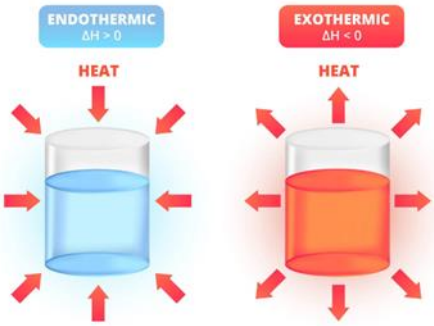
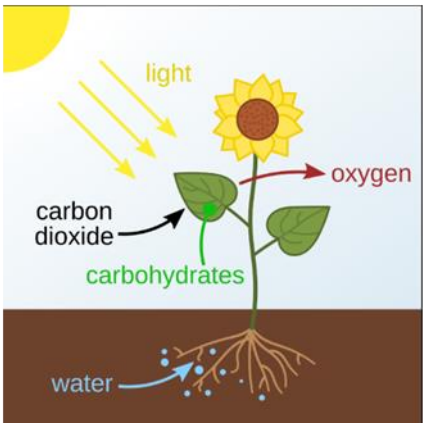
Year 9 Home Learning

Autumn term 2 2026

Name:_____ Class:_____

Dedication





Home Learning expectations

- -Written by yourself, in your own words.
- -Completed by the due date.
- -Finished to the best of your ability.
- -Closely followed the instructions.
- -Green penned and improved when needed.
- -Peer or self-assessed when asked to.
- -Presented so it is clear and neat
- -Proof read the work to ensure spelling, punctuation and grammar is to the best of your ability.

Task 8

Topic: How Science Works: Planning a practical. Literacy task.

Instructions: Read the information and complete the questions.

Title: Investigation into how the concentration of acid affects the rate of reaction

In this practical, you will investigate how the concentration of acid affects the rate of reaction between hydrochloric acid and magnesium ribbon. The independent variable in this experiment is the concentration of the hydrochloric acid, because this is the factor that is changed each time. The dependent variable is the time taken for the magnesium ribbon to dissolve, because this shows how fast the reaction happens. Several control variables must stay the same to keep the test fair: the length of the magnesium ribbon, the volume of acid used, and the temperature of the room.

To carry out the practical, a 2 cm piece of magnesium ribbon is placed into a beaker. Then 20 ml of hydrochloric acid at a chosen concentration is added. As soon as the magnesium touches the acid, the timer is started. The reaction produces bubbles, and the magnesium slowly disappears. The timer is stopped when the magnesium has fully dissolved. This process is repeated using different acid concentrations, while keeping all control variables the same. The aim of the practical is to find out how changing the concentration of acid affects the speed of the reaction.

Complete the questions below:

1. **What is the independent variable in this experiment? (1 mark)**

   _____

2. **What is the dependent variable in this experiment? (1 mark)**

   _____

3. **Name two control variables that must stay the same. (2 marks)**
   1. _____
   2. _____
4. **What is the aim of the practical? (1 mark)**

   _____
5. **What happens when magnesium reacts with hydrochloric acid? (1 mark)**

   _____
6. **Why is it important to keep the length of the magnesium ribbon the same? (2 marks)**

   _____

7. **Why does changing the concentration of acid affect the rate of reaction? (2 marks)**

_____

Teacher ticks here	Tick	Student comment: How to improve
Excellent homework **(good comment)**		
Good/completed		
Requires improvement		
Incomplete/unsatisfactory		

Peer assessed / Self-

Due Date: _____

Task 9

Topic: Electrical Power – Topic review

Instructions: Complete the following activities, use the information from your booklet to help you:

1. Match each electrical quantity to its correct unit. [5 marks]

Current	Volts (V)
Voltage	Joules (J)
Resistance	Watts (W)
Power	Ohms (Ω)
Energy	Amperes (A)

2. Fill in the blanks about energy and power. [6 marks]

energy | power | kilowatts | second | watts | kilowatt-hours

Power is the amount of _____ transferred every _____. Power is measured in _____. A device that uses more energy each second has a higher _____ rating. Multiplying power in _____ by time in hours gives energy in _____.

WORKED EXAMPLE — EFFICIENCY

Formula: efficiency (%) = (useful energy output ÷ total energy input) × 100

Example: A motor receives 500 J of electrical energy and produces 350 J of useful kinetic energy.
efficiency = (350 ÷ 500) × 100 = 70%

3. An electric bulb is supplied with 200 J of electrical energy. It produces 50 J of useful light energy and the rest is wasted as heat.

A. Calculate the amount of energy wasted as heat. [1 mark]

Answer = _____ J

B. Calculate the efficiency of the bulb. Show your working. [2 marks]

Answer = _____ %

C. Explain what the efficiency value tells you about how well the bulb converts electrical energy into light energy. [2 marks]

_____

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Task 10

Topic: Photosynthesis

Instructions: Complete the tasks about photosynthesis

Multiple choice questions: circle the letter of the the correct answer.

1. What is the word equation for photosynthesis?

A. Carbon dioxide + water → glucose + oxygen
B. Glucose + oxygen → carbon dioxide + water
C. Water + oxygen → glucose + carbon dioxide
D. Carbon dioxide + glucose → water + oxygen

2. Which subcellular structure is the site of photosynthesis in plant cells?

A. Nucleus
B. Chloroplast
C. Cell membrane
D. Vacuole

3. What colour is chlorophyll?

A. Red
B. Blue
C. Green
D. Yellow

4. Which gas do plants take in during photosynthesis?

A. Oxygen
B. Nitrogen
C. Carbon dioxide
D. Hydrogen

3. What useful substance does a plant make during photosynthesis? *Help: Look at the equation, what is the chemical the plants can use for energy?*

4. Explain why chloroplasts are important in photosynthesis. *Help: What do they contain? What happens here?*

5. A plant is kept in a dark cupboard for two weeks. Explain how this would affect photosynthesis and why.

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Task 11

Topic: How science works

Instructions: Complete the following tasks to practice drawing a line of best fit:

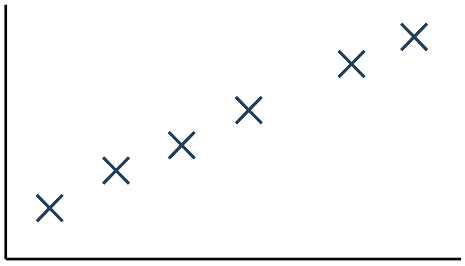
1. Why draw a line of best fit? Tick the correct answer.

- ❑ To make it easier to see what is happening in the graph
- ❑ To estimate values we did not measure
- ❑ Both

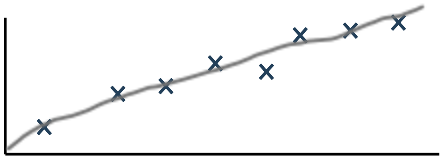
2. Draw a line of best fit on each graph. The first one has been done for you.

Remember: If the pattern is in a straight line you use a ruler, if it is in a curve you draw the line free hand. This must be a continuous line and not the dots joined up.

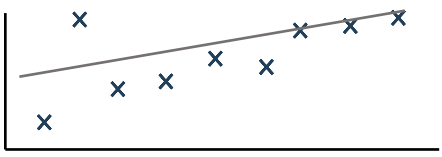
3. When drawing a line of best fit we do not include the anomaly.
   a) Circle the anomaly on the graph on the right.
   b) Draw a line of best fit, leaving out the anomaly.



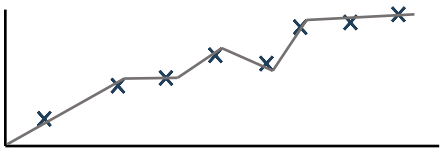
4. Each of the lines of best fit below has an error. State the problem with each one.



Problem:



Problem:



Problem:

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Task 12

Topic: Photosynthesis: Literacy task, importance of green plants

Instructions: Read through the information below and complete the questions. You can also use lesson 4 from your photosynthesis booklet.

Reading Task: Why Are Plants Important?

Plants and algae use sunlight to make food in a process called photosynthesis. During photosynthesis, they take in carbon dioxide and release oxygen, which humans and animals need to breathe. Plants help reduce global warming by removing carbon dioxide from the air. Tiny ocean organisms called phytoplankton also do photosynthesis and produce about half of the oxygen we breathe.

Plants help clean the air by absorbing some harmful pollution. They also stop desertification, which happens when good soil becomes dry and barren. Tree roots hold soil together and help keep it healthy.

Plants are important parts of habitats. They provide food, oxygen, and shelter for living things. However, habitats can be damaged by deforestation, pollution, and building new towns and cities. We can help by planting more trees and reducing pollution. Protecting plants helps keep our planet healthy for all living things

1. What gas do plants release during photosynthesis? Circle one.

A. Carbon dioxide

B. Oxygen

C. Nitrogen

2. What can damage plant habitats? Circle one.

A. Planting trees

B. Deforestation

C. Recycling

3. Draw a line to match the word to its meaning.

Photosynthesis	A place where plants and animals live
Habitat	Harmful substances in the air
Pollution	The process plants use to make food using sunlight

4. Plants photosynthesis, describe why this is important for earth. Think about what gas they release and what gas they remove from the atmosphere. (3 marks)

Word bank to help: oxygen, carbon dioxide, remove, fossil fuels, release, reduce

_____

_____

_____

5. What is desertification? (1 mark) Circle the correct answer:

A. When fertile land becomes dry and unable to support plants

B. When forests grow larger every year

C. When there is too much rain and flooding

6. How are trees and plants beneficial to animals in terms of giving them a place to live? (2 marks)

_____

_____

_____

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Task 13

Topic: How science works

Instructions: Complete the following tasks to practice your scientific skills:

1.

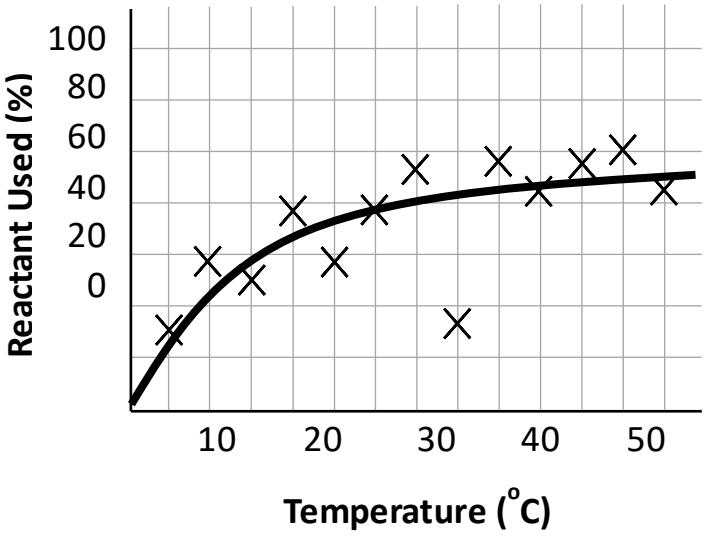
a. On the graph, circle the anomaly

b. The independent variable (the variable we change) is found on the x axis. State what the independent variable is below:

_____

c. The dependent variable (the variable we measure) is found on the y axis. State what the dependent is variable is below:

_____

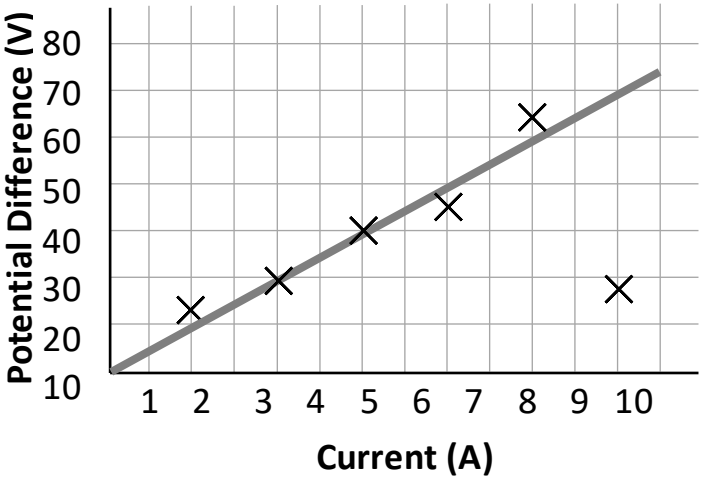


2.

a. On the graph, circle the anomaly

b. Describe the pattern of the graph below by filling in the words:

As the current _____, the potential difference also _____.



c. State how much more potential different a current of 5 amps has than a current of 8 amps.

Answer = _____ V.

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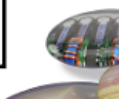
Task 14

Topic: Chemical reactions

Instructions: Complete the tasks below on the topic 'chemical reactions'.

(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)
1																	18
1 H hydrogen 1.0	2	Key: atomic number, Symbol, name, relative atomic mass										13	14	15	16	17	2 He helium 4.0
3 Li lithium 6.9	4 Be beryllium 9.0											5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2
11 Na sodium 23.0	12 Mg magnesium 24.3	3	4	5	6	7	8	9	10	11	12	13 Al aluminium 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3
55 Cs caesium 132.9	56 Ba barium 137.3	57–71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium	85 At astatine	86 Rn radon
87 Fr francium	88 Ra radium	89–103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium		114 Fl flerovium		116 Lv livermorium		

57 La lanthanum 138.9	58 Ce cerium 140.1	59 Pr praseodymium 140.9	60 Nd neodymium 144.2	61 Pm promethium 144.9	62 Sm samarium 150.4	63 Eu europium 152.0	64 Gd gadolinium 157.2	65 Tb terbium 158.9	66 Dy dysprosium 162.5	67 Ho holmium 164.9	68 Er erbium 167.3	69 Tm thulium 168.9	70 Yb ytterbium 173.0	71 Lu lutetium 175.0
89 Ac actinium	90 Th thorium 232.0	91 Pa protactinium	92 U uranium 238.1	93 Np neptunium	94 Pu plutonium	95 Am americium	96 Cm curium	97 Bk berkelium	98 Cf californium	99 Es einsteinium	100 Fm fermium	101 Md mendelevium	102 No nobelium	103 Lr lawrencium



1. Use your periodic table in your diary (or the copy above).
2. Write the chemical formula for the following elements in the table below. The first one has been done for you.

Name of element	**Chemical formula**
Oxygen	O
Calcium	
Iron	
Hydrogen	

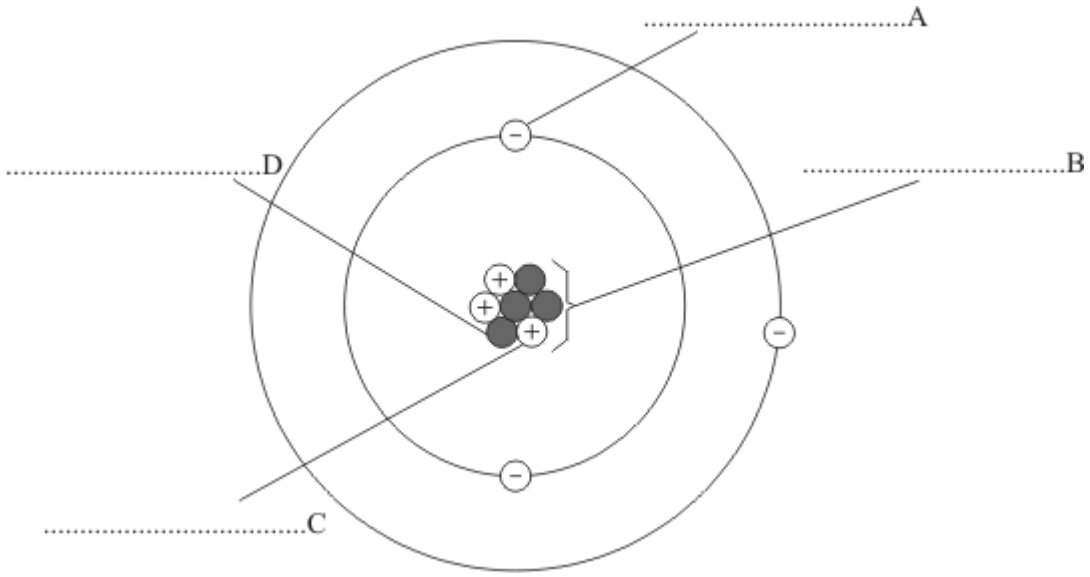
3. Identify some common elements and compounds below:

Chemical formula of element/compound	**Name of the element/compound**
H_2O	Water
CO_2	
O_2	
Challenge: $C_6H_{12}O_6$	

4. Research the structure of an atom using your booklet or the internet and complete the tasks below:

a. Label the atom's sub-atomic particles

Word bank: Neutron, nucleus, electron, proton.



b. Match up the charges of each of the subatomic particles below:

Proton	**0**
Electron	**+ 1**
Neutron	**-1**

c. Write a sentence explaining the masses of each subatomic particle.

Protons and neutrons both have a relative mass of _____. Electrons do have mass, but it is so small we consider it _____.

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