

University of Gloucestershire
Gloucestershire Initial Teacher Education Partnership
Science Interview questions
WITH ANSWERS

Science is an activity whose products are ideas or theories. These questions relate to your ideas and understanding about our environment. They are questions that even university graduates, like yourselves, find challenging, even though they are deceptively simple. Please work through them ahead of your interview - it will take about 15 to 30 minutes - and submit the sheet at the end of your interview.

Please be ready to talk about your recent experiences of secondary school. If you have not visited a school since (or during) your degree, please arrange to spend at least a day in school before your interview.

Name Date of Interview

*Write true or false for each alternative, or answer the question in the space provided, -
Be prepared, at interview, to give a brief justification/explanation of your choice. Use the spaces below each question to make notes (or use a separate sheet).*

1. Weight of a football If you pump air into a football, the football will:

- (a) get slightly heavier
- (b) stay exactly the same weight
- (c) get slightly lighter

(a) gases are made of atoms

2 Energy from the sun:

- (a) reaches us in the form of electromagnetic radiation
- (b) is the energy source that fuels living things
- (c) is the energy source that fuels the weather and climate
- (d) is absorbed directly by the atmosphere, causing the greenhouse effect

a, b, and c but not d

3 A cyclist completed a round trip of 20 miles yesterday. Where is the energy, measured in joules, today, that was released from the working of her muscles during the ride?

- (a) It has been used up fighting against air resistance etc.
- (b) It has not been used up, but is now mainly in the form of sound, air movement, and heat energy in the tyres and brakes.
- (c) It has been stored and is available for use later on.
- (d) It has been transferred into environmental heat energy.

a joules are not used up b. maybe true yesterday, but not today c. no d yes

4 Which of the following is/are mostly true about renewable energy sources?

- (a) The poorest people in the Third World rely almost solely on them for cooking, farming and transport.
- (b) They are almost all continually replenished by solar energy.
- (c) Examples include windmills, fuel wood, muscle power, solar panels, drying clothes on a washing line.
- (d) Nuclear fission power is a renewable energy resource.

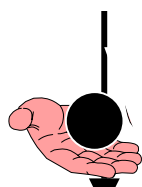
a. yes – though wood and crops need to be husbanded to ensure a continuous b yes c yes d no

- 5 **A car travels at a constant 60 mph, along a flat road.** There is a forward force from the engine, and a backward force from wind resistance, friction etc. Is the forward force (a) greater than, (b) equal to, or (c) less than the combined backward forces?

b since the car is neither slowing down or speeding up.

- 6 **A ball has been thrown up, away from the earth.** The 3 drawings show the ball on its way up, at the top of its flight, and on its way down. Also drawn, as an example, is the ball being pushed by your hand against gravity.

For the three pictures, draw arrows to indicate the size and direction of any forces that you think are acting on the ball. The longer the arrow, the larger the force. Name the force(s) against the arrow, as on the first example. Before you rush to answer this, consider what is happening to the speed of the ball — is it getting slower, or faster?



Gravity

Initial push

Half-way up

At the top

Half-way down

Neglecting air resistance (you can ask them to ignore this) the only force is that due to gravity, which slows the ball to a stop then accelerates it downwards – so each picture needs just one downward arrow Gravity the same length as the first picture

7. **Mass of exhaust gas** Suppose you collect everything that comes out of the exhaust pipe of a car on a journey (exhaust gas, fumes etc), and somehow press it all together so it can be weighed. Compared to the amount (weight) of petrol that was used for the journey, the amount (weight) of exhaust will be:
(a) much lighter (b) about the same (c) much heavier.

C much heavier – if petrol is HCH it reacts with OO O to give OCO and HOH. So 14 g of petrol react with 48g of oxygen (and there is the nitrogen taken in as well that comes out of the exhaust!)

8. **Fate of the material from which our food is made.** Think of what happens to the **material** (stuff, matter, atoms ...) of our food which is used as a **fuel** (eg carbohydrate such as starch or sugar)

How does this **material leave** our body?

- [] (a) it is all used up and only energy is left
[] (b) it comes out as faeces
[] (c) after use it is stored in our bodies
[] (d) we breathe a lot of it out as carbon dioxide and water vapour.
[] (e) it comes out as energy - movement and heat

Only d is true – fuel is respired so comes out (see car above) as OCO and HOH. E is particularly tempting but wrong – energy is not matter, and the question asks about matter (atoms)

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9. Hot air balloon A hot air balloon goes up because:

- (a) gravity no longer acts on the hot air
- (b) cold air pushes it up
- (c) hot air is buoyed up by the rest of the air
- (d) hot air always rises

b and c are both OK – without the buoyancy hot air will fall to the ground attracted by the force from gravity.

10. Being scientific. Construct a flow diagram (linear or circular) that shows how these words illustrate what scientists do. Add or omit words if you need to.

discover, predict, observe, notice, experiment, have ideas, make theories, search for the truth, ...

be wary of *search for the truth* which science can never achieve – ideas are only our best guess, moderated and tested against our senses.

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