

Due Date:	<b>Friday, 10<sup>th</sup> June 2022</b>
Student Number:	
Name:	



## **Y10 T6 W1 - Working Scientifically Vocabulary**

Visit the BBC bitesize link: [BBC Bitesize – Practical Skills](https://www.bbc.co.uk/bitesize/articles/zx7t2p3)

Question	Answer
What is the definition of accurate?	Results which are accurate are close to the true value.
What is the definition of reliable (sometimes called precise)?	Results which are reliable are consistent with one another: this means they have a small range.
What is the definition of valid?	Valid means the investigation is appropriate to answer the question: only one variable is changed.
What is the definition of repeatable?	Repeatable means that one person can use the same method and equipment to obtain similar results.
What is the definition of reproducible?	Reproducible means that someone else can repeat the experiment and obtain similar results.
What is the cause of a systematic error?	A systematic error is caused by a problem with the method. All results are affected in the same way.
What is the cause of a random error?	A random error affects each result differently: it can be an error reading the scale or human reaction time.
What is the cause of a zero error?	A zero error is caused by a lack of calibration (setting the equipment to zero before use). All results are affected in the same way.
What is an independent variable?	The independent variable is what you change in the investigation.
What is a control variable?	The control variables are what you keep the same.

### **Look, Cover, Write, Check**

Question	Answer
What is an independent variable?	
What is the definition of repeatable?	
What is the cause of a systematic error?	
What is the definition of reliable (sometimes called precise)?	
What is a control variable?	
What is the definition of accurate?	
What is the cause of a zero error?	
What is the definition of reproducible?	
What is the definition of valid?	
What is the cause of a random error?	

## Look, Cover, Write, Check

Question	Answer
	The control variables are what you keep the same.
What is the definition of repeatable?	
What is the cause of a random error?	
	Reproducible means that someone else can repeat the experiment and obtain similar results.
	Valid means the investigation is appropriate to answer the question: only one variable is changed.
What is an independent variable?	
	Results which are reliable are consistent with one another: this means they have a small range.
	A zero error is caused by a lack of calibration (setting the equipment to zero before use). All results are affected in the same way.
What is the cause of a systematic error?	
What is the definition of accurate?	

### **Exam Question:**

A teacher repeated an experiment 4 times. The table below shows the teacher's results.

Experiment	Maximum temperature rise in °C
1	6.1
2	7.8
3	6.1
4	6.4

Calculate the mean maximum temperature rise.

Do **not** use the anomalous result in your calculation.

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Mean maximum temperature rise = \_\_\_\_\_ °C

(2)

How could the accuracy of the experiment be improved?

Add 20.0 cm<sup>3</sup> of hydrochloric acid

Use a lid on the polystyrene cup

Use a metal beaker

Use a thermometer with a resolution of 1 °C

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## Y10 T6 W2 C1 - Atoms vs Ions

Visit the BBC bitesize link: [www.bbc.co.uk/bitesize/guides/zpipb82/revision/1](http://www.bbc.co.uk/bitesize/guides/zpipb82/revision/1)

Question	Answer
What is the charge of a proton?	+1 (positive 1)
What is the charge of an electron?	-1 (negative 1)
Why do atoms have an overall neutral charge?	They have an equal number of protons and electrons.
Define an ion.	An atom with an overall charge due to the loss of gain of electrons.
How does an atom form a positive ion?	Positive ions are formed when the atom loses electrons.
Why does losing electrons cause an ion to become positive?	An atom that has lost electrons, now has more protons than electrons, giving it an overall positive charge.
How does an atom form a negative ion?	Negative ions are formed when the atom gains electrons.
Why does gaining electrons cause an ion to become positive?	An atom that has gained electrons, now has more electrons than protons, giving it an overall negative charge.
What type of elements form positive ions?	Elements in group 1, 2 and 3 (most of which are metals).
What type of elements form negative ions?	Elements in group 5, 6 and 7 (most of which are non-metals).
Why does group 0 not form ions?	Group 0 are inert (unreactive) because they have a full outer shell. They do not gain or lose electrons.

## Look, Cover, Write, Check

Question	Answer
Why do atoms have an overall neutral charge?	
What is the charge of an electron?	
What is the charge of a proton?	
Define an ion.	
Why does group 0 not form ions?	
What type of elements form positive ions?	
How does an atom form a negative ion?	
Why does gaining electrons cause an ion to become positive?	
Why does losing electrons cause an ion to become positive?	
What type of elements form negative ions?	
How does an atom form a positive ion?	

## Look, Cover, Write, Check

Question	Answer
	+1 (positive 1)
	-1 (negative 1)
Why do atoms have an overall neutral charge?	
	An atom with an overall charge due to the loss or gain of electrons.
How does an atom form a positive ion?	
Why does losing electrons cause an ion to become positive?	
	When the atom gains electrons.
Why does gaining electrons cause an ion to become positive?	
	Elements in group 1, 2 and 3 (most of which are metals).
	Elements in group 5,6,7 (most of which are non-metals).
	Group 0 are inert (unreactive) because they have a full outer shell. They do not gain or lose electrons.

### Exam Question:

1. Atoms can form ions. Which statement is **correct**?

- A All metal ions are negatively charged.
- B Ions are always smaller than the atom they are made from.
- C Negative ions are formed when an atom gains electrons.
- D Positive ions are formed when an atom gains electrons.

Your answer

[1]

2. The table shows some common ions.

Negative ions		Positive ions	
Nitrate	$\text{NO}_3^-$	Aluminium	$\text{Al}^{3+}$
Oxide	$\text{O}^{2-}$	Magnesium	$\text{Mg}^{2+}$

Write the formula for **aluminium oxide**.

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[1]

3. The element **sodium** forms an **ion** with a charge of **1+**.

Work out the number of electrons in an **ion** of this element.

Electrons: \_\_\_\_\_

[1]

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## **Y10 T6 W3 – P2 Newton's Laws**

**Visit the BBC Bitesize link:** [Newton's first law - Newton's laws - OCR Gateway - GCSE Combined Science Revision - OCR Gateway - BBC Bitesize](https://www.bbc.co.uk/bitesize/guides/zq68n39)

<b>Question</b>	<b>Answer</b>
What is Newton's first law?	An object remains in the same state of motion unless a resultant force acts on it.
What state of motions would an object have if the resultant force is zero?	Stationary or moving at a constant velocity
What is Newton's second law?	Force = mass x acceleration
What is Newton's third law?	When objects interact, they exert equal and opposite forces on each other.
What are contact forces?	Forces exerted between two objects when they are touching.
What are non-contact forces?	The push or pull between objects that are not physically touching when they interact.
What are the force pairs that occur when pushing a pram?	The person pushes the pram forwards, the pram pushes the person backwards.
What are the force pairs that occur between a satellite in orbit and the Earth?	The Earth pulls the satellite, and the satellite pulls the Earth.
What forces are acting on a skydiver?	Weight and air resistance
What is terminal velocity?	The maximum speed of an object, reached when the forces moving the object are balanced by frictional forces.

### **Look, Cover, Write, Check**

<b>Question</b>	<b>Answer</b>
What are contact forces?	
What are non-contact forces?	
What is Newton's second law?	
What are the force pairs that occur when pushing a pram?	
What is Newton's third law?	
What forces are acting on a skydiver?	
What is terminal velocity?	
What is Newton's first law?	
What are the force pairs that occur between a satellite in orbit and the Earth?	
What state of motions would an object have if the resultant force is zero?	

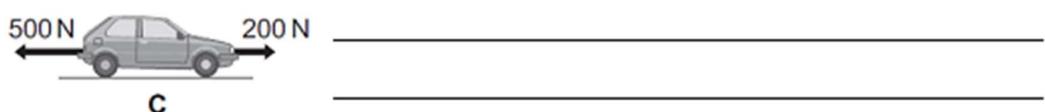
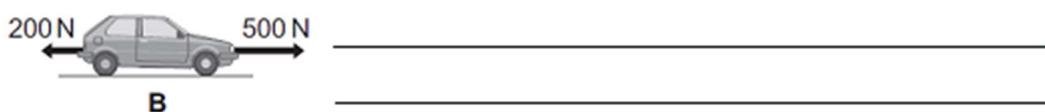
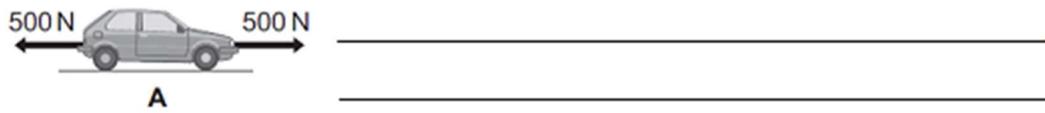
## Look, Cover, Write, Check

Question	Answer
	An object remains in the same state of motion unless a resultant force acts on it.
What state of motion would an object have if the resultant force is zero?	
	Force = mass x acceleration
	When objects interact, they exert equal and opposite forces on each other.
What are contact forces?	
What are non-contact forces?	
	The person pushes the pram forwards, the pram pushes the person backwards.
What are the force pairs that occur between a satellite in orbit and the Earth?	
	Weight and air resistance
	The maximum speed of an object, reached when the forces moving the object are balanced by frictional forces.

## Exam Question

Q1. A car is being driven along a straight road. The diagrams, **A**, **B** and **C**, show the horizontal forces acting on the moving car at three different points along the road.

Describe the motion of the car at each of the points, **A**, **B** and **C**.



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## **Y10 T6 W4 B2 – Plant Transport Vessels**

Visit the BBC Bitesize link: [www.bbc.co.uk/bitesize/quides/zqqtw6f/revision/3](http://www.bbc.co.uk/bitesize/quides/zqqtw6f/revision/3)

<b>Question</b>	<b>Answer</b>
Define 'vessel'	A tube responsible for transporting substances.
What 2 vessels transport substances around the plant?	Xylem and phloem
Where are the xylem and phloem found?	They run from the root, up the stem to the leaves of the plant.
What does the xylem transport?	Water and mineral ions.
What does the phloem transport?	Sugars e.g. sucrose.
Define 'translocation'	The movement of sugars up and down the plant (in the phloem).
Describe the structure of the xylem.	Hollow tube made of dead cells. Lignin in the walls for strength.
Describe the structure of the phloem.	Tube made of live cells with sieve plates. Has companion cells which provide energy for the phloem to transport the sugars.
How does water enter the plant?	Absorbed into root hair cell by osmosis.
How do mineral ions enter the plant?	Absorbed into root hair cell by active transport.
How are sugars made in the plant?	By photosynthesis which happens in the chloroplasts.

### **Look, Cover, Write, Check**

<b>Question</b>	<b>Answer</b>
Define 'translocation'	
What 2 vessels transport substances around the plant?	
How do mineral ions enter the plant?	
How does water enter the plant?	
What does the phloem transport?	
Describe the structure of the phloem.	
Describe the structure of the xylem.	
What does the xylem transport?	
Define 'vessel'	
Where are the xylem and phloem found?	
How are sugars made in the plant?	

## Look, Cover, Write, Check

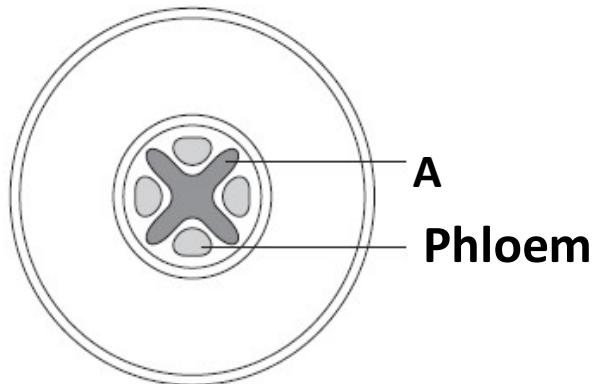
Question	Answer
	A tube responsible for transporting substances.
	Absorbed into root hair cell by osmosis.
	Absorbed into root hair cell by active transport.
What 2 vessels transport substances around the plant?	
What does the xylem transport?	
What does the phloem transport?	
	The movement of sugars up and down the plant (in the phloem).
Describe the structure of the xylem.	
Describe the structure of the phloem.	
Where are the xylem and phloem found?	
How are sugars made in the plant?	

## Exam Question:

**Q1.** The diagram below shows a cross-section from the root of a plant. The transport tissues are labelled.

- (a) (i) What is tissue A?

Draw a ring around the correct answer.



- (ii) Name **two** substances transported by tissue A.

2. \_\_\_\_\_ (2)

- (b) The phloem is involved in a process called translocation.

## What is translocation?

(1)

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## **Y10 T6 W5 Introducing Chemical Reactions**

Visit the BBC Bitesize link: <https://www.bbc.co.uk/bitesize/guides/zpfjcj6/revision/1>

Question	Answer
What are the rules for writing the formulae of elements?	Each element starts with a capital letter, with any other letters being lower case. E.g. Na or Br
What is a diatomic molecule?	A molecule containing 2 atoms e.g. Cl <sub>2</sub> .
What information is given from the molecular formula?	The number of atoms of each element present in a molecule. E.g. C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>
What are the 4 different states and the corresponding state symbols?	Solid (s), liquid (l), gas (g) and aqueous (aq)
What is an exothermic reaction?	A reaction in which thermal energy is released into the surroundings, increasing the temperature of the surroundings.
What is an endothermic reaction?	A reaction in which thermal energy is absorbed (taken in) from the surroundings, decreasing the temperature of the surroundings.
What is the general word equation for combustion?	Fuel + oxygen → carbon dioxide + water
Define 'activation energy'	The minimum amount of energy required to start a reaction by breaking the bonds in the reactants.
What is a mole?	The amount of a substance that contains the same number of particles ( $6.02 \times 10^{23}$ ) as there are atoms in 12g of carbon-12 ( <sup>12</sup> C).
How many particles in 1 mole?	$6.02 \times 10^{23}$

### **Look, Cover, Write, Check**

Question	Answer
Define 'activation energy'	
What are the rules for writing the formulae of elements?	
What is an exothermic reaction?	
What are the 4 different states and the corresponding state symbols?	
What is a mole?	
What is an endothermic reaction?	
Define 'molecular formula'	
How many particles in 1 mole?	
What is the general word equation for combustion?	
What is a diatomic molecule?	

## Look, Cover, Write, Check

Question	Answer
What are the rules for writing the formulae of elements?	
What is a mole?	
	A description of an element, molecule or compound that uses symbols for atoms and numbers to show the actual number of atoms of each element present in the molecule. E.g. C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>
What are the 4 different states and the corresponding state symbols?	
	6.02x10 <sup>23</sup>
What is an exothermic reaction?	
	A reaction in which thermal energy is absorbed (taken in) from the surroundings, into the reaction, decreasing the temperature of the surroundings.
What is the general word equation for combustion?	
	A molecule containing 2 atoms e.g. Cl <sub>2</sub> .
Define 'activation energy'	

### Exam Question:

During a reaction, bonds are broken and new bonds are made.

- i. Complete the sentence.

Choose words from this list.

**Absorbed      destroyed      magnified      neutralised      released**

When bonds are broken, energy is

[1]

- ii. Complete the sentence.

Choose words from this list.

**Catalytic      continuous      endothermic      exothermic      limiting**

- iii. Making new bonds is

..... [1]

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## **Y10 T6 W6 - P3 Resistance and Resistors**

**Watch this you tube clip: <https://www.bbc.co.uk/bitesize/guides/z9tfrwx/revision/1>**

Question	Answer
What is resistance?	Resistance is a measure of how difficult it is for current to flow through a component.
What are the units for resistance?	Ohms ( $\Omega$ )
How is resistance, current and potential difference related?	Potential different = Current x Resistance
What causes resistance?	The collisions of electrons with positive ions.
Describe the relationship between resistance and temperature in a thermistor.	As temperature increases resistance decreases.
Describe the relationship between resistance and light intensity in an LDR.	As light intensity increases resistance decreases.
What does LDR stand for?	Light dependent resistor
Where are LDRs used?	Street lights, screen lighting for your mobile phone
Where are thermistors used?	Thermostats / ovens
How do you find the total resistance in a series circuit?	Add up all the individual resistances in the circuit.

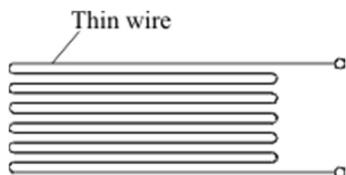
### **Look, Cover, Write, Check:**

Question	Answer
What is resistance?	
What are the units for resistance?	
How is resistance, current and potential difference related?	
What causes resistance?	
Describe the relationship between resistance and temperature in a thermistor.	
Describe the relationship between resistance and light intensity in an LDR.	
What does LDR stand for?	
Where are thermistors used?	
Where are LDRs used?	
How do you find the total resistance in a series circuit?	

### **Look, Cover, Write, Check:**

Question	Answer
	Resistance is a measure of how difficult it is for current to flow through a component.
	Ohms ( $\Omega$ )
How is resistance, current and potential difference related?	
What causes resistance?	
Describe the relationship between resistance and temperature in a thermistor.	
Describe the relationship between resistance and light intensity in an LDR.	
	Light dependent resistor
	Thermostats / ovens
	Street lights, screen lighting for your mobile phone
How do you find the total resistance in a series circuit?	

An ammeter and voltmeter can be used to find the resistance of the wire shown.



When correctly connected to a 9 volt battery the wire has a current of 0.30 amperes flowing through it.

- (i) Give the equation that links current, resistance and voltage.

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(1)

- (ii) Calculate the resistance of the wire. Show clearly how you work out your answer and give the unit.

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Resistance = \_\_\_\_\_

(3)

- (iii) When the wire is heated, the current goes down to 0.26 amperes. State how the resistance of the wire has changed.

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(1)