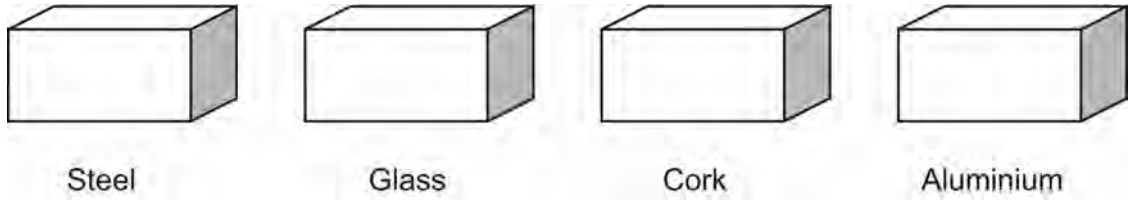
Sample Questions and Mark Schemes

1 An experimental kit contains some blocks made of different substances.



(a) A strong magnet is held over the blocks. Which block or blocks will be attracted to the magnet?

[1]

(b) A beam of light is shone onto the blocks. Which block or blocks will let the light pass through?

[1]

(c) The blocks are put into a bowl of water. Which block or blocks will float?

[1]

Mark Scheme for Question 1

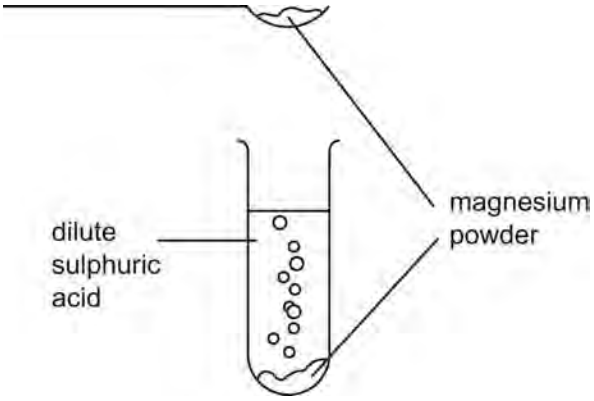
Question No. 1: Investigate everyday materials and their physical properties.

- Calculate unknown angles using the properties of: angles at a point, angles formed within parallel lines and angle properties of triangles and quadrilaterals

Part	CF[1]	Mark	Answer	Further Information
(a)	Cm4	1	Steel	No mark if more than one answer given
(b)	Cm4	1	Glass	No mark if more than one answer given
(c)	Cm4	1	Cork	No mark if more than one answer given
	Total	**3**		

1 CF stands for Curriculum Framework. This column shows which part of the Curriculum Framework is being assessed in the question. The first letter, B, P or C, shows the main areas of Science: Biology, Physics or Chemistry. The next letter shows the subtopic e.g. Biology is divided into Cells and Organisms (c), Humans as Organisms (h), Plants (p), Variation and Classification (v) and Ecosystems (e). The number shows which bullet point from that section of the Curriculum Framework is being assessed.

2 Some magnesium powder is added to dilute sulphuric acid until no more reacts. Bubbles of gas are given off. This gas burns with a pop when it is ignited.



(a) What is the name of the gas formed when magnesium reacts with sulphuric acid?

[1]

(b) Some magnesium powder remains. How could this solid be removed from the solution of the salt?

[1]

(c)(i) What happens to the pH of the acid as the magnesium is added? Circle the correct answer.

pH goes from 1 to 14 **pH goes from 1 to 7** **pH goes from 14 to 7** **pH goes from 14 to 1**

[1]

(ii) What is the name given to this type of chemical reaction?

[1]

Mark Scheme for Question 2

Question No. 2

- Investigate the reactivity of metals (with oxygen, water and dilute acids), and a reactivity series and examples of displacement reactions
- Understand the idea of exothermic and endothermic reactions
- Describe neutrality, acidity and alkalinity and use indicators and the pH scale
- Meet different chemical reactions and word equations, including formation of oxides from metals, neutralisation and displacement reactions

Part	CF	Mark	Answer	Further Information
(a)	Cc4	1	hydrogen	
(b)	Cs3	1	filtering or filtration	
(c) (i)	Cc5	1	pH goes from 1 to 7✓	
(ii)	Cc1	1	neutralisation **or** neutralising	
	Total	**4**		

3(a) Information about the reaction of four metals, A, B, C and D, is given below.

metal	reaction when heated in air	reaction with water	reaction with dilute hydrochloric acid
A	burns with a white light	very slow reaction	bubbles are rapidly formed
B	no reaction	no reaction	no reaction
C	burns with a yellow flame	floats and forms bubbles	very violent reaction
D	produces a blue-green flame	no reaction	no reaction

(i) Which one, A, B, C or D, is likely to be gold?

[1]

(ii) Which one, A, B, C or D, is likely to be sodium?

[1]

(iii) Put the metals A, B, C and D in order of reactivity with the most reactive first.

_____ _____ _____ _____ [1]

most reactive least reactive

(b) Magnesium is more reactive than copper.
When magnesium is put into a solution of copper sulphate heat is given out.
The solution goes from blue to colourless and a red/brown solid is formed.

Complete the word equation for the reaction that occurs.

magnesium + copper sulphate → _____ + _____ [2]

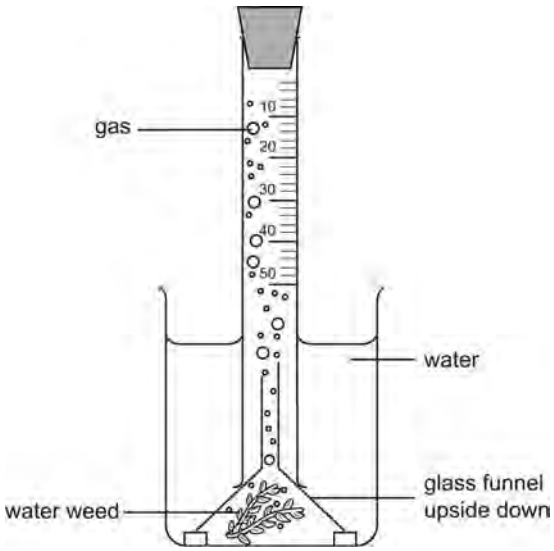
Mark Scheme for Question 3

Question No. 3:

- Investigate the reactivity of metals (with oxygen, water and dilute acids), and a reactivity series and examples of displacement reactions
- Meet different chemical reactions and word equations, including formation of oxides from metals, neutralisation and displacement reactions

Part	CF	Mark	Answer	Further Information
(a) (i)	Cc4	1	B	
(ii)	Cc4	1	C	
(iii)	Cc4	1	C A D B	Must be in correct order
(b)	Cc1	1	copper	Either order Accept Cu
	Cc1	1	magnesium sulphate	Accept Mg SO4 Do **not** accept sulphite **or** sulphide
	Total	5		

4 The diagram shows some apparatus used to investigate **photosynthesis**.



The water weed was exposed to three different intensities of light, each for the same length of time. The gas produced at each light intensity was analysed.
The results are shown in the table.

	percentage gas		
light intensity units	**oxygen**	**carbon dioxide**	**nitrogen**
1	19	1	80
8	30	0	70
24	40	0	60

(a) What happened to the percentage of **carbon dioxide** when the light intensity was increased from 1 to 8 units?

[1]

(b) What happened to the percentage of **oxygen** when the light intensity was increased from 1 to 8 units?

[1]

(c) Explain why the percentage of **carbon dioxide** and **oxygen** changed as the light intensity increased.

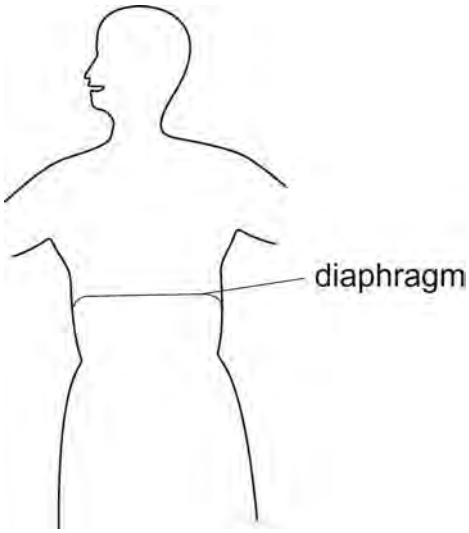
[3]

Mark Scheme for Question 4

Question No. 4: Learn about photosynthesis, including a word equation for the process.				
Part	**CF**	**Mark**	**Answer**	**Further Information**
(a)	Bp2	1	it fell **or** dropped **or** went down	
(b)	Bp2	1	it rose **or** increased **or** went up	
(c)	Bp2	1	the plant takes in carbon dioxide	For maximum marks the student must show understanding that the plant is responsible for the change in gases
		1	for photosynthesis	
		1	oxygen is given out	
	Total	**5**		

5 The drawing shows an organ found in the human body. It is part of an organ system.

(a) Put an X on the diagram below to show where this organ is found in the body.



[1]

(b) Of which system is the organ a part?

Tick the correct box.

circulatory system ☐ reproductive system ☐

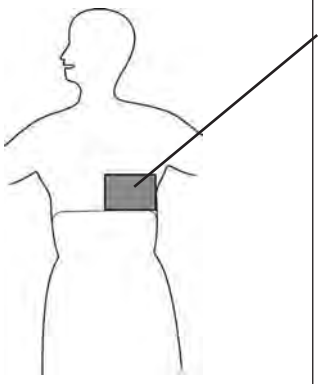
digestive system ☐ respiratory system ☐

[1]

Mark Scheme for Question 5

Question No. 5

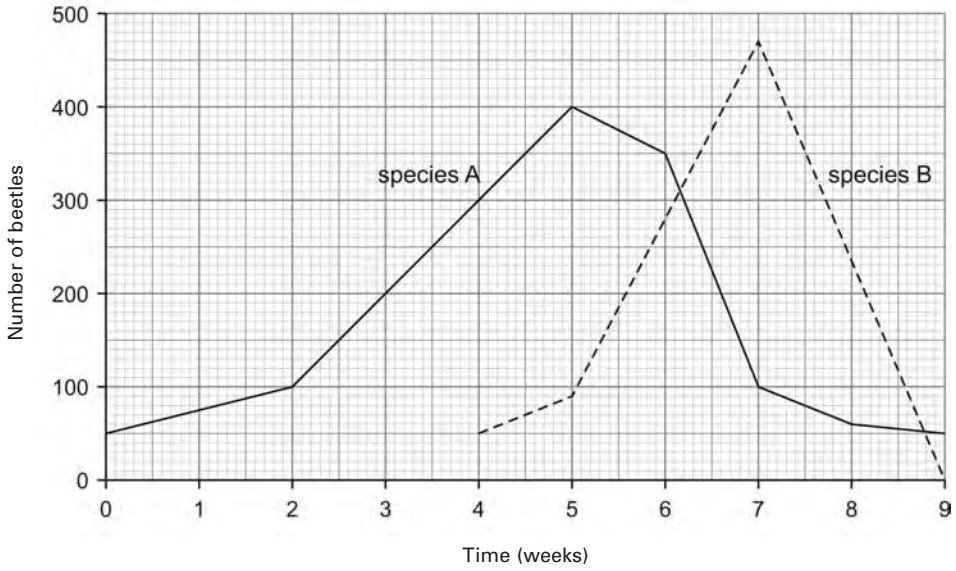
- Recognise the positions and know the functions of the major organ systems
- Learn about the components and basic functions of the circulatory system

Part	CF	Mark	Answer	Further Information
(a)	Bh1	1		The centre of the cross must come within the shaded area
(b)	Bh4	1	circulatory system ✓	
	Total	**2**		

6 Two species of beetle, species A and species B, live in flour.
Species A feeds on flour.
Species B feeds on species A.

50 beetles of species A were put into a tin of flour.
Four weeks later 50 beetles of species B were put into the tin.

The graph shows the populations of each species of beetle.



(a) **(i)** How many beetles of species A were in the tin at 2 weeks?

[1]

(ii) Calculate the rate at which the population of species A increased between 2 and 5 weeks? Show your working.

_____ Beetles/week [2]

(b) Suggest **one** reason that the number of beetles of species B decreased after 7 weeks.

[1]

(c) Suggest **two** factors that would limit the population of species A if species B had not been introduced.

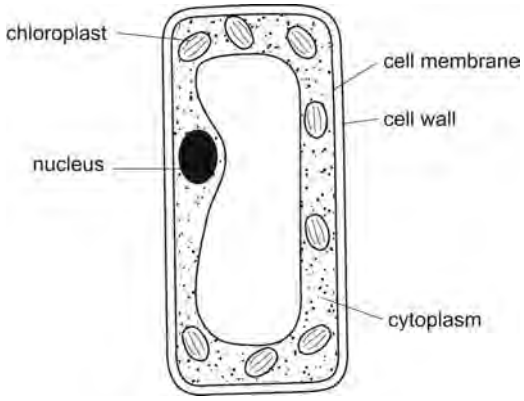
Factor 1 _____ Factor 2 _____

[2]

Mark Scheme for Question 6

Question No. 6: Learn about factors affecting the size of populations				
Part	**CF**	**Mark**	**Answer**	**Further Information**
(a) (i)	Be3	1	100	
(ii)	Be3	1	400 – 100 = 300 300 ÷ 3 = 100	i.e. 1 mark for calculation
		1	100	1 mark for correct answer
(b)	Be3	1	not enough food/very small numbers of A	
(c)	Be3	2	Any 2 from: (Lack of) food, lack of oxygen, build-up of wastes	
	Total	**6**		

7 The diagram shows a plant cell.



(a) Which **two** named parts are present in plant cells but not in animal cells?

1. _____

2. _____

[2]

(b) Choose words from the list to complete the sentences below.

membrane wall chloroplast cytoplasm nucleus

1. The _____ is a structure that contains genetic information.

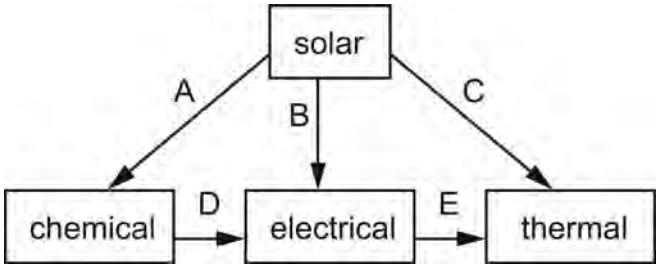
2. The _____ is a structure in which photosynthesis takes place.

[2]

Mark Scheme for Question 7

Question No. 7: Investigate animal and plant cells and understand the functions of the main components; define what is meant by a tissue, an organ and an organ system				
Part	**CF**	**Mark**	**Answer**	**Further Information**
(a)	Bc2	1	cell wall	
	Bc2	1	chloroplast	
(b)	Bc2	1	nucleus	
	Bc2	1	chloroplast	
	Total	**4**		

8 The diagram shows some energy changes, labelled A, B, C, D and E.



Which energy change, A, B, C, D or E, takes place when:

(a) green plants make food

[1]

(b) battery-powered calculator is used

[1]

(c) solar-powered calculator is used

[1]

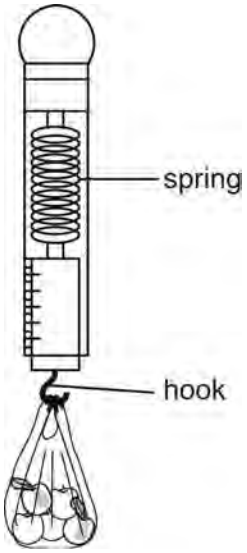
(d) kettle is switched on

[1]

Mark Scheme for Question 8

Question No. 8: Become familiar with energy as the ability to make things happen (do work) and its conversion and conservation				
Part	**CF**	**Mark**	**Answer**	**Further Information**
(a)	Pe2	1	A	
(b)	Pe2	1	D	
(c)	Pe2	1	B	
(d)	Pe2	1	E	
	Total	**4**		

9 A bag of apples is being weighed on a spring scale which acts as a force meter.



(a) What is the name of the force that pulls the spring down?

[1]

(b) What will happen to the length of the spring:
(i) if another apple is added to the bag?

[1]

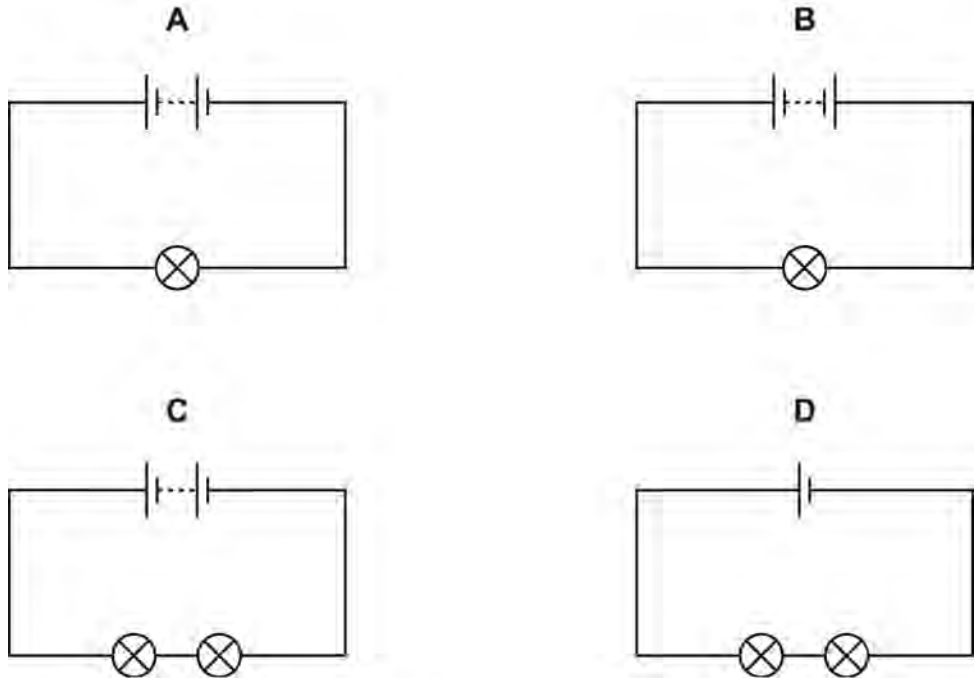
(ii) if the bag of apples is lowered into a bucket of water?

[1]

Mark Scheme for Question 9

Question No. 9: Investigate the effect of forces on the motion and shape of objects				
Part	**CF**	**Mark**	**Answer**	Further Information
(a)	Pf2	1	gravity	Accept 'weight'
(b) (i)	Pf2	1	gets longer **or** increases	Do **not** accept 'it goes down'
(ii)	Pf2	1	gets shorter **or** decreases	Do **not** accept 'it goes up'
	Total	**3**		

10 **(a)** The diagram shows four circuits.



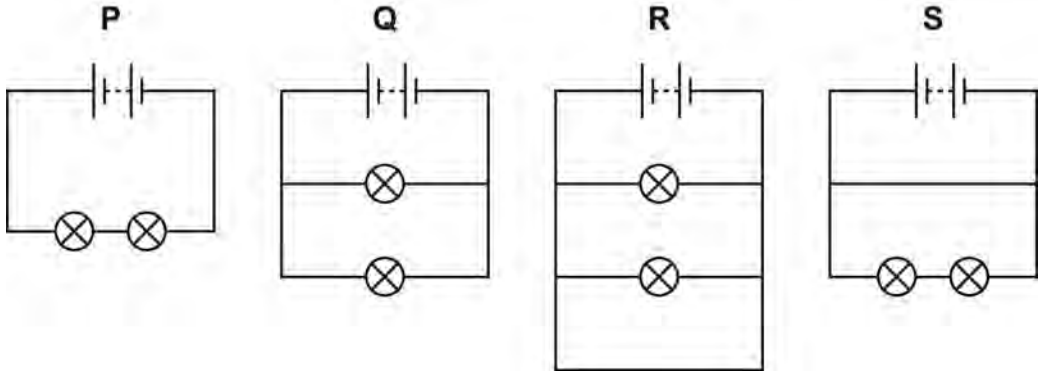
(i) Give the letter of the circuit where the lamp or lamps do **not** light.

[1]

(ii) Give the letter of the circuit that has the brightest lamp or lamps.

[1]

(b) The diagram below shows four circuits.



(i) Give the letter of the circuit that has the brightest lamps.

[1]

(ii) What name is given to the type of circuit shown in diagram **Q**?

Underline the correct answer.

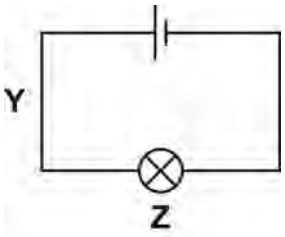
ring circuit **series circuit** **parallel circuit** **short circuit**

[1]

(c) **(i)** Draw the symbol for an ammeter.

[1]

(ii) A student uses an ammeter to measure current in the circuit shown below.



The current at **Y** is 0.2A.
What is the current at **Z**?

[1]

Mark Scheme for Question 10

Question No. 10

- Interpret and draw circuit diagrams and design simple series and parallel circuits
- Understand how the number and common types of component, including cells, affect current
- Measure current in circuits

Part	CF	Mark	Answer	Further Information
(a) (i)	Pc3	1	B	
(ii)	Pc4	1	A	
(b) (i)	Pc3	1	Q	
(ii)	Pc3	1	parallel circuit	ACCEPT if indicated in any other way. No mark if more than one answer underlined.
(c) (i)	Pc3	1	accept	
(ii)				
	Pc6	1	0.2A	Do not accept A with no circle
	Total	**6**		