what does the term 'inheritance' mean?	Answer
Why do giraffes have long necks?	Answer
How are camels able to survive for long periods in the desert?	Answer

Knowledge Organiser – Evolution (Science Year 6)

Key Vocabulary	Definition
Evolution	Gradual process in which something changes.
Adaptation	Process of changing.
Characteristics	Qualities that make things different to other things.
Variation	A difference or change.
Inheritance	Passing of characteristics from parents to offspring.

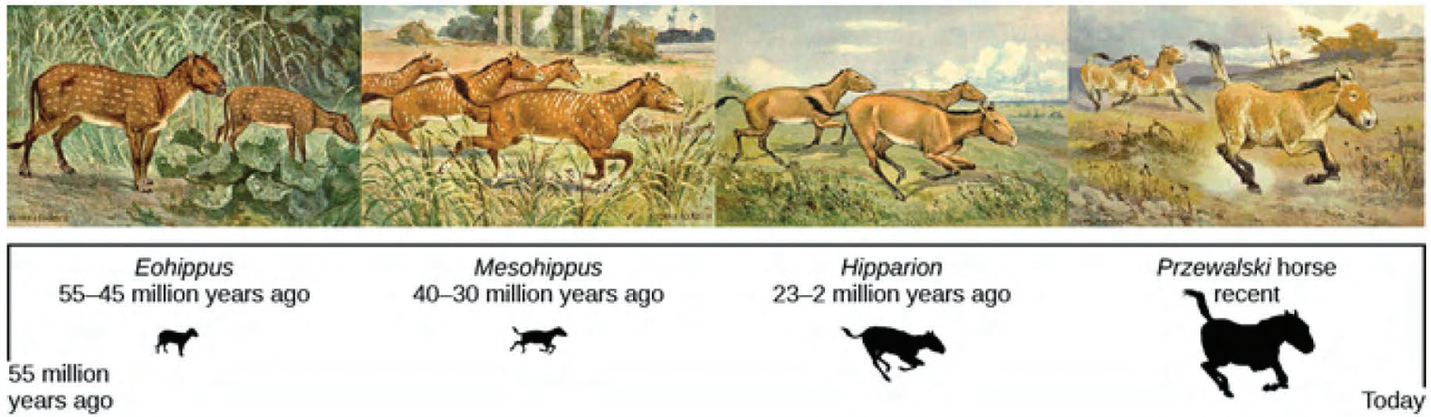


Fossils are formed over millions of years and they are trapped in layers of rock.

We can use these layers to find out how old the fossils are and how species have changed over time.

Similarities and differences between fossils in rocks of different ages help us to see how animals have evolved over billions of years.

A four-toed hoof evolved into a single hoof, more suitable for running.
A modern-day horse is much taller than its original ancestor.



When living things reproduce, they pass on characteristics to their offspring.

When offspring have similar characteristics to their parents, we say that they are inherited.

Inherited characteristics	Environmental characteristics
Eye colour	Food choices
Hair colour	Being good at sport
Height	Liking football

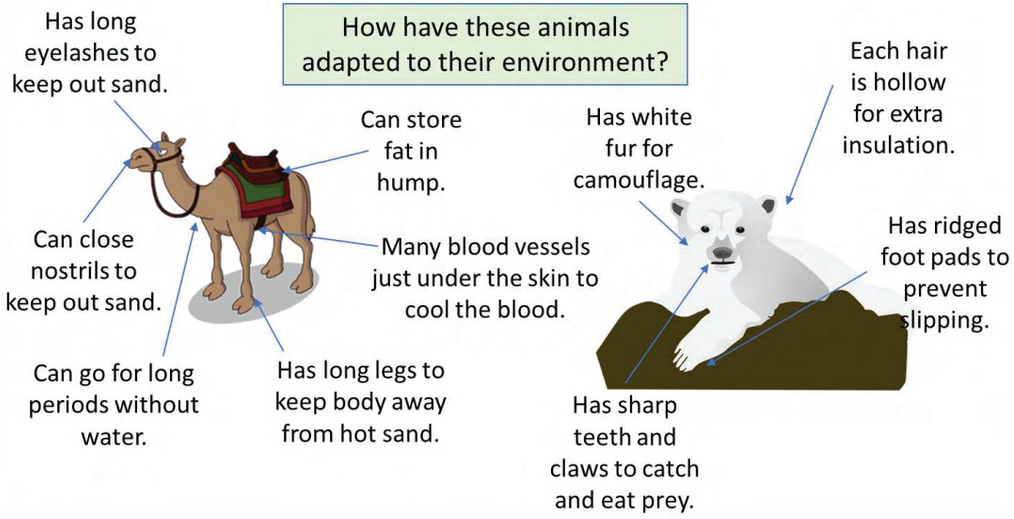
Why do species change over time?

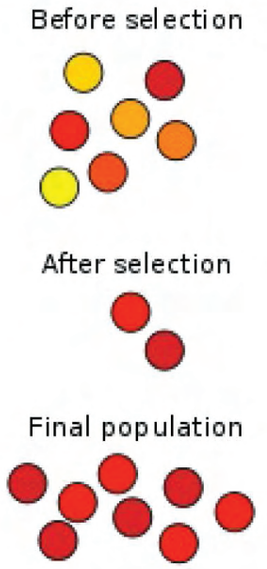
Variation - Within a species, there are natural variations that result from differences in the genetic material.

Adaptation - Sometimes a mutation occurs that makes an individual more able to survive than other members of the group.

Selection - Organisms with particularly advantageous adaptations are most likely to survive long enough to reproduce.

How have these animals adapted to their environment?





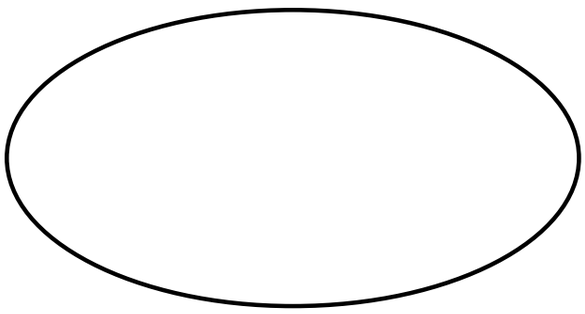
Natural selection

The better adapted members of the species to the environment survive...Survival of the fittest.

The survivors pass on their genes to their offspring.

National curriculum	Evolution
Year 3	recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
Year 3	recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
Year 3	identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to e volution

Mind Map



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Science - Spring Term 2

Electricity

What is a series circuit?	Answer
What does this symbol mean? 	Answer
What is an electrical insulator and how are they useful?	Answer
What is a parallel circuit?	Answer
Why are some wires thicker than others?	Answer
Describe a situation where electricity could be dangerous.	Answer

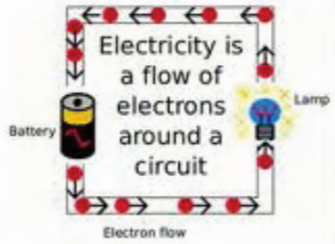
Knowledge Organiser – Electricity (Science Year 6)

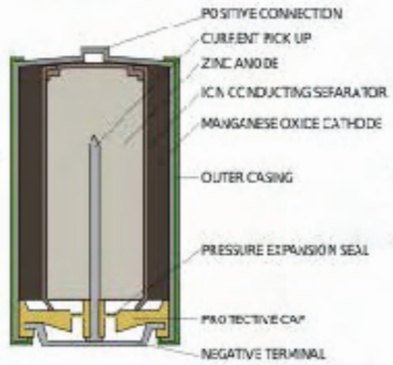
Key Vocabulary	Definition
Terminal	Point of connection for closing an electric circuit.
Voltage	Force of an electrical current.
Current	Flow of electrical charge.
Resistance	Reducing the electric current flow through a material.

The flow of electrons in a circuit is known as a **current.**

An electric current can only flow when there is a complete circuit.

Electrons are small particles with a negative electric charge.



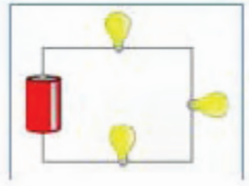


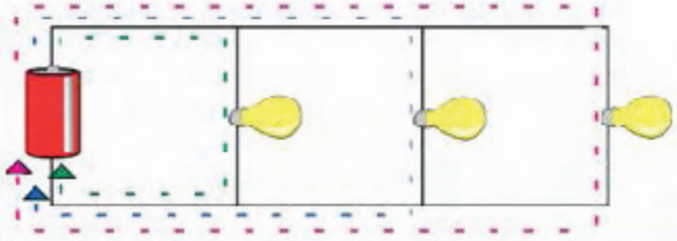
Batteries store **chemical energy** and change it to **electrical energy**.

A **cell** is the basic unit that produces electricity, and a battery has two or more cells.

Voltage is the electrical force that causes electrons to flow around a circuit. It is measured in units called volts (V).

A circuit connected in **series** contains components attached to each other, like holding hands in a circle.





Components connected in a **parallel** circuit are connected across each other.

Increasing the battery voltage does two things:
- it increases the energy supplied.
- it drives the charge around the circuit at a greater rate.

CELL

WIRE

BUZZER

M

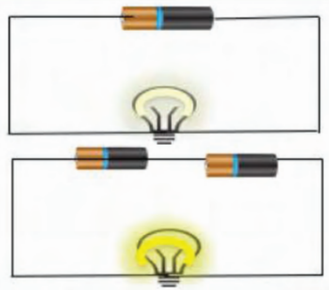
ELECTRIC MOTOR

BULB

SWITCH (OPEN)

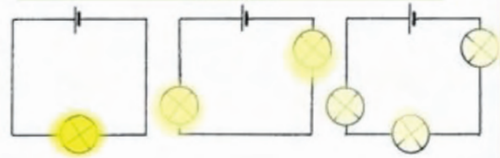
More batteries

Adding more batteries to a simple circuit will increase the electrical energy, which will make a bulb brighter.



More bulbs

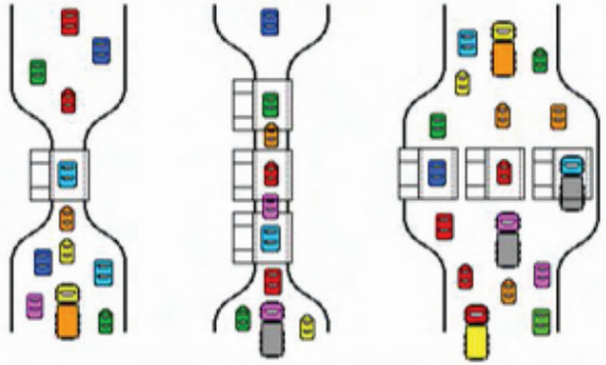
Adding more bulbs to a simple circuit will reduce the electrical energy and make the bulbs dimmer.



This diagram of a flow of traffic through a tollbooth can help explain the effect bulbs have in different types of circuit.

A bulb in the circuit slows down (resists) the flow of electricity.

The tollbooth represents the bulb and the cars imitate the flow of electricity.

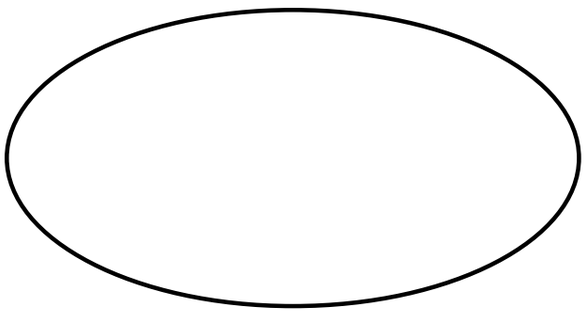


If the tollbooths (bulbs) were in parallel, there would be a greater flow of traffic (electricity) and the bulbs would be of equal brightness.

More tollbooths (bulbs) in series would slow down the flow of traffic even further so the bulbs would become dimmer.

National curriculum	Electricity
Year 4	identify common appliances that run on electricity
Year 4	construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
Year 4	identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
Year 4	recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
Year 4	recognise some common conductors and insulators, and associate metals with being good conductors
Year 6	associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
Year 6	compare and give reasons for variations in how components func-tion, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
Year 6	use recognised symbols when representing a simple circuit in a diagram

Mind Map



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Why are some wires thicker than others?	Answer
Describe a situation where electricity could be dangerous.	Answer

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Science - Summer Term

Micro-organisms

There are seven life processes that all living things do. Name as many as you can.	Answer
What is a microbe?	Answer
Explain what a microscope is used?	Answer
What is penicillin?	Answer
Name a way in which microbes are useful to us. Name a way in which microbes are harm-ful.	Answer
Do we need microbes to survive? Explain your answer.	Answer

National curriculum	Living things
Year 5	describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
Year 5	describe the life process of reproduction in some plants and animals
Year 5	describe the changes as humans develop to old age
Year 6	describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
Year 6	give reasons for classifying plants and animals based on specific characteristics
Year 6	associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
Year 6	recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
Year 6	describe the ways in which nutrients and water are transported within animals, including humans

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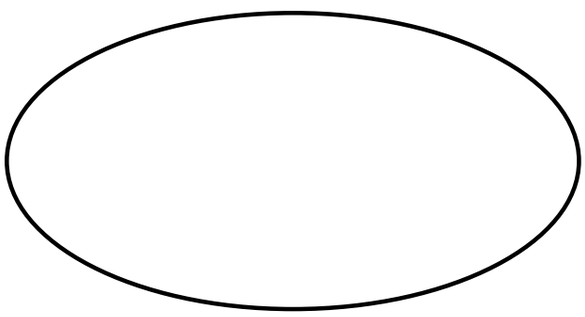

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Science
End of Year

Assessment

Q1.

Food and health

(a) Damon has a balanced diet. It helps him to keep healthy.

Which of the following **best** describes a **balanced** diet?

Tick **ONE** box.

eating mostly fruit and vegetables	☐	eating foods from different food groups	☐
taking vitamin pills	☐	not eating sweets	☐

1 mark

(b) Damon has some ideas about his balanced diet.

Write **true** or **false** next to each idea below.

A balanced diet will help my bones grow strong.

.....

A balanced diet gives me all the nutrients I need.

.....

A balanced diet means I do not need to exercise to stay healthy.

.....

1 mark

Q2.

The circulatory system

(a) Some children are learning about blood and how it flows around the human body.

Blood flows faster when the heart pumps faster.

Which **TWO** of the following make the heart pump **fastest**?

Tick **TWO** boxes.

swimming	☐	resting	☐
stretching	☐	running	☐

1 mark

(b) What do we measure to find out how fast the heart is pumping?

.....

1 mark

(c) What is the heart made from?

Tick **ONE** box.

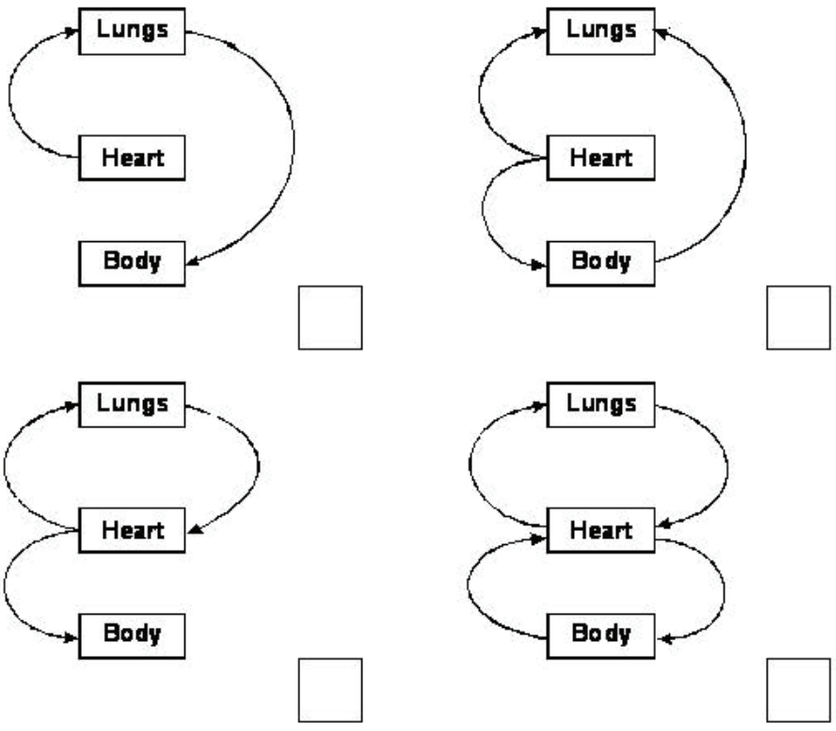
muscle	☐	blood	☐
bone	☐	skin	☐

1 mark

(d) The heart pumps the blood.

Which diagram best shows the path of the blood as it circulates?

Tick **ONE** box.



1 mark

(e) When the heart pumps the blood faster, we also breathe faster.

Complete this sentence.

*We breathe **faster** because the body needs to*
take more ..... into the lungs.

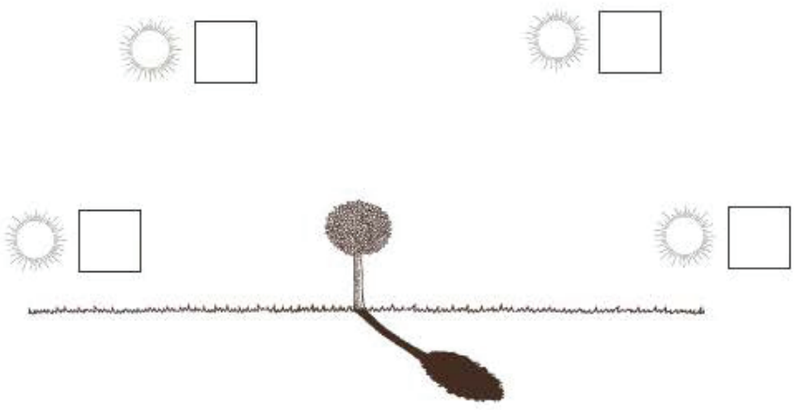
1 mark

Q3.

Tree shadow

(a) Alex looks at a tree on a sunny day.

Tick **ONE** box to show where the Sun was when it caused this shadow of the tree.



1 mark

(b) Explain why a shadow forms behind the tree.

.....

1 mark

(c) Alex looks at the shadow of the tree at different times of the day. He observes that the shadow is in a different position each time.

The position of the shadow changes because the Sun appears to move across the sky.

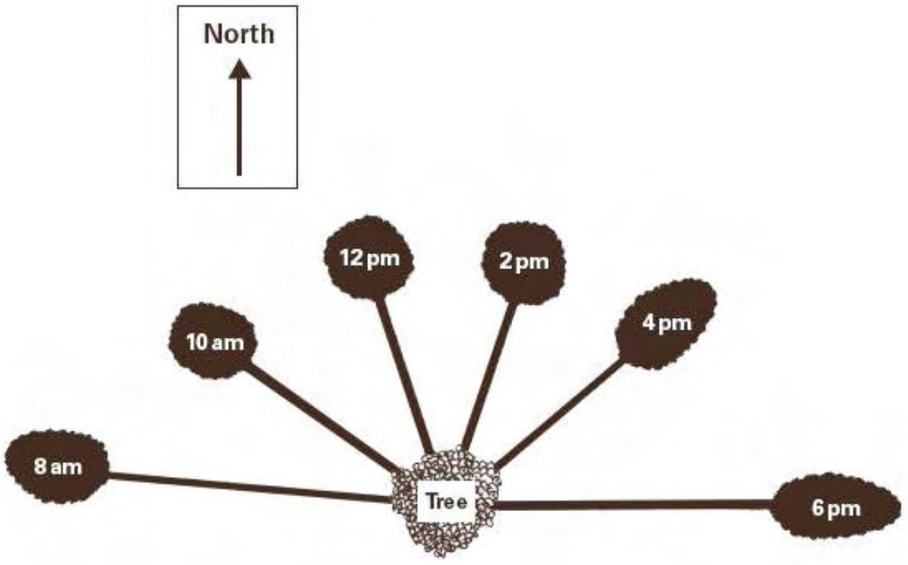
Tick **One** box to explain why the Sun appears to move across the sky each day.

The Earth orbits the Sun.	☐	The Earth spins on its axis.	☐
The Sun orbits the Earth.	☐	The Sun spins on its axis.	☐

1 mark

(d) Alex looks at the tree's shadow every two hours. He draws the position of the shadows on the ground.

The diagram below shows his results.



At 8 pm there is no shadow of the tree on the ground.

Why is there no shadow of the tree on the ground at 8 pm?

.....

.....

1 mark

(e) Use Alex's diagram to estimate what time the shadow was pointing north.

..... pm

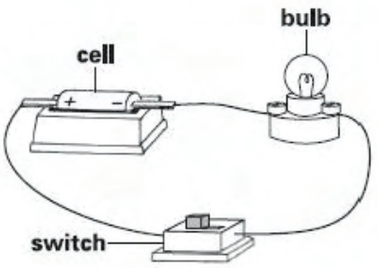
1 mark

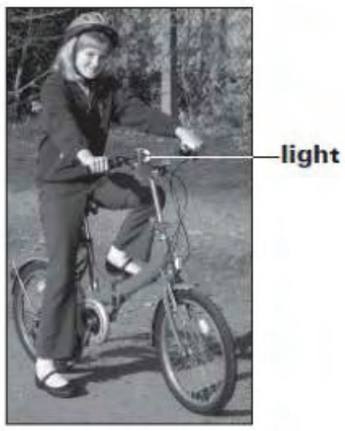
Q4.

Road safety

(a) Julia has a bike with a light.

The picture below shows the circuit in Julia's light.





(i) Draw a circuit diagram to show the circuit in Julia's light.
Use symbols in your drawing.

2 marks

(ii) What should Julia add to her circuit to make the light brighter?

Julia should add .....

1 mark

(b) It is important for people riding bikes to be seen in the dark.
The pictures below show what two jackets look like when Julia shines a torch on each of them.

Jacket A

Jacket B

Julia can see jacket **B** better than jacket **A**.

Explain what happens to the light from the torch for Julia to see jacket **B** better than jacket **A**.

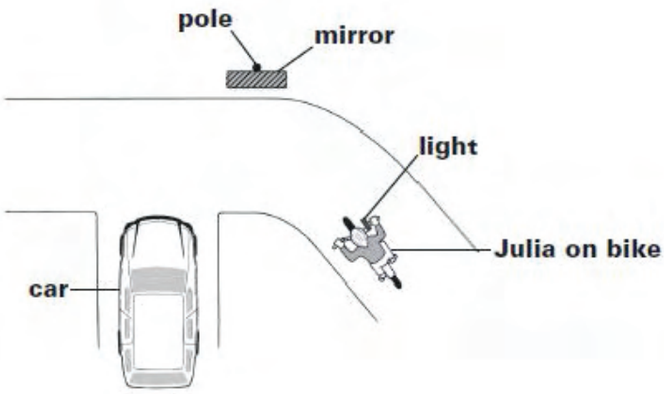
.....

.....

1 mark

(c) Julia's house is near a bend in the road. There is a mirror on a pole so car drivers can see people coming round the bend.

Draw **TWO** arrows on the diagram below to show the direction light travels for the car driver to see the light on Julia's bike.



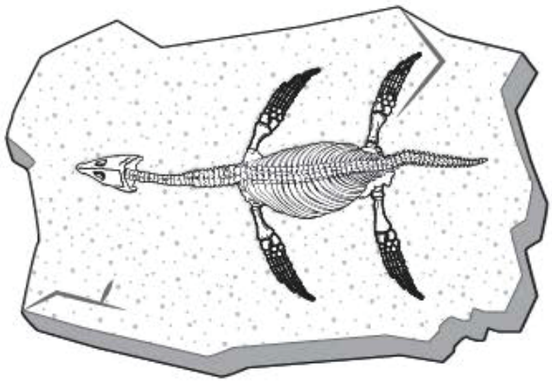
2 marks

Q5.

Sea creature

(a) The picture shows the fossil of a pliosaur.

These animals lived in the sea a long time ago.



What material are fossils made of?

..... 1 mark

(b) How did the fossil of the pliosaur form? Match each stage to order what happens.

Stage	What happens
1st	Soft parts decayed away.
2nd	Hard parts were turned into fossils over many years.
3rd	Hard parts were buried by many layers of sand.
4th	The pliosaur died and sank to the sea bed.

1 mark

(c) Very few animals become fossils after they die.

Explain why very few animals become fossils after they die.

1. .....

2. .....

1 mark

(d) Fossils can give a lot of information about animals that lived in the past.

Write **true** or **false** for each statement about the pliosaur fossil.

The pliosaur's fossil could give us information about...

	True or **false**?
how long ago the animal lived.	.....
what the animal ate.	.....
what the animal smelt like.	.....
what colour the animal's eyes were.	.....
how large the animal was.	.....

2 marks

Q6.

Birds in their environments

(a) Many water birds have webbed feet.

Why are webbed feet useful to water birds?

.....

1 mark

(b) Birds have different shaped beaks.
The shape of the bird's beak is suited to the food the bird eats.

Draw **THREE** lines to match each beak to the food the bird eats.

Beak			
Food	animals buried deep in mud	small seeds and berries	meat torn from prey

1 mark

(c) There is a law in England to stop people taking eggs from the nests of wild birds.

It is important for **wild birds** that people stop taking their eggs.
Tick **ONE** box to show why.

because there would be no food for foxes	☐	because birds' eggs break easily	☐
so people do not hurt themselves taking eggs	☐	so there are enough birds to reproduce	☐

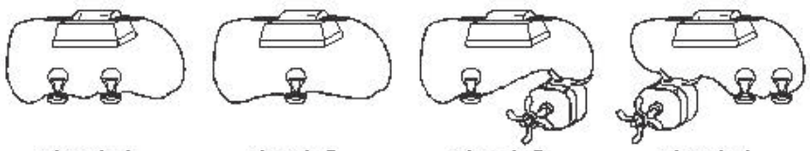
1 mark

Q7.

Circuits and sensors

(a) Class 6D makes different circuits using the same type of bulbs, motors with fans and cells (batteries).

(i) Tick **ONE** box to show the circuit in which the bulb or bulbs are brightest.



circuit 1	circuit 2	circuit 3	circuit 4
☐	☐	☐	☐

1 mark

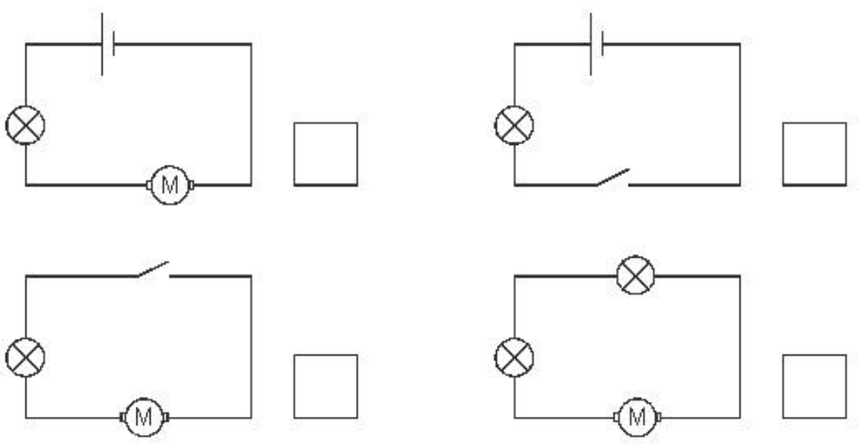
(ii) Explain why the circuit you chose has the brightest bulb or bulbs.

.....

.....

1 mark

(b) Tick **ONE** box to show which circuit diagram below is correct for circuit 3.



1 mark

(c) Each of the circuits made by class 6D has one cell.

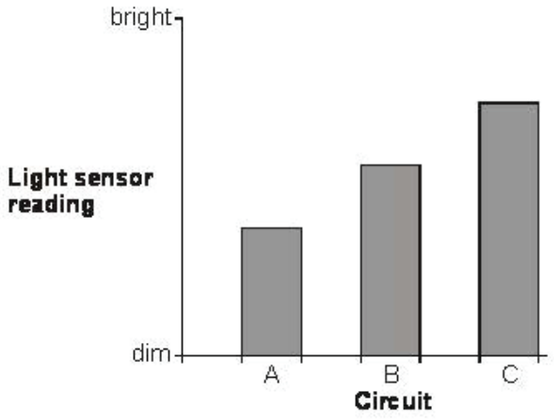
Complete the sentence below to explain the effect on the bulbs of adding a second cell to circuit 1.

The bulbs will .....

1 mark

(d) Class 6D made three new circuits. They used a light sensor to measure the brightness of one of the bulbs in each circuit.

The sensor gave the results on the graph below.



1 mark

Write **A**, **B** or **C** next to each circuit below to show which circuit gave each light sensor reading on the graph.

circuit ..... **circuit** ..... **circuit** .....

1 mark