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

Y10 Combined 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 cm^3

The student took readings at 20-second intervals

Readings for the volume of gas were 24 cm^3, 44 cm^3, 59 cm^3, 70 cm^3, 76 cm^3 and 79 cm^3

Draw a results table for the investigation.

Include the student's results in the table.

(3)

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

Y10 Combined 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.

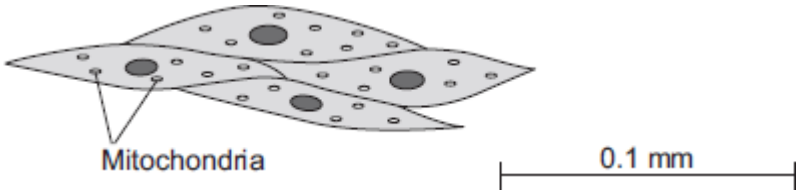
Look, Cover, Write, Check

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 muscle cells in **Figure above** contain many mitochondria. What is the function of mitochondria?

_____

_____

_____ **(2)**

(b) The muscle cells also contain many ribosomes. The ribosomes cannot be seen in the figure above.

(i) What is the function of a ribosome?

_____

(1)

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

_____

(1)

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

Y10 Combined T1 W4 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?	• 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.

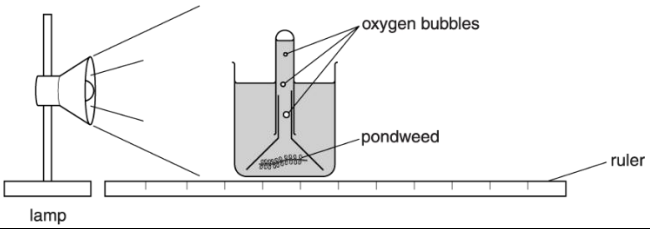
Look, Cover, Write, Check

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.
	• **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.

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.



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

1. Describe and explain these results.

_____

_____

_____

_____ **[3]**

2. 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.

_____

_____ **[2]**

Due Date:	**Friday, 6th October 2023**
Student Number:	
Name:	

Y10 Combined T1 W5 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
Define 'relative atomic mass'	The number of protons and neutrons
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?	the same number of protons.
Why do isotopes of an element have different relative atomic mass numbers?	they have a different number of neutrons.
Why is $^{6}C_{13}$ an isotope of $^{6}C_{12}$?	They have the same number of protons (6) but different number of neutrons (13 and 12).
Why is $^{6}C_{12}$ <u>not</u> an isotope of $^{7}C_{12}$?	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 $^{6}C_{13}$ an isotope of $^{6}C_{12}$?	
Why is $^{6}C_{12}$ <u>not</u> an isotope of $^{7}C_{12}$?	

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 $^{6}C_{13}$ an isotope of $^{6}C_{12}$?	
Why is $^{6}C_{12}$ <u>not</u> an isotope of $^{7}C_{12}$?	

1. Magnesium exists as isotopes.

Look at the information about two atoms of magnesium.

$^{24}_{12}Mg$ $^{25}_{12}Mg$

i. Explain why these two atoms are isotopes of magnesium.

_____

_____

_____

_____ **[2]**

ii. Complete the table to show the number of **protons** and **neutrons** in each isotope of magnesium.

Isotope	Number of protons	Number of neutrons
$^{25}_{12}Mg$		
$^{24}_{12}Mg$		

[2]

Due Date:	**Friday, 13th October 2023**
Student Number:	
Name:	

Y10 Combined T1 W6 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?	

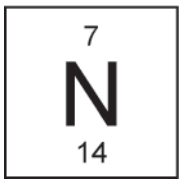
Look, Cover, Write, Check

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. Which statement best describes an atom?
   a. The nucleus is small compared to the atom and contains little of the atom's mass.
   b. The nucleus is large compared to the atom and contains little of the atom's mass.
   c. The nucleus is small compared to the atom and contains most of the atom's mass.
   d. The nucleus is large compared to the atom and contains most of the atom's mass.

   Your answer _____ **[1]**

2. How many electrons are in a nitride ion, N^{3-}?
   a. 4
   b. 10
   c. 11
   d. 17



   Your answer _____

   [1]

3. Aluminium, phosphorus, and magnesium are all in Period 3 of the Periodic Table. Aluminium has an atomic number of 13 and a mass number of 27.
   a. Describe the nucleus of an aluminium atom in terms of sub-atomic particles.

   _____

   _____ **[2]**

   b. What is the overall charge on the nucleus of an atom of aluminium?

   _____ **[1]**

   c. Which sub-atomic particles surround the nucleus?

   _____ **[1]**

Due Date:	**Friday, 20th October 2023**
Student Number:	
Name:	

Y10 Combined T1 W7 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.	
	Mass balance
How do you convert from g to kg?	
How do you convert from kg to g?	
	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'	
	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	
Which state of matter has the lowest density? Explain your answer.	

A student has two metal cubes, **A** and **B**, as shown.

Cube **A** Cube **B**

Each side of metal cube **A** is 1.0 cm. Each side of metal cube **B** is 2.0 cm.

Both metal cubes have the same mass. The density of metal cube **A** is 16 g / cm^3.

i. Calculate the density of metal cube **B**.

Use the equation: density = mass ÷ volume

Density = ... g / cm^3 **[3]**

ii. Metal cube **A** sinks when placed in water. Explain why.

_____

_____ **[1]**

Due Date:	**Friday, 10th November 2023**
Student Number:	
Name:	

Y10 Combined 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, subliming, and deposing.
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?	

The initial temperature of the mixture was +20 °C. The mixture froze at –1.5 °C.

A total of 165 kJ of internal energy was transferred from the mixture to cool and freeze it.

specific heat capacity of the mixture = 3500 J/kg °C

specific latent heat of fusion of the mixture = 255 000 J/kg

Calculate the mass of the mixture.

Give your answer to **2 significant figures.**

Use the equations:

Energy = mass x specific latent heat

Energy = mass x specific heat capacity x change in temperature

Mass (2 significant figures) = _____ kg

(6)

Due Date:	**Friday, 17th November 2023**
Student Number:	
Name:	

Trinity Academy Grammar

Y10 Combined T2 W2 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. The 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. 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 effects 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)

1. A sealed bottle contains gas. The bottle 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 ☐

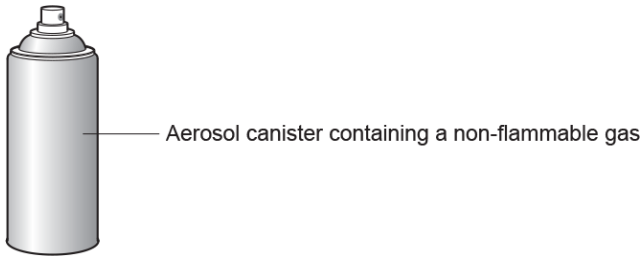
[1]

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

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

Explain why.

Include ideas about gas particles in your answer.



_____

_____

_____

_____ **[3]**

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

Trinity Academy Grammar

Y10 Combined T2 W3 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 did not have a nucleus.

Describe **three** other differences between the nuclear model of the atom and the plum pudding model.

1 _____

_____

_____

2 _____

_____

_____

3 _____

_____

_____

(3)

(b) Niels Bohr adapted the nuclear model. Describe the change that Bohr made to the nuclear model.

_____

_____

(2)

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

Trinity Academy Grammar

Y10 Combined T2 W4 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?	

Solid, liquid and gas are three different states of matter.

Describe the difference between the solid and gas states, in terms of the arrangement and movement of their particles.

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(4)

Due Date:	**Friday, 8th December 2023**
Student Number:	
Name:	

Y10 Combined 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 - Concentration gradient - Surface area: volume ratio - 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.

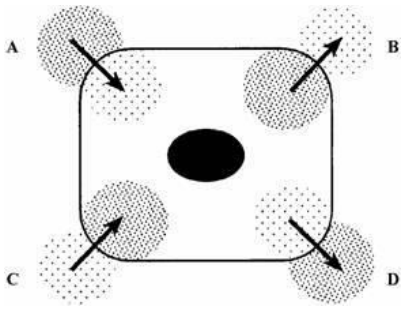
Look, Cover, Write, Check

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?	

Look, Cover, Write, Check

Question	Answer
What is meant by the term 'concentration gradient'?	
	Increase temperature; increase concentration gradient; increase surface area: volume ratio; decrease the diffusion distance.
Define 'diffusion'	
What 4 factors affect the rate of diffusion?	
Where does diffusion occur in living organisms?	
How does breathing allow oxygen to diffuse into the blood?	
	Decrease temperature; decrease concentration gradient; decrease surface area: volume ratio; increase the diffusion distance.
How is the alveoli adapted gas exchange?	

The diagram shows four ways in which molecules may move into and out of a cell. The dots show the concentration of molecules.



The cell is respiring aerobically. Which arrow, **A**, **B**, **C** or **D**, represents:

(i) movement of oxygen molecules; _____

(ii) movement of carbon dioxide molecules? _____

(2)

(b) Name the process by which these gases move into and out of the cell.

_____

(1)

(c) Which arrow, **A**, **B**, **C** or **D**, represents the active uptake of sugar molecules by the cell?

_____

Explain the reason for your answer.

_____

_____

_____**(2)**

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

Y10 Combined 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.

	Requires energy	Movement down a concentration gradient	Substance(s) moved
A	yes	no	water and glucose
B	no	no	water only
C	yes	yes	water and glucose
D	no	yes	water only

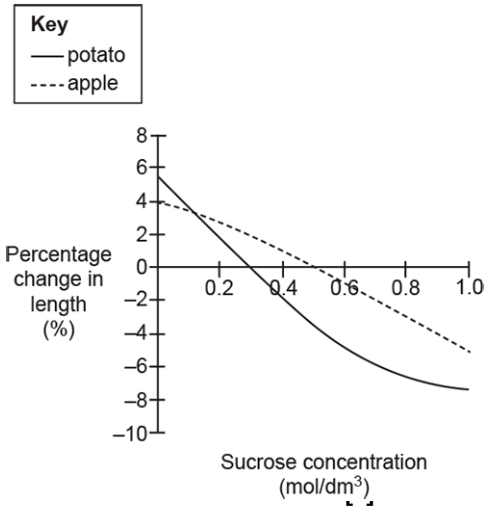
1. Which row in the table describes osmosis?

Your answer ☐ **[1]**

2. A student investigates osmosis by placing chips of potato and apple into different concentrations of sucrose solution.

The student calculates the percentage change in length for each chip of potato and apple.

The graph shows the student’s results.



Estimate the concentration of sucrose inside the cells of the **apple.**

A 0.0 mol / dm^3
B 0.3 mol / dm^3
C 0.5 mol / dm^3
D 1.0 mol / dm^3

Your answer ☐

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

Y10 Combined T3 W2 – B2 The Challenges of Size

Question	Answer
What type of circulatory system do humans have?	Humans have a **double circulatory system**.
Name the four chambers in the heart	Left atrium, right atrium, left ventricle, right ventricle.
Name the three types of blood vessel	Veins, arteries and capillaries.
Name the four components of blood	Red blood cells, white blood cells, plasma and platelets.
What is the phloem?	The phloem is a transport vessel in plants made of living cells that **transports sugars** around the plant.
What is translocation?	The movement of sugars around a plant.
What is the xylem?	The xylem is a transport vessel in plants made up of dead cells that **transport water and minerals** around the plant.
What is transpiration?	The **movement of water** around a plant from the roots to the leaves.
What factors can affect transpiration?	Light intensity, air movement, humidity and temperature.
What is a potometer used for?	A potometer is used to **measure the rate of transpiration.**

Look, Cover, Write, Check

Question	Answer
What is translocation?	
What factors can affect transpiration?	
What is the xylem?	
What is a potometer used for?	
What type of circulatory system do humans have?	
Name the four components of blood.	
What is transpiration?	
Name the four chambers in the heart.	
Name the three types of blood vessel	
What is the phloem?	

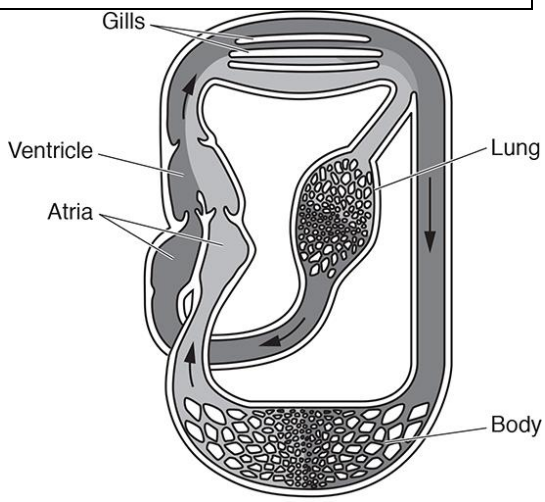
Look, Cover, Write, Check

Question	Answer
What type of circulatory system do humans have?	
	Left atrium, right atrium, left ventricle, right ventricle.
	Veins, arteries and capillaries.
Name the four components of blood.	
	The phloem is a transport vessel in plants made of living cells that transports sugars around the plant.
What is translocation?	
What is the xylem?	
	The movement of water around a plant from the roots to the leaves.
	Light intensity, air movement, humidity and temperature.
What is a potometer used for?	

Lungfish are fish that have both gills and a lung.

When in water, the blood flows through the gills. When on land, blood flow to the gills is stopped and the blood enters the lung instead.

The diagram shows the circulatory system of a lungfish.



The lungfish circulatory system is different to that of humans.

Blood in the lungfish can flow through gills and lungs, humans only have lungs.

i. Write down one **other** way the **structure** of the lungfish circulatory system is different to that of humans.

_____

_____ **[1]**

ii. When lungfish and humans are on land, the human circulatory system is more efficient than that of lungfish. Suggest why the human circulatory system is more efficient.

_____

_____

_____

_____ **[2]**

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

Y10 Combined T3 W1 B2 – Plant Transport Vessels

Question	Answer
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

Question	Answer
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?	

1. 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?

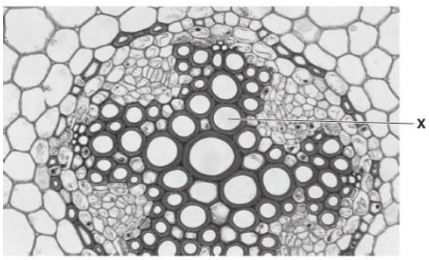
Your answer ☐ **[1]**

2. Lettuce leaves contain xylem vessels. Describe the structure of xylem vessels.

_____

_____ **[2]**

3. The picture shows cells from the centre of a root, seen using a light microscope. Which type of transport cell is labelled **X**?



A Phloem
B Root hair
C Stomata
D Xylem

Your answer ☐ **[1]**