

Due Date:	Friday, 15th September 2023
Student Number:	
Name:	



Y10 Triple T1 W2 – Working Scientifically

Question	Answer
What is the definition of accurate?	Close to the true value.
What is the definition of reliable (sometimes called precise)?	Consistent with one another: this means they have a small range.
What is the definition of valid?	The investigation is appropriate to answer the question: only one variable is changed.
What is the definition of repeatable?	One person can use the same method and equipment to obtain similar results.
What is the definition of reproducible?	Someone else can repeat the experiment and obtain similar results.
What is the cause of a systematic error?	A problem with the method. All results are affected in the same way.
What is the cause of a random error?	Each result is effected differently: it can be an error reading the scale or human reaction time.
What is the cause of a zero error?	A lack of calibration (setting the equipment to zero before use). All results are affected in the same way.
What is an independent variable?	What you change/investigate 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?	

Q1. A student investigated the rate of the reaction between magnesium and hydrochloric acid.

The student measured the volume of hydrogen gas produced.

(a) How could the student collect and measure the volume of gas produced?

(1)

(b) At the start of the investigation the volume of gas was 0 cm³

The student took readings at 20-second intervals

Readings for the volume of gas were 24 cm³, 44 cm³, 59 cm³, 70 cm³, 76 cm³ and 79 cm³

Draw a results table for the investigation.

Include the student's results in the table.

(3)

Due Date:	Friday, 22 nd September 2023
Student Number:	
Name:	



Y10 Triple T1 W3 B1 - Cell Structures

Question	Answer
What is a light microscope used for?	To magnify the size of a specimen so it can be observed.
What is the equation to calculate total magnification?	Total magnification = Eyepiece lens x objective lens
What is the equation to calculate magnification?	Magnification = size of the image /real size of the object
What stain is used to see animal cells?	Methylene blue is used to stain animal cells.
What stain is used to see plant cells?	Iodine is used to stain plant cells.
What is an advantage of an electron microscope?	Electron microscopes have a higher resolution and magnification than light microscopes.
What is the disadvantage of an electron microscope?	A disadvantage of an electron microscope is that the specimen must be dead and images are in black and white.
What is the role of the mitochondria?	The mitochondria are the site of aerobic respiration.
What is the role of the ribosome?	The ribosomes are the site of protein synthesis.
What is the role of the chloroplasts?	The chloroplasts contain chlorophyll and is the site of photosynthesis.

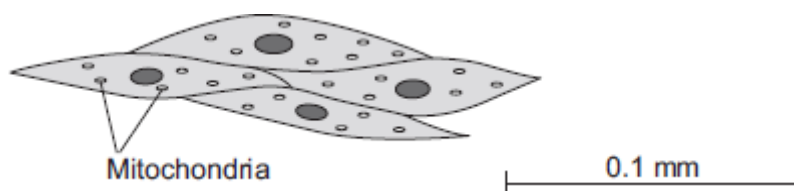
Look, Cover, Write, Check

Question	Answer
What is the equation to calculate magnification?	
What is the role of the chloroplasts?	
What is an advantage of an electron microscope?	
What is a light microscope used for?	
What is the role of the mitochondria?	
What stain is used to see animal cells?	
What is the equation to calculate total magnification?	
What is the role of the ribosome?	
What is the disadvantage of an electron microscope?	
What stain is used to see plant cells?	

Look, Cover, Write, Check

Question	Answer
	To magnify the size of a specimen so it can be observed.
	Total magnification = Eyepiece lens x objective lens
What is the equation to calculate magnification?	
	Methylene blue is used to stain animal cells.
What stain is used to see plant cells?	
	Electron microscopes have a higher resolution than a light microscope.
What is the disadvantage of an electron microscope?	
What is the role of the mitochondria?	
What is the role of the ribosome?	
	The chloroplasts contain chlorophyll and is the site of photosynthesis.

The image below shows some muscle cells from the wall of the stomach, as seen through a light microscope.



- (a) The figure above is highly magnified. The scale bar in the figure above represents 0.1 mm.

Use a ruler to measure the length of the scale bar and then calculate the magnification of the figure above.

Magnification = _____ times

(2)

- (b) What is the function of mitochondria?

(2)

- (c) Suggest why the ribosomes **cannot** be seen through a light microscope.

_____ (1)

Due Date:	Friday, 29 th September 2023
Student Number:	
Name:	



Y10 Triple T1 W4 C1 - Atomic Structure and Isotopes

Question	Answer
What is the mass of a proton?	1
What is the mass of a neutron?	1
Define 'atomic number'	The number of protons in the nucleus of an atom.
Define 'relative atomic mass'	The number of protons and neutrons in the nucleus of an atom.
How do you calculate the number of protons in an atom?	Number of protons = atomic number
How do you calculate the number of neutrons in an atom?	Number of neutrons = (relative atomic mass – atomic number)
Define an isotope.	Atoms of the same element with the same number of protons but a different number of neutrons.
Why do isotopes of an element have the same atomic number?	Isotopes have the same atomic number because they have the same number of protons.
Why do isotopes of an element have different relative atomic mass numbers?	Isotopes have a different relative atomic mass because they have a different number of neutrons.
Why is ${}^6\text{C}_{13}$ an isotope of ${}^6\text{C}_{12}$?	They have the same number of protons (6) but different number of neutrons (13 and 12).
Why is ${}^6\text{C}_{12}$ <u>not</u> an isotope of ${}^7\text{C}_{12}$?	They have a different number of protons which means that they are different elements. An atom with an atomic number of 7 is in fact nitrogen, not carbon.

Look, Cover, Write, Check

Question	Answer
What is the mass of a proton?	
What is the mass of a neutron?	
Define 'atomic number'	
Define 'relative atomic mass'	
How do you calculate the number of protons in an atom?	
How do you calculate the number of neutrons in an atom?	
Define an isotope.	
Why do isotopes of an element have the same atomic number?	
Why do isotopes of an element have different relative atomic mass numbers?	
Why is ${}^6\text{C}_{13}$ an isotope of ${}^6\text{C}_{12}$?	
Why is ${}^6\text{C}_{12}$ <u>not</u> an isotope of ${}^7\text{C}_{12}$?	

Look, Cover, Write, Check

Question	Answer
	1
Define an isotope.	
	The number of protons in the nucleus of an atom.
Why do isotopes of an element have different relative atomic mass numbers?	
How do you calculate the number of protons in an atom?	
	Relative atomic mass – atomic number
	1
Why do isotopes of an element have the same atomic number?	
	The number of protons and neutrons in the nucleus of an atom.
Why is ${}^6\text{C}_{13}$ an isotope of ${}^6\text{C}_{12}$?	
Why is ${}^6\text{C}_{12}$ <u>not</u> an isotope of ${}^7\text{C}_{12}$?	

Application:

1. An atom has both an **atomic number** and a **mass number**. What do these **two** terms mean?

[2]

2. An atom of chlorine can be represented as



Different **isotopes** of chlorine exist.

Nick thinks the following are three isotopes of chlorine.

Only one is correct. Circle the correct isotope. Explain your answer.



Explanation: _____

[1]

Due Date:	Friday, 6th October 2023
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Y10 Triple T1 W5 P1 - Density

Question	Answer
Define 'density'	The amount of mass in a certain volume.
What is the equation for density? Include units.	Density (kg/m ³) = mass (kg) / volume (m ³)
What apparatus is used to measure mass?	Mass balance
How do you convert from g to kg?	Divide by 1000.
How do you convert from kg to g?	Multiply by 1000.
Mass and weight are not the same. How is mass different to weight?	Mass is the amount of matter in an object, measured in g or kg. Weight is the force of gravity acting on a mass, measured in N.
Define 'volume'	The amount of space an object occupies.
How do you measure the volume of a regular object?	Length x width x height
What piece of equipment do you use to measure the volume of an irregular object?	Eureka can
Which state of matter has the highest density? Explain your answer	Solid because the particles are closely-packed together so there are lots of particles in a certain volume.
Which state of matter has the lowest density? Explain your answer.	Gas because the particles are spread out so there are few particles in a certain volume.

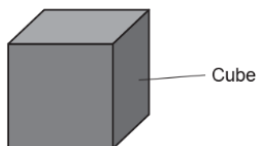
Look, Cover, Write, Check

Question	Answer
Define 'density'	
What is the equation for density? Include units.	
What apparatus is used to measure mass?	
How do you convert from g to kg?	
How do you convert from kg to g?	
Mass and weight are not the same. How is mass different to weight?	
Define 'volume'	
How do you measure the volume of a regular object?	
What piece of equipment do you use to measure the volume of an irregular object?	
Which state of matter has the highest density? Explain your answer	
Which state of matter has the lowest density? Explain your answer.	

Look, Cover, Write, Check

Question	Answer
	The amount of mass in a certain volume.
What is the equation for density? Include units.	
What apparatus is used to measure mass?	
How do you convert from g to kg?	
How do you convert from kg to g?	
Mass and weight are not the same. How is mass different to weight?	
	The amount of space an object occupies.
	Length x width x height
What piece of equipment do you use to measure the volume of an irregular object?	
Which state of matter has the highest density? Explain your answer	Solid because the particles are closely-packed together so there are lots of particles in a certain volume.
	Gas because the particles are spread out so there are few particles in a certain volume.

A student is given a **solid** metal cube.



- i. Explain how the student can use a ruler to calculate the volume of the metal cube.

_____ [2]

- ii. The metal cube has a volume of 125 cm^3 and a mass of 850 g.

Calculate the density of the metal cube. Use the equation: density = mass \div volume

Density = _____ g/cm^3

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Y10 Triple T1 W6 B1 - Photosynthesis

Question	Answer
What is the word equation for photosynthesis?	Carbon dioxide + Water → Glucose + Oxygen
Where does photosynthesis take place?	Photosynthesis takes place in the chloroplasts .
How many stages is photosynthesis?	There are 2 stages in photosynthesis.
Why is photosynthesis an endothermic reaction?	Absorbs energy from the surroundings.
How does photosynthesis affect the concentration of carbon dioxide in the atmosphere?	Photosynthesis decreases the concentration of carbon dioxide in the atmosphere.
How does deforestation affect the concentration of carbon dioxide in the atmosphere?	Deforestation (the removal of trees) increases the concentration of carbon dioxide
Why do plants carry out photosynthesis?	To produce food (in the form of glucose)
What happens to the glucose made during photosynthesis?	<ul style="list-style-type: none"> • Can be respired to released energy • Can be stored as starch (for later use) • Used to make proteins e.g. cellulose
Why do root hair cells not contain chloroplasts?	They receive no/very little light underground.

Look, Cover, Write, Check

Question	Answer
How does deforestation affect the concentration of carbon dioxide in the atmosphere?	
Why do root hair cells not contain chloroplasts?	
How many stages is photosynthesis?	
Why is photosynthesis an endothermic reaction?	
How does photosynthesis affect the concentration of carbon dioxide in the atmosphere?	
What happens to the glucose made during photosynthesis?	
Why do plants carry out photosynthesis?	
What is the word equation for photosynthesis?	
Where does photosynthesis take place?	

Look, Cover, Write, Check

Question	Answer
What is the word equation for photosynthesis?	
How many stages is photosynthesis?	
	... to produce food (in the form of glucose) for themselves.
How does deforestation affect the concentration of carbon dioxide in the atmosphere?	
How does photosynthesis affect the concentration of carbon dioxide in the atmosphere?	
	... because energy is absorbed (taken in) from the surroundings in the form of light.
	<ul style="list-style-type: none"> • Can be respired to released energy • Can be stored as starch (for later use) • Used to make proteins e.g. cellulose
Where does photosynthesis take place?	
	... because root hair cells do not photosynthesise.

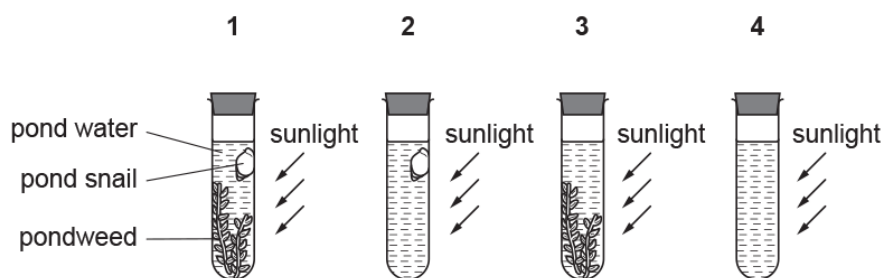
1. Describe how and where oxygen is produced in photosynthesis.

[3]

2. Explain why the amount of oxygen gas given off is **not** a true measure of the rate of photosynthesis.

[2]

3. Pond snails and pondweed are living in water in sealed test tubes.



Carbon dioxide dissolves in water and forms an acid. In which test tube would the water become most acidic?

_____ [1]

Due Date:	Friday, 20th October 2023
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Y10 Triple T1 W7 C1 - Atoms vs Ions

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 negative?	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 5,6,7 (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 of 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.

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	NO_3^-	Aluminium	Al^{3+}
Oxide	O^{2-}	Magnesium	Mg^{2+}

Write the formula for **aluminium oxide**.

[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 Triple T2 W1 P1 – Specific Latent Heat

Question	Answer
What are the 6 changes of state?	The 6 changes of state are evaporating, condensing, melting, freezing, sublimation, and deposition.
Describe what happens to temperature when a change of state occurs.	Temperature remains constant during a state change.
Explain why there is no change in temperature when ice melts.	The energy goes into breaking intermolecular forces between the particles, rather than increasing the kinetic energy of the particles.
What are the two types of specific latent heat?	Specific latent heat of vapourisation Specific latent heat of fusion
How do you calculate the energy needed to change the state of a substance?	Energy = mass x specific latent heat
What are the units of specific latent heat?	J/kg
What is the definition of specific latent heat?	The energy needed to change the state of 1kg of substance
What are the weak forces between molecules called?	Intermolecular forces.
What happens to molecules when you increase their temperature?	They gain kinetic energy.

Look, Cover, Write, Check

Question	Answer
Explain why there is no change in temperature when ice melts.	
What is the definition of specific latent heat?	
What are the weak forces between molecules called?	
Describe what happens to temperature when a change of state occurs.	
Describe what happens to temperature when a change of state occurs.	
What happens to molecules when you increase their temperature?	
What are the 6 changes of state?	
What are the units of specific latent heat?	
What are the two types of specific latent heat?	

Look, Cover, Write, Check

Question	Answer
	They vibrate more.
How do you calculate the energy needed to change the state of a substance?	
	J/kg
What are the 6 changes of state?	
	Energy goes into breaking intermolecular forces between the particles, rather than increasing the kinetic energy of the particles.
	Intermolecular forces.
Describe what happens to temperature when a change of state occurs.	
	Specific latent heat of vapourisation Specific latent heat of fusion
What is the definition of specific latent heat?	

*A student does an experiment using 0.2 kg of water.

Here is some information from the experiment:

The aim is to find the energy needed to raise the temperature of the water by 20 °C.

An electrical heater is used to heat the water. The temperature of the water increases by 20 °C.

The **specific heat capacity** of water is 4 200 J / kg °C.

Describe how the student should carry out the experiment, including the equipment used.

In your answer calculate the change in internal energy for the water.

You may include a diagram in your answer.

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Y10 Triple T2 W2 C1 – History of the Atom

Question	Answer
What is Dalton's model of the atom?	Atoms are solid sphere. Each different element will have a different sized sphere.
What did JJ Thomson discover?	The electron
What is JJ Thomson's model of the atom?	Atoms are positively charged matter with negative electrons evenly spread.
What did Rutherford discover?	A small, positively charged nucleus.
What experiment did Rutherford carry out to make his discovery?	Rutherford fired alpha particles at a thin sheet of gold foil.
How did most alpha particles behave? What did this show?	Most alpha particles passed straight through which shows the atom is mostly empty space.
How did some alpha particles behave? What did this show?	Some alpha particles were reflected. This showed there was a small, dense nucleus.
What is Rutherford's model of the atom?	The atom is mostly empty space with a small, dense nucleus at the centre. Electrons have random orbits.
What is Bohr's model of the atom?	Bohr discovered electron shells and stated electrons orbit the nucleus at fixed distances.
Why have our ideas about the atom changed over time?	As technology has developed it has allowed us to gain extra evidence.

Look, Cover, Write, Check

Question	Answer
What is Dalton's model of the atom?	
What is JJ Thomson's model of the atom?	
What did JJ Thomson discover?	
What is Rutherford's model of the atom?	
What did Rutherford discover?	
What experiment did Rutherford carry out to make his discovery?	
How did most alpha particles behave? What did this show?	
How did some alpha particles behave? What did this show?	
What is Bohr's model of the atom?	
Why have our ideas about the atom changed over time?	

Look, Cover, Write, Check

Question	Answer
	As technology has developed it has allowed us to gain extra evidence.
What is Bohr's model of the atom?	
	The atom is mostly empty space with a small, dense nucleus at the centre. Electrons have random orbits.
What did Rutherford discover?	
	Rutherford fired alpha particles at a thin sheet of gold foil.
How did most alpha particles behave? What did this show?	
How did some alpha particles behave? What did this show?	
	Atoms are positively charged matter with negative electrons evenly spread.
What did JJ Thomson discover?	
	Atoms are solid sphere. Each different element will have a different sized sphere.

The plum pudding model of the atom was replaced by the nuclear model.

The nuclear model was developed after the alpha particle scattering experiment.

Compare the plum pudding model with the nuclear model of the atom.

Due Date:	Friday, 24th November 2023
Student Number:	
Name:	



Y10 Triple T2 W3 C1 - Particles

Question	Answer
What is a particle?	A particle is a tiny amount of matter.
Describe the arrangement and movement of particles in a solid.	In a solid the particles are arranged regularly and they vibrate about fixed positions.
Describe the arrangement and movement of particles in a liquid.	In a liquid the particles are arranged randomly and they move around each other.
Describe the arrangement and movement of particles in a gas.	In a gas the particles are arranged randomly and they move quickly in all directions.
What is a chemical change?	A chemical change is a change that produces one or more new substances. Many chemical changes are irreversible.
Give two examples of chemical changes.	Two examples of chemical changes are cooking eggs and an acid reacting with an alkali to create a salt and water.
What is a physical change?	A physical change is a change that when no new substance is made. Physical changes are usual a change of state.
Give two examples of physical changes.	Freezing juice to make an ice lolly and dissolving sugar in water.
What types of forces are between particles?	Electrostatic forces of attraction.
What are the limitations of the particle model?	The model does not take into account the forces between particles, the size of particles and the space between particles.

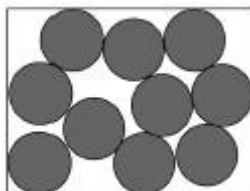
Look, Cover, Write, Check

Question	Answer
Describe the arrangement and movement of particles in a solid.	
What is a chemical change?	
Give two examples of physical changes.	
Give two examples of chemical changes.	
What is a physical change?	
What types of forces are between particles?	
What is a particle?	
Describe the arrangement and movement of particles in a liquid.	
What are the limitations of the particle model?	
Describe the arrangement and movement of particles in a gas.	

Look, Cover, Write, Check

Question	Answer
What is a particle?	
Describe the arrangement and movement of particles in a solid.	
	In a liquid the particles are arranged randomly and they move around each other.
Describe the arrangement and movement of particles in a gas.	
	A chemical change is a change that produces one or more new substances. Many chemical changes are irreversible.
	Two examples of chemical changes are cooking eggs and an acid reacting with an alkali to create a salt and water.
What is a physical change?	
Give two examples of physical changes.	
	The forces between particles are electrostatic forces of attraction.
What are the limitations of the particle model?	

Figure 1 shows a model of the particles in a liquid.



(a) Give **one** similarity and **one** difference you would see in **Figure 1** if it showed the same substance as a gas.

Similarity _____

Difference _____

(2)

(b) Describe **two** limitations of the model shown in **Figure 1**.

1. _____

2. _____

(2)

Due Date:	Friday, 1 st December 2023
Student Number:	
Name:	



Y10 Triple T2 W4 P1 - Pressure

Question	Answer
Describe the arrangement and motion of particles in a solid.	The particles have a regular, tightly packed arrangement. They are in fixed positions so can only vibrate.
Describe the arrangement and motion of particles in a liquid.	The particles have a random, tightly packed arrangement. The particles can move randomly while still touching.
Describe the arrangement and motion of particles in a gas.	The particles have a random arrangement with large spaces between particles. They move freely and randomly.
What causes gas pressure?	The collision of gas particles with the container walls which exerts a force.
Explain how an increase in temperature affects gas pressure.	Particles increase in kinetic energy. This causes more frequent collisions with the container walls so pressure increases.
Other than temperature, how else can gas pressure be increased?	If the volume of the container decreases or the concentration of particles increases.
What is the equation linking pressure and area?	$Pressure = \frac{Force}{Area}$
What are the units of measure for pressure?	Pascals (Pa)
Why do containers explode?	If the pressure inside is greater than the pressure outside and the container is no longer able to withstand the force.
In which direction do particles exert a force on the container?	The force will be perpendicular to the container wall.

Look, Cover, Write, Check

Question	Answer
What are the units of measure for pressure?	
In which direction do particles exert a force on the container?	
What is the equation linking pressure and area?	
Explain how an increase in temperature affects gas pressure.	
Describe the arrangement and motion of particles in a gas.	
Describe the arrangement and motion of particles in a solid.	
Why do containers explode?	
What causes gas pressure?	
Other than temperature, how else can gas pressure be increased?	
Describe the arrangement and motion of particles in a liquid.	

Look, Cover, Write, Check

Question	Answer
What is the equation linking pressure and area	
	The force will be perpendicular to the container wall.
	The higher the temperature the more kinetic energy the particles have. This causes more frequent collisions with the container walls so pressure increases.
Describe the arrangement and motion of particles in a solid.	
	Gas pressure will increase if the volume of the container decreases or the concentration of particles increases.
What causes gas pressure?	
Why do containers explode?	
Describe the arrangement and motion of particles in a gas.	
	The particles have an irregular, tightly packed arrangement. The particles can move randomly while still touching.
	Pascals (Pa)

What is the change in pressure when a diver moves from a depth of 3.0 m to a depth of 8.0 m?

Assume gravitational field strength on Earth = 10 N / kg and water density = 1000 kg / m³.

Use an equation from the data sheet to help you.

- A** 30 000 Pa
- B** 50 000 Pa
- C** 80 000 Pa
- D** 110 000 Pa

Your answer

Which statement explains why atmospheric pressure changes as you climb up a mountain?

- A** Number of air molecules above you decrease the further you move from the centre of the Earth.
- B** Density of air increases the further you move from the centre of the Earth.
- C** Gravity increases the further you move from the centre of the Earth.
- D** Temperature decreases the further you move from the centre of the Earth.

Your answer

[1]

A sealed can contains gas.

The can is heated and the pressure of the gas increases.

How do the gas particles cause this increase in pressure?

- A.** Their average distance apart increases.
- B.** They expand.
- C.** They hit each other more frequently.
- D.** They hit the can more frequently.

Your answer

Due Date:	Friday, 8 th December 2023
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Y10 Triple T2 W5 B2 - Diffusion and Gas Exchange

Question	Answer
Define 'diffusion'	The net movement of particles from a region of high concentration to a region of low concentration.
What 4 factors affect the rate of diffusion?	- Temperature - Surface area: volume ratio - Concentration gradient - Diffusion distance
What is meant by the term 'concentration gradient'?	The difference in concentration between two areas.
How can you increase the rate of diffusion?	Increase temperature; increase concentration gradient; increase surface area: volume ratio; decrease the diffusion distance.
How can you decrease the rate of diffusion?	Decrease temperature; decrease concentration gradient; decrease surface area: volume ratio; increase the diffusion distance.
Where does diffusion occur in living organisms?	Gas exchange between the lungs and blood; gas exchange between the blood and cells; gas exchange in and out of the stomata.
How is the alveoli adapted for gas exchange?	Thin walls, large surface area, good blood supply
How does breathing allow oxygen to diffuse into the blood?	Breathing allows large amounts of oxygen to enter the lungs. This creates a high concentration gradient between the alveoli and the blood, allowing oxygen to enter the blood by diffusion.

Look, Cover, Write, Check

Question	Answer
What is meant by the term 'concentration gradient'?	
What 4 factors affect the rate of diffusion?	
Define 'diffusion'	
How can you increase the rate of diffusion?	
How is the alveoli for adapted gas exchange?	
How does breathing allow oxygen to diffuse into the blood?	
How can you decrease the rate of diffusion?	
Where does diffusion occur in living organisms?	

Due Date:	Friday, 15th December 2023
Student Number:	
Name:	



Y10 Triple T2 W6 – B2 Osmosis and Active Transport

Question	Answer
Define 'water potential'	The concentration of water.
Describe the water potential of a 'dilute' solution.	High water potential.
Describe the water potential of a 'concentrated' sugar solution.	Low water potential.
Define 'osmosis'	The net movement of water from a region of high water potential to a region of low water potential, across a partially-permeable membrane.
Where does osmosis take place in living organisms?	Absorption of water from the large intestine; absorption of water into the roots of a plant.
What would happen to a potato placed in a dilute solution?	The potato would expand because water enters the potato by osmosis.
What happens to a potato placed in a concentrated sugar solution?	The potato would shrink because water leaves the potato by osmosis.
Define 'active transport'	The net movement of particles from a region of low concentration to a region of high concentration, using energy in the form of ATP.
Where does active transport take place in living organisms?	The absorption of glucose in the small intestine; absorption of mineral ions into the roots of a plant.

Look, Cover, Write, Check

Question	Answer
Where does active transport take place in living organisms?	
Describe the water potential of a 'dilute' solution.	
Describe the water potential of a 'concentrated' sugar solution.	
Define 'osmosis'	
Define 'water potential'	
Where does osmosis take place in living organisms?	
What happens to a potato placed in a concentrated sugar solution?	
Define 'active transport'	
What would happen to a potato placed in a dilute solution?	

Look, Cover, Write, Check

Question	Answer
Define 'water potential'	
Define 'osmosis'	
What happens to a potato placed in a concentrated sugar solution?	
Where does osmosis take place in living organisms?	
Where does active transport take place in living organisms?	
What would happen to a potato placed in a dilute solution?	
	Low water potential.
Define 'active transport'	
	High water potential.

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		
1.0	2.2	1.6	-0.6	-27.3

1. Calculate the percentage change of mass for the potato chip in **0.8 mol / dm³** sugar solution.

Record your answer to 1 decimal place.

Answer = _____ % [2]

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

Due Date:	Friday, 22nd December 2023
Student Number:	
Name:	



Y10 Triple T2 W7: C2 Separating Techniques

Question	Answer
Define pure.	A substance containing only one type of element or compound.
How is melting point used to determine purity?	A pure substance will have a distinct melting point. An impure substance will melt over a range of temperatures.
What is relative formula mass?	The total mass of all of the elements in a compound.
What is an empirical formula?	The simplest whole number ratio of elements in a compound.
What is an alloy?	A mixture of two or more elements, where at least one is a metal.
What is filtration?	A separation technique used to separate an insoluble solid from a liquid.
What is crystallisation?	A separation technique used to separate a soluble solid from a solution.
What is simple distillation?	A separation technique used to separate a mixture of solutions with two different boiling points.
What changes of state are involved in simple distillation?	Evaporation and condensation
What is a condenser used for?	To cool and condense the hot vapour

Look, cover, write, check

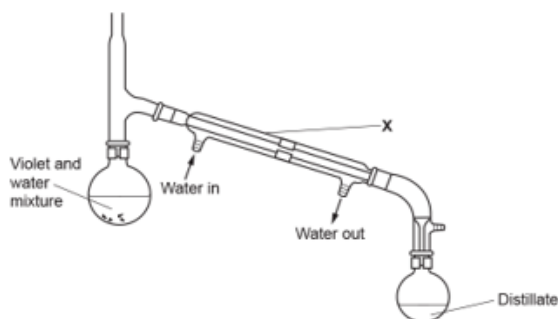
Question	Answer
What is an alloy?	
What is crystallisation?	
What is a condenser used for?	
What is simple distillation?	
How is melting point used to determine purity?	
What is relative formula mass?	
Define pure.	
What is empirical formula?	
What changes of state are involved in simple distillation?	
What is filtration?	

Look, cover, write, check

Question	Answer
Define pure.	
How is melting point used to determine purity?	
	The total mass of all of the elements in a compound.
What is empirical formula?	The simplest whole number ratio of elements in a compound.
	A mixture of two or more elements, where at least one is a metal.
What is filtration?	
What is crystallisation?	
	A separation technique used to separate a mixture of solutions with two different boiling points.
What changes of state are involved in simple distillation?	
	To cool and condense the hot vapour

1. A student is making perfume using violet flowers.

The student does an experiment to extract the perfume from the flowers using the apparatus shown in Fig. 21.1.



The teacher says the apparatus is not set-up correctly.

i. What is the name of the piece of apparatus labelled X?

..... [1]

ii. Name the process shown in Fig. 21.1.

..... [1]

iii. Suggest **two** changes that the student should make to set-up the apparatus correctly.

1

.....

2

.....

.....

[2]

Due Date:	Friday, 12 th January 2024
Student Number:	
Name:	



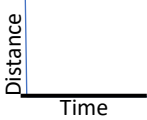
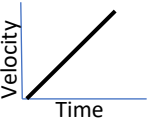
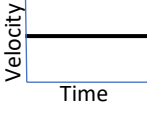
Y10 Triple T3 W1 – P2 Distance-Time vs Velocity-Time Graphs

Question	Answer
Define 'stationary'	Not moving (still).
Define 'acceleration'	Velocity increasing.
Sketch a distance-time graph for an object that is stationary .	
Sketch a velocity-time graph for an object that is stationary .	
Sketch a distance-time graph for an object travelling at a constant speed .	
Sketch a velocity-time graph for an object travelling at a constant speed .	
How is speed calculated from a distance-time graph?	The gradient (steepness) of the line.
Sketch a distance-time graph for an object that is accelerating .	
Sketch a velocity-time graph for an object that is accelerating .	

Look, Cover, Write, Check

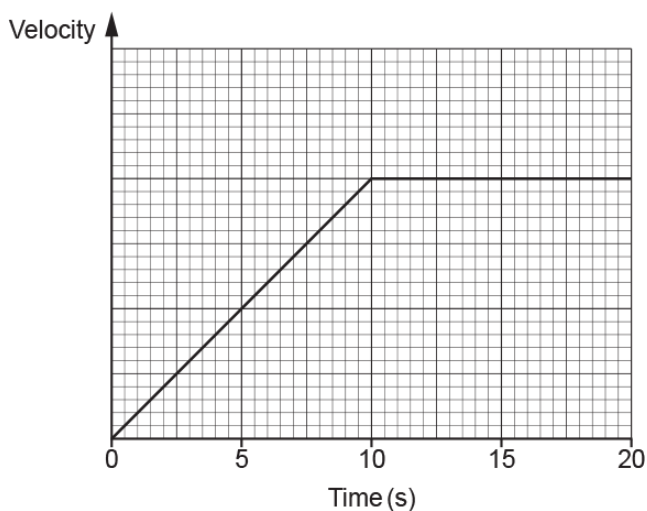
Question	Answer
Define 'stationary'	
Sketch a velocity-time graph for an object that is stationary .	
Sketch a distance-time graph for an object that is stationary .	
Define 'acceleration'	
How is speed calculated from a distance-time graph?	
Sketch a velocity-time graph for an object that is accelerating .	
Sketch a distance-time graph for an object that is accelerating .	
Sketch a velocity-time graph for an object travelling at a constant speed .	
Sketch a distance-time graph for an object travelling at a constant speed .	

Look, Cover, Write, Check

Question	Answer
	Not moving (still).
Sketch a velocity-time graph for an object that is stationary .	
	
	Increase in velocity.
How is speed calculated from a distance-time graph?	
	
Sketch a distance-time graph for an object that is accelerating .	
	
Sketch a distance-time graph for an object travelling at a constant speed .	

Q1

Look at the velocity-time graph for a car during 20 seconds.



Overall, the car travels 390 m.

Use the graph to calculate the **final** velocity of the car.

Final velocity = m/s