

Year 8

Science Booklet 2



Use the knowledge organiser to help you answer these questions.

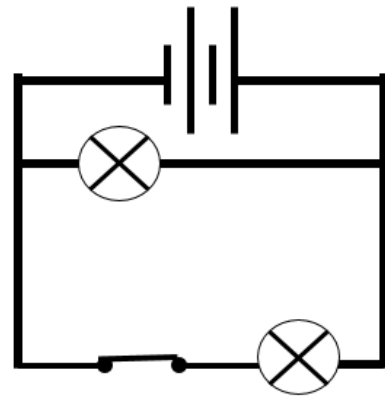
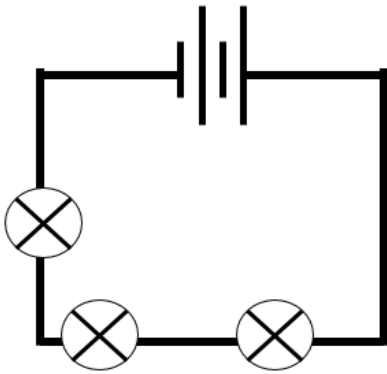
Use the markscheme to check your work.

Topics are:

1. Electricity and magnetism
2. Ecosystem processes
3. Adaptation and inheritance
- 4. Further questions on each topic**

1. Electricity and magnetism: Potential difference

What is the voltage across each bulb? They are all identical and the battery provides 6V



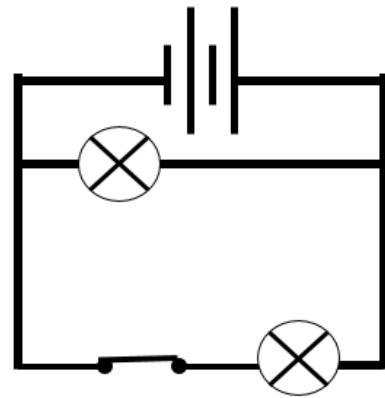
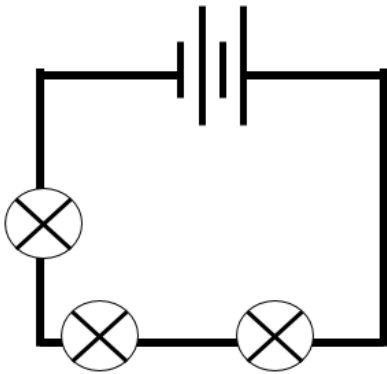
What happens to potential difference in a parallel circuit?

What happens to potential difference in a series circuit?

How can you increase the potential difference in a circuit like the ones above?

1. Electricity and magnetism: Current

What is the current across each bulb? They are all identical and the current across the battery is 3A



What happens to current in a parallel circuit?

What happens to current in a series circuit?

What is resistance and how does it relate to potential difference and current?

1. Electricity and magnetism: Magnetism

Draw the magnetic field lines around this magnet (remember arrows)



Draw the field lines out of these two magnets to show how attraction happens



How can the Earth's magnetic field be used for navigation?

What is the difference between a magnet and a magnetic substance?

1. Electricity and magnetism: Electromagnets

What is a solenoid?

What is the centre of an electromagnet called?

Give 3 ways that the strength of an electromagnet can be increased

Fill in the blanks

In an electric bell, circuit breaker, or loudspeaker a coil of wire becomes an when a current flows. A bell contains a "make or break" circuit that makes the bell A circuit breaker is like a you can In a loudspeaker themagnet and electromagnet.....to make a cone move in and out.

2. Ecosystem processes: Interdependence

Describe the following food chain; (key words producer, consumer, top predator)

Grass → Grasshopper → Snake → Hawk

Construct a food web from the following food chains

cabbage → caterpillar → thrush → owl

cabbage → slug → hedgehog

cabbage → slug → thrush → owl

Pesticides are spread on the field of grass from the food chain at the top of the page, explain in detail how a hawk can become poisoned.

3. Adaptation and inheritance: Evolution

Why is a penguin that can swim quickly more likely to survive?

What is variation?

What is competition?

What is adaptation?

How did Charles Darwin link these together?

3. Adaptation and inheritance: Inheritance

Give three characteristics that are inherited and three that are environmental

Describe the structure of a cell's nucleus

The following words will help: DNA, Cell, Nucleus, Gene, Chromosome

Complete the punnet square for gender

		Father's Genes	
		X	Y
Mother's Genes	X		
	X		

What is the probability of having a male or female child? Use the punnet square to help you

4. Further questions on all topics

Electricity and magnetism further questions

Task 1: Electrostatics

- 1 Put these sentences in order to explain how hair can become charged when it is combed.

	Order
The comb is pulled through the hair.	1
The comb has more negative charge than positive charge.	
Negative charges move from the hair onto the comb.	
The hair has less negative charge than positive charge.	
This means the hair becomes positively charged overall.	
This means the comb becomes negatively charged.	

- 2 Predict how two charged objects will behave when placed next to each other. Fill in the grid below. (Tick = attract, cross = repel)

	+	-
+		
-		

Task 2: Current and potential difference

Look at the circuit your teacher has set up. It includes equipment to measure current and potential difference.

Complete this table using the following phrases:

ammeter connected in series amount of charge flowing per second

how much energy is transferred to the charge

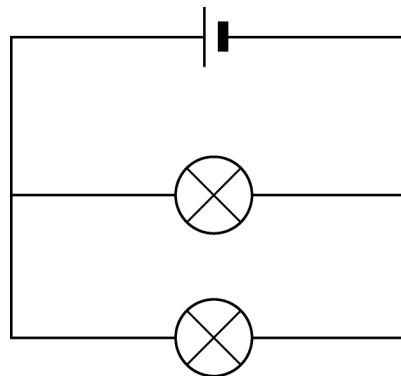
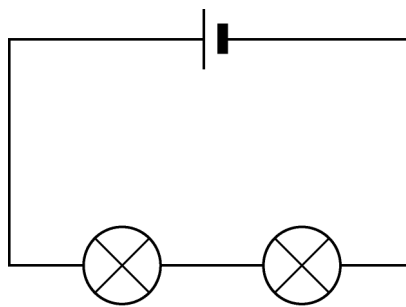
voltmeter connected in parallel

	Current	Potential difference
What it is measured with		

Definition		
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Task 3: Series and parallel circuits

The two circuits below show different ways circuit components can be connected. Label the components in these circuits and state whether they are series or parallel circuits. Explain your answer.



Task 4: Resistance

1 Complete the following paragraph to describe resistance using the words given below. Words can be used more than once.

ohms resistance V A Ω component charges

Each circuit _____ has a different _____ .
This tells

you how easy or difficult it is for the _____ to pass
through the

component. Resistance is measured in _____ , which
has the

symbol _____. Resistance can be calculated using the
equation:

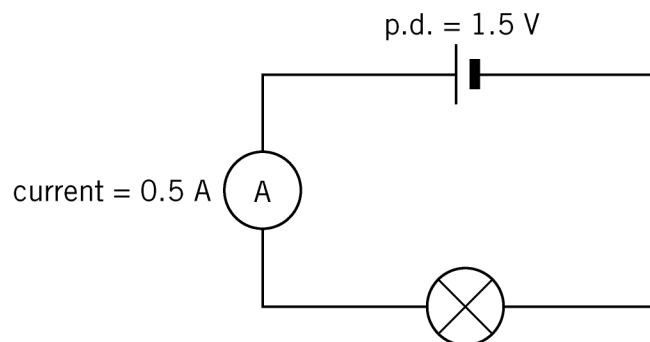
$$\text{resistance (_____)} = \frac{\text{potential difference (_____)}}{\text{current (_____)}}$$

2 State the rules for current and potential difference in a series circuit.

3 For a bulb with current = 0.2 A and potential difference = 1 V in a series circuit, its resistance is:

$$\begin{aligned} \text{Resistance} &= \text{potential difference} \div \text{current} \\ &= 1 \text{ V} \div 0.2 \text{ A} \\ &= 5 \Omega \end{aligned}$$

Calculate the resistance of one bulb in the following series circuit.
Show your working.



Ecosystem processes further questions

Task 1: Food chains

Create a food chain for these organisms, and then describe what a food chain shows.

Organisms:

- nettles (a producer)
- barn owl (eats voles)
- caterpillar (eats nettles)
- field vole (eats caterpillars).



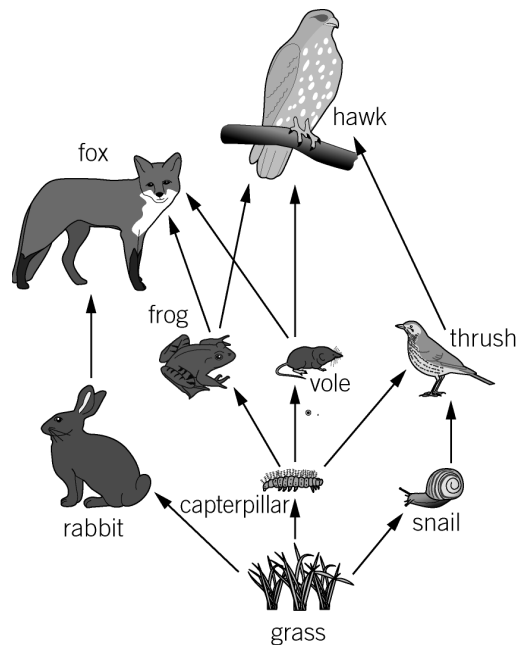
Task 2: Interdependence

Fill in the gaps in the paragraphs below. Some of the key words are shown in bold. Not all of the words you need are given.

interdependent

population

food web



Interdependence means the way in which living organisms depend on each other

to survive, grow, and reproduce. Organisms in a _____ depend on

each other for survival. They are _____ .

The number of animals or plants of the same type that live in the same area is

called _____. The population size of one type of organism has a

direct effect on the size of another type of population.

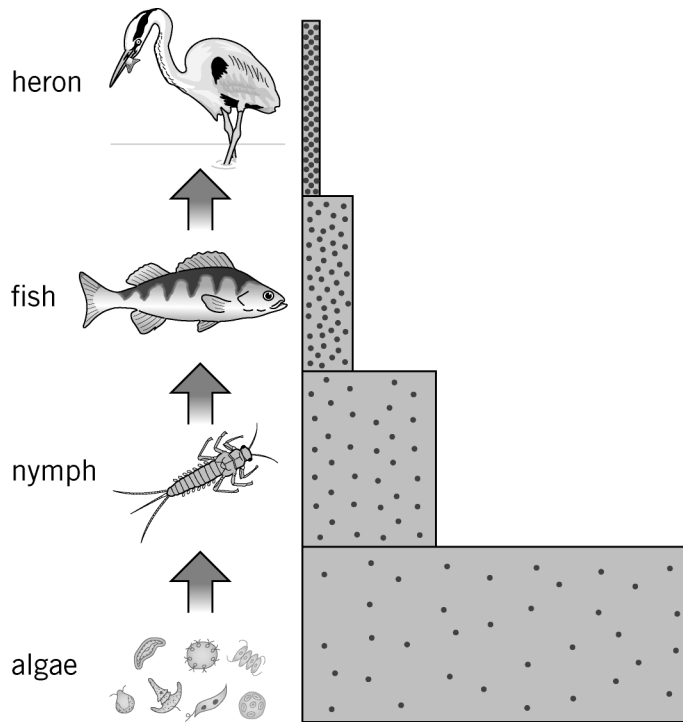
In this food web, the rabbit has one predator. Its predator is a _____ .

If the number of rabbits _____ due to a disease, the number of foxes

would also _____ as they would have less to eat.

Task 3: Ecosystems

Bioaccumulation



The diagram represents a food chain in an area containing toxic waste. Complete the paragraphs below to explain why the heron will have high levels of toxins.

polluted **bioaccumulation** **low** **fish**
herons **high** **algae**

In this food chain, the _____ is the producer. The area is _____ with toxic waste. The algae each contain _____ levels

of toxins. The nymphs eat lots of algae. The _____ eat lots of nymphs.

The _____ eat a lot of fish. The levels of toxins build up through the

food chain. This is because the bigger organisms eat lots of the smaller

organisms. The herons consume _____ levels of toxins. This is called

_____ .

Ecosystem key words

co-exist community ecosystem habitat
oak tree woodlice

An _____ is the name given to the plants and animals that are found

in a particular location, and the area in which they live. These plants and animals

depend on each other to survive. The organisms in an ecosystem are known as a

_____. The area they live in is called a _____.

For

example, in an oak-tree ecosystem, the _____ - is the habitat. The

community is made of different organisms that live in the oak tree, for example

_____, birds, and squirrels. The organisms in a community and a

habitat _____ . This means they live in the same place at the same time.

Adaptation and inheritance further questions

Task 1: Competing for resources

Animals and plants compete for resources. Write a paragraph describing what plants and animals compete for. You need to use the key words shown in bold. You might use some of them more than once.

light food water space mates minerals

Describe what plants compete for.

Describe what animals compete for.

Task 2: Adaptation

Plants in the desert have a number of adaptations to enable them to survive with very little water. They need to maximise the amount of water they can take in through the roots, and minimise water loss through the leaves.

Why do you think they have a waxy layer?

Why do you think they have widespread roots?

They have spikey leaves to decrease surface area. Why do they need to decrease the surface area of the leaf?

Can you think of any other adaptations of plants that live in the desert?

Task 3: Adapting to change

Write a definition for each of the key words given below. When you write a definition, you should think about all the information you would want to know if you looked the word up in a dictionary.

You should also give an example for each definition.

Hibernation

Definition: _____

Example: _____

Migration

Definition: _____

Example: _____

Adaptation

Definition: _____

Example: Snow shoes hares have white hair. This helps them blend in with their snowy environment. They are less likely to be seen by predators.

Task 4: Variation

Read the following statements about variation. Some of the statements are false. Cross out the false statements. Then use the information to write a complete definition of variation.

- Twins are exactly the same and show no difference in characteristics.
- Variation is always caused by the surroundings.
- Variation is always inherited.
- Variation can be caused by the surroundings and through inheritance.
- Variation occurs between different species.
- Variation occurs within a species.
- Differences in characteristics are known as variation.

Task 5: Histograms

Characteristics that show continuous variation can be plotted on a histogram. You can recognise continuous variation as the measurements can be any value from one extreme to another.

Some students carried out a survey into body mass in their class. The data is continuous, and is shown in the table below.

Height (cm)	Number of people
130-134	2
135-139	4
140-144	6
145-149	8
150-154	6
155-159	4
160-164	2

Step 1

- Draw your x-axis on a piece of graph paper. The x-axis is the horizontal.
- You need to make a space on your scale for each interval (130-134 cm is an interval).
- Each interval has the same range (5 cm), so your space for each interval should be the same. Label each interval on the scale.
- Label your axis 'Height (cm)'.

Step 2

- Draw your y-axis on a piece of paper. The y-axis is vertical.
- Your scale should cover 0-10 people. You need to make sure you add markers to your scale for the number of people. You could add a marker for every 2 people.

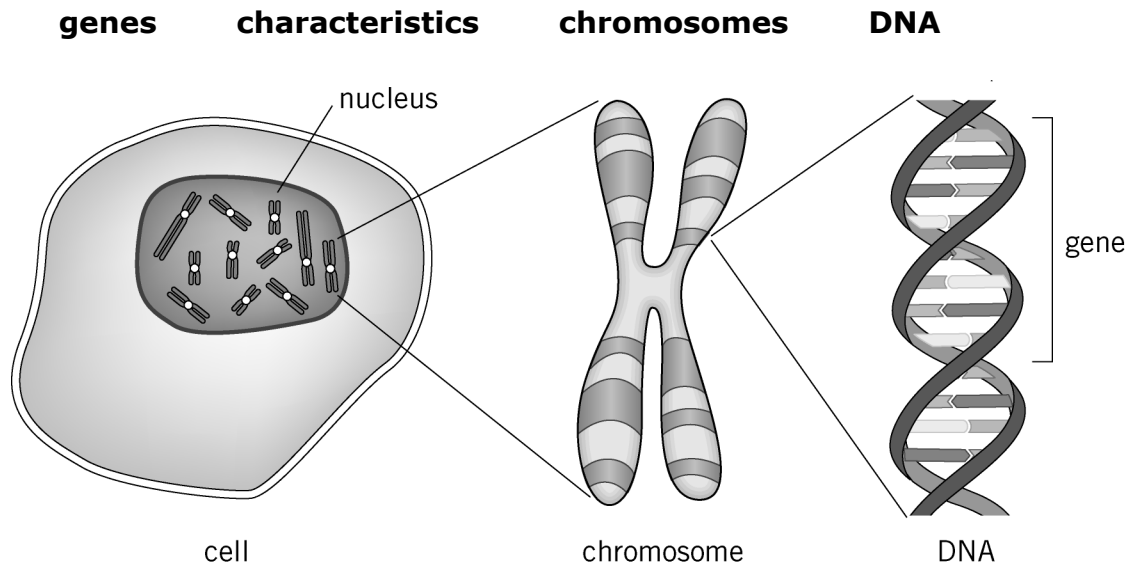
Step 3

- Draw your bars on your histogram. For each interval, use your y-axis scale to find the height. Draw a line at that height for the interval, and then vertical lines to make the bar.

Task 6: Evolution and inheritance

Inheritance

Fill in the gaps using the key words shown in bold.



You inherit characteristics from your parents through genetic material stored in

the nucleus of your cells. This material is a chemical called _____

(deoxyribonucleic acid). It contains all the information needed to make an

organism.

Inside the nucleus, your DNA is arranged into long strands called

_____. Humans have 46 _____.

You inherit half of your _____ from your mother and half from

your father. This is why you share some of your _____ with

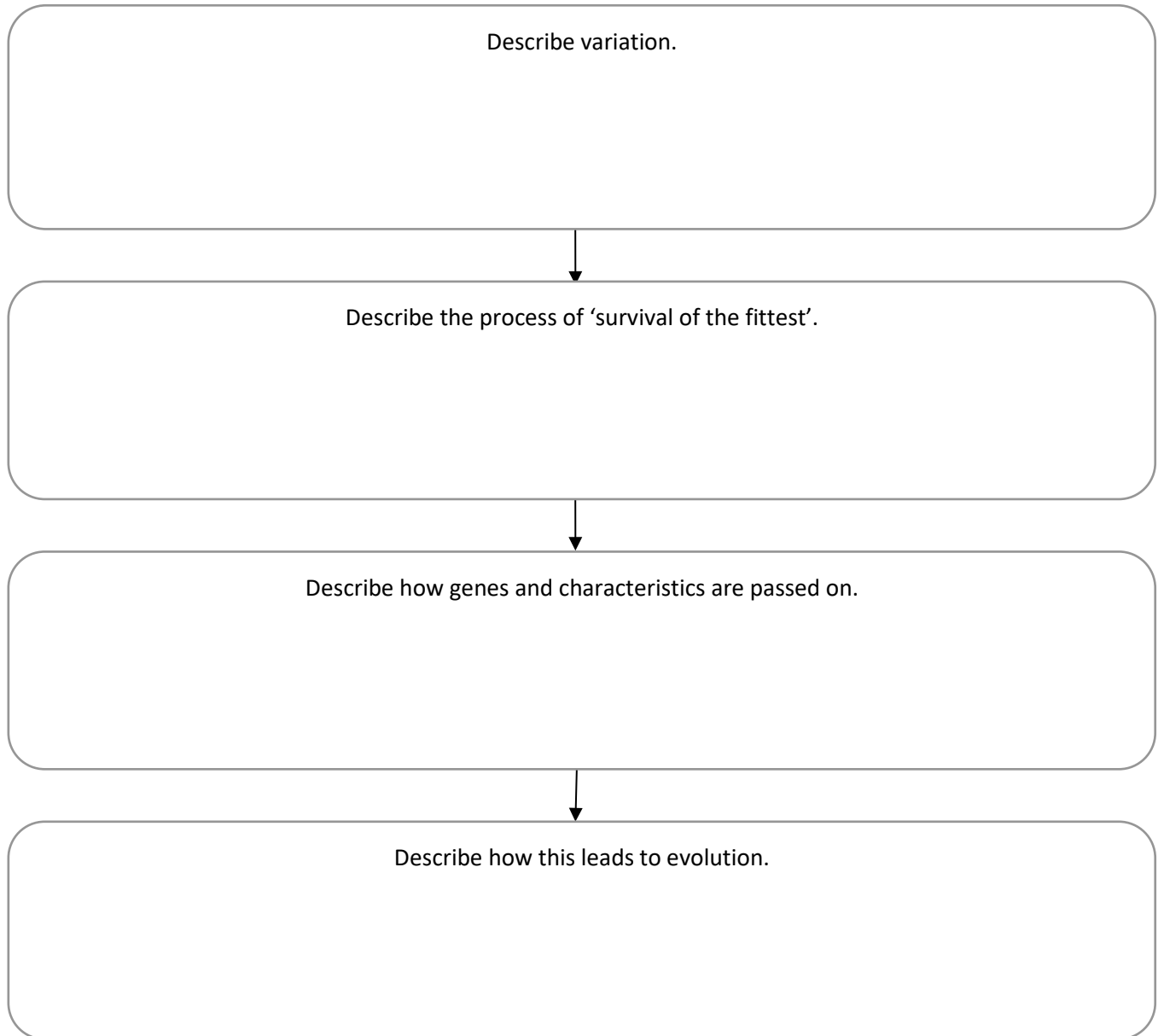
your mother and some with your father.

Each chromosome is divided into sections of DNA. The sections that hold the

information to produce a characteristic are called _____.

Natural selection and evolution

Natural selection is a process. When you describe a process, you can think about the order it happens to help you structure your description. Complete the boxes in this flow chart to describe the theory of natural selection.



Task 7: Extinction

There are a number of reasons why animals can become extinct or endangered, including:

- changes to the organism's environment
- destruction of habitat
- outbreak of a new disease
- introduction of new predators and competitors.

Read the information below about animals that are extinct or endangered. Write a possible reason next to each example (from the bullet points above).

Dodo

Dodos used to live on the island of Mauritius, which was uninhabited. It had no natural predators. In the 17th century people arrived on the island, and dodos were hunted for food. Rats that came on the ships ate the dodos' eggs. In less than a century, the dodo became extinct.

Reason for extinction:

Black rhino

The black rhino is an endangered species. They are poached for their horns. Some rhino habitats have also been taken over by landless people with nowhere to live.

Reason why they are endangered:

Christmas Island Rats

Christmas Island was an uninhabited island until 1888. When people inhabited the island, rats from the people's ships also inhabited the island. The native rat population became extinct within a decade.

Reason for extinction:

Well done on completing the booklet. Thank you for your hard work.

Now use your knowledge organiser to make some revision resources.

You could make:

- A poster
- A mind map
- A model of a diagram
- A quiz
- A written story e.g. of sound travelling into someone's ear
- A storyboard e.g. of plant reproduction
- A crossword with clues
- Flashcards of definitions