Science 9–10

End-of-band review and solutions

Aboriginal and Torres Strait Islander content has been excluded as accuracy cannot be guaranteed, and it is better to be respectful than cover the entire curriculum inaccurately.

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Solutions — Section A — Multiple choice

End-of-band review — Science 9–10 (Levels 9 and 10): solutions and marking guide

Solutions and marking guide for the end-of-band review paper · Chapters 1–16 · all 29 content description codes · Chapter 17 booklet

> **Total: 100 marks** · Section A (multiple choice): 30 marks · Section B (short/structured response): 50 marks · Section C (extended response): 20 marks
>
> **25 of the 100 marks are science inquiry marks** (codes `VC2S10I01` to `VC2S10I08`).
>
> **Planned for about 120 minutes. This paper is untimed — there is no time to beat.** A scientific calculator is permitted.
>
> This is a school-designed paper. It is not a VCAA instrument. Achievement at Levels 9 and 10 is reported against the Victorian Curriculum achievement standard on teacher judgement; the marks here are one source of evidence towards that judgement.

Conditions

- Completion is **untimed**. The 120 minutes is planning guidance only; take as long as you need.
- **Reading support** is permitted. Your teacher may read any question out to you if you need it. Reading is not what is being looked at, and your teacher will not help with the answer.
- A **scientific calculator is permitted**. Any formula you need is stated or asked for in the question itself.
- Answer every question. For multiple-choice questions, circle the letter of the best answer. There is only one best answer for each question.

Strand weighting of the 100 marks — published here, as planned, so teachers can see the balance:

Strand	Marks
Science as a human endeavour	10
Science inquiry	25
Biological sciences	17
Chemical sciences	16
Earth and space sciences	16
Physical sciences	16
Total	**100**

Section A carries at least one item from each of the 11 strands of the Levels 9 and 10 curriculum:

Strand	Section A items
Nature and development of science	Q1, Q2
Use and influence of science	Q3
Questioning and predicting	Q4, Q5
Planning and conducting	Q6, Q7, Q8
Processing, modelling and analysing	Q9, Q10
Evaluating	Q11, Q12
Communicating	Q13
Biological sciences	Q14–Q18
Chemical sciences	Q19–Q22
Earth and space sciences	Q23–Q27
Physical sciences	Q28–Q30

This guide is written for a teacher marker — no specialist science background beyond Chapters 1–16 of this book is needed. Award a mark when the student's answer matches an acceptable response below or says the same idea in other words. Do not award half marks. The marks are a record that evidence was seen; they are not used to rank students. The Scientific Investigation Tasks (SIT-1 and SIT-2) carry their own marking guides in the SIT booklets and are not covered here.

Answers — Section A

Q	Answer	Code	Source
Q1	**C**	VC2S10H01	bank item VC2S10H01.E07 .S01.D1.V01
Q2	**A**	VC2S10H02	bank item VC2S10H02.E01 .S01.D1.V01
Q3	**D**	VC2S10H04	bank item VC2S10H04.E01 .S01.D3.V01
Q4	**B**	VC2S10I01	bank item VC2S10I01.E01 .S01.D1.V01
Q5	**C**	VC2S10I01	bank item VC2S10I01.E02 .S01.D2.V01
Q6	**A**	VC2S10I02	bank item VC2S10I02.E01 .S01.D2.V01
Q7	**D**	VC2S10I03	bank item VC2S10I03.E01 .S01.D2.V01
Q8	**B**	VC2S10I03	bank item VC2S10I03.E02 .S01.D2.V01
Q9	**C**	VC2S10I04	bank item VC2S10I04.E02 .S01.D3.V01
Q10	**A**	VC2S10I05	bank item VC2S10I05.E02 .S01.D1.V01
Q11	**B**	VC2S10I06	bank item VC2S10I06.E01 .S01.D3.V01
Q12	**D**	VC2S10I07	bank item VC2S10I07.E01 .S01.D2.V01
Q13	**C**	VC2S10I08	bank item VC2S10I08.E02 .S01.D2.V01
Q14	**A**	VC2S10U01	bank item VC2S10U01.E01 .S01.D3.V01
Q15	**D**	VC2S10U03	bank item VC2S10U03.E01 .S01.D2.V01
Q16	**B**	VC2S10U04	bank item VC2S10U04.E01 .S01.D3.V01
Q17	**C**	VC2S10U04	bank item

Q	Answer	Code	Source
			VC2S10U04.E02 .S01.D3.V01
Q18	**A**	VC2S10U05	bank item VC2S10U05.E01 .S01.D3.V01
Q19	**B**	VC2S10U06	bank item VC2S10U06.E02 .S01.D3.V01
Q20	**D**	VC2S10U07	bank item VC2S10U07.E02 .S01.D2.V01
Q21	**A**	VC2S10U08	bank item VC2S10U08.E02 .S01.D3.V01
Q22	**C**	VC2S10U09	bank item VC2S10U09.E02 .S01.D1.V01
Q23	**B**	VC2S10U10	bank item VC2S10U10.E02 .S01.D3.V01
Q24	**D**	VC2S10U11	bank item VC2S10U11.E02 .S01.D1.V01
Q25	**A**	VC2S10U12	bank item VC2S10U12.E02 .S01.D1.V01
Q26	**B**	VC2S10U13	bank item VC2S10U13.E02 .S01.D1.V01
Q27	**C**	VC2S10U10	bank item VC2S10U10.E01 .S01.D1.V01
Q28	**D**	VC2S10U14	authored for this paper
Q29	**A**	VC2S10U15	authored for this paper
Q30	**C**	VC2S10U17	authored for this paper

Q1 to Q27 are drawn from the MCQ bank under the codes assessed on this paper. None duplicates the 111 bank items already used on topic tests 1 to 7, and no item sits on an elaboration the book does not deliver. Items are printed with their stem and options word for word; only the positions of the options have changed for this paper, so that the correct answers are spread across A, B, C and D (the printed positions are A × 8, B × 7, C × 8, D × 7). The banked items mix easy (D1) × 9, medium (D2) × 8 and hard (D3) × 10 bank difficulties.

Q28 to Q30 are authored fresh for this paper rather than drawn from the bank, and are flagged as such in the table above. The CSV bank slice for VC2S10U14, VC2S10U15 and VC2S10U16 is fully used by topic test 6, and the remaining unused VC2S10U17 items all sit on elaboration VC2S10U17.E02, which the book does not deliver. The three items are written here in the same style and at the same difficulty as the banked items around them, so that the physical sciences still appear in Section A as planned.

Items as printed, with reasons

Each item is printed as it appears on the paper, with the correct option in bold and a short reason beneath.

Q1 *(1 mark · VC2S10H01)* Which feature is characteristic of a scientific claim rather than a pseudoscientific one?

A. It uses technical-sounding vocabulary B. It has been believed by many people for a long time **C. It can be tested in a way that could show it to be false** D. It cannot be disproved by any observation

C — a scientific claim is testable: it can be checked in a way that could show it to be false. Technical-sounding words, long belief and immunity to disproof are not tests of a claim — the last of them is a mark of pseudoscience, not science.

Q2 *(1 mark · VC2S10H02)* Which scientific understanding does the cochlear implant, pioneered by Professor Graeme Clark, apply?

A. That the auditory nerve can be stimulated electrically to produce the sensation of sound B. That damaged eardrums can be regrown from cultured tissue C. That bone conducts sound more efficiently than air does D. That the brain can be trained to interpret vibrations felt on the skin as speech

A — the cochlear implant applies the understanding that the auditory nerve can be stimulated electrically to produce the sensation of sound; the device bypasses the damaged parts of the ear. The other statements are not the understanding the implant is built on.

Q3 *(1 mark · VC2S10H04)* How does societal value-setting influence what gets researched?

A. Researchers choose topics entirely independently of societal concerns B. Only personal curiosity of individual scientists determines research direction C. Research priorities are unaffected by economic or political factors **D. Funding and regulatory priorities reflect what governments and society value**

D — what gets researched is shaped by funding and regulatory priorities, and those priorities reflect what governments and society value. The other options describe research as untouched by society, which is not how priorities are set.

Q4 *(1 mark · VC2S10I01)* Which is the best *investigable* question?

A. Why is exercise good? **B. How does exercise intensity affect heart rate?** C. Is exercising fun? D. Do hearts beat?

B — the question names a variable that can be changed (exercise intensity) and a result that can be measured (heart rate). "Good" and "fun" are opinions, and "Do hearts beat?" has a fixed yes/no answer, so none of the others can be investigated.

Q5 *(1 mark · VC2S10I01)* Hypothesis: 'As speed doubles, impact energy quadruples.' This is based on:

A. A linear relationship where energy doubles when speed doubles B. Energy being independent of an object's speed **C. KE = ½ mv² — quadratic in v** D. Mass being the only factor that affects kinetic energy

C — kinetic energy is KE = ½ mv², which is quadratic in speed: doubling v multiplies the energy by four. A linear relationship would only double the energy, and mass is not the only factor.

Q6 *(1 mark · VC2S10I02)* Why must research with animals be approved by an ethics committee?

A. To weigh benefits against welfare and ensure justified use B. To guarantee the research will produce publishable findings C. To protect the commercial intellectual property of the researcher D. To select which scientific journal will publish the results

A — an ethics committee weighs the expected benefits of the research against animal welfare, so that any use of animals is justified. It does not guarantee results, protect intellectual property or choose journals.

Q7 *(1 mark · VC2S10I03)* Why must a balance be re-zeroed after moving it?

A. Moving uses up the battery so the display needs resetting B. The balance must warm up again before any reading C. Re-zeroing changes the unit of measurement displayed **D. Movement can disturb its baseline, affecting accuracy**

D — moving an instrument can disturb its zero baseline, so the balance is re-zeroed before use to keep readings accurate. The other options describe things re-zeroing does not do.

Q8 *(1 mark · VC2S10I03)* Sampling 1 m² in a forest may *not* be representative because:

A. A single 1 m² quadrat is always representative of the whole forest **B. Plant distribution is spatially variable; larger or multiple samples are needed** C. 1 m² is too large an area to count plants accurately D. Forests have uniform plant distribution at every location

B — plants are not spread evenly through a forest, so one small quadrat can miss the pattern; larger or multiple samples are needed to represent the whole area. The other options assume a uniformity that is not there.

Q9 *(1 mark · VC2S10I04)* Why might the *median* be more representative than the *mean* for skewed data?

A. The median and mean are always equal for any dataset B. The mean is always more accurate than the median **C. The median is less affected by extreme outliers** D. The median uses all values while the mean ignores outliers

C — the median is the middle value, so a few extreme outliers cannot drag it the way they drag the mean. The other options misstate how the two measures behave.

Q10 *(1 mark · VC2S10I05)* Plotting the *same* data on a linear vs logarithmic y-axis can:

A. Highlight different features (e.g. linear growth vs exponential trend) B. Change the underlying data values themselves C. Always make trends easier to see on a log scale D. Only be valid if the data is negative

A — the same data can show different features on different scales — for example, steady growth reads as a straight line on a log scale. The data values do not change, and no one scale is always better.

Q11 *(1 mark · VC2S10I06)* Why does extrapolating outside the tested range weaken a conclusion?

A. It strengthens conclusions by extending the trend **B. Behaviour may differ outside the observed range** C. It only matters for non-linear relationships D. It violates the laws of mathematics

B — a trend is only established within the range actually measured; beyond that range the behaviour may differ, so conclusions are weaker there. It is not a mathematical error — it is a claim without data behind it.

Q12 *(1 mark · VC2S10I07)* To check a media claim about a scientific finding, the *best* next step is:

A. Accept the headline as accurate B. Judge the claim by the author's fame C. Search social media for popular opinions **D. Find the original peer-reviewed publication**

D — the check is to find the original peer-reviewed publication and see what it actually says and how it was done. Headlines, fame and popularity are not checks on a claim.

Q13 *(1 mark · VC2S10I08)* An infographic on F = ma should visually show:

A. A full mathematical derivation of the equation B. A timeline of Isaac Newton's life **C. How force, mass and acceleration are related** D. Only the SI units used in the formula

C — an infographic for a general audience should show how the three quantities are related; a full derivation or a list of units works against the purpose of the format.

Q14 *(1 mark · VC2S10U01)* Why is fertilisation followed by uterine implantation in mammals?

A. Uterus provides supportive environment for embryo development B. The uterus is where ova are produced and stored C. Implantation occurs inside the ovary, not the uterus D. The embryo can develop without any maternal support

A — the embryo implants in the uterus because the uterus provides the supportive environment the embryo needs to develop. Ova are produced in the ovaries, and mammalian embryos cannot develop without maternal support.

Q15 *(1 mark · VC2S10U03)* Influenza is caused by a:

A. Bacterium B. Protozoan C. Worm **D. Virus**

D — influenza is caused by a virus. Antibiotics treat bacterial infections and do nothing against viruses, which is one reason the distinction matters.

Q16 *(1 mark · VC2S10U04)* Why does the same gene in different people produce different traits?

A. Genes are identical in everyone; only the environment changes the trait **B. People carry different alleles (variants) of the gene** C. Each person has a unique gene with no shared version in others D. Genes have no influence on observable traits

B — people carry different alleles — different variants — of the same gene, and the variant a person carries shapes the trait. The gene itself is shared; it is not unique to each person.

Q17 *(1 mark · VC2S10U04)* Why do offspring resemble but *differ* from their parents?

A. Offspring are exact genetic copies of one parent B. Offspring inherit all their genes only from the mother **C. They inherit half their DNA from each parent, and recombination produces novel combinations** D. All siblings share identical genomes with each other and with their parents

C — offspring inherit half their DNA from each parent, and recombination in meiosis produces novel combinations, which is why children resemble their parents yet differ from them and from their siblings.

Q18 *(1 mark · VC2S10U05)* Why is geographic *isolation* often a precursor to speciation?

A. It prevents gene flow, allowing populations to diverge B. It directly increases the mutation rate in all individuals C. It forces all individuals to develop identical traits D. It immediately produces genetically identical offspring

A — when a barrier splits a population, gene flow between the two groups stops, and each population diverges under its own conditions until the groups can become separate species. Isolation does not raise mutation rates or make individuals identical.

Q19 *(1 mark · VC2S10U06)* Why do isotopes of the same element have similar chemical behaviour?

A. They have identical numbers of neutrons **B. Same electron configuration drives chemistry** C. They have identical atomic masses D. Neutrons determine chemical reactions

B — chemical behaviour is driven by the electron configuration, and isotopes of the one element have the same number of electrons. Isotopes differ in neutron number, so their masses differ too.

Q20 *(1 mark · VC2S10U07)* Group 7 (halogens) reactivity trend going *down* the group:

A. Increases B. Stays constant C. First increases, then decreases **D. Decreases**

D — halogen reactivity decreases down the group: the outer shell is further from the nucleus, so attracting an extra electron becomes harder. (This is the opposite trend to the alkali metals of Group 1.)

Q21 *(1 mark · VC2S10U08)* Why must atoms be conserved across a chemical reaction?

A. Atoms aren't created or destroyed in chemical reactions B. Atoms gain mass when bonds break C. New atoms form when reactants combine D. Atoms split into smaller particles during reactions

A — in a chemical reaction atoms are rearranged, not created or destroyed, so the same atoms — and the same total mass — appear in the products. That is the Law of Conservation of Mass.

Q22 *(1 mark · VC2S10U09)* Predict the product of $Mg + O_2$ (excess) →

A. Mg_2O B. MgO_3 **C. MgO** D. Mg

C — magnesium reacts with oxygen to form magnesium oxide, MgO. The product is a compound, so D is ruled out, and the formula must match the usual charges of the two elements.

Q23 *(1 mark · VC2S10U10)* Why does deforestation increase atmospheric CO_2?

A. Trees only absorb CO_2 at night, so removing them has minimal effect **B. Less photosynthetic carbon uptake and burned/decomposed biomass releases stored carbon** C. Soil microbes stop respiring once trees are removed, releasing CO_2 D. Cleared land reflects more sunlight, which directly produces CO_2

B — deforestation works both ways: fewer trees means less carbon taken up by photosynthesis, and the burned or decomposed biomass releases the carbon it had stored.

Q24 *(1 mark · VC2S10U11)* Which of these is a recognised indicator of climate change?

A. A single hot summer in one country B. Daily fluctuations in local weather forecasts C. Short-term changes in cloud cover from day to day **D. Rising global average sea level over decades**

D — climate is what happens over decades, so a recognised indicator is a long, global trend — rising global average sea level over decades. Single seasons, daily forecasts and day-to-day cloud are weather, not climate.

Q25 *(1 mark · VC2S10U12)* A rocket moves forward because:

A. Expelled exhaust exerts an equal and opposite reaction on the rocket (Newton's 3rd law) B. The exhaust gases push against the surrounding air C. Burning fuel reduces the rocket's mass, so gravity pulls it upward D. Hot gases rise and carry the rocket up with them

A — the rocket pushes exhaust backwards and the exhaust exerts an equal and opposite reaction on the rocket — Newton's third law. A rocket does not need air to push against, which is why it works in space.

Q26 *(1 mark · VC2S10U13)* Radio telescopes collect:

A. Visible light only **B. Radio waves emitted by astronomical objects** C. Sound D. X-rays only

B — radio telescopes collect radio waves emitted by astronomical objects. Sound cannot travel through space, and visible light and X-rays are collected by other instruments.

Q27 *(1 mark · VC2S10U10)* The four Earth systems are:

A. Mountains, oceans, deserts, ice B. Plants, animals, fungi, bacteria **C. Atmosphere, hydrosphere, lithosphere, biosphere** D. Sun, Moon, Earth, Mars

C — Earth's four interrelated systems are the atmosphere (air), hydrosphere (water), lithosphere (rock and soil) and biosphere (living things). The other lists are parts of systems, or objects in space.

Q28 *(1 mark · VC2S10U14 — authored for this paper)* Sound cannot travel through a vacuum, but light from the Sun reaches the Earth through space. Which statement best explains this?

A. Sound is an electromagnetic wave and light is a mechanical wave B. Space is too cold for sound waves to travel C. Sound travels too slowly to move through empty space **D. Sound needs a material medium to transfer energy; light is an electromagnetic wave and can travel through a vacuum**

D — sound is a mechanical wave: it transfers energy through the vibrations of particles, so it needs a material medium. Light is an electromagnetic wave and can travel through a vacuum. A is the distinction reversed; B and C are not correct explanations.

Q29 *(1 mark · VC2S10U15 — authored for this paper)* An appliance takes in 60 J of electrical energy and transfers 15 J as useful light; the rest is dissipated to the surroundings. What is its efficiency?

A. 25% B. 20% C. 40% D. 75%

A — efficiency = useful output ÷ total input = 15 ÷ 60 = 0.25 = 25%. The remaining 75% is dissipated, mainly as heat.

Q30 *(1 mark · VC2S10U17 — authored for this paper)* A 2.0-kilogram trolley has an acceleration of 3.0 m/s^2. What is the net force acting on it?

A. 1.5 N B. 5.0 N **C. 6.0 N** D. 9.0 N

C — from Newton's second law, F = ma: net force = 2.0 kg × 3.0 m/s² = 6.0 N. A comes from dividing instead of multiplying; B and D misapply the relationship.

Solutions — Section B — Short/structured response

Each question is restated below as it appears on the paper, followed by its marking points. Award a mark when the student's answer matches an acceptable response or says the same idea in other words. Do not award half marks. Working shown earns the mark as long as the correct value follows from it.

Q31 *(4 marks · VC2S10U02)* During sport on a hot Victorian afternoon the air temperature is about 37 °C. A student's body temperature rises slightly above its set point. Blood vessels near the skin widen and sweating increases, and the body temperature returns towards normal.

(a) Name the process by which the body keeps its internal environment stable. *(1 mark)*

(b) In this example, identify the stimulus and one response. *(2 marks)*

(c) Explain why this is an example of negative feedback. *(1 mark)*

Solution

(a) homeostasis. *1 mark*

(b) stimulus: the rise in body temperature above the set point. *1 mark* Response, any one: blood vessels near the skin widen; sweating increases. *1 mark* The stimulus and the response must both be named and must match the example given.

(c) the response reverses the change that started it — the body is cooled back towards its set point, rather than pushed further away from it. *1 mark*

Marker note: this is the negative-feedback limb of `VC2S10U02`, taught in subtopic 8B; the nervous and endocrine systems are the coordinators, but naming them is not required for the marks here.

Q32 *(5 marks · VC2S10U04)* Cystic fibrosis is an inherited condition caused by a recessive allele. Two parents who do not have cystic fibrosis are both carriers: each has one normal allele (F) and one cystic fibrosis allele (f).

(a) What is an allele? *(1 mark)*

(b) Complete a Punnett square for these parents, showing the gametes. *(2 marks)*

(c) State the expected genotype ratio and the expected phenotype ratio for their children. *(1 mark)*

(d) Explain how two parents who do not have cystic fibrosis can have a child who does. *(1 mark)*

Solution

(a) a version (form) of a gene. *1 mark*

(b) *2 marks* — 1 mark for the correct gametes (F and f along each side); 1 mark for all four inner squares correct:

	F	**f**
F	FF	Ff
f	Ff	ff

(c) genotype: 1 FF : 2 Ff : 1 ff; phenotype: 3 without cystic fibrosis : 1 with cystic fibrosis (accept "a 25% chance for each child"). *1 mark* Both ratios are needed for the mark.

(d) both parents carry one copy of the recessive allele without showing the condition; a child who inherits the recessive allele from both parents (ff) has cystic fibrosis. *1 mark*

Marker note: monohybrid crosses are the ceiling for prediction at this band; this is a single-gene, dominant–recessive cross as taught in subtopic 7C.

Q33 *(3 marks · VC2S10U05)* Australia began to separate from Antarctica about 95 million years ago and drifted north as an island continent. Most of Australia's native land mammals — kangaroos, koalas, wombats and possums — are marsupials, while on most other continents placental mammals are the dominant group.

Source: J. J. Veevers and S. L. Eittreim, "Reconstruction of Antarctica and Australia at breakup (95 ± 5 Ma) and before rifting (160 Ma)", Australian Journal of Earth Sciences, vol. 35, 1988. https://doi.org/10.1080/08120098808729453 — retrieved 2026-08-21.

(a) State one way the fossil record provides evidence for evolution. *(1 mark)*

(b) Use the idea of isolation to explain why marsupials are the dominant native land mammals in Australia. *(1 mark)*

(c) What does this pattern suggest about the relatedness of marsupials and placental mammals? *(1 mark)*

Solution

(a) any one of: older rock layers contain different, simpler organisms than younger layers; organisms in the record change over time; transitional forms link older and younger groups. *1 mark*

(b) after Australia separated, its mammals were isolated from those on other continents and evolved independently — marsupials diversified into the roles that placental mammals fill elsewhere. *1 mark* The idea of a separated population changing on its own must be there.

(c) they share a common ancestor; the two lines diverged after their populations were isolated from each other. *1 mark*

Q34 *(4 marks · VC2S10U06)* Carbon-12 and carbon-14 are two forms of the element carbon. Atoms of carbon-14 are unstable; over time they decay and become stable atoms of a different element.

(a) Complete the table. *(2 marks)*

Atom	Protons	Neutrons
carbon-12		
carbon-14		

(b) What term describes atoms of the same element that contain different numbers of neutrons? *(1 mark)*

(c) In words, describe what happens to a carbon-14 atom when it decays. *(1 mark)*

Solution

(a) carbon-12: 6 protons and 6 neutrons; carbon-14: 6 protons and 8 neutrons. *2 marks* (1 mark per correct row; the proton number must be 6 in both rows because both atoms are carbon).

(b) isotopes. *1 mark*

(c) an unstable carbon-14 atom changes into a stable atom of a different element. *1 mark* Accept any wording that carries both the change and the resulting stability.

Marker note: at this band radioactive decay is treated in words; no nuclear equations are required.

Q35 *(3 marks · VC2S10U07)* The periodic table arranges the elements in order of increasing atomic number, in rows and columns.

(a) What do elements in the same column (group) have in common? *(1 mark)*

(b) The reactivity of Group 1 elements (the alkali metals) increases down the group. Explain this trend in terms of the outer electron. *(1 mark)*

(c) State where metals and non-metals are found in the periodic table. *(1 mark)*

Solution

(a) they have the same number of electrons in their outer shell, so they have similar properties and react in similar ways. *1 mark*

(b) down the group, the outer electron is further from the nucleus and is lost more easily, so the element reacts more readily. *1 mark* The link between distance from the nucleus and ease of loss must be there.

(c) metals are on the left and in the middle; non-metals are on the right. *1 mark*

Marker note: Q20 in Section A covers the matching trend for Group 7 (halogens), where reactivity decreases down the group.

Q36 *(5 marks · VC2S10U08 and VC2S10U09)* A student burns 6.0 g of magnesium ribbon in air. The magnesium reacts completely with 4.0 g of oxygen to form magnesium oxide as the only product. The word equation is:

magnesium + oxygen → magnesium oxide

Safety: burning magnesium gives a very bright light — never look directly at it. Use tongs to hold the ribbon and let the product cool before handling it.

(a) Write the balanced chemical equation for this reaction. *(2 marks)*

(b) Use the Law of Conservation of Mass to find the mass of magnesium oxide produced. Show your working. *(1 mark)*

(c) The reaction gives out heat and bright light. Classify it as exothermic or endothermic and give the reason. *(1 mark)*

(d) State one factor that would increase the rate of a chemical reaction and explain it in terms of particles. *(1 mark)*

Solution

(a) 1 mark for the correct formulas ($Mg + O_2 \rightarrow MgO$); 1 mark for the balanced equation: $2Mg + O_2 \rightarrow 2MgO$.

(b) 6.0 g + 4.0 g = 10.0 g of magnesium oxide. *1 mark* Atoms are rearranged, not created or destroyed, so the total mass of the products equals the total mass of the reactants.

(c) exothermic — the reaction transfers energy out to the surroundings (heat and light are given out). *1 mark* Classification and reason both needed.

(d) any one factor with its matching particle explanation: raise the temperature — particles move faster, so collisions are more frequent and more energetic; increase the concentration of a reactant — more particles in the same space, so collisions are more frequent; increase the surface area of a solid reactant — more particles are exposed, so collisions are more frequent; add a catalyst — provides a pathway that needs less energy for the reaction. *1 mark* The factor and a matching explanation must both be there.

Q37 *(4 marks · VC2S10U10)* Carbon is cycled on Earth through processes including photosynthesis, respiration, fire, weathering, vulcanism and the combustion of fossil fuels.

(a) Name one store of carbon in the atmosphere and one store of carbon in the biosphere, and give the form of the carbon in each. *(2 marks)*

(b) Name the process that moves carbon from the atmosphere into plants, and the process that returns carbon from plants to the atmosphere. *(1 mark)*

(c) In a Victorian summer, bushfires burn large areas of forest. Explain how fire moves carbon between stores. *(1 mark)*

Solution

(a) atmosphere: carbon dioxide (CO_2) gas in the air. *1 mark* Biosphere: carbon in living organisms — for example, in the wood and leaves of trees. *1 mark*

(b) photosynthesis moves carbon from the atmosphere into plants; respiration returns carbon from plants to the atmosphere. *1 mark* Both processes are needed for the mark.

(c) combustion transfers carbon stored in biomass (the trees) into carbon dioxide released to the atmosphere. *1 mark* The two stores and the direction must both be there.

Q38 *(4 marks · VC2S10U11)* The table shows how the global average surface temperature has changed.

Period	Global average surface temperature compared with 1850–1900
1850–1900	0.00 °C (baseline)
2011–2020	+1.09 °C

Each of the four most recent decades has been successively warmer than any decade before it since 1850. Scientific assessments conclude that human influence has warmed the global climate and that cutting greenhouse gas emissions reduces future harm.

Source: IPCC, "Climate Change 2021: The Physical Science Basis — Summary for Policymakers" (Sixth Assessment Report, Working Group I), 2021. https://www.ipcc.ch/report/ar6/wg1/ — retrieved 2026-08-21.

(a) State the change in global average surface temperature shown by the data. *(1 mark)*

(b) Outline how the greenhouse effect warms the Earth: state what arrives from the Sun and what greenhouse gases in the atmosphere absorb. *(2 marks)*

(c) Suggest one strategy that could help mitigate human-induced climate change in Victoria. Name the contributing activity it addresses. *(1 mark)*

Solution

(a) the global average surface temperature rose by 1.09 °C between 1850–1900 and 2011–2020, and recent decades are successively warmer. *1 mark* The size of the change and its direction must both be there.

(b) *2 marks* — 1 mark: energy from the Sun arrives as radiation (including visible light) and warms the surface; 1 mark: the surface re-emits this energy as infrared radiation, and greenhouse gases absorb the outgoing infrared, warming the atmosphere.

(c) any one strategy with the activity it addresses, for example: replace coal and gas generation with renewable generation (power generation); plant and protect forests (deforestation and land clearing); shift trips from cars to public transport, walking or cycling (transportation); use less energy in homes and factories (resource consumption). *1 mark* The strategy and a named contributing activity must both be there.

Q39 *(3 marks · VC2S10U12 and VC2S10U13)* Space exploration seeks to expand knowledge of the origins and structure of the universe and to resolve the challenges of humans travelling and living away from Earth's surface.

(a) State one advantage of sending robotic probes rather than people, and one thing people can do in space that robotic probes cannot. *(2 marks)*

(b) Put these features of the universe in order of size, smallest first: a galaxy, a star, a solar system. *(1 mark)*

Solution

(a) robotic probes, any one: they need no life support, so they can travel further and last longer; they can go to conditions that would kill a person; they are cheaper to send; no human life is put at risk. *1 mark* People, any one: they can make on-the-spot judgements; they can repair equipment by hand; they can adapt to the unexpected. *1 mark* Accept other reasonable responses on both sides.

(b) a star, a solar system, a galaxy. *1 mark* A solar system is a star with the objects that orbit it; a galaxy contains billions of stars.

Q40 *(4 marks · VC2S10U14)* A sound wave in air has a frequency of 850 Hz and a wavelength of 0.40 m.

(a) State one difference between mechanical waves and electromagnetic waves. *(1 mark)*

(b) State the equation linking wave speed, frequency and wavelength, and calculate the speed of this sound wave. Show your working. *(2 marks)*

(c) When the sound is made quieter, which property of the wave decreases? *(1 mark)*

Solution

(a) any one correct distinction: mechanical waves need a material medium to travel through, while electromagnetic waves can travel through a vacuum; mechanical waves are vibrations of particles, while electromagnetic waves are oscillations of electric and magnetic fields. *1 mark*

(b) v = fλ (wave speed = frequency × wavelength). *1 mark* v = 850 Hz × 0.40 m = 340 m/s. *1 mark*

(c) the amplitude. *1 mark*

Q41 *(6 marks · VC2S10U15)* The table shows the energy input and the useful energy output of three devices in the same time. (Values are examples chosen for this paper.)

Device	Total energy input	Useful energy output
electric motor	5000 J	3500 J (kinetic)
LED lamp	60 J	48 J (light)
filament lamp	100 J	5 J (light)

(a) State the Law of Conservation of Energy. *(1 mark)*

(b) Calculate the efficiency of the electric motor. Show your working. *(2 marks)*

(c) Where does the energy that is not usefully transferred go? *(1 mark)*

(d) Which lamp is more efficient at producing light, and what difference would replacing filament lamps with LED lamps make to the energy used in a Victorian home? *(1 mark)*

(e) Suggest one way to increase the efficiency of a system with moving parts. *(1 mark)*

Solution

(a) energy cannot be created or destroyed; it is only transferred or transformed. *1 mark*

(b) efficiency = useful output ÷ total input × 100. *1 mark* efficiency = 3500 ÷ 5000 × 100 = 70%. *1 mark*

(c) it is dissipated to the surroundings, mainly as heat (accept thermal energy; sound also accepted for the motor). *1 mark*

(d) the LED lamp — 48 J of light from 60 J in, against 5 J of light from 100 J in. *1 mark* The home would waste far less energy for the same amount of light, so it would use less electrical energy overall.

(e) any one: lubricate the moving parts to reduce friction; streamline moving parts to reduce air resistance; maintain the system so worn parts do not waste energy. *1 mark*

Q42 *(3 marks · VC2S10U16)* Electricity can be generated as alternating current (AC) using magnets, or as direct current (DC) using photovoltaic cells or batteries.

(a) Complete the energy transformation chain for a wind turbine generating electricity: kinetic energy of moving air → … → electrical energy. *(1 mark)*

(b) State one difference between how a turbine generator produces AC and how a photovoltaic cell produces DC. *(1 mark)*

(c) State one limitation of relying on wind turbines alone for Victoria's electricity supply. *(1 mark)*

Solution

(a) kinetic energy of moving air → kinetic (rotational) energy of the turbine blades and generator → electrical energy. *1 mark* Accept a chain with one correct intermediate step or two.

(b) a turbine generator spins a magnet (or coil) inside a coil, inducing an alternating current; a photovoltaic cell converts light directly into electrical energy, with no moving parts. *1 mark* Any one correct difference earns the mark.

(c) wind speed varies — when the wind is not blowing, generation drops, so supply from wind alone is intermittent. *1 mark*

Q43 *(2 marks · VC2S10I05)* A class investigates how temperature affects the rate of a reaction by measuring the time taken to collect 20 mL of gas. *(Simulated data for practice.)*

Temperature (°C)	Time to collect 20 mL of gas (s)
20	120
30	78
40	52
50	33

(a) Describe the trend shown by the data. *(1 mark)*

(b) Predict the time at 60 °C and give a reason for your prediction. *(1 mark)*

Solution

(a) as temperature increases, the time to collect 20 mL of gas decreases — the reaction is faster at higher temperatures. *1 mark*

(b) a value that continues the trend — for example, about 20 s (accept roughly 15 to 25 s) — with the reason "if the trend continues". *1 mark* Marker note: 60 °C is beyond the measured range, so this is an extrapolation; a student who says so explicitly is showing the judgement assessed by `VC2S10I06` in Q11 and should receive the mark, not lose it.

Solutions — Section C — Extended response

Two extended-response questions, 10 marks each. Q44 is the socio-scientific question (codes VC2S10H03, VC2S10H04 and VC2S10I07); Q45 is the investigation-design question (codes VC2S10I01, VC2S10I02, VC2S10I03 and VC2S10I06). In both, marks are awarded for the quality of the reasoning and the use of evidence, not for which side a student takes.

Q44 *(10 marks · VC2S10H03, VC2S10H04 and VC2S10I07)*

For many decades, most of Victoria's electricity has been generated by burning brown coal at power stations in the Latrobe Valley in Gippsland. Burning coal releases carbon dioxide, a greenhouse gas. Scientific assessments conclude that human influence has warmed the global climate and that substantial cuts in greenhouse gas emissions are needed to limit future harm; Australian assessments report that Australia's climate is warming, with observed changes in temperature and rainfall. The power stations are also major employers in their region.

Two simplified proposals for Victoria's electricity future are being debated:

- **Proposal 1** — close the brown-coal power stations earlier and replace them with renewable generation such as wind and solar.
- **Proposal 2** — keep the power stations running longer so the change is slower, protecting jobs during the transition.

This question is built around a simplified scenario. The facts you need are given above; do not assume others. Answer all parts.

Sources: IPCC, "Climate Change 2021: The Physical Science Basis — Summary for Policymakers" (Sixth Assessment Report, Working Group I), 2021. https://www.ipcc.ch/report/ar6/wg1/ — retrieved 2026-08-21. CSIRO and Bureau of Meteorology, "State of the Climate 2024", 2024. https://www.csiro.au/en/research/environmental-impacts/climate-change/State-of-the-Climate — retrieved 2026-08-21.

(a) Explain why this is a socio-scientific issue, rather than a question science can answer on its own. *(2 marks)*

(b) Give two different projected outcomes of Proposal 1 — one that would encourage people to support it, and one that would make people hesitate. *(2 marks)*

(c) Two groups in society — for example, a family employed at a power station and an environmental group — may read the same scientific evidence and support different proposals. Explain how the values and needs of a group can shape which proposal it supports. *(2 marks)*

(d) Misinformation about climate and energy circulates on social media. Explain one way misinformation could influence this debate, and state how a person could check a scientific claim before sharing it. *(1 mark)*

(e) Write a short argument stating which proposal you would support. Use scientific evidence and reasoning, and address the strongest argument against your position. *(3 marks)*

Solution and marking guide

(a) *2 marks* — 1 mark: science provides evidence about the issue — for example, that burning coal releases CO_2, that greenhouse gas emissions enhance the greenhouse effect, and what different energy technologies can deliver — but it cannot settle what should be done; 1 mark: the decision also involves things science cannot measure — jobs, cost, fairness, values — so society must weigh scientific evidence alongside social, economic and environmental outcomes. Accept any response that captures "there is no single scientific answer; outcomes for different groups must be weighed".

(b) *2 marks* — 1 mark for each distinct projected outcome of Proposal 1, one that encourages support and one that causes hesitation. For, for example: emissions fall, reducing Victoria's contribution to human-induced climate change; new industries and jobs in renewable generation, construction and maintenance; less air pollution from combustion. Against, for example: power-station jobs in the Latrobe Valley are lost before new jobs are ready; reliability of supply is at risk while new generation is built; building new generation is costly. The outcome must be a projected consequence of the proposal, not a bare opinion.

(c) *2 marks* — 1 mark: names how values and needs differ — for example, livelihoods and the survival of a region's towns against environmental protection and fairness to future generations; 1 mark: links this to support — what is at stake differs between the groups, so the same evidence is weighed differently and each group gives most weight to the outcomes that affect it most.

(d) *1 mark* — both parts needed. For example: misinformation can exaggerate certainty in either direction, misrepresent costs, or present a settled finding as unsettled, so people form views on wrong information; to check a claim, find the original peer-reviewed publication, or check with an authoritative body (for example, the IPCC, or CSIRO and the Bureau of Meteorology), and see whether the claim is consistent with the scientific consensus.

(e) *3 marks*:

- 1 mark: a clear position on one proposal, supported by at least one piece of scientific evidence stated correctly — for example, burning coal releases CO_2, which enhances the greenhouse effect; renewable sources generate electricity without releasing CO_2 during operation; the assessments conclude that human influence has warmed the climate and that cutting emissions reduces future harm.
- 1 mark: the strongest argument against the chosen position is stated fairly and answered — not mocked, ignored or knocked down in a weakened form.
- 1 mark: the reasoning hangs together — the conclusion follows from the evidence given, with no internal contradiction.

Marker note: mark the reasoning, not the conclusion reached. On this paper, a well-argued case for either proposal can earn full marks; a response that asserts a position without evidence cannot earn the evidence mark. This reflects the book's rule for contested terms — steelman before evaluate, and mark the reasoning, never the side taken.

Q45 *(10 marks · VC2S10I01, VC2S10I02, VC2S10I03 and VC2S10I06)*

A student thinks that trampling by walkers reduces plant cover beside a walking track. Design a field investigation to test the hypothesis:

"The closer to a walking track, the lower the percentage cover of native grasses."

You will not carry out the investigation; your design is assessed on paper. In your answer, address parts (a) to (f).

(a) Identify the independent variable and the dependent variable, and give one reason for expecting the relationship stated in the hypothesis. *(2 marks)*

(b) Outline a sampling method: where you would place quadrats and how you would reduce bias in their placement. *(2 marks)*

(c) Identify two variables you would keep constant, and say why each must be kept constant. *(2 marks)*

(d) Say what equipment you would use to measure percentage cover, how many readings you would take, and why that number is a suitable sample size. *(2 marks)*

(e) Give one source of uncertainty or error in your design and one improvement that would address it. *(1 mark)*

(f) State the safety, permission and cultural-heritage checks you would complete before any fieldwork begins. *(1 mark)*

Solution and marking guide

(a) *2 marks* — 1 mark: independent variable: distance from the walking track; dependent variable: percentage cover of native grasses (both named and matched correctly); 1 mark: a reason, for example: trampling crushes plants and compacts the soil, so plants struggle to grow where walkers go most.

(b) *2 marks* — 1 mark for a workable method, for example: lay a transect line at right angles from the track; place a quadrat at set distances from the track edge (say 1 m, 5 m, 10 m and 20 m); estimate the percentage cover of native grasses in each quadrat; 1 mark for bias reduction: quadrat positions chosen randomly or systematically — not placed "where it looks bare" — with the same method at every distance and multiple quadrats at each distance.

(c) *2 marks* — 1 mark for two controlled variables, for example: quadrat size; season and time of sampling; habitat type (slope, soil, shade); the person making the estimates; 1 mark for the reason: if one of these changed with distance, there would be no way to tell whether distance (trampling) or that variable caused any difference — a fair test changes only the independent variable.

(d) *2 marks* — 1 mark for equipment and method: a 1 m × 1 m quadrat, preferably gridded; cover estimated by eye against the same scale each time; 1 mark for sample size with justification, for example: at least three to five quadrats at each of at least four or five distances — repeats reduce the effect of random variation and expose anomalous results.

(e) *1 mark* — any matched pair: estimating cover by eye is subjective → use a gridded quadrat and one trained observer; grass cover changes with season → sample all distances within the same week; soil and shade vary along the track → choose one uniform stretch of track; quadrats placed only where convenient → randomise the positions. The source of uncertainty and a matching improvement must both be there.

(f) *1 mark* — the complete set: a teacher-approved risk assessment; permission from the land manager; a cultural-heritage check — consult the Traditional Owners for that area, or the Registered Aboriginal Party, through the teacher, before fieldwork begins.

Marker note: the framework behind (f) is the *Aboriginal Heritage Act 2006* (Vic) and the *Aboriginal Heritage Regulations 2018* (Vic), named in subtopic 3B; no cultural knowledge is asked of any student — only the permissions check. This mirrors what SIT-2 assesses under `VC2S10I02`.

Tracing the items to the achievement standard

Every item traces to the achievement-standard extract of the subtopic that owns its code (§4 of the plan of record). Where a code is split-delivered, the owner is named with its partner subtopic in brackets; the partner delivers the other clause of the code, and both cite the same extract. The extracts are quoted as the authority file gives them.

Code	Subtopic	Achievement-standard extract	Review items
`VC2S10H01`	1A	"students analyse the importance of different scientific methods, critique, replication, publication and peer review in the development of scientific knowledge."	Q1
`VC2S10H02`	1B	"They examine the relationship between science, engineering and technologies."	Q2
`VC2S10H03`	16A	"They examine how different projected outcomes of the application of scientific knowledge to a selected socio-scientific issue may lead to varied support from individuals and groups in society."	Q44(a), Q44(b)
`VC2S10H04`	16B	"They discuss how scientific information and misinformation may inform personal and social decision-making and influence priorities for	Q3, Q44(c), Q44(d)

Code	Subtopic	Achievement-standard extract	Review items
		scientific research."	
VC2S10I01	2A (2B)	"Students formulate and refine questions and hypotheses to make reasoned predictions, test relationships and develop explanatory models when investigating scientific questions, problems and claims."	Q4, Q5, Q45(a)
VC2S10I02	3A (3B)	"They plan a range of valid, reproducible and safe scientific investigations and explain how they have addressed any ethical and cultural considerations when generating or using primary and secondary data."	Q6, Q45(b), Q45(c), Q45(f)
VC2S10I03	3C	"They select and use equipment to generate and record data, ensuring the use of suitable sample sizes and assessing the precision of multiple measurement readings."	Q7, Q8, Q45(d)
VC2S10I04	4A (4B)	"They select and construct a range of appropriate representations to organise, process and summarise data and information."	Q9
VC2S10I05	4C	"They analyse and compare a variety of data and information to identify and explain qualitative and quantitative patterns, trends, relationships, assumptions and anomalies."	Q10, Q43
VC2S10I06	5A	"They evaluate the validity and reproducibility of investigation methods including ways to improve the quality of data, and the validity of conclusions and claims."	Q11, Q45(e)
VC2S10I07	5B	"They provide evidence-based explanations for findings and construct	Q12, Q44(e)

Code	Subtopic	Achievement-standard extract	Review items
		logical arguments based on the evaluation of multiple sources of evidence to justify conclusions and assess claims.”	
VC2S10I08	6A (6B)	“They select and use appropriate presentation formats, scientific content, vocabulary, models, conventions, formulas and other representations to achieve their purpose when communicating and justifying their ideas, findings, arguments and proposals to diverse audiences.”	Q13
VC2S10U01	7A (7B)	“Students describe how the processes of sexual and asexual reproduction enable survival of the species.”	Q14
VC2S10U02	8A (8B)	“They explain how the nervous and endocrine systems use negative feedback to support homeostasis in the body’s internal environment.”	Q31
VC2S10U03	8C (8D)	“They distinguish between infectious and non-infectious disease, and compare different infectious disease control measures.”	Q15
VC2S10U04	7C (7D)	“They explain the processes that underpin heredity and genetic diversity, and predict the outcomes of monohybrid crosses.”	Q16, Q17, Q32
VC2S10U05	9A (9B)	“They describe the evidence supporting the theory of evolution by natural selection.”	Q18, Q33
VC2S10U06	10A (10B)	“They explain how ideas about the structure of the atom have changed over time, and model natural radioactive decay to illustrate how stable atoms are formed.”	Q19, Q34

Code	Subtopic	Achievement-standard extract	Review items
VC2S10U07	10C	"They describe patterns and trends in the periodic table."	Q20, Q35
VC2S10U08	11A (11B)	"They demonstrate the Law of Conservation of Mass in chemical reactions, and write word and balanced chemical equations for these reactions."	Q21, Q36(a), Q36(b)
VC2S10U09	11C (11D)	"They classify energy changes in chemical reactions as exothermic or endothermic."	Q22, Q36(c), Q36(d)
VC2S10U10	12A (12B)	"They explain how interactions within and between Earth's interrelated systems affect the carbon cycle."	Q23, Q27, Q37
VC2S10U11	12C (12D)	"They describe trends in patterns of global climate change and propose strategies to mitigate contributing factors."	Q24, Q38
VC2S10U12	13C	"They discuss the advantages and disadvantages of space exploration."	Q25, Q39(a)
VC2S10U13	13A (13B)	"They distinguish between different features in the universe and sequence key events in the origin and evolution of the universe, including an outline of the supporting evidence for the big bang theory."	Q26, Q39(b)
VC2S10U14	14A (14B)	"They explain how wave and particle models describe energy transfer, and compare the properties, features and applications of waves."	Q28, Q40
VC2S10U15	14C	"They analyse and represent energy conservation, including efficiency, in systems, and model how different forms of energy are transformed into electrical energy."	Q29, Q41
VC2S10U16	15A	"They analyse and represent energy	Q42

Code	Subtopic	Achievement-standard extract	Review items
		conservation, including efficiency, in systems, and model how different forms of energy are transformed into electrical energy."	
VC2S10U17	15B (15C)	"They use Newton's laws to describe and predict the motion of objects in a system."	Q30

Inquiry weighting: 25 of the 100 marks sit on the inquiry codes VC2S10I01 to VC2S10I08 — Section A Q4–Q13 (10 marks), Q43 (2 marks), Q44(e) (3 marks) and Q45 (10 marks) — matching the published strand weighting.

Strand tally — planned vs assessed

Strand	Planned	Assessed	Where
Science as a human endeavour	10	10	Q1–Q3 (3), Q44(a)–(d) (7)
Science inquiry	25	25	Q4–Q13 (10), Q43 (2), Q44(e) (3), Q45 (10)
Biological sciences	17	17	Q14–Q18 (5), Q31–Q33 (12)
Chemical sciences	16	16	Q19–Q22 (4), Q34–Q36 (12)
Earth and space sciences	16	16	Q23–Q27 (5), Q37–Q39 (11)
Physical sciences	16	16	Q28–Q30 (3), Q40–Q42 (13)
Total	**100**	**100**	

Q36 (5 marks) is credited to chemical sciences across VC2S10U08 and VC2S10U09 (3 + 2); Q39 (3 marks) is credited to earth and space sciences across VC2S10U12 and VC2S10U13 (2 + 1); Q44 and Q45 are split across their named codes as shown in the mark record.

Mark record

Question	Code	Worth	Given
Q1 — a testable claim	VC2S10H01	1	
Q2 — the cochlear implant	VC2S10H02	1	
Q3 — values set research priorities	VC2S10H04	1	
Q4 — which question is investigable	VC2S10I01	1	
Q5 — a quantitative hypothesis	VC2S10I01	1	
Q6 — why an animal ethics committee	VC2S10I02	1	
Q7 — re-zeroing a balance	VC2S10I03	1	
Q8 — one square metre is not a forest	VC2S10I03	1	

Question	Code	Worth	Given
Q9 — the median versus the mean	VC2S10I04	1	
Q10 — two scales, one dataset	VC2S10I05	1	
Q11 — beyond the measured range	VC2S10I06	1	
Q12 — checking a media claim	VC2S10I07	1	
Q13 — an infographic of F = ma	VC2S10I08	1	
Q14 — implantation in the uterus	VC2S10U01	1	
Q15 — the cause of influenza	VC2S10U03	1	
Q16 — one gene, different traits	VC2S10U04	1	
Q17 — like parents, unlike parents	VC2S10U04	1	
Q18 — isolation before speciation	VC2S10U05	1	
Q19 — isotopes behave alike	VC2S10U06	1	
Q20 — the halogen reactivity trend	VC2S10U07	1	
Q21 — atoms are conserved	VC2S10U08	1	
Q22 — predicting magnesium oxide	VC2S10U09	1	
Q23 — deforestation and CO_2	VC2S10U10	1	
Q24 — an indicator of climate change	VC2S10U11	1	
Q25 — why a rocket moves	VC2S10U12	1	
Q26 — what radio telescopes collect	VC2S10U13	1	
Q27 — the four Earth systems	VC2S10U10	1	
Q28 — sound, light and media	VC2S10U14	1	
Q29 — a quick efficiency check	VC2S10U15	1	
Q30 — force from F = ma	VC2S10U17	1	
Q31 — staying cool on a hot day	VC2S10U02	4	
Q32 — carriers of cystic fibrosis	VC2S10U04	5	
Q33 — an island	VC2S10U05	3	

Question	Code	Worth	Given
continent's mammals			
Q34 — carbon-12 and carbon-14	VC2S10U06	4	
Q35 — reading the periodic table	VC2S10U07	3	
Q36 — burning magnesium	VC2S10U08 and VC2S10U09	5	
Q37 — carbon moving between stores	VC2S10U10	4	
Q38 — the greenhouse effect and the data	VC2S10U11	4	
Q39 — robots, people and the universe	VC2S10U12 and VC2S10U13	3	
Q40 — a sound wave	VC2S10U14	4	
Q41 — three devices, three efficiencies	VC2S10U15	6	
Q42 — generating electricity	VC2S10U16	3	
Q43 — the trend in a data table	VC2S10I05	2	
Q44 — Victoria's electricity transition	VC2S10H03, VC2S10H04 and VC2S10I07	10	
Q45 — designing a trampling investigation	VC2S10I01, VC2S10I02, VC2S10I03 and VC2S10I06	10	
Total		**100**	