GCSE

WJEC GCSE Integrated Science (Single Award)

Approved by Qualifications Wales

Sample Assessment Materials

Unit 2: Science in a Changing World
Foundation Tier

Teaching from 2026
For award from 2028



This Qualifications Wales regulated qualification is not available to centres in England.

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Ready for the world.

WJEC would like to thank the students and teachers of Fitzalan High School, Cardiff and Llanwern High School, Newport for their participation in the creation of these covers.

WJEC GCSE Integrated Science (Single Award)

Unit 2: Science in a Changing World

Foundation Tier

External Sample Assessment Materials

For teaching from September 2026

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Surname	Centre number	Candidate number
First name(s)		0

GCSE

3450U2

Integrated Science (Single Award)
Unit 2: Science in a Changing World

Foundation Tier

Time 1 hour 30 minutes

SAMPLE ASSESSMENT MATERIALS

Additional materials

A calculator and a ruler.

Instructions to candidates

Use black ink or black ball-point pen. Do not use gel pen. Do **not** use correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Write your answers in the spaces provided in this booklet. If you need more space, use the additional page(s) at the back of this booklet. Number the question(s) correctly

Answer **all** questions.

Write your answers in the spaces in this booklet.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**7**	
2.	**8**	
3.	**13**	
4.	**8**	
5.	**7**	
6.	**11**	
7.	**5**	
8.	**13**	
Total	**72**	

Information for candidates

The number of marks is given in brackets at the end of each question or part-question.

The total number of marks available is **72.**

You should think carefully about how you use your time.

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Equations

$kgCO_2eq$ = global warming potential × mass of gas	$kgCO_2eq = GWP \times m$
weight = mass × gravitational field strength	$W = mg$
wave speed = frequency × wavelength	$v = f\lambda$
density = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{V}$
resultant force = mass × acceleration	$F = ma$

SI multipliers

Prefix	Symbol	Conversion factor	Multiplier
milli	m	divide by 1000	1×10^{-3}
centi	c	divide by 100	1×10^{-2}
kilo	k	multiply by 1000	1×10^{3}
mega	M	multiply by 1 000 000	1×10^{6}

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Answer **all** questions.

Examiner only

1. Life-cycle assessments (LCA) are processes of evaluating the effects that a product has on the environment over the entire period of its life.

(a) The stages in an LCA are given below but are not all in the correct order.

1. Manufacturing process	2. Product used by consumer	3. Raw materials are collected / processed	4. Product reaches end of its useful life	5. Storage and distribution

Arrange the stages in the correct order by completing the list below. [2]

Two stages have been filled in for you.

3 → ..... → ..... → ..... → 4

(b) The table shows a life cycle assessment of using PVC or wood to make window frames of a certain size.

The data can be used to decide which option is better.

Factor	Wooden	PVC
Raw materials	Trees	Oil
Effect on wildlife	Large scale destruction of habitats	Disruption to habitats around drilling sites
Coal and oil used in production and/or painting	5.37 kg	18.23 kg
Units of phosphate washed into streams	67	1.6
Disposal of old windows	Can be chopped up and used as fuel	Difficult to recycle – non biodegradable
Density (kg/m^3)	150	60
Volume of material needed (m^3)	0.05	0.07

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(i) Use the data in the table.

Tick (✓) **two** reasons why it is more environmentally friendly to make window frames using wood. [2]

Unlimited supply of wood	☐
More phosphates are washed into streams	☐
Can be reused	☐
Does not affect wildlife	☐
Wood is denser than PVC	☐

(ii) Use the equation:

$$\text{mass} = \text{density} \times \text{volume}$$

to calculate the mass of wood used to make the wooden window frame. [3]

Mass = …… kg

7

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2. Telescopes and satellites gather information.

(a) Telescopes can be Earth-based or space-based.

Tick (✓) the **two** statements that are true about Earth based telescopes. [2]

Statement about Earth based telescopes	**True (✓)**
More expensive than space-based telescopes	
Produce clearer images than space-based telescopes	
Are affected by light pollution	
Suffer interference from the Earth's atmosphere	
Are launched into space by rockets	

(b) Satellites can be positioned in orbit to communicate with base stations on the ground. Messages can be sent around the world in this way.

The diagram shows base stations A, B, C and D and four satellites.

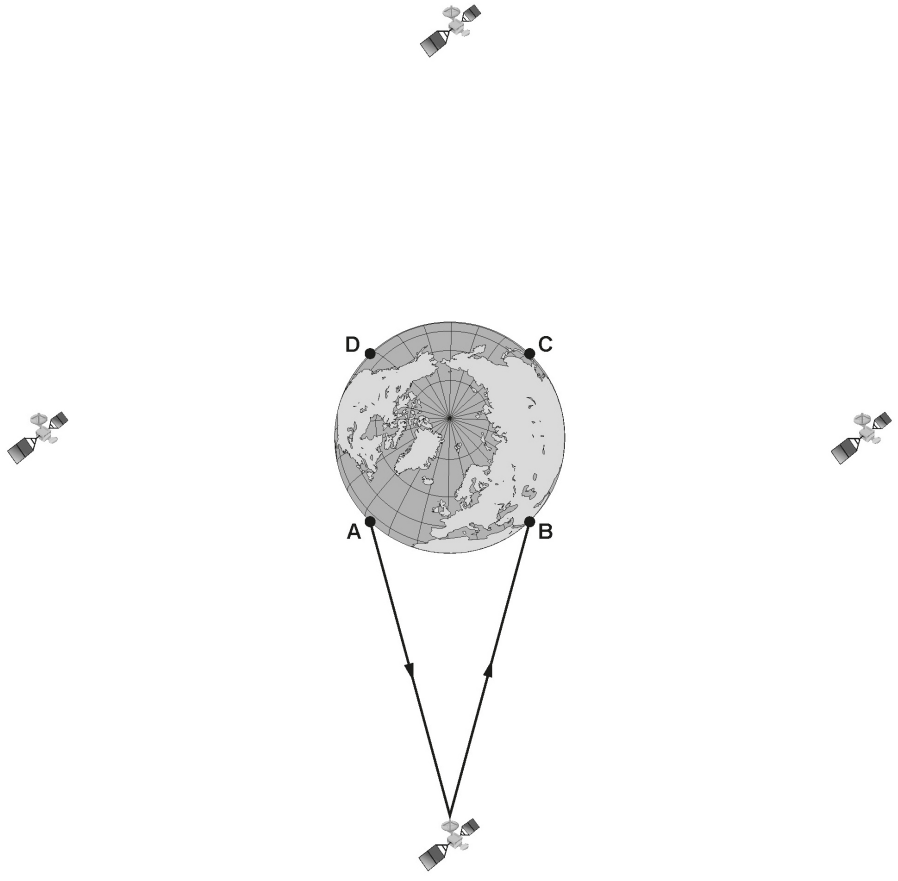

diagram not drawn to scale

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(i) The diagram shows the path of a signal sent from base station A to base station B.

Draw lines on the diagram above to **continue the path of the signal** so it is received at base station C. [2]

(ii) The distance from a base station to a satellite is 36 000 km.
Calculate the total distance travelled by the signal in going from A to C. [2]

Give your answer in km.

Total distance = …… km

(iii) Calculate the time taken by the signal to travel from A to C given that the time taken for it to travel from A to the first satellite is 0.12 s. [2]

Time = …… s

8

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3. The South Wales Joint Scientific Investigation Unit is a forensic police unit that analyses evidence from crime scenes. They use biological and chemical testing to identify individuals linked to crime scenes.

(a) DNA profiling is commonly used in criminal investigations.

Tick (✓) the boxes next to the **three** correct statements about DNA. [3]

DNA is found in the nucleus of a cell	☐
DNA controls the temperature of a cell	☐
One of the base pairs in DNA is A-T	☐
DNA has a triple-helix structure	☐
One of the base pairs in DNA is C-G	☐
DNA is made from chromosomes	☐

(b) Samples of DNA can be analysed to produce DNA profiles. These can be used to identify individuals in criminal investigations.

The image below shows a DNA profile taken from a crime scene along with the DNA profiles of three suspects.

They are shown in the image below.



(i) Analyse the image above.
Identify the suspect whose DNA was found at the crime scene. [1]

Suspect ……..

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(ii) Give a reason for your answer. [1]

Examiner only

……

……

(iii) Underline **one** use of DNA profiling in the box below. [1]

Predicting intelligence	Predicting future health	Identifying genetic conditions

(c) Forensic scientists analyse substances found at crime scenes.

Students used chemical tests to analyse an unknown powder.

To test for positive metal ions, the students dissolved some of the powder in water and added a few drops of sodium hydroxide (NaOH). They then added excess NaOH to see if the precipitate dissolved or not.

They noticed that a white precipitate was produced and that the precipitate did not dissolve in excess NaOH.

The students found the following table in their class notes.

Positive metal ions	NaOH solution	
	A few drops	Excess
		Soluble (✓ or ×)
Ca^{2+}	white precipitate	×
Zn^{2+}	white precipitate	✓
Pb^{2+}	white precipitate	✓
Mg^{2+}	white precipitate	×
Cu^{2+}	blue precipitate	×
Fe^{2+}	green precipitate	×
Ba^{2+}	no precipitate	

(i) State the symbols for the two positive metal ions that could be present in the powder. [2]

1. ……

2. ……

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The table below shows the results for the flame tests for a selection of positive metal ions.

Positive metal ions	Flame colour
Ca^{2+}	brick-red
Mg^{2+}	no colour
Cu^{2+}	blue-green
Ba^{2+}	apple green

(ii) Describe how a flame test is carried out. [1]

……

……

(iii) State how the results of a flame test could be used to confirm which positive metal ions are present in the powder in part (i). [1]

……

……

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Further tests were carried out on the powder to identify the negative ions present.

(iv) The powder was dissolved in a small amount of water and a few drops of aqueous silver nitrate were added. A white precipitate formed.

Negative ions	Observation
chloride (Cl^-)	white precipitate
iodide (I^-)	yellow precipitate
bromide (Br^-)	cream precipitate

Use the table above to identify the negative ions present in the powder. [1]

……..……

(v) Suggest possible names for the powder. [2]

1. ……..……

2. ……..……

13

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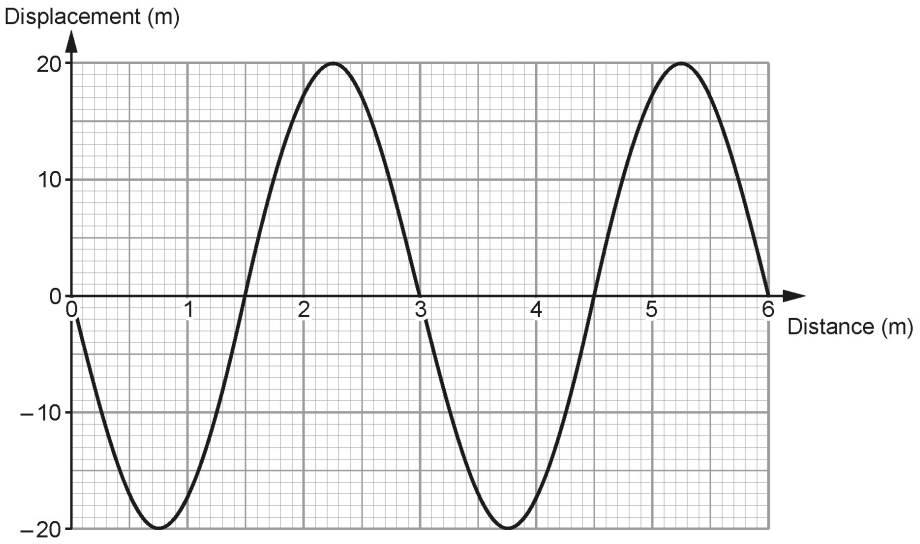
4. (a) Electromagnetic (em) waves are used in communications.

(i) An em wave diagram is shown below.



Use the following values and the information in the diagram to complete the table below. You may use each value once, more than once or not at all. [2]

3	5	6	10	20

Property	Value
Amplitude	…….m
Wavelength	…….m

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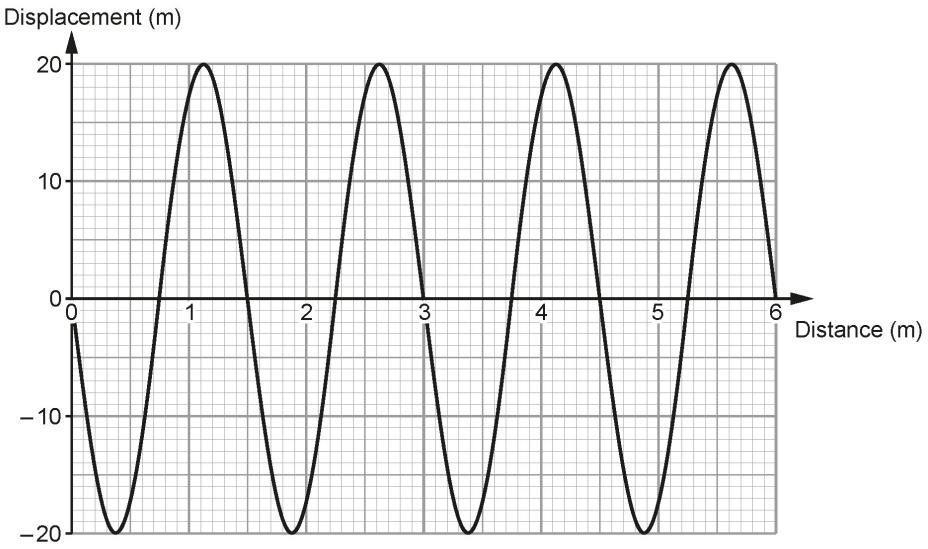
(ii) The speed of the wave remains constant but its **frequency is doubled**.

A student draws a diagram of the expected wave.

It is shown below.



Explain whether you agree with the student's diagram of the wave. [2]

……

……

……

……

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(b) The table below gives information about the frequency and wavelength of sound waves in different materials.

Material	Frequency (Hz)	Wavelength (m)
air	170	2
water	170	9
iron	170	29

Use the information in the table to answer the questions below.

(i) Use the equation:

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

to calculate the speed of sound waves in air. [2]

Wave speed = ……m/s

(ii) The sound wave travels from air into water.

Its frequency stays the same.

Without further calculation explain whether its speed increases, decreases or stays the same. [2]

…….

…….

…….

…….

8

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5. Red squirrel populations in Great Britain have decreased since the introduction of the grey squirrel in 1876. Grey squirrels are classified as invasive non-native species.

(a) The pictures below show some features of red and grey squirrels.





Use the information in the pictures and your own knowledge to suggest **three** reasons why the introduction of grey squirrels caused the number of red squirrels to decrease since 1876. [3]

1 ……..

……..

2 ……..

……..

3 ……..

……..

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(b) The Red Squirrel Trust Wales was set up to protect areas threatened by grey squirrels in North Wales.

One forest on Anglesey has an area of 244 hectares and the numbers of grey squirrels were controlled by trapping.

One method of estimating the number of squirrels involved counting the number of squirrel nests.

Before trapping, the mean number of red squirrel nests per hectare was 0.50 and the mean number of grey squirrel nests per hectare was 1.2

(i) Use the equation:

$$\text{number of red squirrels in the forest} = \text{mean number of nests per hectare} \times 0.26 \times 244$$

to calculate the number of red squirrels in the forest. [2]

Number of red squirrels = …….

(ii) The number of grey squirrels in the forest was found to be 217.

Calculate the difference in the numbers of red and grey squirrels in this forest before trapping. [1]

Difference in population = …….

(c) Grey squirrels were eradicated from Anglesey in 2013. Suggest why monitoring for grey squirrels continues on Anglesey. [1]

……

……

7

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6. Each process in the carbon cycle effects the amount of carbon dioxide in the atmosphere.

(a) Complete the table below by placing a tick (✓) in each row, to show the effect of each process on carbon dioxide in the atmosphere. [3]

One row has been completed for you.

Process	Effect on carbon dioxide in the atmosphere		
	Decreases	Stays the same	Increases
Microbe respiration			✓
Photosynthesis			
Plant respiration			
Combustion			

(b) Human activity has an effect on the carbon cycle.

Complete the sentence below about carbon footprint by underlining the correct word in the brackets. [1]

Carbon footprint is the total equivalent amount of carbon

(monoxide / dioxide / trioxide) generated by human activity**.**

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(c) One farmer produces beef and milk.

Another farmer produces poultry and eggs.

The table gives information about the carbon footprint of producing these different food products.

Food product	Carbon footprint ($kgCO_2eq$)
beef	13 000
poultry	4000
eggs	1000
milk	600

Calculate the difference in the carbon footprints of these farmers. [3]

Difference in carbon footprint = …….. $kgCO_2eq$

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(d) The table gives information about gases present in the atmosphere.

Gas	Global warming potential (over 100 years)
Carbon dioxide	1
Methane	28
Water vapour	0.001

Use the information in the table to answer the following questions.

(i) There is a debate whether methane should be burned or just released into the atmosphere.

When 16 kg of methane is burned, 44 kg of carbon dioxide is produced.

Dylan says we should burn methane to reduce the carbon footprint but Carys disagrees.

Use the equation:

$$kgCO_2eq = \text{global warming potential} \times \text{mass of gas}$$

And the information above to explain who you agree with. [3]

……

……

……

……

……

……

(ii) State **one** reason why the effect of water vapour in the atmosphere can be ignored. [1]

……

……

11

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7. The numbers of a species in a habitat can be investigated by using quadrats.

The results of an investigation into four different species of snail, A, B, C and D is shown below. The results were collected from two different habitats, X and Y.

Habitat X

Quadrat	Number of each species of snail			
	A	B	C	D
1	0	2	3	1
2	0	0	3	2
3	0	1	3	1

Habitat Y

Quadrat	Number of each species of snail			
	A	B	C	D
1	0	0	1	2
2	0	0	4	3
3	0	0	1	1

Use the results above to answer the following questions.

(a) Compare the distribution of snails of species **C** in both habitats. [2]

……

……

……

……

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(b) Habitat **Y** has an area equal to 15 quadrats.

Estimate the number of snails of species **D** you would expect to find in habitat **Y**. [2]

Number of snails = ……

(c) State **one** way the experiment could be improved so you have more confidence in your answer in (b). [1]

……

……

5

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8. The table below gives information about some of the planets in our Solar System.

Planet	Mean distance from Sun (AU)	Diameter (Mm)	Length of day (Earth days)	Length of year (Earth years)	Mean temperature (°C)	Content of atmosphere	Known moons	Rings
Mercury	0.4	5	59	0.2	427	None	0	no
Venus	0.7	12	243	0.6	480	carbon dioxide (96%), nitrogen (3.5%) thick clouds of sulfuric acid	0	no
Earth	1.0	13	1	1	14	nitrogen (77%), oxygen (21%)	1	no
Mars	1.5	7	1	2	-63	carbon dioxide (95%), argon	2	no
Jupiter	5.2	143	0.4	12	-130	hydrogen, helium	63	yes
Saturn	9.5	120	0.4	29	-130	Hydrogen, helium	61	yes
Neptune	30.0	50	0.7	165	-200	hydrogen, helium, methane	13	yes

Use the information in the table to answer the questions that follow.

(a) Name the planet not included in the table. [1]

……..

(b) (i) Name the planet closest in size to Earth. [1]

……..

(ii) Name the planet which has a year twice as long as a year on Earth. [1]

……..

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(c) (i) Describe how the temperature on a planet depends on the distance from the Sun. [1]

……..……..

……..……..

(ii) Give one reason why Venus does not follow this trend. [1]

……..……..

……..……..

(d) Ceres is a dwarf planet found in the asteroid belt:

(i) **Estimate** its temperature. [1]

…… °C

(ii) **Estimate** the length of its year. [1]

……. Earth years

(e) The Perseverance Rover was sent to Mars as part of its 2020 mission.

(i) Calculate the closest distance between Earth and Mars in AU. [1]

Closest distance = …….AU

(ii) Sunlight takes 8.3 minutes to travel from the Sun to Earth.

It takes 13 minutes to reach Mars.

Calculate the time taken for an electromagnetic wave to travel from the Perseverance Rover on Mars to reach Earth when they are closest together. [1]

Time = …… minutes

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(iii) A one-way trip to Mars from Earth would take nine months but a return journey would be around three years.

State **two** factors that need to be considered so human life is supported on a long journey in space. [2]

1. ……

2. ……

(iv) The gravitational field strength on Mars is 3.7 N/kg.

The mass of the Perseverance Rover on Earth is 1025 kg.

Use an equation from page 2 to calculate its weight on Mars. [2]

Weight = …… N

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END OF PAPER

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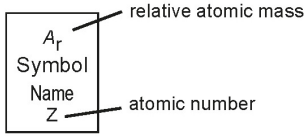
THE PERIODIC TABLE

1	2	Group										3	4	5	6	7	0
							1 H Hydrogen 1										4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	63.5 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
86 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	99 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	179 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86
223 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															

Key



Question number	Additional page, if required. Write the question number(s) in the left-hand margin.
	…… ……

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INTEGRATED SCIENCE (SINGLE AWARD)

UNIT 2: SCIENCE IN A CHANGING WORLD

Foundation Tier

MARK SCHEME

Guidance for examiners

Generic marking principles

- Marks awarded are always whole marks (not half marks, or other fractions).
- Answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.
- Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
- Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Positive marking

It should be remembered that candidates are writing under examination conditions and credit should be given for what the candidate writes, rather than adopting the approach of penalising candidates for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.

For questions that are objective or points-based, the mark scheme should be applied precisely. Marks should be awarded as indicated and no further subdivision made.

Mark schemes often list points which may be included in candidates' answers. The list is not exhaustive. The inclusion of *'Credit any other valid response.*' (or similar instruction) within mark schemes allows for the possible variation in candidates' responses. Credit should be given according to the accuracy and relevance of candidates' answers.

Appropriate terminology is reflected in exemplar responses in mark schemes. However, unless there is a specific requirement within a question, candidates may be awarded marks where the answer is accurate but expressed in their own words.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

ecf = error carried forward
bod = benefit of doubt

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Enquiry
1.	(a)		[3→] **1** → **5** → **2** [→ 4] All correct (2) One correct (1)	2			2		
	(b)	(i)	**Ticks 2 × (1):** Unlimited supply of wood Can be reused		2		2		
		(ii)	Density = 150 (1) selected × 0.05 (1) select and sub = 7.5 [kg] (1)		3		3	2	
			Question 1 total	**2**	**5**	**0**	**7**	**2**	**0**

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Enquiry
2.	(a)		Are affected by light pollution (1) Suffer interference from the Earth's atmosphere (1)	2			2		
	(b)	(i)	Straight line from B to right hand satellite (1) Straight line from right hand satellite to C (1)		2		2		
		(ii)	36 000 × 4 (1) = 144 000 km (1)		2		2	2	
	(iii)		0.12 × 4 (ecf) (1) = 0.48 [s] (1)		2		2	2	
			Question 2 total	**2**	**6**	**0**	**8**	**4**	**0**

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Enquiry
3.	(a)		Ticks in boxes 1, 3 and 5 DNA is found in the nucleus of a cell One of the base pairs in DNA is A-T One of the base pairs in DNA is C-G	3			3		
	(b)	(i)	Suspect 2			1	1		
		(ii)	DNA of suspect 2 *does* match the crime scene		1		1		
		(iii)	Identifying genetic conditions	1			1		
	(c)	(i)	Ca^{2+} (1) Mg^{2+} (1)			2	2		2
		(ii)	Place powder in blue flame and observe colour	1			1		
		(iii)	If brick-red Ca^{2+} OR if no colour Mg^{2+}			1	1		1
		(iv)	chloride			1	1		1
		(v)	calcium chloride (1) magnesium chloride (1) ecf possible from parts (i) and (v)			2	2		2
			Question 3 total	**5**	**1**	**7**	**13**	**0**	**6**

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<table>
<tr><th colspan="3" rowspan="2">Question</th><th rowspan="2">Marking details</th><th colspan="6">Marks Available</th></tr>
<tr><th>AO1</th><th>AO2</th><th>AO3</th><th>Total</th><th>Maths</th><th>Enquiry</th></tr>
<tr><td>4.</td><td>(a)</td><td>(i)</td><td><table><tr><th>Property</th><th>Value</th></tr><tr><td>Amplitude</td><td>20 [m] (1)</td></tr><tr><td>Wavelength</td><td>3 [m] (1)</td></tr></table></td><td></td><td>2</td><td></td><td>2</td><td></td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>The amplitude hasn’t changed (1)
The wavelength has halved / there are twice as many waves (1) so agree with the student.</td><td></td><td></td><td>2</td><td>2</td><td></td><td></td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>Wave speed = 170 × 2 (1) select and subs
= 340 [m/s] (1)</td><td></td><td>2</td><td></td><td>2</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Wavelength increases (1)
So wave speed increases (1)
Accept: wavelength and wave speed are (directly) proportional for (2)</td><td></td><td>2</td><td></td><td>2</td><td></td><td></td></tr>
<tr><td colspan="4">Question 4 total</td><td>0</td><td>6</td><td>2</td><td>8</td><td>2</td><td>0</td></tr>
</table>

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Enquiry
5.	(a)			**Any 3 × (1) from:** They are smaller (1) Less successful at competing for food / water (1) Less successful at nesting / habitats / shelter (1) More predation (1) Spread of disease (1) Poorer camouflage (1)		3		3		
	(b)	(i)		Number of red squirrels = 0.50 × 0.26 × 244 (1) selection and substitution = 31 (1)		2		2	2	
		(ii)		Difference 217 – 31 (ecf) = 186		1		1	1	
	(c)			To prevent grey squirrels re-establishing on the island/ be able to respond quickly if grey squirrels are detected/ owtte	1			1		
				Question 5 total	**1**	**6**	**0**	**7**	**3**	**0**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Enquiry
6.	(a)			Photosynthesis → tick decreases (1) Plant respiration → tick increases (1) Combustion → tick increases (1)	3			3		
	(b)			dioxide	1			1		
	(c)			Cattle farmer: 13 000 + 600 = 13 600 (1) Poultry farmer: 4000 + 1000 = 5000 (1) Difference = 13 600 – 5000 = 8 600 [kgCO_2eq] (1)		3		3		
	(d)	(i)		CO_2eq of 44 g of carbon dioxide over 100 y = 44 × 1 = 44 (1) CO_2eq of 16 g of methane over 100 y = 16 × 28 (1) = 448 [g] (1) so Dylan is correct			3	3	2	
		(ii)		The GWP of water vapour is very small			1	1		
				Question 6 total	**4**	**3**	**4**	**11**	**2**	**0**

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Question		Marking details	Marks Available					
			AO1	AO2	AO3	Total	Maths	Enquiry
7.	(a)	More common in X (1) and evenly distributed in habitat X (1) OWTTE		2		2		2
	(b)	Mean of 2 per quadrat (1) 15 × 2 = 30 (1)		2		2	1	2
	(c)	Take more quadrat samples			1	1		1
		Question 7 total	**0**	**4**	**1**	**5**	**1**	**5**

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Enquiry
8.	(a)	Uranus		1			1		
	(b)	(i)	Venus			1	1		
		(ii)	Mars			1	1		
	(c)	(i)	As distance increases, temperature decreases		1		1		
		(ii)	Highest % of carbon dioxide in the atmosphere		1		1		
	(d)	(i)	Between -64 and -129 [°C]			1	1		
		(ii)	Between 3 and 11 [Earth years]			1	1		
	(e)	(i)	0.5 [AU]		1		1		
		(ii)	4.7 [minutes]		1		1	1	
		(iii)	**Any 2 × (1) from:** Food supply (1) Oxygen supply (1) Water supply (1) Effect of low gravity (1)	2			2		
		(iv)	1025 × 3.7 (1) subs = 3792.5 [N] (1)	1	1		2	2	
Question 8 total				**4**	**5**	**4**	**13**	**3**	**0**

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FOUNDATION TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	Enquiry
1	2	5	0	7	2	0
2	2	6	0	8	4	0
3	5	1	7	13	0	6
4	0	6	2	8	2	0
5	1	6	0	7	3	0
6	4	3	4	11	2	0
7	0	4	1	5	1	5
8	4	5	4	13	3	0
TOTAL	**18**	**36**	**18**	**72**	**17**	**11**

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