

Due Date	Friday, 12 th September 2026
Name	



Y11 Combined T1 W2 - Working Scientifically

Keyword	Definition
Accurate	Close to the true value
Reliable	Consistent with one another: this means they have a small range
Valid	The investigation is appropriate to answer the question only one variable is changed
Repeatable	If the use of the same equipment, same method and same experimenter gives similar results
Reproducible	Similar results being obtained by other groups
Systematic error	Are consistent repeatable errors involving equipment
Random error	error in a measurement due to small uncontrollable effects

Comprehension Question

A student calculates the specific heat capacity of water. The student does one experiment and gets the result of 4250 J/kg°C. The textbook value of water is 4200 J/kg°C.

Complete the sentence below.

The students value is

How could the student make her results more reliable?

.....

The student reads the thermometer at an angle rather than at eye level. What sort of error is this?

.....

Look, Cover, Write, Check

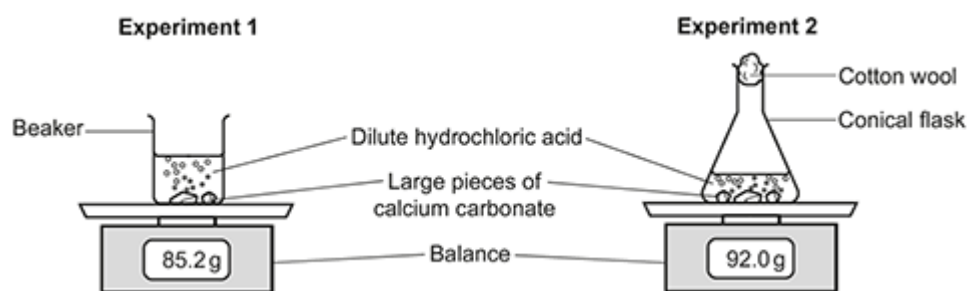
Keyword	Definition
Accurate	
	Consistent with one another: this means they have a small range
Valid	
	If the use of the same equipment, same method and same experimenter gives similar results
	Similar results being obtained by other groups
Systematic error	
	error in a measurement due to small uncontrollable effects

Application Questions

A student investigates the rate of reaction between large pieces of calcium carbonate and dilute hydrochloric acid.

Fig. 13.1 shows two different experiments the student could use.
In both experiments the mass decreases as the reaction progresses.

Fig. 13.1



The student decides to use **Experiment 2** because they think it will produce more accurate results than **Experiment 1**.

Explain why the student is correct.

.....

.....

.....(2)

Due Date	Friday, 18 th September 2026
Name	



Y11 Combined T1 W3 – B1 Photosynthesis PAG

Keyword	Definition
Resolution	A measure of the smallest object that can be seen using an instrument
Endothermic	A reaction that absorbs energy from the surrounding
Inverse square law	$1/\text{distance}^2$
Limiting factors	A condition which controls how fast a reaction happens.
Denature	When the active site of an enzyme changes shape so the enzyme no longer works
Photosynthesis	The process by which organisms convert light energy into chemical energy
Chloroplast	The plant cell structure where photosynthesis occurs
Photosynthesis Equation	Carbon dioxide + water $\rightarrow$ oxygen + glucose

Comprehension Question

Why is photosynthesis an endothermic reaction?

.....

Complete the word equation for photosynthesis.

_____ + water $\rightarrow$ _____ + oxygen

How is energy transferred to the plant to allow photosynthesis to take place?

.....

Where in the plant cell does photosynthesis occur?

.....

Light intensity is a limiting factor of photosynthesis. Why is it a limiting factor?

.....

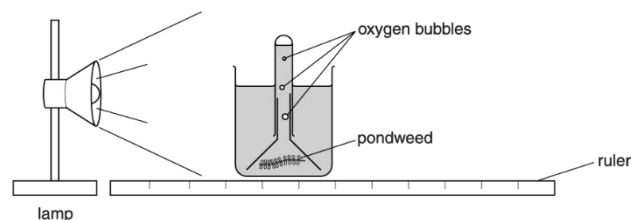
Look, Cover, Write, Check

Keyword	Definition
	A measure of the smallest object that can be seen using an instrument
Endothermic	
Inverse square law	
Limiting factors	
	When the active site of an enzyme changes shape so the enzyme no longer works
Photosynthesis	
	The plant cell structure where photosynthesis occurs
Photosynthesis Equation	

Application Questions

Sanjay investigates the amount of oxygen made by pondweed. He counts how many bubbles of oxygen are given off by pondweed at different distances from a lamp.

The table shows his results.



Distance between lamp and pondweed in cm	Number of bubbles given off by pondweed in 1 minute
10	48
20	25
30	12
40	7
50	5

Describe and explain these results.

.....

Sanjay's friend says that counting bubbles is **not** a very good method for measuring the amount of oxygen. Explain how Sanjay could change his method to get more accurate results.

.....

Due Date	Friday, 25 th September 2026
Name	



Y11 Combined T1 W4 – C1 History of the Atom

Keyword	Definition
Atomic number	The number of protons in the nucleus of an atom
Ion	An atom that has gained or lost electrons to become a charged particle
Isotope	An atom of the same element with the same number of protons but different numbers of neutrons
Atom	A single sphere that makes up all matter
Plum pudding model	Negatively charged electrons embedded in a positive solid sphere
Alpha particles	2 protons and 2 neutrons (+2 charge)
Electron	A negatively charged subatomic particle

History of Atoms

Dalton – solid spheres

JJ Thompson – plum pudding model

Ernest Rutherford – discovered the nucleus

Niels Bohr – Electron shells

DTs aRe Bohring

Comprehension Question

Alpha particles were fired at a gold leaf they were deflected. What charge does this show that the nucleus has?

.....

Who discovered the electron?

.....

How does the nuclear model discovered by Ernest Rutherford differ from the plum pudding model?

.....

Look, Cover, Write, Check

Keyword	Definition
Atomic number	
	An atom that has gained or lost electrons to become a charged particle
Isotope	
	A single sphere that makes up all matter
Plum pudding model	
	2 protons and 2 neutrons (+2 charge)
Electron	

Application Questions

Many scientists helped to develop the theory of atomic structure.

Dalton's theory stated that atoms could not be split.

Later, scientists such as Rutherford and Bohr developed theories that had particles smaller than an atom.

Now even more detailed theories of atomic structure are being developed.

Explain why all theories of atomic structure are only provisional and keep changing.

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.....

.....

.....

Due Date	Friday, 2 nd October 2026
Name	



Y11 Combined T1 W4 – P1 Atomic Structure

Keyword	Definition
Atomic number	The number of protons in the nucleus of an atom
Ion	An atom that has gained or lost electrons to become a charged particle
Matter	The physical part of the universe consisting of solids, liquids and gases
Atom	A single sphere that makes up all matter
Density	How much mass there is in a certain volume
Mass	The amount of matter
Volume	The amount of space occupied by an object
Model	A description, analogy or equation which helps you explain the physical world

Comprehension Question

Why do we use models to explain the structure of different matter?

.....

The density of an iron is 7.87g/cm^3 what does this tell me about iron?

.....

Iron becomes a Fe^{2+} ion what does this mean has happened to the element?

.....

Carbon has 6 protons, 6 neutrons and 6 electrons. What is the atomic number of Carbon?

.....

Look, Cover, Write, Check

Keyword	Definition
	The number of protons in the nucleus of an atom
Ion	
Matter	
	A single sphere that makes up all matter
	How much mass there is in a certain volume
	The amount of matter
Volume	
Model	

Application Questions

A student has made some notes on a simple model of an atom.

An atom consists of a negatively charged nucleus surrounded by protons.

Most of the atom is just empty space.

The nucleus contains neutrons and ions.

The student has made three mistakes.

Write down the **three** mistakes that the student has made.

.....

.....

.....

Due Date	Friday, 9th October 2026
Name	



Y11 Combined T1 W6 – B2 Exchange Surfaces

Keyword	Definition
Double circulatory system	A system in which the blood travels through the heart twice during each circuit of the body
Diffusion	The net movement of particles from an area of high concentration to an area of low concentration
Osmosis	The net movement of water particles from a region of higher water potential to a region of lower water potential, across a partially permeable membrane
Red blood cells	Small biconcave cells that carry oxygen around the body
Transpiration	The loss of water from the leaves (stomata) of plants
Stomata	Small holes on the underside of leaves that allow for gas exchange
Translocation	The transport of sugars up and down the phloem
Plasma	Straw coloured substance that the blood cells travel in

Comprehension Question

Where does carbon dioxide enter the leaf of a plant?

.....

Describe how oxygen moves from the alveoli of the lungs to the red blood cells

.....

.....

What happens to a red blood cell when it is placed in distilled water?

.....

.....

Look, Cover, Write, Check

Keyword	Definition
	A system in which the blood travels through the heart twice during each circuit of the body
Diffusion	
Osmosis	
	Small biconcave cells that carry oxygen around the body
Transpiration	
	Small holes on the underside of leaves that allow for gas exchange
Translocation	
Plasma	

Application Questions

Most stomata are on the bottom surface and **not** on the top surface.

Explain why.

.....

.....

.....

Due Date	Friday, 16 th October 2026
Name	



Y11 Combined T1 W7 – C2 Relative Masses and Percentages

Keyword	Definition
Mass	The amount of matter in an object
Relative atomic mass	Mean mass of an atom of an element compared to one 12 th of the carbon-12 atom
Periodic table	The table which contains all the known elements
Formula	A way to symbolically express information as simply as possible
Molecule	A group of two or more atoms held together by chemical bonds
Carbon	The 12 th element on the periodic table
Atom	The smallest particle of a single element that can exist
Isotope	Atoms of one element that have the same number of protons, but different numbers of neutrons.
Relative	When an item is considered, it compares to something else.

Comprehension Question

What does the relative atomic mass of a carbon atom tell us?

.....

A scientist finds two atoms of hydrogen, one has one neutron, the other has two neutrons. What do we call them?

.....

Two hydrogen atoms have a covalent bond. What word describes this groups?

.....

What is the relative atomic mass of a carbon atom?

.....

Look, Cover, Write, Check

Keyword	Definition
Mass	
	Mean mass of an atom of an element compared to one 12 th of the carbon-12 atom
Periodic table	
	A way to symbolically express information as simply as possible
Molecule	
	The 12 th element on the periodic table
	The smallest particle of a single element that can exist
Isotope	
	When an item is considered, it compares to something else.

Application Questions

Phosphorus sulfide, P_4S_3 , has a relative formula mass of 220.3.

What is the percentage, by mass, of phosphorus in P_4S_3 ?

Use the Periodic Table to help you.

- A 6.8
- B 14.1
- C 27.2
- D 56.3

2. The table shows some relative atomic masses.

Element	Relative atomic mass
Sulfur	32.1
Oxygen	16.0

Calculate the percentage, by mass, of oxygen in SO_2 .

Give your answer to **1** decimal place.

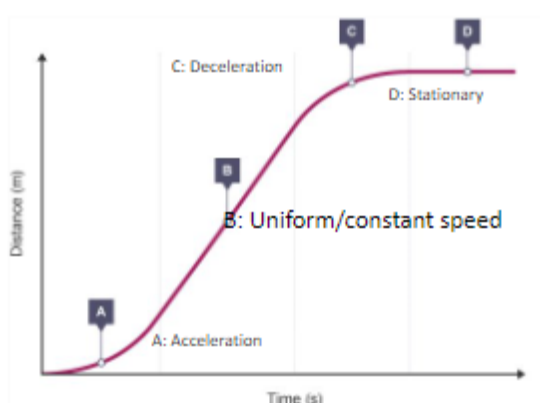
Due Date	Friday, 6 th November 2026
Name	



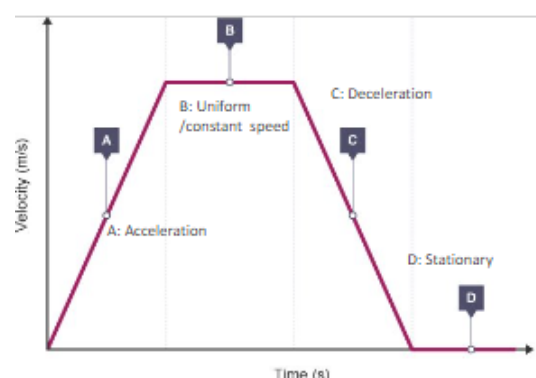
Y11 Combined T2 W1 – P2 Velocity/time and Distance/time graphs

Keyword	Definition
Vector	A value which has both magnitude and direction
Scalar	A value which has magnitude only
Speed	The rate at which distance changes
Rate	A measure of the change in a value over time
Velocity	The rate at which displacement changes
Displacement	The change in distance in a single direction
Uniform motion	Constant motion
Non-uniform motion	Motion which has a changing value

Distance-Time Graph



Velocity-Time Graph or Speed-Time Graph



Comprehension Question

Velocity is the rate at which displacement changes. Is this quantity and vector or a scalar?

.....

On the graphs above where identify the letters than show uniformed motion.

.....

Describe what acceleration would look like on a velocity time graph.

.....

What is the difference between a vector and a scalar.

.....

Look, Cover, Write, Check

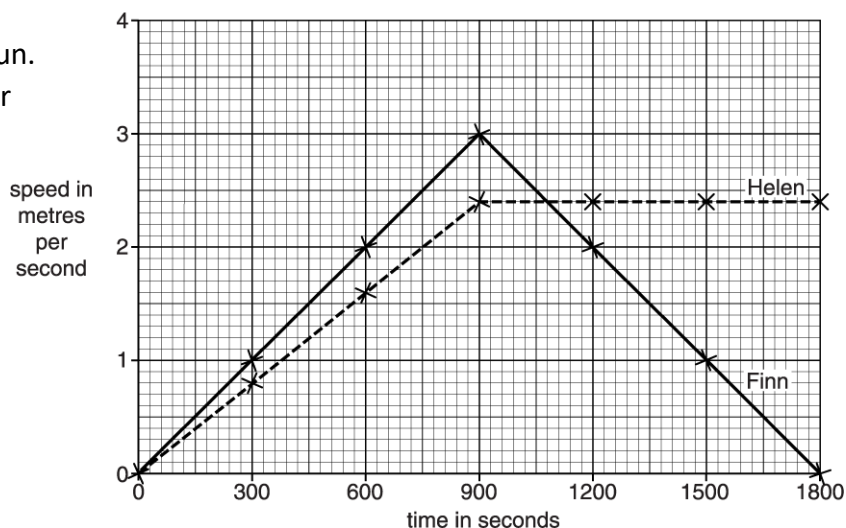
Keyword	Definition
	A value which has both magnitude and direction
Scalar	
	The rate at which distance changes
	A measure of the change in a value over time
	The rate at which displacement changes
Displacement	
	Constant motion
Non-uniform motion	

Application Questions

Helen and Finn take part in a cross-country run.

Look at the information about their run. Their speeds have been plotted on a graph.

Use the graphs to compare Helen's and Finn's **acceleration** over the whole run. (6)



Due Date	Friday, 13 th November 2026
Name	



Y11 Combined T2 W2 – C3 Moles

Keyword	Definition
Mole	The amount of substance that contains the same number of particles as there are atoms in 12g of Carbon-12
Molar mass	The mass of a substance when there is one mole of it, this is just its atomic mass (M_r)
Avogadro's Constant	The number of particles in 1 mole of substance -6.022×10^{23}
Reactants	A substance that undergoes change during a reaction
Products	A substance that is made after a reaction has taken place
Molecular formula	The actual number of atoms of each element in a compound
Displayed formula	This shows all the atoms in the molecule and shows the bonds between those atoms

Comprehension Question

What is the difference between the molecular formula and the displayed formula of a substance?

.....

Which element do we compare with for a mole?

.....

How many particles is in 1 mole of Nitrogen – 14?

.....

What is the molar mass of Carbon Dioxide (CO_2) Carbon – 12 and Oxygen – 16

.....

Look, Cover, Write, Check

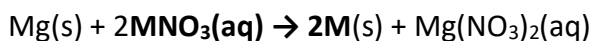
Keyword	Definition
Mole	
Molar mass	
	The number of particles in 1 mole of substance - 6.022×10^{23}
	A substance that undergoes change during a reaction
	A substance that is made after a reaction has taken place
Molecular formula	
Displayed formula	

Application Questions

Aluminium, phosphorus and magnesium are all in Period 3 of the Periodic Table.

A student is given a sample of the metal magnesium and a solution of an unknown nitrate of metal **M**, **MNO₃(aq)**. The student does an experiment to identify metal **M**. The student weighs the magnesium. Then the student adds the magnesium to the solution of the metal nitrate.

A displacement reaction takes place forming metal **M**:



The student separates the metal **M** and then weighs metal **M**.

Look at the student's results:

Mass of magnesium = 0.729 g

Mass of metal **M** = 6.476 g

- i. Calculate the moles of magnesium used in the experiment.

Moles of magnesium = [1]

- ii. Calculate the relative atomic mass of metal **M**. Give your answer to **3** significant figures.

Relative atomic mass of metal **M** = [3]

- iii. Use your answer from (ii) and the Periodic Table to identify the metal **M**.

[1]

Due Date	Friday, 20th November 2026
Name	



Y11 Combined T2 W3 – B3 Nervous System

Keyword	Definition
Stimulus	A change in the environment
Receptor	A cell or organ that detects the stimulus
Sensory Neurone	A nerve cell that carries electrical impulses from the receptor to the CNS
Central Nervous System (CNS)	Consists of the brain and spinal cord
Relay Neurone	A nerve cell in the CNS that carries electrical impulses from the sensory neurone to the motor neurone
Motor Neurone	A nerve cell that carries electrical impulses from the CNS to the effector
Effector	An organ that carries out the response e.g a gland or a muscle
Reflex	A response carried out by the nervous system that is automatic and does not require conscious thought, it does not involve the brain.

Comprehension Question

Identify which part of the nervous response is the following:

The eye -

A bee coming towards the eye -

Back muscles contracting to move out of the way -

Why is the reflex action so fast?

.....

What is the order of the reflex action?

.....

Look, Cover, Write, Check

Keyword	Definition
Stimulus	
Receptor	
Sensory Neurone	A nerve cell that carries electrical impulses from the receptor to the CNS
	Consists of the brain and spinal cord
	A nerve cell in the CNS that carries electrical impulses from the sensory neurone to the motor neurone
Motor Neurone	
Effector	
	A response carried out by the nervous system that is automatic and does not require conscious thought, it does not involve the brain.

Application Questions

Benny is cooking his tea. He lifts a hot plate of food. The plate is very hot. Benny holds onto the plate until he can slowly put it down. Benny's response to the hot plate is **not** a reflex action.



Explain why his response is not a reflex action.

.....

.....

[2]

Complete the sequence of a reflex arc.

stimulus →	receptor →	→	CNS →	motor neurone →	→	response
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[2]

Due Date	Friday, 4 th December 2026
Name	



Y11 Combined T2 W4 – P2 Momentum

Keyword	Definition
Vector	A value which has both magnitude and direction
Momentum	A vector quantity of moving objects
Conservation of momentum	The principle that the total momentum of a system stays the same
Inertia	The tendency of an object to continue in its current state
Velocity	The rate at which displacement changes
Contact forces	Forces exerted when objects touch e.g friction, air resistance
Uniform motion	Constant motion
Kinetic energy	Moving objects have energy in their kinetic store

Comprehension Question

If the momentum of two cars before a collision is 5.6 kgm/s what is the momentum of the two cars after the collision?

.....

Why is momentum a vector quantity?

.....

Gravity is not a contact force. Why?

.....

How will increasing the velocity of an object effect the momentum of the object?

.....

Which object has the higher kinetic energy. Object A with a momentum of 15 kgm/s or object B with a momentum of 4.5 kgm/s?

.....

Look, Cover, Write, Check

Keyword	Definition
Vector	
	A vector quantity of moving objects
Conservation of momentum	
	The tendency of an object to continue in its current state
Velocity	
Contact forces	
Uniform motion	
	Moving objects have energy in their kinetic store

Application Questions

Police guidance on air rifles states: "Any rifle that fires a pellet with an energy that is below 16 Joules may be held without a licence"

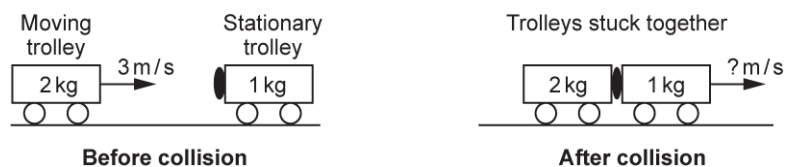
A paintball gun fires a pellet of mass 3×10^{-3} kg at a velocity of 90 m/s.

What is the momentum of the pellet when it leaves the paintball gun? Show your working and give the unit.

answer _____ unit _____

[3]

The diagrams show a collision between two trolleys.



Calculate the combined speed of the trolleys **after** the collision. Use the information in the diagram and the equation: momentum = mass $\times$ velocity

- A 1 m / s
- B 2 m / s
- C 6 m / s
- D 9 m / s

Due Date	Friday, 11 th December 2026
Name	



Y11 Combined T2 W5 – B3 Menstrual Cycle

Keyword	Definition
Hormone	A chemical messenger secreted from glands and released into the blood
Gland	A tissue or organ that releases a hormone
Endocrine system	Consists of hormones and glands
Contraception	A method to reduce the chance of pregnancy
Infertility	The inability to reproduce
FSH	A hormone that is produced in the pituitary gland that matures the egg in the ovary
LH	A hormone that is produced in the pituitary gland that causes the egg to be released
Oestrogen	A hormone that is produced by the ovaries that causes the uterus lining to thicken
Progesterone	A hormone that is produced by the ovaries that maintains the uterus lining

Comprehension Question

What are the two glands involved in the menstrual cycle?

.....

.....

How does FSH travel to the ovaries?

.....

Name the 4 hormones of the menstrual cycle.

.....

.....

.....

.....

Someone who is infertile would not need to use contraception why?

.....

Look, Cover, Write, Check

Keyword	Definition
Hormone	
Gland	A tissue or organ that releases a hormone
	Consists of hormones and glands
	A method to reduce the chance of pregnancy
Infertility	
	A hormone that is produced in the pituitary gland that matures the egg in the ovary
LH	
Oestrogen	
	A hormone that is produced by the ovaries that maintains the uterus lining

Application Questions

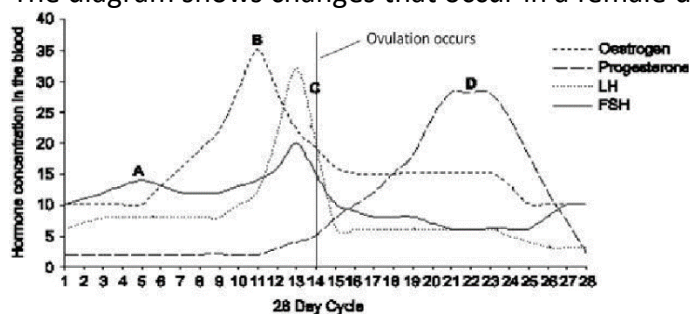
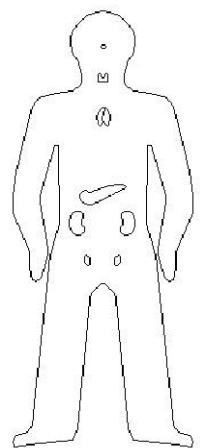
Changes happen in a female during the menstrual cycle.

The changes happen because of hormones.

- Label the diagram to show where follicle stimulating hormone (FSH), oestrogen and progesterone are made.

[3]

- * The diagram shows changes that occur in a female during the menstrual cycle.



Describe the main stages of the menstrual cycle. Explain how follicle stimulating hormone (FSH), oestrogen and progesterone control the changes that

Due Date	Friday, 18 th December 2026
Name	

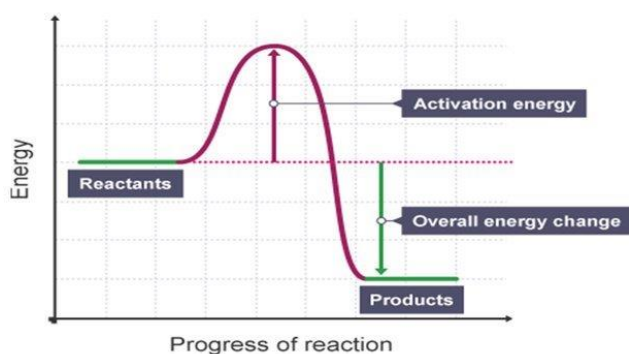
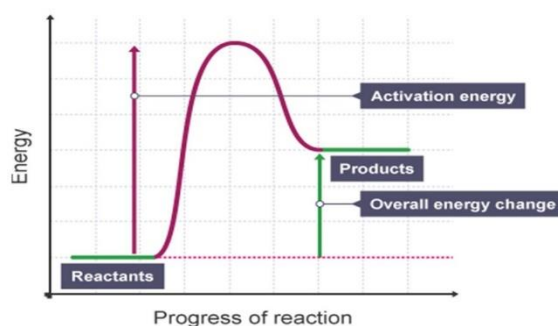


Y11 Combined T2 W6 – C3 Endothermic and Exothermic Reactions

Keyword	Definition
Endothermic	Energy is transferred from the surroundings to the reaction
Exothermic	Energy is transferred from the reaction to the surroundings
Reaction profile	A chart that shows the energy of the products and reactants for a particular reaction
Activation energy	The minimum amount of energy needed for a reaction to start
Energy Change	the difference in energy of the products compared to the energy of the reactants
Bond energy	The amount of energy required to break a mole of a particular covalent bond

Comprehension Question

Label the reaction profiles below to if they are endothermic or exothermic?



The start of a reaction the solution was at 99°C at the end of the reaction the temperature of the solution was 15°C is this an example of an exothermic or endothermic reaction?

.....

Why?

.....

The start of a reaction the solution was at 19°C at the end of the reaction the temperature of the solution was 55°C is this an example of an exothermic or endothermic reaction?

.....

Why?

.....

Look, Cover, Write, Check

Keyword	Definition
Endothermic	
Exothermic	
	A chart that shows the energy of the products and reactants for a particular reaction
	The minimum amount of energy needed for a reaction to start
	the difference in energy of the products compared to the energy of the reactants
Bond energy	

Application Questions

What is the name of a reaction that releases heat energy into the surroundings?

- A.endothermic
- B.exothermic
- C.oxidation
- D.reduction

A student investigates three reactions.

She wants to find out if the reactions are exothermic or endothermic.

Look at her results.

Reaction	Start temperature (°C)	Final temperature (°C)
X	21	25
Y	20	18
Z	22	24

Which reaction, **X**, **Y** or **Z**, is **endothermic**?

Explain your answer.

Due Date	Friday, 8 th January 2027
Name	



Y11 Combined T3 W1 – P3 Static Electricity

Keyword	Definition
Static Electricity	Results from the transfer of electrons between objects
Friction	A force which can transfer electrons between objects when they rub together
Current	The rate of flow of charge
Charge	Charged particles which are free to move e.g delocalised electrons and ions
Delocalised electrons	Electrons which can flow through a material
Coulomb	the unit of measure of charge

Comprehension Question

Why does static electricity not build up on a metal?

.....

.....

Why can plastic not conduct electricity?

.....

.....

What is the charged particle that flows around a circuit?

.....

.....

When an object gains electrons what charge is the object?

.....

.....

When an object loses electrons. What charge is the object?

.....

.....

When an insulator is rubbed with another insulator it becomes charged why?

.....

.....

