

Due Date	Friday, 11 th September 2026
Name	



Y10 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

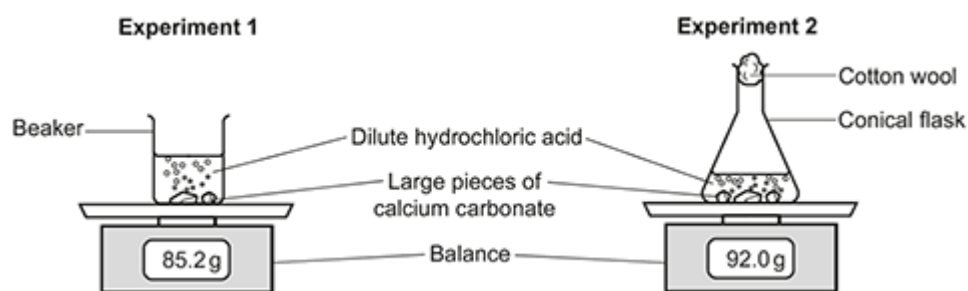
Keyword	Definition
Accurate	
	Consistent with one another: this means they have a small range
Valid	
	If the use of the same equipment, same method and same experimenter gives similar results
	Similar results being obtained by other groups
Systematic error	
	error in a measurement due to small uncontrollable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



Y10 Combined T1 W3 - B1 – Cell Structures

Keyword	Definition
prokaryotic cell	a type of cell without a nucleus, whose genetic material is found free-floating within the cytoplasm
eukaryotic cell	a type of cell with a nucleus and other membrane-bound organelles
nucleus	an organelle in eukaryotic cells that contains the DNA
mitochondria	an organelle which is the site of aerobic respiration
chloroplasts	an organelle in plant cells containing chlorophyll which is the site of photosynthesis
ribosome	an organelle which is the site of protein synthesis
membrane-bound organelle	a type of organelle surrounded by a membrane e.g., mitochondria or nucleus

Comprehension Question

1. A bacterial cell has plasmids and free-floating DNA in the cytoplasm. Which type of cell is a bacterial cell?

.....

2. Why would a muscle cell need lots of mitochondria?

.....

.....

.....

3. Explain why a root hair cell has no chloroplasts.

.....

.....

.....

Look, Cover, Write, Check

Keyword	Definition
membrane-bound organelle	
	an organelle in plant cells containing chlorophyll which is the site of photosynthesis
prokaryotic cell	
	an organelle which is the site of protein synthesis
mitochondria	
	a type of cell with a nucleus and other membrane-bound organelles

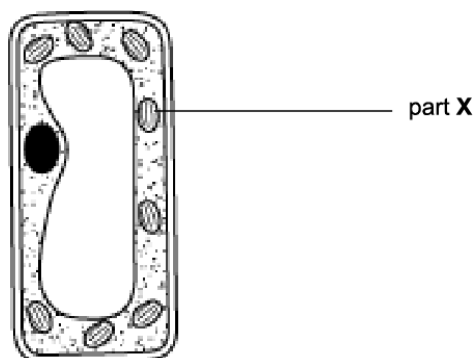
Application Questions

1. What structures do prokaryotic and eukaryotic cells have in common?

- A. Cell membrane and cytoplasm
- B. Cell membrane and nucleus
- C. Cytoplasm and mitochondria
- D. Mitochondria and nucleus

Look at the palisade cell from a leaf.

It is important for photosynthesis.



Part X is where the chemical reactions of photosynthesis take place.

Write down the name of the part X. (1)

Due Date	Friday, 25 th September 2026
Name	



Y10 Combined T1 W5 - C1 – Atomic Structure

Keyword	Definition
atom	a single sphere that makes up all matter
atomic number	the number of protons in the nucleus of an atom
relative atomic mass	the average mass of the atoms of an element measured relative to the mass of one atom of carbon-12
proton	a subatomic particle found in the nucleus of the atom with a charge of +1 and a mass of 1
neutron	a subatomic particle found in the nucleus of the atom with a charge of 0 and a mass of 1
electron	a subatomic particle found in the electron shells with a charge of –1 and a mass of 0.0005
element	a pure substance made of up the same type of atoms with the same number of protons
nucleus (chemistry)	the centre of an atom that contains protons and neutrons

Comprehension Question

1. Carbon has 6 protons, 6 neutrons and 6 electrons.

a) What is the atomic number of carbon?

.....

b) What is the atomic mass of carbon?

.....

2. Why is the overall charge of the nucleus positive?

.....

.....

3. 2 atoms have the same atomic number. What does this tell you about the atoms?

.....

.....

Look, Cover, Write, Check

Keyword	Definition
electron	
	the centre of an atom that contains protons and neutrons
	the average mass of the atoms of an element measured relative to the mass of one atom of carbon-12
neutron	
atomic number	
	a pure substance made of up the same type of atoms with the same number of protons

Application Questions

1. An atom of chlorine can be represented as:



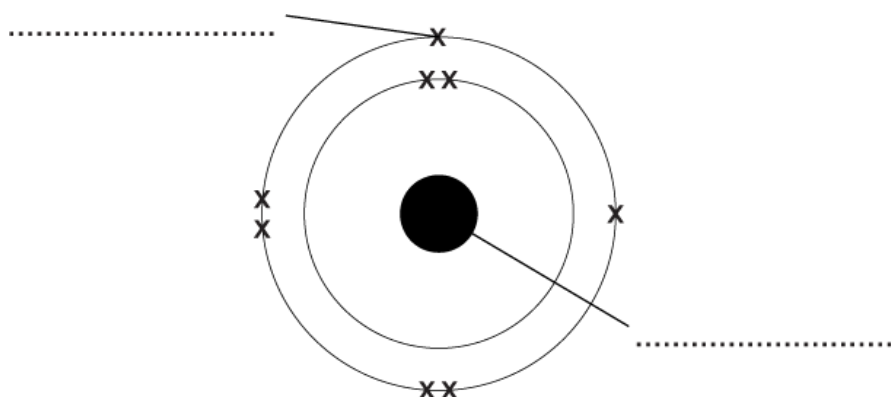
Complete the following sentence.

This atom of chlorine contains protons, 17 electrons and neutrons.

[2]

2. This question is about atomic structure. Look at the diagram of an atom of oxygen.

Complete the labels on the diagram.



Due Date	Friday, 2 nd October 2026
Name	



Y10 Combined T1 W6 - C1 – Atoms vs Ions

Keyword	Definition
atom	a single sphere that makes up all matter
atomic number	the number of protons in the nucleus of an atom
proton	a subatomic particle found in the nucleus of the atom with a charge of +1 and a mass of 1
electron	a subatomic particle found in the electron shells with a charge of -1 and a mass of 0.0005
ion	an atom that has gained or lost electrons to become a charged particle
charged	something that is positive or negative

Comprehension Question

1. An atom of magnesium has 12 protons and 12 electrons. What is the overall charge of the atom?

.....

2. A calcium ion has a charge of +2. What has happened to the atom for it to become a +2 ion?

.....

3. A fluorine atom has 9 protons. How many electrons does a fluorine atom have?

.....

4. A fluorine ion has a -1 charge. How many electrons does a fluorine ion have?

.....

5. If an atom has gained electrons, what charge will the ion have?

.....

Look, Cover, Write, Check

Keyword	Definition
electron	
	something that is positive or negative
	a single sphere that makes up all matter
ion	
	a subatomic particle found in the nucleus of the atom with a charge of +1 and a mass of 1

Application Questions

1. The mass number of an element is 23. The atomic number of the same element is 11.

How many protons and how many neutrons are there in an atom of this element?

Number of protons:

Number of neutrons:

[2]

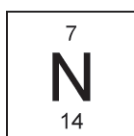
This element forms an **ion** with a charge of +1.

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

Number of electrons:

[1]

2. Look at the information about a nitrogen atom.



How many **electrons** are in a nitride ion, N^{3-} ?

- A 4
- B 10
- C 11
- D 17

Due Date	Friday, 9 th October 2026
Name	



Y10 Combined T1 W7 - P1 – Density

Keyword	Definition
atom	The smallest unit of matter
mass	The amount of matter in a substance
volume	The amount of space occupied by an object
density	The amount of mass in a certain volume
mass balance	A piece of equipment used to measure mass
measuring cylinder	A piece of equipment used to measure the volume of a liquid
eureka can	A piece of equipment used alongside a mass balance to measure the density of an irregular solid
ruler	A piece of equipment used to measure the volume of a regular solid
state of matter	Solid, liquid or gas

Comprehension Question

- What pieces of equipment could be used to measure the density of a regular solid?
.....
- Solids have a greater density than liquids and gases, why?
.....
.....
- What pieces of equipment could be used to measure the density of an irregular solid?
.....
- If the mass of a substance increases but the volume stays the same, what effect would this have on the density of the substance?
.....

Look, Cover, Write, Check

Keyword	Definition
volume	
	The amount of matter in a substance
	A piece of equipment used to measure mass
	A piece of equipment used alongside a mass balance to measure the density of an irregular solid
density	

Application Questions

1. A student has a wooden cube.

Explain how she could find the density of the wooden cube.

Include the measurements needed.

[3]

Due Date	Friday, 16 th October 2026
Name	



Y10 Combined T2 W1 - P1 – Specific Latent Heat

Keyword	Definition
Specific latent heat of fusion	The amount of energy needed to melt or freeze 1kg of a substance
Specific latent heat of vaporisation	The amount of energy needed to evaporate or condense 1kg of a substance
Freezing	Changing state from liquid to solid
Melting	Changing state from solid to liquid
Evaporation	Changing state from liquid to gas
Condensation	Changing state from gas to liquid
Internal energy	The total amount of kinetic and potential energy of particles in a system
State of matter	Solid, Liquid, Gas

Comprehension Questions

1. A student uses the equation $E = m \times L$ to calculate the amount of energy required to freeze a substance, where L = specific latent heat of _____. Which type of specific latent heat does the student need to use?
2. Another student wants to calculate the total amount of energy required to change a solid substance into a gas. How might they calculate this?
.....
.....
3. If the amount of energy required to melt 1kg of a substance is 150kJ, how much energy would be required to melt 2kg of the same substance?
.....
.....

Look, Cover, Write, Check

Keyword	Definition
Specific latent heat of fusion	
Specific latent heat of vaporisation	
	Changing state from liquid to gas
	Changing state from gas to liquid
Internal energy	

Application Questions

1. A beaker contains water with a mass of 540 g

The specific latent heat of the vaporisation of water is 2.26×10^6 J/kg.

How much energy is needed to boil the water?

- a) 1.22×10^3 J
- b) 1.22×10^6 J
- c) 1.22×10^9 J
- d) 1.22×10^{12} J

Your answer

2. Describe the difference between specific heat capacity and specific latent heat.

.....
.....

Due Date	Friday, 6 th November 2026
Name	



Y10 Combined T2 W2 - P1 – Pressure

Keyword	Definition
matter	The particles that make up the universe
mass	The amount of matter
volume	The amount of space occupied by an object
density	The amount of mass in a certain volume
gas pressure	The force applied to the walls of a container due to particle collisions
frequency	Number of something in a set time
kinetic energy	The energy store associated with moving objects
Pascal (Pa)	The unit of measurement of pressure

Comprehension Question

1. Gas pressure increases with an increase in temperature. Explain why. *Use the key words:*

frequency, kinetic and collisions

.....

.....

.....

2. Gas pressure decreases when density decreases. Explain why. *Use the key words: frequency, mass and collisions*

.....

.....

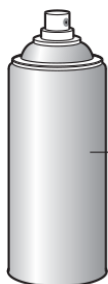
.....

Look, Cover, Write, Check

Keyword	Definition
	The particles that make up the universe
	The unit of measurement of pressure
volume	
gas pressure	
	The energy store associated with moving objects

Application Questions

1. An aerosol canister may contain a non-flammable gas at high pressure.



Aerosol canister containing a non-flammable gas

The aerosol canister should **not** be exposed to high temperatures.

Explain why.

Include ideas about gas particles in your answer.

[3]

.....

.....

.....

.....



Due Date	Friday, 13 th November 2026
Name	

Y10 Combined T2 W3 - 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

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

.....

2. Who discovered the electron?

.....

3. 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.

.....

.....

.....

.....

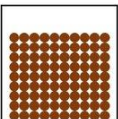
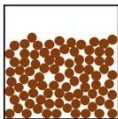
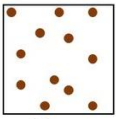
Due Date	Friday, 20 th November 2026
Name	



Y10 Combined T2 W4 - C1 – Particles

Keyword	Definition
physical change	A change that does not produce new substances, usually reversible e.g., melting ice
chemical change	A change that produces new substances, often difficult to reverse, e.g., aerobic respiration.
atom	A single sphere that makes up all matter
ion	A charged particle that has gained or lost electrons
isotope	An atom of the same element with the same number of protons but different numbers of neutrons.
model	Something that helps to explain a scientific idea or theory

States of Matter

	 Solid	 Liquid	 Gas
Arrangement of Particles	Regular, all particles touching	Irregular, all particles touching	Irregular, no particles touching
Movement of Particles	Vibrate in fixed positions	Flow over each other	Random, quickly in all directions

Comprehension Question

- If an iron nail is left outside it begins to rust, causing a change of colour. What type of change is this an example of?
- A substance can be compressed under pressure – which state of matter is this substance?
.....

Look, Cover, Write, Check

Keyword	Definition
	A change that produces new substances, often difficult to reverse, e.g., aerobic respiration.
model	
atom	
	A change that does not produce new substances, usually reversible e.g., melting ice
	An atom of the same element with the same number of protons but different numbers of neutrons.

Application Questions

1. Which of these processes is an example of a **physical** change?

- A** Combustion
- B** Freezing
- C** Neutralisation
- D** Oxidation

Your answer

☐

2. In which state of matter do particles have the **most** energy?

Tick (✓) **one** box.

Solid

☐

Liquid

☐

Gas

☐

Due Date	Friday, 4 th December 2026
Name	



Y10 Combined T1 W4 -B1 – Photosynthesis

Keyword	Definition
Independent variable	The variable that is changed in an experiment.
Dependent variable	The variable that is measured in the experiment.
Control variable	The variable that is kept the same.
Photosynthesis	A chemical reaction that happens inside the chloroplasts to produce simple sugar: Carbon dioxide + Water → Oxygen + Glucose
Word equation	A representation of a chemical reaction using the names of the substances involved.
Symbol equation	A representation of a chemical reaction using the chemical formulae of the substances involved.
Endothermic	A reaction that absorbs energy from the surroundings.
Factors affecting photosynthesis	Light intensity, temperature and carbon dioxide concentration
Chloroplast	Plant organelle containing chlorophyll which is the site of photosynthesis.
Rate limiting factor	A condition which controls how fast a reaction happens.

Comprehension Question

1. Ryan was counting the number of bubbles produced in one minute. After each minute, he would record the data, then move the pondweed 10cm away from the lamp (light source). He used the same lamp throughout the experiment. In the experiment described, what is the:

- Independent variable:
- Control variable:
- Dependent variable:

2. Carbon dioxide (CO₂) reacts with water (H₂O) to produce glucose (C₆H₁₂O₆) and oxygen (O₂). Write the balanced symbol equation for this chemical reaction.

.....

Look, Cover, Write, Check

Keyword	Definition
	A reaction that absorbs energy from the surroundings.
Rate limiting factor	
	The variable that is kept the same.
	plant organelle containing chlorophyll which is the site of photosynthesis.
Word equation	
Dependent variable	
Factors affecting photosynthesis	
Photosynthesis	
	A representation of a chemical reaction using the chemical formulae of the substances involved.
	The variable that is changed in an experiment.

Application Questions

The figure shows algae growing on the surface of a lake. In the summer, the area covered by the algae increases. Other plants growing at the bottom of the lake receive less light. Explain how this could affect the growth of the plants at the bottom of the lake.

.....

.....

.....

.....

.....

.....



Due Date	Friday, 11 th December 2026
Name	



Y10 Combined T2 W5 - B2 – Diffusion & Gas Exchange

Keyword	Definition
diffusion	the net movement of particles from a region of high concentration to a region of low concentration
fluid	liquid and gases
passive	no energy required
gas exchange	a process where two gases are swapped e.g., carbon dioxide leaves the blood into the alveoli, whereas oxygen leaves the alveoli to enter the blood
adaptation	a change in a characteristic to make an organism better suited for its environment or function
concentration	the amount of particles in a set volume
surface area to volume ratio	the amount of available surface an object has compared to the amount of space it takes up
concentration gradient	the difference in concentration between two areas

Comprehension Question

1. The stomata in leaves release oxygen via diffusion down a concentration gradient. What is meant by this statement?

.....

.....

2. Capillaries are one cell thin to increase the rate of diffusion of substances between the blood and the cells. What is this change in characteristic called?

.....

3. Why can diffusion only occur in fluids?

.....

.....

Look, Cover, Write, Check

Keyword	Definition
	The amount of particles in a set volume
	A process where two gases are swapped e.g., carbon dioxide leaves the blood into the alveoli, whereas oxygen leaves the alveoli to enter the blood
fluid	
diffusion	
	No energy required
	A change in a characteristic to make an organism better suited for its environment or function
	the amount of available surface an object has compared to the amount of space it takes up
concentration gradient	

Application Questions

1. **Fig. 13.1** shows a red blood cell.



Fig. 13.1

Explain **one** way red blood cells are adapted to transport oxygen around the body.

2. Which process allows oxygen to enter blood cells from the alveoli down a concentration gradient?

- A** Active transport
- B** Diffusion
- C** Evaporation
- D** Osmosis

Your answer

Due Date	Friday, 18 th December 2026
Name	



Y10 Combined T2 W6 - B2 – Osmosis & Active Transport

Keyword	Definition
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
active transport	the net movement of particles from a region of low concentration to a region of high concentration, using ATP
passive	No energy required
water potential	Amount of water in a set volume
dilute	A liquid with a high water potential
concentrated	A liquid with a high solute concentration and low water potential

Comprehension Question

1. Water moves into the roots via osmosis. Explain this process using the term 'water potential'.

.....

.....

.....

2. Why does active transport require energy?

.....

.....

3. A teacher makes some dilute juice. They pour a 5ml of juice and 100ml of water into a cup but decide they want the juice stronger, so they add some more juice. Circle the correct terms that could be used to describe the drink now.

Dilute Concentrated High water potential Low water potential

Look, Cover, Write, Check

Keyword	Definition
	The net movement of particles from a region of low concentration to a region of high concentration, using ATP
water potential	
dilute	
	A liquid with a high solute concentration and low water potential
	the net movement of particles from a region of low concentration to a region of high concentration, using ATP
passive	

Application Questions

1. A student investigates the effect of concentration on osmosis.

He cuts out five potato chips of similar mass. The student measures the mass of each potato chip.

He then places the potato chips in different concentrations of sugar solution.

After 30 minutes he removes the potato chips from the solution. He dries them with a paper towel before measuring the new mass.

The table shows his results.

Concentration of sugar solution (mol / dm ³)	Mass of potato chip (g)		Change in mass (g)	Percentage change in mass
	At start	After 30 minutes		
0.0	2.1	2.7	+0.6	+28.6
0.2	2.2	2.3	+0.1	+4.5
0.4	2.0	1.8	-0.2	-10.0
0.6	2.0	1.6	-0.4	-20.0
0.8	2.3	1.7	-0.5	-26.1
1.0	2.2	1.6	-0.6	-27.3

Use ideas about osmosis to explain the patterns in the results.

.....

.....

.....

.....

Due Date	Friday, 8 th January 2027
Name	



Y10 Combined T3 W1 - B2 – Plant Transport Vessels

Keyword	Definition
xylem	A type of plant transport vessel in the stem through which water and mineral ions move up the plant
phloem	A type of plant transport vessel in the stem through which sugars move up and down the plant
lignin	A woody substance that surrounds the xylem vessel for structure and support
companion cells	A specialised cell in the phloem that provides energy
sieve tube	A specialised cell in the phloem that helps to transport dissolved substances
transpiration	A passive process where water is lost from the leaves (stomata) of a plant
translocation	An active process where sugars are transported up and down the phloem
diffusion	The net movement of particles from an area of high concentration to an area of low concentration
osmosis	The net movement of water from an area of high water potential to an area of low water potential across a partially permeable membrane
active transport	The movement of particles from an area of low concentration to an area of high concentration, this process requires energy

Comprehension Questions

1. In which plant vessel is transpiration involved?

.....

2. In which plant vessel is the translocation involved?

.....

3. Why does the phloem require companion cells?

.....

4. How does osmosis link to the xylem vessels?

.....

Look, Cover, Write, Check

Keyword	Definition
translocation	
	A type of plant transport vessel in the stem through which water and mineral ions move up the plant
transpiration	
phloem	
	A specialised cell in the phloem that provides energy
	A specialised cell in the phloem that helps to transport dissolved substances

Application Questions

1. Which of the following is a similarity between xylem and phloem?

They both have:

- A. Cell walls containing lignin
- B. Companion cells
- C. No nucleus
- D. Sieve plates

2. Translocation is a process that occurs in plants.

	Transport tissue	Substances transported	Direction of movement	Involves active transport
A	Phloem	Sucrose	Two way flow	Yes
B	Phloem	Mineral ions	One direction only	No
C	Xylem	Mineral ions	One direction only	No
D	Phloem	Sucrose	Two way flow	No

Which row describes translocation?