

GCSE SCIENCE · AQA AND PEARSON EDEXCEL

GCSE Science revision check and practice pack

An original mixed Biology, Chemistry and Physics check. Confirm the learner's board, tier and separate or combined route before selecting further materials.

How to use this pack

Attempt the questions without searching for an answer. Show working where appropriate. Check the answer section only after completing a full section.

SECTION 1

Biology

Use precise biological vocabulary and connect structure to function.

1. Explain why a root hair cell is well adapted for absorbing mineral ions from soil.

2. A student places potato cylinders in different sugar solutions. State the dependent variable and one control variable.

3. Explain how vaccination can reduce the spread of a communicable disease through a population.

SECTION 2

Chemistry

Balance equations and distinguish observations from explanations.

1. Balance the equation: $\text{Al} + \text{O}_2 \rightarrow \text{Al}_2\text{O}_3$.

2. Explain why increasing temperature usually increases the rate of a reaction.

3. Calculate the relative formula mass of calcium carbonate, CaCO_3 . Use Ar: Ca = 40, C = 12, O = 16.

SECTION 3

Physics

Write the equation first, substitute with units and round only at the end.

1. A 1,200 W kettle transfers 216,000 J of energy. Calculate the time taken.

2. A car increases its velocity from 6 m/s to 18 m/s in 4 s. Calculate its acceleration.

3. Explain why a transformer requires an alternating current rather than a direct current.

SECTION 4

Working scientifically

Identify variables, describe a repeatable method and evaluate evidence rather than only naming a result.

1. A student repeats a measurement five times and obtains one result far from the others. What should the student do before deciding whether it is anomalous?

2. Explain why repeating measurements and calculating a mean can improve the quality of evidence.

3. A graph of current against potential difference is a straight line through the origin. What does this show about resistance at constant temperature?

4. State two features of a fair test when investigating how light intensity affects photosynthesis.

ANSWERS AND METHODS

Check the method, not only the final answer

Biology 1. A root hair cell has a long projection that increases surface area, a thin exchange surface and many mitochondria to supply energy for active transport of mineral ions against a concentration gradient.

Biology 2. The dependent variable could be change in mass or percentage change in mass. A suitable control is the cylinder length, starting mass, solution volume, temperature or immersion time.

Biology 3. Vaccination produces memory cells without the person first developing the disease. A later exposure produces a faster antibody response, reducing infection and transmission. When enough people are immune, there are fewer routes for the pathogen to reach susceptible people.

Chemistry 1. $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$. This gives four aluminium atoms and six oxygen atoms on each side.

Chemistry 2. At higher temperature, particles have more kinetic energy. They collide more frequently and a greater proportion of collisions have energy equal to or above the activation energy, so there are more successful collisions per second.

Chemistry 3. $M_r = 40 + 12 + (3 \times 16) = 100$.

Physics 1. 180 s. Use power = energy ÷ time, so time = 216,000 J ÷ 1,200 W.

Physics 2. 3 m/s². Acceleration = change in velocity ÷ time = (18 – 6) ÷ 4.

Physics 3. A changing current produces a changing magnetic field in the primary coil. That changing field induces a potential difference in the secondary coil. A steady direct current does not continuously change the field.

Working scientifically 1. Check the apparatus and method, then repeat that measurement. A result should not be discarded solely because it is different; there should be evidence of a measurement error or a repeated inconsistency.

Working scientifically 2. Repeats expose random variation and possible anomalous results. A mean reduces the effect of random error when the repeats are valid.

Working scientifically 3. Current is directly proportional to potential difference, so $V \div I$ remains constant. The component therefore has constant resistance under those conditions.

Working scientifically 4. Change only light intensity and measure oxygen production or another defined rate. Keep variables such as temperature, carbon dioxide availability, plant size and measuring time constant; use repeats at each intensity.