Week 1.1 – Recall

9 school weeks to go

B1 – 4.1.2.1 – 4.1.2.2 Chromosomes and Mitosis & the cell cycle

1. DNA is arranged into chromosomes and stored in which organelle of a eukaryote cell?

1. How many pairs of chromosomes does each human body cell (exc. gametes) contain?

1. Why are chromosomes arranged into pairs?

4. Number these statements in the order of the cell cycle

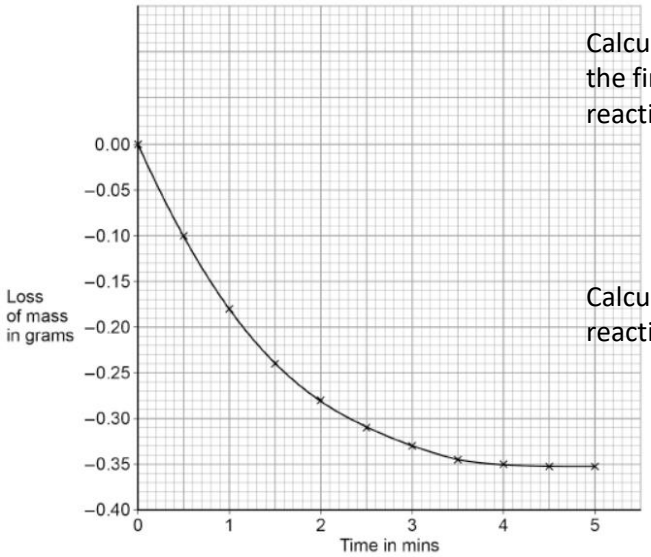
- Cytoplasm and cell membranes divide to form two identical cells.
- DNA is replicated – 2 copies of each chromosome
- Cell grows in size and number of organelles such mitochondria and ribosomes increase
- Mitosis - one set of chromosomes is pulled to each end of the cell and the nucleus divides.

C1 – 5.1.2.1 – 5.1.2.2 The Periodic Table & It's Development

1. Complete these sentences

- The atomic number of an element tells us the number of _____ in the atoms
- The elements of the Periodic Table are arranged in order of their _____ number
- Elements in the same column (_____) have the same number of _____
- Elements in the same column (_____) have similar _____
- In early iterations of the Periodic Table, elements were arranged in order of their _____
- This meant that elements ended up in groups with elements that did not share similar properties
- To overcome this, Mendeleev _____ for elements that he theorised had not been _____ yet. He even _____ the properties of these elements, which were eventually proven correct

C2 – 5.6.1.1 Calculating Rates of Reaction



Calculate the rate of reaction in the first 1.5 minutes of the reaction. Give the correct unit

Calculate the mean rate of reaction. Give the correct unit

P1 – 6.1.1.2 Energy Changes in Systems

kinetic energy = 0.5 × mass × speed²
Elastic P.E. = 0.5 × spring constant × extension²
G.P.E. = mass × gravitational field strength × height

1. Calculate the GPE of an object that has a mass of 50kg and is up a height of 20**cm**. Gravitational field strength = 9.8 N/kg

2. Calculate the GPE of an object that has a weight of 160 N and is up a height of 0.5m.

3. Calculate the kinetic energy of a car that travels at a speed of 20m/s and has a mass of 1200 kg.

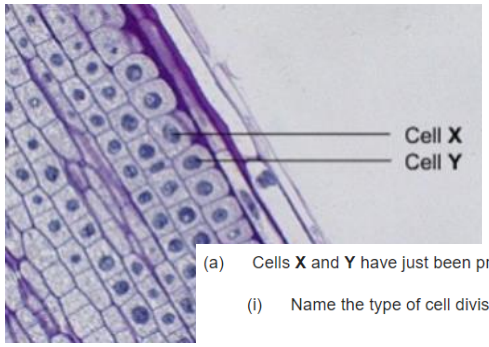
4. Calculate the elastic potential energy of a spring with spring constant of 3N/m that extends from 12cm to 14cm when a force of 20N is applied.

Week 1.1 – Practice

9 school weeks to go

B1 – 4.1.2.1 – 4.1.2.2 Chromosomes and Mitosis & the cell cycle

The photograph shows some cells in the root of an onion plant.



(a) Cells **X** and **Y** have just been produced by cell division.

(i) Name the type of cell division that produced cells **X** and **Y**.

_____

(1)

(ii) What happens to the genetic material before the cell divides?

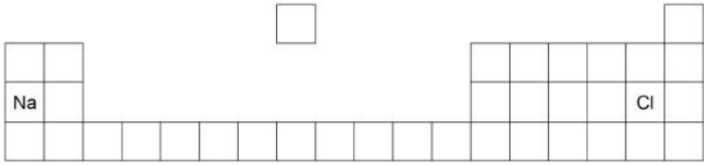
_____

(1)

C1 – 5.1.2.1 – 5.1.2.2 The Periodic Table & It's Development

Figure 1 shows the positions of sodium and chlorine in the periodic table.

Figure 1



(a) State **one** difference and **one** similarity in the electronic structure of sodium and of chlorine.

Difference _____

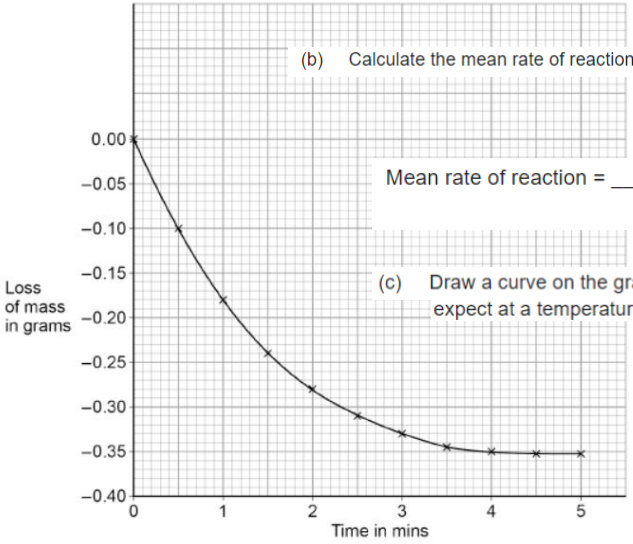
_____

Similarity _____

_____

(2)

C2 – 5.6.1.1 Calculating Rates of Reaction



(b) Calculate the mean rate of reaction between 1 minute and 3 minutes at 40 °C

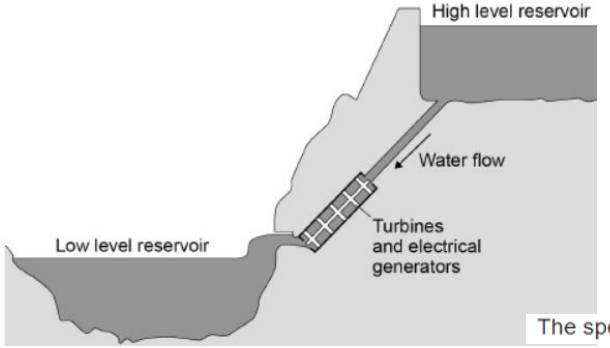
Mean rate of reaction = _____ g/min

(3)

(c) Draw a curve on the graph above for the results you would expect at a temperature of 50 °C instead of 40 °C

P1 – 6.1.1.3 Energy Changes in Systems

The diagram shows the flow of water through a hydroelectric power station.



The speed of the water is 30 m/s

In 1 minute, a mass of 9 000 kg of water flows through the turbines.
Calculate the total kinetic energy of the water passing through the turbines in 1 minute.
Give your answer in kilojoules (kJ).

Week 1.2 – Recall

9 school weeks to go

B2 – 4.5.1 Homeostasis & 4.5.3.1 Human endocrine system

1. Complete this sentence

Homeostasis is the _____of the internal _____of a cell or organism to maintain _____conditions for function in response to internal and external _____.

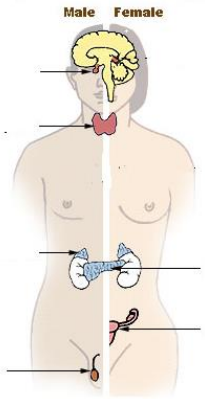
2. The maintenance of which conditions are controlled by the endocrine system?

3. Define the term 'hormone'

4. Compare the effects of endocrine system to that of nervous system

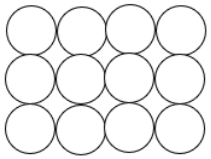
5. Label these glands on this diagram

Adrenal gland ovaries
Pituitary gland pancreas
testes thyroid



C1 – 5.2.2.2 Properties of Ionic Compounds

1. Draw the correct charges into this diagram to represent an ionic lattice



1. Match the property of an ionic compounds to its explanation

High melting and boiling points	Ions are not free to move and carry a charge
Do not conduct electricity when solid	Strong electrostatic forces of attraction between oppositely charged ions
Conduct electricity when liquid $_{(l)}$ or aqueous $_{(aq)}$	Ions are free to move and carry a charge

P1 – 6.2.1.2 Electrical Charge and Current

1. Electrical current is the flow of _____ around a circuit

2. Change the subject of this equation to calculate current

charge flow = current × time

3. What is the unit of charge? _____
4. What is the unit of current? _____
5. What is the unit of time? _____

6. Calculate the charge that flows in a circuit in 1 minute when the current is 2A.

7. Calculate the current when 500 C of charge flows in 2 minutes.

P2 – 6.5.1.3 Gravity

Weight is the force acting on an object's _____ due to _____

1. What is the unit of weight? _____
2. What is the unit of mass? _____

1. weight = mass × gravitational field strength

Calculate the weight of a 75 kg object. Gravitational field strength = 9.8 N/kg

4. When mass increases by a certain amount, the weight of the object also increases by a certain amount. What do we call this relationship?

On Earth; when the mass is 1kg, the weight is 9.8 N/kg, when the mass is 2kg, the weight is 19.6 N/kg. When the mas is 4kg, what is the mass?

Week 1.2 – Practice

9 school weeks to go

B2 – 4.5.1 Homeostasis & 4.5.3.1 Human endocrine system

Conditions inside the human body are controlled.

(a) What is the control of conditions inside the body called?

Tick (✓) **one** box.

- Excretion ☐
- Fertilisation ☐
- Homeostasis ☐
- Osmosis ☐

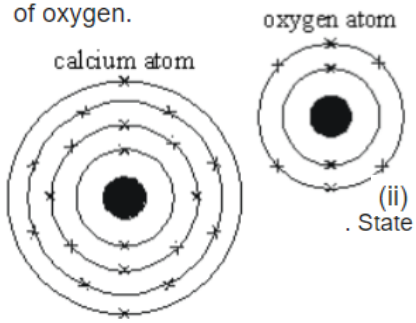
(b) What are the **two** ways information is sent to control body conditions?

Tick (✓) **two** boxes.

- By antigens ☐
- By hormones ☐
- By muscles ☐
- By nerve impulses ☐
- By red blood cells ☐

C1 – 5.2.2.2 Properties of Ionic Compounds

The diagrams below show the electronic structure of an atom of calcium and an atom of oxygen.



Describe fully what happens to its electrons when:

(i) a calcium atom forms a calcium ion.

State the charge on the calcium ion formed.

(ii) an oxygen atom forms an oxygen ion.

. State the charge on the oxygen ion formed.

Calcium oxide is an ionic compound. Why do ionic compounds have high melting points?

_____

_____

_____

(2)

P1 – 6.2.1.2 Electrical Charge and Current

Calculate the charge flow when there is a current of 0.50 A in the wire for 17 s

_____

_____

_____

_____

Charge flow = _____ C **(2)**

P2 – 6.5.1.3 Gravity

A student placed a magnet close to each metal sample. Describe what happened.

The student added more paperclips to one end of the magnet.

The maximum number of paperclips the magnet could hold was 20
Each paper clip had a mass of 1.0 g gravitational field strength = 9.8 N/kg

Calculate the maximum force the magnet can exert.

(3)

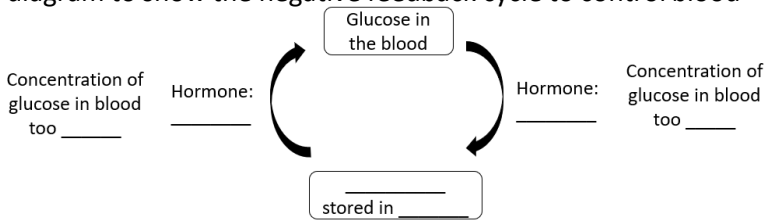
Week 2.1 – Recall

8 school weeks to go

B2 – 4.5.3.1 Control of Blood Glucose Concentration

1. Which organ monitors and controls blood glucose concentration?

2. Complete this diagram to show the negative feedback cycle to control blood glucose levels



3. How is Type 1 diabetes treated?
4. What is Type 2 diabetes?

5. How is Type 2 diabetes treated?

6. What are the risk factors of Type 2 diabetes?

C1 – 5.2.2.7 – Properties of Metals & Alloys

1. What is an alloy?

1. Match the properties of pure metals and alloys to their explanations

good conductors of heat and electricity	Layers of atoms can slide over each other
Pure metals are soft	Contain delocalised electrons that can move throughout the structure
Alloys are harder	Different size atoms distort the layers. Layers are unable to slide over each other

C2 - 5.6.1.2 – Factors affecting the rate of reaction

Complete to describe collision theory

Chemical reactions can occur only when reacting particles _____ with each other, with enough _____ . The minimum amount of energy that particles must have, to react is called the _____

Circle the correct explanation for why each of these factors increases the rate of reaction

Increasing the concentration of aqueous reactants
more frequent collisions *more energetic and successful collisions*
the pressure of reacting gases,
more frequent collisions *more energetic and successful collisions*
the surface area of solid reactants,
more frequent collisions *more energetic and successful collisions*
Increasing the temperature

P2 – 6.5.4.1.2 Speed & 6.5.4.1.3 Velocity

Speed is a scalar quantity because it has only _____

Velocity is a vector quantity because it has _____ and _____.

1. What is the difference between distance and displacement?

1. Calculate the speed of a person who runs 60 m in 20 s

3. Which of these is a typical walking speed? 1.5 m/s 3 m/s 6 m/s
4. Which of these is the speed of sound in air? 330 m/s 300,000,000 m/s
5. Which of these is the speed of light? 330 m/s 300,000,000 m/s

Week 2.1 – Practice

8 school weeks to go

B2 – 4.5.3.1 Control of Blood Glucose Concentration

What is the general name for the processes that keep body conditions relatively constant?

eutrophication **homeostasis** **hydrotropism**

Use the correct answer from the box to complete each sentence.

glucagon	glycerol	glycogen
kidney	liver	pancreas

When the blood glucose concentration increases, an organ called the _____ releases the hormone insulin.

Insulin causes glucose to move from the blood into the cells of the muscles and the _____

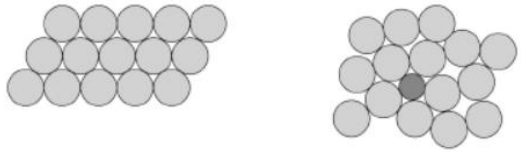
Inside these organs, the glucose is changed into a carbohydrate called _____ , which can be stored.

When the blood glucose concentration falls, another hormone is released, which causes the storage carbohydrate to break down into glucose again.

This hormone is called _____

C1 – 5.2.2.7 – Properties of Metals & Alloys

Pure iron **Cast iron**



Explain why cast iron is harder than pure iron.

_____

_____

_____

_____ **(4)**

Copper is a metal. Explain how it conducts electricity.

_____

_____

_____

_____ **(2)**

C2 - 5.6.1.2 – Factors affecting the rate of reaction

The rate of reaction between sulfuric acid and phosphate rock can be increased if the mixture is heated to a higher temperature.

Explain, in terms of particles, why an increase in temperature increases the rate of reaction.

_____

_____

_____

_____

_____

_____

(2)

P2 – 6.5.4.1.2 Speed & 6.5.4.1.3 Velocity

(iii) Complete the following sentence.

The velocity of the athlete is the _____ of the athlete in a given direction.

(1)

The wheelchair moves at a constant speed of 2.4 m/s for 4.5 seconds.

Calculate the distance moved by the wheelchair.

(2)

Week 2.2 – Recall

8 school weeks to go

B1 – 4.1.2.3 Stem Cells

1. What is a stem cell?

1. From which two sources can we get human stem cells?

1. Where are stem cells found in plants?

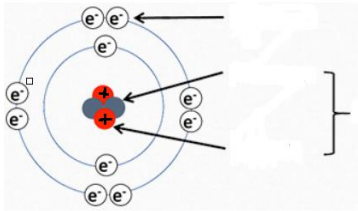
1. Which conditions may be helped by stem cell treatments?

1. In therapeutic cloning; the nucleus of an egg cell is removed and replaced with the nucleus of one of the patient's cells. Why is this done?

1. What are the disadvantages of stem cell treatments?

C1 – 5.1.1.4 - 5.1.1.7 Atomic Structure

1. Label this diagram of an atom



2. Complete this table

Sub-atomic particle	Charge	Relative mass
Proton		
Neutron		
Electron		

3. Atomic number is number of …
4. Mass number is number of _____ and _____
5. Max of ____ electrons can fit on 1st shell
6. Max of ____ electrons can fit on 2nd and 3rd shell

C2 – Required Practical 11 – Effect of concentration on rate of reaction

1. What is the independent variable?

1. The dependent variable can either be….

Or….

3. Identify the control variables

4. Give a unit of concentration

P1 – 6.2.1.3 Current, Resistance and Potential Difference

1. What is electrical current?

2. What is the relationship between the resistance of a component and the current through it?

3. Change the subject of this equation
potential difference = current × resistance
to calculate the current through a component

the resistance through a component

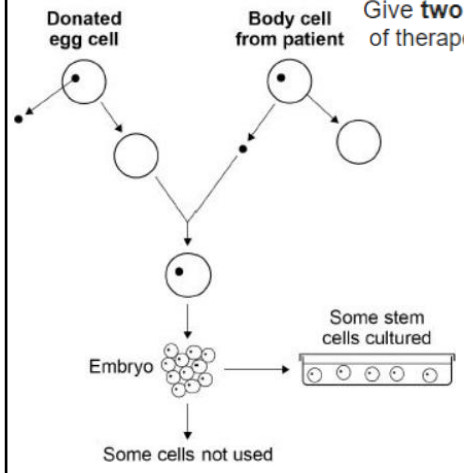
4. What are the units of potential difference?
5. What are the units of resistance?

Week 2.2 – Practice

8 school weeks to go

B1 – 4.1.2.3 Stem Cells

Figure 2 shows how embryonic stem cells are produced in therapeutic cloning for use in patients.



Give **two** advantages and **two** disadvantages of therapeutic cloning in medical treatments.

C1 – 5.1.1.4 - 5.1.1.7 Atomic Structure

(a) An aluminium atom is represented as:

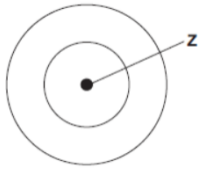
$^{27}_{13}Al$

Give the number of electrons and neutrons in the aluminium atom.

Number of electrons _____

Number of neutrons _____ **(2)**

(a) **Figure 1** shows an atom with two energy levels (shells)



(i) Complete **Figure 1** to show the electronic structure of a boron atom. **(2)**

(ii) What does the central part labelled **Z** represent in **Figure 1**? **(1)**

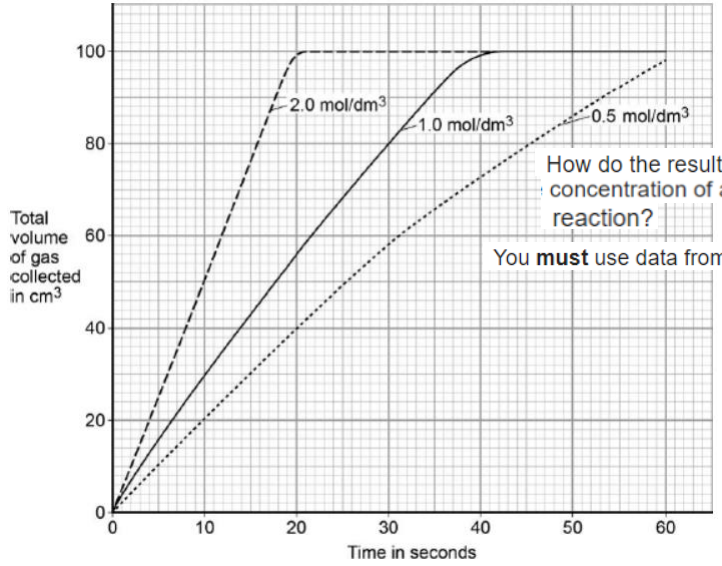
Name the sub-atomic particles in part **Z** of a boron atom.

Give the relative charges of these sub-atomic particles.

_____

_____ **(3)**

C2 – Required Practical 11 – Effect of concentration on rate of reaction



How do the results show that increasing the concentration of acid increases the rate of reaction?

You **must** use data from the graph in your answer.

P1 – 6.2.1.3 Current, Resistance and Potential Difference

A student investigated how the current in a resistor varies with the potential difference across the resistor.

The student increased the resistance of the variable resistor.
How did increasing the resistance affect the current in the circuit? **(1)**

How should the student change the circuit to give negative values for current and potential difference? **(1)**

Name the type of relationship between current and potential difference for a resistor a constant temperature. **(1)**

The current in the resistor was 0.12 A when the potential difference across the resistor was 3.0 V
Calculate the resistance of the resistor. **(1)**

Week 3.1 – Recall

7 school weeks to go

B1 – 4.1.3.1 Diffusion

1. Define the term 'diffusion'

2. Which two substances diffuse into cells for respiration?

3. Which two substances are made in respiration, and diffuse out of cells?

4. Draw an example of a cell that is adapted for efficient diffusion

5. Describe 3 factors that affect the rate of diffusion

C2 – 5.7.1.2 Fractional Distillation of Crude Oil

1. Where is the fractional distillation column hottest?

1. What property of the hydrocarbon fractions is exploited in order to separate the mixture of crude oil?

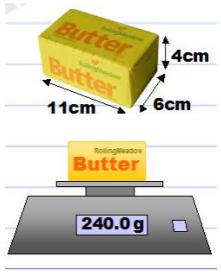
1. What is the trend in the length of the hydrocarbon chain, and the property you mentioned in Q2?

1. Complete the passage to explain what happens when crude oil is fractionally distilled

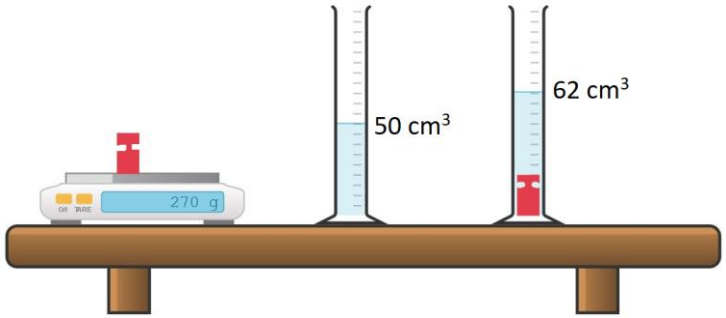
The crude oil mixture is heated until it becomes a _____. The different fractions then _____ at different _____.

P1 – 6.3.1.1 Density of Materials

Calculate the density of this block of butter



Calculate the density of this irregular object



P2 – 6.5.4.1.4 Distance-Time Relationship

1.What do these features of a distance-time graph show?

Key	Distance-time graph
Horizontal line	
Upwards diagonal line	
Downwards diagonal line	
Curved line upwards	
Curved line downwards	

2. How can speed be calculated from a distance-time graphs?

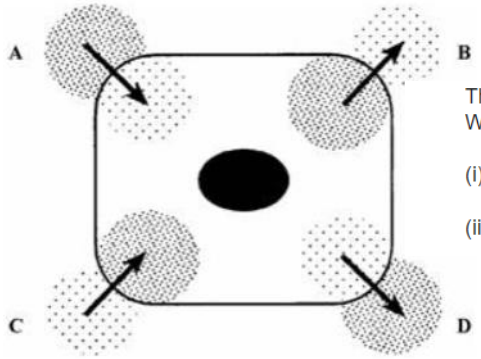
3. What is the relationship between speed and the gradient of the line?

Week 3.1 – Practice

7 school weeks to go

B1 – 4.1.3.1 Diffusion

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



(2)

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

(i) movement of oxygen molecules;

(ii) movement of carbon dioxide molecules?

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

_____

(1)

C2 – 5.7.1.2 Fractional Distillation of Crude Oil

(a) Diesel is separated from crude oil by fractional distillation.

Describe the steps involved in the fractional distillation of crude oil.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

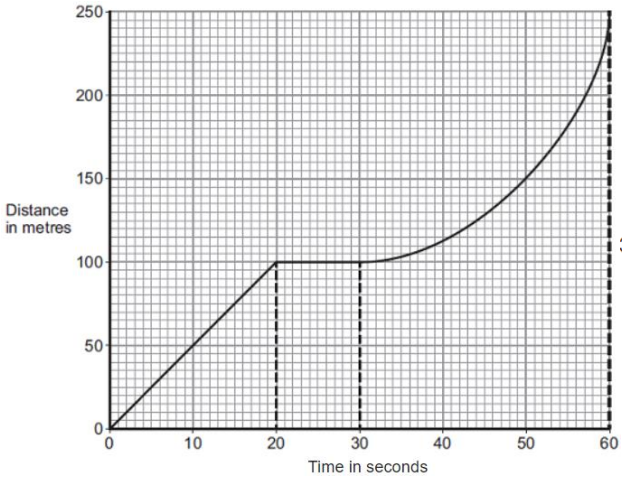
P1 – 6.3.1.1 Density of Materials

A student wanted to determine the density of the irregular shaped object shown in **Figure 1**

(a) Plan an experiment that would allow the student to determine the density of the object.

Figure 1

P2 – 6.5.4.1.4 Distance-Time Relationship



Describe the motion of the bus between 20 seconds and 30 seconds.

Describe the motion of the bus between 30 seconds and 60 seconds.

What is the speed of the bus at 45 seconds?

Show clearly on the figure above how you obtained your answer.

Week 3.2 – Recall

7 school weeks to go

B2 – 4.6.1.4 Genetic Inheritance	C1 – 5.4.1.3 Extraction of Metals and Reduction
1. Which combination of alleles is heterozygous? Dd DD dd 2. Which combination of alleles is homozygous recessive? Dd DD dd 3. Which combination of alleles is homozygous dominant? Dd DD dd Blue eyes (b) is recessive and brown eyes (B) is dominant. Draw punnet square to illustrate the probability of offspring being born with blue eyes from a heterozygous father and a homozygous recessive mother	1. Write a word equation for the reaction between iron oxide and carbon. 1. Define the term 'reduction' 1. Which species has been reduced? 1. Why can iron be extracted from its ore by heating with carbon, but aluminium cannot?
C2 – Required Practical 12: Chromatography	**P1 – 6.4.1.2 Radioactive Decay and Nuclear Radiation**
1. In paper chromatography, What is the stationary phase? 2. What is the mobile phase? 3. Why is the start line drawn in pencil not ink? 4. Why must the starting solvent level be below the pencil line? 5.What property of the components of the mixture does chromatography exploit to be able to separate them? 6. How are the components of the mixture identified?	1. What is an alpha particle? 2. What is a beta particle? 3. What is a gamma ray? 4. Which type of nuclear radiation has the highest ionising power? 5. Which type of nuclear radiation has the longest range in air? 6. What material can stop alpha radiation? 7. What material can stop beta radiation? 8. What material can stop gamma radiation?

Week 3.2 – Practice

7 school weeks to go

B2 – 4.6.1.4 Genetic Inheritance

(b) The allele for blue eves is recessive (**b**). The allele for brown eyes is dominant (**B**).
A woman has blue eyes. What are the woman's alleles? Tick **one** box.

BB ☐ **Bb** ☐ **bb** ☐ **(1)**

(c) The woman marries a man with the alleles **Bb** for eye colour. What colour eyes does the man have?

_____ **(1)**

(d) Complete the Punnett square diagram in **Figure 2** for this man and woman.

		Woman	
Man	**B**		
	b		

(1)

(e) What is the probability that a child of this man and woman will have brown eyes?

_____ **(1)**

C1 – 5.4.1.3 Extraction of Metals and Reduction

Aluminium is produced by the reduction of aluminium oxide (Al_2O_3).

What is meant by the term reduction? **(1)**

_____

_____

The word equation below shows a reaction used in an industrial process.

chromium oxide + aluminium → chromium + aluminium oxide

Name the substance which is reduced. **(1)**

_____

(ii) Complete this word equation for the reaction between lead oxide and carbon.

lead oxide + carbon → _____ + _____ **(1)**

C2 – Required Practical 12: Chromatography

A student investigated a purple food colouring, **Y**, using chromatography.
The student compares **Y** with dyes **A**, **B** and **C**.

What **three** conclusions can you make about the dyes in food colouring **Y**?

In a different experiment a student recorded these results:

Distance moved by dye **G** = 60 mm
Distance moved by solvent = 80 mm

Calculate the R_f value of dye **G**.

P1 – 6.4.1.2 Radioactive Decay and Nuclear Radiation

Explain the differences between the properties of alpha, beta and gamma radiations.

_____

_____

_____

_____

_____

_____

_____

_____ **(6)**

Week 4.1 – Recall

6 school weeks to go

B1 – 4.2.2.1 The Human Digestive System

1. In which organ do small digested molecules diffuse into the blood?

1. Describe 2 adaptations of this organ for efficient diffusion

3. Why are enzymes described as catalysts?

4. Complete this table

Enzyme	Found in the: Salivary Glands	Stomach	Pancreas	Small Intestine	Breaks Down	Into
Amylase					→	
Lipase					→	
Protease					→	

C1 – 5.4.2.1 Reaction of Metals and Acids

Complete these word equations:

1. zinc + hydrochloric acid →

1. iron + sulfuric acid →

3. Define the term 'displacement reaction'

4. Which element is displaced in the two reactions above?

5. Why doesn't copper react with acids?

C2 – 5.8.1.1 – 5.8.1.2 Pure Substances & Formulations

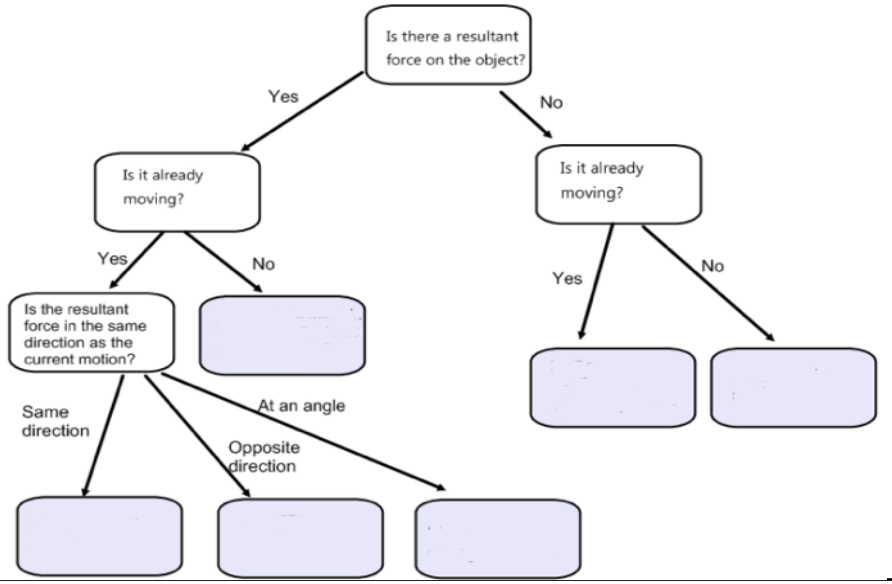
1. What does a pure substance mean in chemistry?

2. How can a pure substance be identified?

3. What is a formulation?

4. Give examples of some formulations

P2 – 6.5.4.2.1 Newton's First Law



Week 4.1 – Practice

6 school weeks to go

B1 – 4.2.2.1 The Human Digestive System

Starch is digested to form sugar molecules in the digestive system.

(a) What is the name of the enzyme that digests starch?

_____

(b) Where are most food molecules absorbed? (1)

Large intestine ☐ Small intestine ☐ Liver ☐ Stomach ☐

(a) Which organs in the digestive system produce protease enzymes?

Mouth and liver ☐ Pancreas and liver ☐

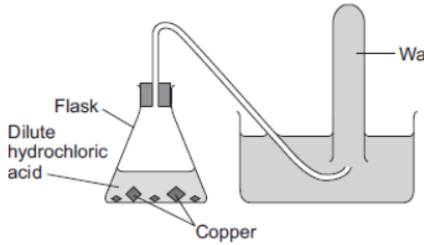
Mouth and stomach ☐ Stomach and pancreas ☐

(b) Bile helps digestion. Where is bile produced?

liver **mouth** **stomach**

C1 – 5.4.2.1 Reaction of Metals and Acids

A student was trying to produce hydrogen gas. No gas was produced.

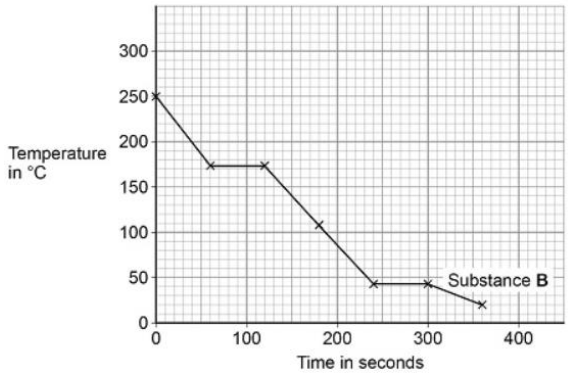


The student's teacher said that this was because the substances in the flask did **not** react. Suggest why

Experiment	Volume of hydrogen collected in one minute in cm^3
1	49
2	50
3	35
4	48

Calculate the mean volume of hydrogen collected in one minute.

C2 – 5.8.1.1 – 5.8.1.2 Pure Substances & Formulations



How does **Figure 2** show that substance **B** is a pure substance?

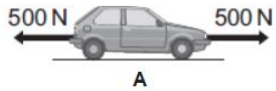
Determine the melting point of substance **B**.

What name is given to mixtures that are designed as useful products?

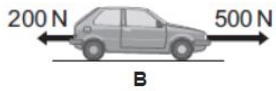
P2 – 6.5.4.2.1 Newton's First Law

The diagrams, **A**, **B** and **C**, show the horizontal forces acting on a **moving** car.

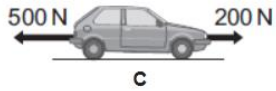
Draw a line to link each diagram to the description of the car's motion at the moment when the forces act. Draw only **three** lines.



A



B



C

stationary

constant speed

slowing down

accelerating forwards

(3)

Week 4.2 – Recall

6 school weeks to go

B1 – Required Practical 3 – Food Tests

Complete this table

Food group	Reagent to test for	Positive result	Negative result
Starch			
Sugars			
Protein			
Lipids			

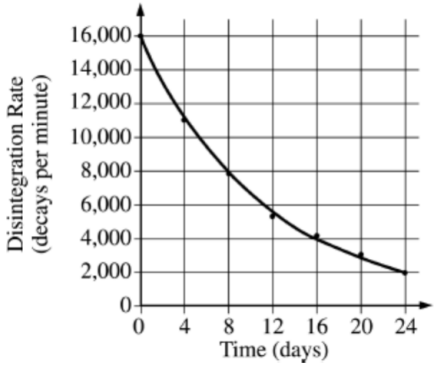
What must be done with solid samples of food first, before they are tested?

C1 – 5.4.2.4 The pH Scale and Neutralisation

1. What pH is a strongly acidic solution?
2. What colour would it be with universal indicator?
3. What pH is a strongly alkaline solution?
4. What colour would it be with universal indicator?
5. What pH is a neutral solution?
6. What colour would it be with universal indicator?
7. The presence of which ion makes solutions acidic?
8. The presence of which ion makes solutions alkaline?
9. Write the ionic equation for neutralisation

P1 – 6.4.2.3 Half-Lives

1. What is the half life of this radioactive isotope?



1. If a radioactive isotopes starting count rate is 544 decays per min. How many half-lifes has it undergone by the time it reaches 17?

P2 – 6.5.4.2.2 Newton's Second Law

Change the subject of this equation
resultant force = mass x acceleration
to calculate the mass of the object

to calculate the acceleration of the object

4. What are the units of force?
5. What are the units of mass?
6. What are the units of acceleration?
7. How is acceleration represented on a distance-time graph?

Week 4.2 – Practice

6 school weeks to go

B1 – Required Practical 3 – Food Tests

Food	Test for starch: colour after iodine test	Test for sugar: colour after Benedict's test	Test for protein: colour after Biuret test
A	Blue-Black	Brick red	Blue
B	Orange	Blue	Lilac
C	Blue-Black	Yellow	Blue
D	Orange	Orange	Lilac

(a) Give **three** conclusions about food **D**.

(3)

Which food in the table above would be the most suitable for a person with Type 2 diabetes to eat?
Give **two** reasons for your answer.

(3)

C1 – 5.4.2.4 The pH Scale and Neutralisation

(a) Which ion is found in all acids?

Cl^- ☐ H^+ ☐ Na^+ ☐ OH^- ☐ **(1)**

(b) Zinc nitrate can be produced by reacting an acid and a metal oxide.

Name the acid and the metal oxide used to produce zinc nitrate.

Acid _____

Metal oxide _____ **(2)**

(c) In an equation, zinc nitrate is written as $Zn(NO_3)_2(aq)$. What does (aq) mean?

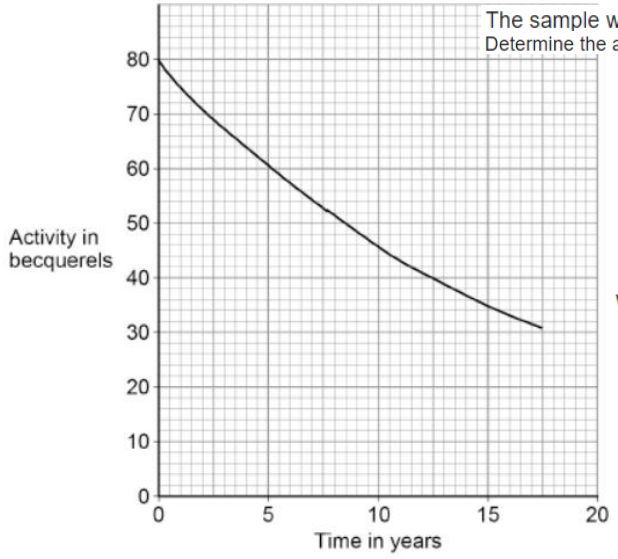
Dissolved in water ☐ Insoluble ☐ Not all reacted ☐ Reactant ☐

(d) The pH of a solution is 8 Some hydrochloric acid is added to the solution.

Suggest the pH of the solution after mixing.

pH = _____ **(1)**

P1 – 6.4.2.3 Half-Lives



The sample was collected from the desert in 1992.
Determine the activity of the tritium in the sample in 2007

What is the half-life of tritium?

P2 – 6.5.4.2.2 Newton's Second Law

The mass of the paper clip is 0.0012 kg
Calculate the acceleration of the paper clip when the resultant force on it is 0.000168 N
Give the unit.

Acceleration = _____ Unit _____ **(4)**

When the resultant force on the trolley was 0.63 N the acceleration of the trolley was 2.1 m/s^2 Calculate the mass of the trolley.

Mass of trolley = _____ kg **(3)**

Week 5.1 – Recall

5 school weeks to go

B2 – Required Practical 7 – Sampling Techniques	C1 – Required Practical 8: Making Soluble Salts
1. What is 'random sampling' used for? 1. What piece of equipment is used in random sampling? 2. Why is it important that a large number of random locations are sampled? 1. What must be done with the results for number of organisms in each of these locations? 1. How can your answer to Q4 be used to estimate the total population size of organisms in the area?	1. Which two reactants are needed to make copper sulfate salts? 1. Why is the acid warmed with a Bunsen burner? 1. Why is the solid reactant added until no more will dissolve? 1. Why is the mixture produced filtered? 1. How are copper sulfate crystals obtained from the filtrate solution?
C2 - 5.9.1.2 - 5.9.1.4 The Earth's Changing Atmosphere	**P2 – 6.5.4.3.3 Stopping Distance**
1. Describe and explain the composition of Earth's early atmosphere 2. Describe the composition of Earth's atmosphere at present 3. How did the levels of carbon dioxide in the atmosphere decrease? 4. How did the levels of water vapour in the atmosphere decrease? 5. How did the levels of oxygen in the atmosphere increase?	1. Stopping distance = _____ distance + _____ distance 1. What is the 'thinking distance' 1. Describe two factors that can increase the thinking distance 1. What is the 'braking distance'? 1. Describe two factors that can increase the braking distance 1. Describe the relationship between the speed of a car and its stopping distance

Week 5.1 – Practice

5 school weeks to go

B2 – Required Practical 7 – Sampling Techniques

Describe how quadrats should be used to estimate the number of dandelion plants in a field.

(4)

The field measured 40 m by 145 m. The students used 0.25 m^2 quadrats.
The students found a mean of 0.42 dandelions per quadrat.
Estimate the population of dandelions on the field.

How could the students make their estimate more accurate?

(1)

C1 – Required Practical 8: Making Soluble Salts

A student planned to make copper sulfate crystals from excess copper oxide and dilute sulfuric
Why is it necessary to add excess copper oxide?

This is the method used.

1. Add 25 cm^3 of dilute sulfuric acid to a conical flask.
2. Gently warm the dilute sulfuric acid.
3. Add excess copper oxide to the dilute sulfuric acid.
4. Stir the mixture.
5. Heat to evaporate all the water from the mixture.

Suggest **two** improvements to the method.

Explain why each improvement is needed.

C2 - 5.9.1.2 - 5.9.1.4 The Earth's Changing Atmosphere

Describe how and why the percentages of carbon dioxide and oxygen in the Earth's atmosphere have changed.

(5)

P2 – 6.5.4.3.3 Stopping Distance

(e) The driver of a car saw an obstacle in the road. He applied the brakes until the car stopped.

The thinking distance was 9.0 m The braking distance was 13.5 m
Calculate the stopping distance of the car. **(1)**

(f) The driver had been drinking alcohol. The car had worn brakes.

Explain why these factors would increase the stopping distance of the car.

(4)

Week 5.2 – Recall

5 school weeks to go

B1 – 4.4.1.1 – 4.4.1.2 Photosynthesis & Rate of photosynthesis

1. Write a word equation for photosynthesis

2. Is photosynthesis an exo or endothermic reaction? Explain why

3. What is the function of chlorophyll? Where is it stored?

4. State 3 factors that will effect the rate of photosynthesis

C1 – 5.4.3.2 Electrolysis of molten ionic compounds

1. Why do the ionic compounds used as the electrolyte have to be molten or aqueous?

1. Why are the electrode made of graphite?

1. Lithium bromide is made of Li^+ and Br^- ions

a. Which electrode do the lithium ions move towards and why?

b. What happens to them there in terms of electrons?

c. Which electrode do the bromide ions move towards and why?

d. What happens to them there in terms of electrons?

P1 – Required Practical 14: Determining Specific Heat Capacity

1. Complete the definition

The specific heat capacity of a substance is the _____ required to raise the _____ of _____ of a substance by _____.

2. What piece of equipment is needed to measure:
the mass of the substance?
the change in temp of the substance?
the energy supplied to the substance?

3. ***SHC = <u>Energy transferred</u>***
(mass x change in temp)

0.95kg of oil was heated from 20 to 75°C. 87258J of energy is supplied by the heater. Calculate the SHC of the oil.

P2 – 6.6.2.1 Types of Electromagnetic Waves

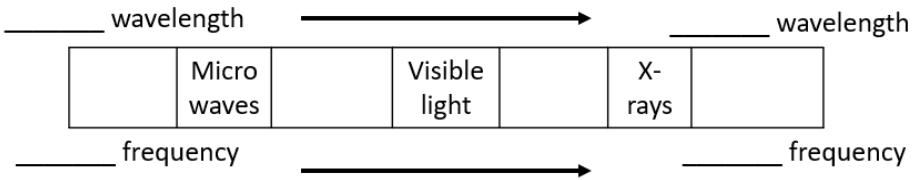
EM waves are transverse waves.

1. Complete the definition of a transverse wave

Vibrations are _____ to the direction of _____ transfer

2. What speed do all EM waves travel at through a vacuum?

3. Fill in the gaps on the diagram

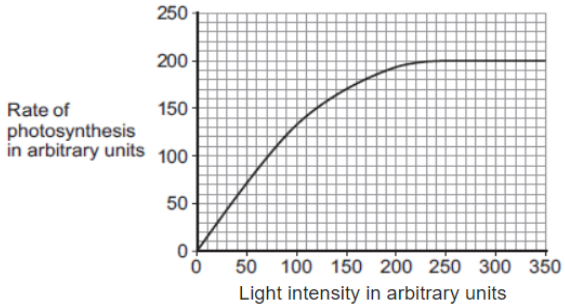


4. Describe the relationship between frequency and rate of energy transfer

Week 5.2 – Practice

5 school weeks to go

B1 – 4.4.1.1 – 4.4.1.2 Photosynthesis & rate of photosynthesis



Describe the effect of increasing light intensity on the rate of photosynthesis.
You should include numbers from **Figure 3** in your description.

At a light intensity of 250 arbitrary units, light is **not** a limiting factor of photosynthesis.
What is the evidence for this in **Figure 3**?

C1 – 5.4.3.2 Electrolysis of molten ionic compounds

A student investigates a potassium salt, **X**.

She finds that salt **X**:

- has a high melting point
- does not conduct electricity when it is solid
- dissolves in water and the solution does conduct electricity.

What is the type of bonding in salt **X**?

Covalent Giant molecular Ionic Metallic

Why does a solution of salt **X** in water conduct electricity? **(1)**

the electrolysis of molten lead bromide.
The electrolyte contains lead ions (Pb^{2+}) and bromide ions (Br^-).

At the positive electrode the gas produced is_____

At the negative electrode lead _____ gain electrons **(2)**

P1 – Required Practical 14: Determining Specific Heat Capacity

Students investigated the specific heat capacity of different oils.

1. Put 200 g of an oil in a beaker.
2. Record the temperature of the oil.
3. Switch on the heater.
4. After 5 minutes, record the temperature of the oil and the reading on the joulemeter.
5. Repeat steps 1–4 with different oils.

Give **one** variable the students controlled in the investigation.

Temperature at start in °C	Temperature after 5 minutes in °C
21	68

What is the resolution of the thermometer used in the investigation?

P2 – 6.6.2.1 Types of Electromagnetic Waves

(a) Give the type of electromagnetic wave with the lowest frequency. **(1)**

_____

(a) Complete the sentences.

In a vacuum, all electromagnetic waves travel at the same _____ .

Gamma waves have the greatest _____ .

Radio waves have the greatest _____ . **(3)**

Which type of electromagnetic wave has the shortest wavelength? **(1)**

P	microwaves	Q	visible light	R		S	gamma rays

(a) Which letter shows the position of ultraviolet (UV) radiation within the electromagnetic spectrum?

P ☐ Q ☐ R ☐ S ☐

Week 6.1 – Recall

4 school weeks to go

B2 – 4.7.2.2 – How materials are cycled

1. Name two chemical reactions that increase the concentration of carbon dioxide in the atmosphere

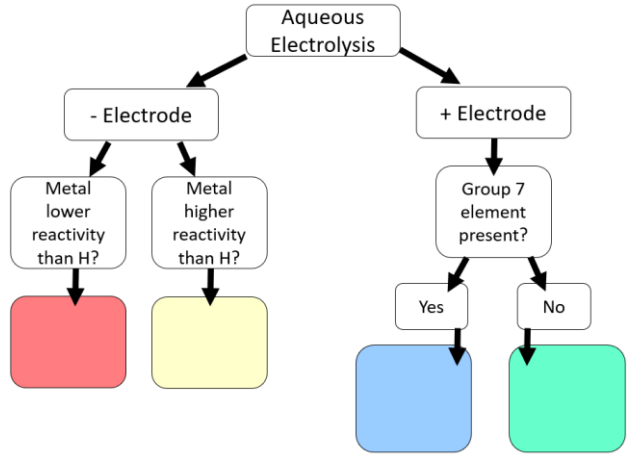
1. Name two processes that remove carbon dioxide from the atmosphere

1. Describe 2 human activities that are increasing the concentration of CO_2 in the atmosphere

1. What physical changes and processes are involved in the water cycle?

C1 – Required Practical 9: Electrolysis of Aqueous Solutions

Fill in the blank boxes of the flow diagram to show how to identify the product formed at each electrode



State the product formed
at each electrode from the following solutions

- Magnesium bromide
- Copper sulfate

C2 – 5.9.3.1 – 5.9.3.2 Properties of Atmospheric Pollutants

1. How is sulfur dioxide (SO_2) released into the atmosphere?

2. What is the effect of SO_2 in the atmosphere?

3. What is the effect of CO_2 in the atmosphere?

4. How is carbon monoxide (CO) released into the atmosphere?

4. What is the effect of CO in the atmosphere?

5. What is the effect of carbon particulates in the atmosphere?

P2 – Required Practical 21: Infrared Radiation

1. What is the independent variable?

1. What is the dependent variable?

1. What piece of equipment is used to measure the dependent variable?

1. Identify the control variables.

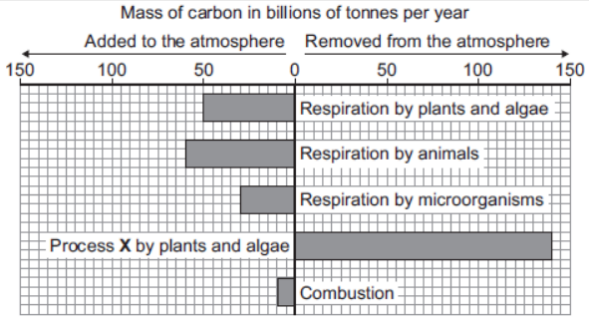
1. How will you know which surface was the best emitter of IR radiation?

1. What type of surface is this likely to be?

Week 6.1 – Practice

4 school weeks to go

B2 – 4.7.2.2 – How materials are cycled



Name process **X**.

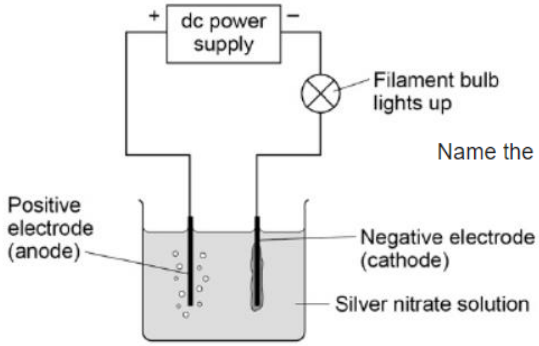
Calculate the mass of carbon added to the atmosphere by respiration per year.

Some scientists are concerned that the mass of carbon in the atmosphere is changing.

How does the data in the graph support this idea?

C1 – Required Practical 9: Electrolysis of Aqueous Solutions

Figure 1 shows the apparatus used to electrolyse silver nitrate ($AgNO_3$) solution.



Name the product discharged at each electrode.

(2)

C2 – 5.9.3.1 – 5.9.3.2 Properties of Atmospheric Pollutants

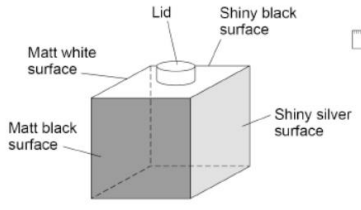
Burning fuels causes atmospheric pollution.

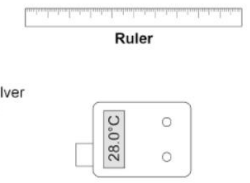
Write **one** effect for each pollutant in **Table 1**.

Pollutant	Effect
Carbon monoxide	
Sulfur dioxide	
Particulates	

(3)

P2 – Required Practical 21: Infrared Radiation





Variable	Independent	Dependent	Control
Distance between infrared detector and surface of cube			✓
Starting temperature of water inside cube			
Temperature measured by infrared detector			
Type of surface			

Week 6.2 – Recall

4 school weeks to go

B2 – 4.6.1.5 Inherited Disorders	C1 – 5.2.3.1 – 5.2.3.2 – Graphite & Diamond
Polydactyly (having extra fingers or toes) is caused by a dominant allele (D) Draw a punnet square to determine the probability of offspring being polydactyly with a homozygous recessive mother and a heterozygous father Cystic fibrosis (a disorder of cell membranes) is caused by a recessive allele (n). Draw a punnet square to determine the probability of offspring having cystic fibrosis with both a heterozygous mother and father	1. What element are both diamond and graphite made from? 2. Why do graphite and diamond have high melting points? 1. Why can graphite conduct electricity? 1. Why is graphite soft and slippery?
C2 – 5.10.1.2 Potable Water	**P1 – 6.1.1.4 Power**
1. What is potable water? 2. Ground water (where rainfall collects) must first be sterilised. What does this mean and what is used to sterilise it? 3. In countries with limited rainfall, desalination is performed on sea water. How is this done? 4. What are the disadvantages of desalination?	Change the subject of this equation to calculate the energy transferred by a device. ***Power = energy transferred/time*** 2. Change the subject of this equation to calculate the potential difference of a component ***Power = potential difference x current*** 3. What are the units of power? 4. What are the units of energy? 5. What are the units of potential difference? 6. What are the units of current?

Week 6.2 – Practice

4 school weeks to go

B2 – 4.6.1.5 Inherited Disorders

Polydactyly is caused by a dominant allele, **D**.

A man has polydactyly. His wife does not have polydactyly.

This couple's children have a 50% chance of having polydactyly.

Draw a genetic diagram to explain why.

(3)

C1 – 5.2.3.1 – 5.2.3.2 – Graphite & Diamond

Diamond has a giant covalent structure.

(d) What is the number of bonds formed by each carbon atom in diamond?

2 ☐ 3 ☐ 4 ☐ 8 ☐

Give **two** physical properties of diamond.

1. _____

2. _____

Explain why graphite is soft and slippery.

_____

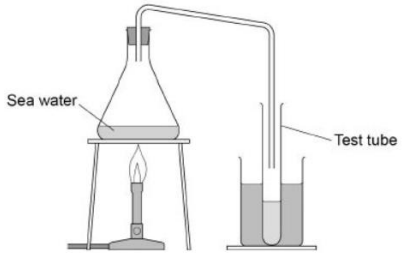
_____

_____

_____

(3)

C2 – 5.10.1.2 Potable Water



What change of state is happening at the surface of the sea water in **Figure 2**?

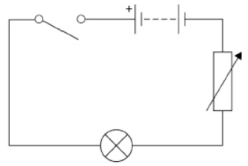
Describe how the water in the test tube in **Figure 2** is different from the sea water.

Why does producing drinking water from sea water using distillation cost a lot of money?

P1 – 6.1.1.4 Power

A student investigated how the power output of a filament lamp varied with the current in the lamp.

The diagram below shows part of the circuit the student used.



(a) To calculate power output the student measured the current in the lamp and the potential difference across the lamp.

Complete the diagram above by adding an ammeter and a voltmeter to make the measurements.

Use the correct circuit symbols.

(b) Which energy store in the battery decreases when the lamp is switched on?

(1)

_____

(f) Determine the resistance of the lamp when the current in the lamp is 0.22 A

Resistance = _____ Ω

(4)

Week 7.1 – Recall

3 school weeks to go

B1 – 4.3.1.1 Communicable Diseases

1. Define the term 'communicable disease'

2. Define the term 'pathogen'

3. State the 4 different types of pathogen

4. Give a disease caused by each of these methods of transfer, and a way to reduce the spread

Droplets in air

Bodily fluids

Vectors

C1 – 5.3.1.2 Relative Formula Mass

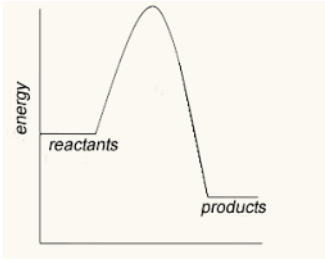
Calculate the relative formula mass of these compounds. Use your periodic table for the atom mass values.

1. H_2O
1. LiOH
1. $CaCO_3$
1. C_3H_8
1. NH_3
1. $Mg(OH)_2$

C2 – 5.6.1.4 Catalysts

1. How do catalysts increase the rate of reactions?

2. Add a line onto this reaction profile to show the effect of adding a catalyst to this exothermic reaction



3. Why are catalysts used?

P1 – Required Practical 16: IV Charactertistics

1. What component is used to measure the potential difference across the component?
2. How is it connected?

3. What component is used to measure the current through the component?
4. How is it connected?

5. Draw the circuit symbol for a resistor

6. Draw the circuit symbol for a diode

7. How do you reverse the direction of the current?

Week 7.1 – Practice

3 school weeks to go

B1 – 4.3.1.1 Communicable Diseases

Draw **one** line from each disease to the type of pathogen that causes the disease.

Disease	Type of pathogen
Gonorrhoea	Bacterium
	Fungus
	Protist
Measles	Virus

(2)

Give **two** ways that the body prevents pathogens entering the body.

(2)

Give **two** ways to prevent the spread of HIV.

(2)

C1 – 5.3.1.2 Relative Formula Mass

Calculate the relative formula mass (M_r) of zinc sulfate ($ZnSO_4$).

Relative atomic masses (A_r): Zn = 65 S = 32 O = 16

_____

_____

_____

Relative formula mass (M_r) = _____

(2)

C2 – 5.6.1.4 Catalysts

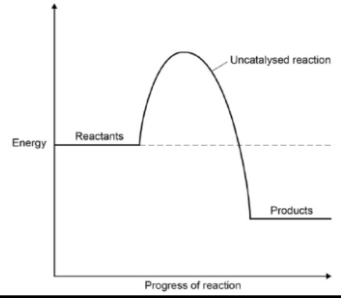
Hydrogen is obtained from natural gas.

One stage in the process is to react carbon monoxide with steam.

Give **two** reasons why a catalyst is used in the reaction between carbon monoxide and steam.

(2)

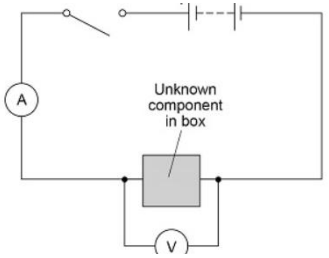
Draw the reaction profile for the reaction **with a catalyst** on **Figure 1**.



(2)

P1 – Required Practical 16: IV Charactertistics

A teacher gave a student an unknown electrical component hidden in a box.



The student measured the potential difference across the component and the current in the component.

She repeated this for several values of potential difference.

Give **one** way the circuit could be altered so that the potential difference across the component could be varied.

Week 7.2 – Recall

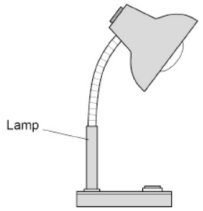
3 school weeks to go

B1 – Required Practical 5 – Photosynthesis	C2 – 5.6.2.2 Energy Changes and Reversible Reactions
1. What is the independent variable? 2. How is the independent variable changed? 3. What is the dependent variable? How is it measured? 4. Identify the control variables 5. What is the function of the sodium hydrogen carbonate solution?	1. What symbol is used to represent a reversible reaction? 1. What does a reversible reaction mean? 1. Explain how the law of the conservation of energy applies to reversible reactions
P1 – 6.3.1.2 Changes of State	**P2 – 6.7.2.1 Electromagnets**
1. State the law of the conservation of mass 1. Name the change of state from a solid to a liquid 2. Name the change of state from a gas to a liquid 3. Name the change of state from a liquid to a solid 4. Name the change of state from a liquid to a gas 1. Draw a particle diagram for a solid, liquid and a gaseous substance.	1. Draw the magnetic field of this solenoid  2. Why does shaping the wire into a solenoid increase the strength of the magnetic field created by the current through the wire? 3. Describe 3 ways of increasing the strength of an electromagnet

Week 7.2 – Practice

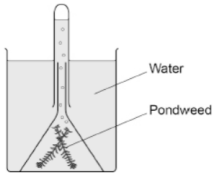
3 school weeks to go

B1 – Required Practical 5 – Photosynthesis



Describe a method to investigate the effect of light intensity on the **rate** of photosynthesis.

Use the equipment in the diagram and other laboratory equipment.



(6)

C2 – 5.6.2.2 Energy Changes and Reversible Reactions

Oxygen reacts with sulfur dioxide. The reaction is reversible.

What is the symbol for a reversible reaction? _____ **(1)**

In a reversible reaction the forward reaction is exothermic, so the reverse reaction is _____ . **(1)**

Equilibrium is reached when the forward and reverse reactions happen at exactly the same _____ .

(1)

P1 – 6.3.1.2 Changes of State

(a) Describe **two** ways the arrangement of particles in a solid is different from the arrangement of particles in a liquid.

1. _____

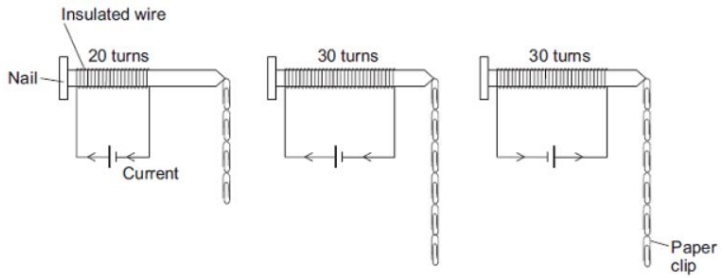
2. _____

Oxygen boils at −183 °C and freezes at −218 °C
Nitrogen boils at −195 °C and freezes at −210 °C
Carbon dioxide sublimates at −78 °C
The scientist continued to cool the air to a temperature of −190 °C
What is the state of each substance at −190 °C?

Substance	Solid	Liquid	Gas
Oxygen			
Nitrogen			
Carbon dioxide			

(2)

P2 – 6.7.2.1 Electromagnets



Complete the conclusion that the student should make from this investigation.

Increasing the number of turns of wire wrapped around the nail will _____ the strength of the electromagnet.

Suggest **two** variables that the student should control in this investigation.

1. _____

2. _____