

HSC Investigating Science - Mark Maximiser

Drill 5

Mixed Core Concepts

2025-08-28

Time Limit: 20 Minutes

Instructions: Circle the correct answer for each question. Aim to complete the drill in under 20 minutes.

1. **(2024 Q2)** A student is investigating the effect of different types of soil on the growth of bean plants. To ensure the experiment is valid, which variable should be changed?
 - (A) The amount of water given to each plant.
 - (B) The type of soil for each plant.
 - (C) The amount of light each plant receives.
 - (D) The size of the pot for each plant.
2. **(2023 Q1)** In a scientific investigation, what is the role of the hypothesis?
 - (A) To provide a conclusive explanation of the results.
 - (B) To be a testable statement that can be supported or refuted by evidence.
 - (C) To summarise all the data collected during the experiment.
 - (D) To list the equipment and materials needed for the investigation.
3. **(2022 Q1)** A student measures the mass of a 1 kg block five times using a digital scale. The readings are: 1.12 kg, 1.11 kg, 1.13 kg, 1.12 kg, 1.12 kg. These measurements can be best described as:
 - (A) Accurate but not precise.
 - (B) Precise but not accurate.

- (C) Both accurate and precise.
 - (D) Neither accurate nor precise.
4. **(2021 Q4)** The development of antibiotics was a major scientific breakthrough. However, the overuse of antibiotics has led to the emergence of antibiotic-resistant bacteria. This is an example of:
- (A) A scientific theory being proven wrong.
 - (B) An unintended negative consequence of a technology.
 - (C) A failure of the peer-review process.
 - (D) A conflict of interest in medical research.
5. **(2020 Q8)** A new drug was tested on six healthy humans. They all immediately became very sick. What step should have been taken to ensure this was an ethical investigation?
- (A) Choose the subjects randomly.
 - (B) Pay subjects for their participation.
 - (C) Inform subjects of possible side effects.
 - (D) Choose subjects with highly effective immune systems.
6. **(2019 Q17)** A student rolls a marble down a ramp and measures the distance it travels across the floor. To investigate the relationship between release height and distance, which variable must be kept constant?
- (A) The release height on the ramp.
 - (B) The distance the marble travels.
 - (C) The angle of the ramp.
 - (D) The time it takes for the marble to stop.
7. **(2024 Q5)** Which of the following is a fundamental principle of the scientific method?
- (A) Conclusions should be based on personal belief.
 - (B) Hypotheses must be falsifiable.
 - (C) The simplest explanation is always the correct one.
 - (D) Scientific knowledge is final and cannot be changed.
8. **(2023 Q5)** A student is conducting an experiment and notices that one of their results is very different from all the others. This result is known as:

- (A) An outlier.
 - (B) A control.
 - (C) A variable.
 - (D) A hypothesis.
9. **(2022 Q3)** In an experiment to test a new vaccine, one group receives the vaccine while another group receives a saline injection that has no effect. The saline injection is an example of a:
- (A) Dependent variable
 - (B) Placebo
 - (C) Confounding variable
 - (D) Independent variable
10. **(2021 Q11)** A student concludes that their experiment was ‘valid’. What does this mean?
- (A) The results were consistent across multiple trials.
 - (B) The experiment measured what it was intended to measure.
 - (C) The results were close to the true or accepted value.
 - (D) The results were published in a scientific journal.
11. **(2020 Q12)** A student uses a formula to calculate the intensity of a fire. This is an example of using a:
- (A) Physical model
 - (B) Conceptual model
 - (C) Mathematical model
 - (D) Biological model
12. **(2019 Q19)** Which of the following is the best way to present quantitative data from an experiment that measures change over time?
- (A) A flowchart
 - (B) A diagram
 - (C) A line graph
 - (D) A paragraph of text

13. **(2024 Q12)** The scientific consensus on climate change is that the Earth's climate is warming at an unprecedented rate due to human activity. This consensus is based on:
- (A) A vote among leading politicians.
 - (B) A single, definitive experiment.
 - (C) The overwhelming body of evidence from multiple lines of research.
 - (D) The opinions of a few influential scientists.
14. **(2023 Q18)** A government agency's decision to ban a pesticide is based on numerous scientific studies showing it harms beneficial insects. This is an example of:
- (A) Pseudoscience influencing policy.
 - (B) A conflict of interest.
 - (C) Evidence-based policy making.
 - (D) The halo effect.
15. **(2022 Q17)** A student is investigating the effect of light intensity on the rate of photosynthesis. What would be the most appropriate unit for the dependent variable?
- (A) Degrees Celsius
 - (B) Lux
 - (C) Bubbles of oxygen per minute
 - (D) Millilitres of water
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Answer Key: Drill 5

- 1. B
- 2. B
- 3. B
- 4. B
- 5. C
- 6. C
- 7. B
- 8. A
- 9. B
- 10. B
- 11. C

- 12. C
- 13. C
- 14. C
- 15. C