

GCSE (9–1)

SCIENCE

J247, J257, J248, J258, J249, J259, J250, J260

For first teaching in 2016

Exam hints for students

General Tips



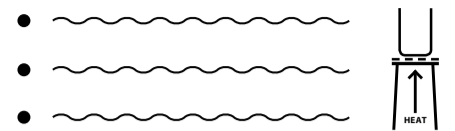
Use capital letters where appropriate when writing chemical symbols. The first letter of an element symbol is always a capital.

- a. ~~~~~ ✗
 b. ~~~~~ ✓
 c. ~~~~~ ✗

For MCQs, if you don't know the answer try eliminating options by annotating. Don't leave MCQ answers blank!

Your answer: ~~A~~ B

If changing the answer for an MCQ, completely cross out the wrong letter and write the correct one anew. Use upper-case letters only



Write like a scientist, not like a storyteller. Using bullet points or diagrams can reduce the amount you have to write.

Hydrocarbons contain carbon and hydrogen ✗
 Hydrocarbons contain carbon and hydrogen only ✓

Use precise terminology, so your answer shows the whole picture.

The value of A is greater than that of B

When a question asks you to make a comparison, make sure you clearly describe differences and/or similarities.

Use the information in the table to **describe** and **compare** the motion of the students.

- a. ~~~~~
 b. ~~~~~
 c. ~~~~~

The different parts of extended questions are linked. Information and answers from part (a)ii may help with part (b)i.

~~~~~  
 ~~~~~  
 ~~~~~ **CON**

Longer answers don't always lead to more marks. If correct responses are contradicted, marks can be lost.



Concise responses are the best responses. All marks can be obtained within the answer space provided.

Describe and compare the bonding of the materials and suggest which of them would be best to use, giving reasons for your answer.

Underlining or circling key information in questions will help you remember, as will jotting down ideas and equations.

Answer : ~~1008~~ -504

Cross out answers if you need to change them. Trying to correct an answer by writing over it can make it unclear.

Practical skills

This shows the results are reliable ✗  
 This shows the results are repeatable ✓  
 This shows the results are reproducible ✓



What would make the results more accurate?  
 Doing more repeats ✗

Use of the term 'reliability' is not encouraged. 'Repeatability', 'confidence' and 'reproducibility' are more appropriate.

Remember that precision is the closeness of agreement between different results. It is not the same as accuracy.

Accuracy is a measure of how close a result is to the true value.

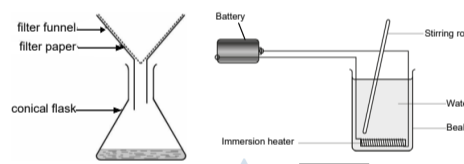
Repeats only improve precision of the set of measurements and not their accuracy.



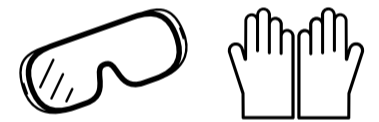
Scientific diagrams of equipment should be schematic and factual (not three-dimensional and artistic).

- ~~~~~  
 • ~~~~~  
 • ~~~~~

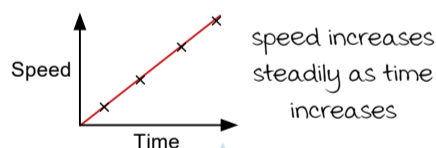
If describing a practical method use bullet points to give a list of simple, clear instructions someone else can follow.



Practice applying what you know to new situations. Unfamiliar experiments will still use apparatus and techniques you know.

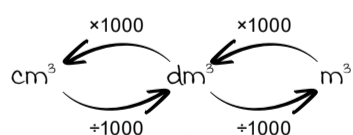


Be specific with suggested safety precautions and why they are needed.



When describing data (graphs/tables) comment on trends, patterns and correlations, not just single data points.

Maths skills



In calculations always check the units and make conversions if needed.

0.34564524 ✓  
 0.346 ✗

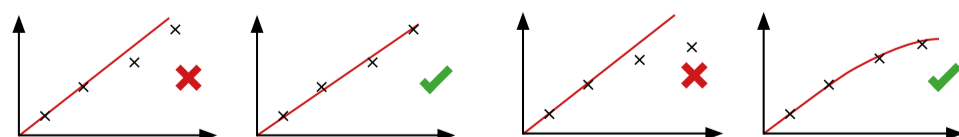
It's always more accurate to round once, for the final answer, and work with unrounded values on the calculator.

346  
 0.346  
 0.0346 → 3 significant figures

Make sure you give answers to the number of significant figures asked for after performing calculations.

$\frac{4.10}{202} = 0.0203 \text{ mol}$      $\frac{4.91}{94} = 0.0522 \text{ mol}$   
 percentage yield = 38.89...% ✓ **ECF**

Show clear working for calculations. Error carried forward may mean a response still gains marks if a mistake is made.



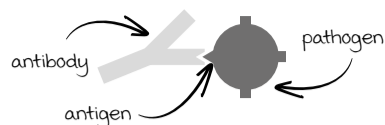
Lines of best fit should cover all points and have a fair distribution of points above and below the line.

Lines of best fit can be straight or curved. They don't have to extend to the axes or origin if not appropriate.

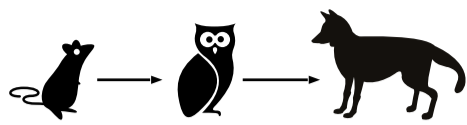
Answer: ..... 65000  
 Answer: .....  $6.5 \times 10^4$

You need to be able to convert results between decimal form and standard form (e.g.  $a \times 10^n$ ).

Biology



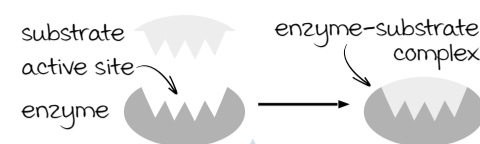
Antibodies made by our immune system recognise and bind to the antigens found on the outside of foreign organisms.



Food chains show the direction energy moves between organisms. Pyramids of biomass show total energy in each level.

|   |    |    |
|---|----|----|
|   | A  | a  |
| A | AA | Aa |
| a | Aa | aa |

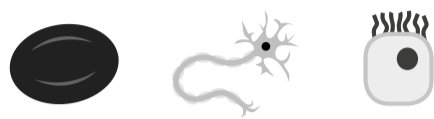
Make sure that your capital letters in a Punnett square are much bigger than the lower-case letters.



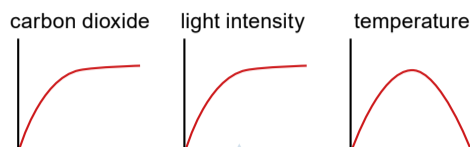
The substrate acts as a key and the enzyme as a lock. The active site is the specific part of the lock the key fits into.



Remember living things are biotic, non-living things are abiotic.



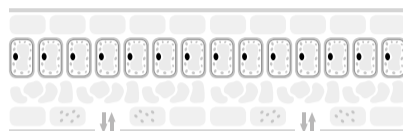
Students didn't know names of cell types and structure of organs. Practise matching diagrams of cells/organs to their functions.



Carry out different experiments and analyse graphs to understand how limiting factors affect photosynthesis.

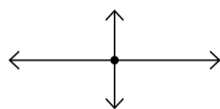
|   |    |    |
|---|----|----|
|   | A  | a  |
| A | AA | Aa |
| a | Aa | aa |

Practise Punnett squares and calculating probability of genetic diseases. Ensure you know different inheritance terms.

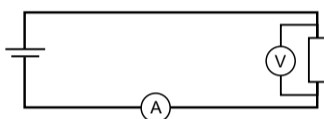


Many students did not understand the function of guard cells and the stomata.

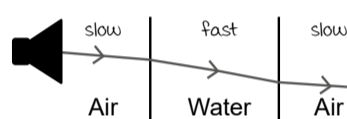
Physics



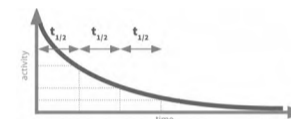
A free body diagram is the scientific way to show the forces acting on an object. Most students showed artistic sketches instead.



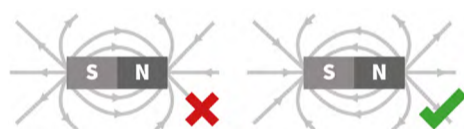
In circuit diagrams components must be connected and in the correct position. Ammeter in series, voltmeter in parallel.



Sound waves move faster in denser mediums. e.g. Sound waves move faster in water than in air.



The half-life of a radioactive source is the time taken for half its nuclei to decay and can be found using an activity-time graph.



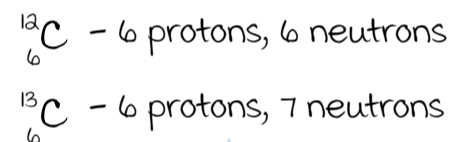
When drawing magnetic field lines, the arrows go from the north pole to the south pole and should not overlap.



Energy can be stored or transferred between stores. There are not different types of energy – only different stores.



The National Grid uses step-up and step-down transformers to reduce the current and increase voltage in transmission lines.

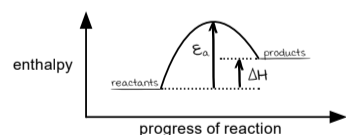


Isotopes of an element have the same number of protons in the nucleus but different numbers of neutrons.

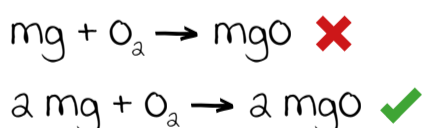
Force is equal to mass times the acceleration, so...  
 vs  
 $F = ma$ , so...

Using equations to help communicate your answer can be quicker than several sentences saying the same thing.

Chemistry



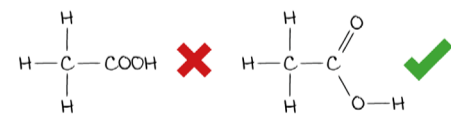
Energy profile diagram arrows are single headed, show direction of energy change and extend to the limits of the change.



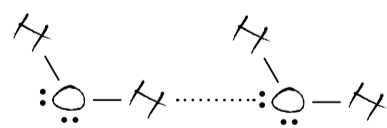
Check equations for balancing errors after writing them. Remember that any charges should also be balanced.



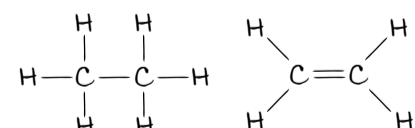
When writing the chemical formula of an ionic compound, remember the charges have to balance in ionic formulas.



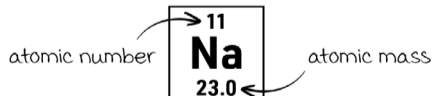
When drawing display formulae show all the bonds in the compound.



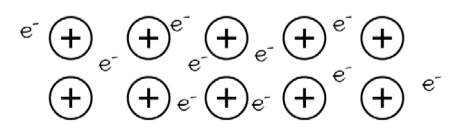
Be clear as to whether an attraction is between molecules or between the atoms within a molecule.



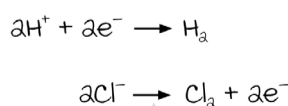
Make sure you know the names of the different organic homologous series.



Atomic number is the smaller number: the number of protons in an atom. Atomic Mass is the larger number: the mass of an atom.



When drawing the structure of a metal, draw the delocalised electrons surrounding and in between the metal ions.



Half equations show you what happens to each ion in the reaction showing the electrons involved.



Many students could not remember the chemical tests for ions in solution.

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