Applied Science Key Words

All these words are important for the Units covered in Year 12 and 13. Find out your own definitions for each word to build yourself a glossary.

Accuracy	
Adapted	
Akaryote	
Analyse	
Analyte	
Anomalous	
Aseptic technique	
Assess	
Batch Processing	
Biotechnology	
Calculate	
Catenate	
Chirality	
Colorimetry	
Commercial	
Compare	
Concise	
Continuous processing	
Conventions	
Cultivation techniques	
Data	
Describe	
Disease	
Effectiveness	

Enantiopure	
Enthalpy	
Ethics and morals	
Eukaryote	
Evaluate	
Evidence	
Explain	
Functional groups	
Genetic engineering	
Haemocytometer	
Hazards	
Identify	
Inconsistencies	
Industrial	
Isomerism	
Justify	
Limiting factor	
Mandatory	
Manipulate	
Methodology	
Modification	
Nomenclature	
Outline	
Percentage error	
Physiology	
Precision	
Primary standard	
Prokaryote	
Record	

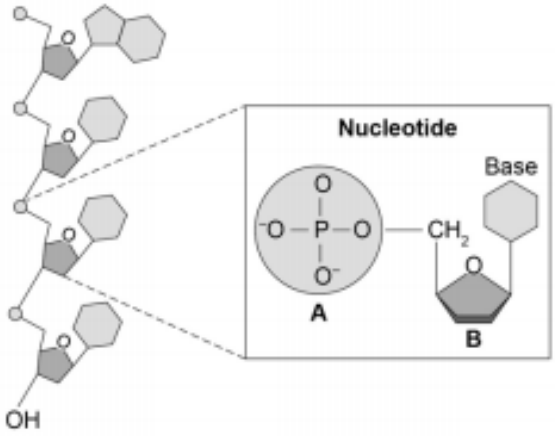
Relate	
Reliability	
Repeatability	
Reproducibility	
Review	
Risk assessment	
Serial dilution	
Somatic	
Stochastic	
Qualitative	
Quantitative	
Radioisotope	
Radiotherapy	
Refractive Index	
Risks	
Secondary standard	
Serial dilution	
Specific heat capacity	
Spectroscopic	
Standard procedure	
Stoichiometry	
Tabulated	
Ultrastructure	
Underpinning	
Validity	
Volumetric	

Example Questions from Unit 1

Unit 1 is called 'Key Concepts' - here is a taster of questions from the Biology, Chemistry and Physics topics we cover. Have a go at these and if you have any issues contact a member of the Science Department (science@hartismere.com)

1 **Figure 1** shows the structure of DNA.

Figure 1



1(a) Name parts **A** and **B** in **Figure 1**.

[2 marks]

A .....

B .....

1(b) A geneticist analysed a sample of nucleic acid and calculated the percentages of the different bases.

Table 1 shows the results of the analysis.

Table 1

Base	Percentage of base in the sample of nucleic acid (%)
Adenine	32
Cytosine	18
Guanine	18
Uracil	32

The information in **Table 1** showed the geneticist that the sample was double-stranded ribonucleic acid (RNA).

1(b)(i) Use the information in **Table 1** to explain how the geneticist knew that the sample was RNA and **not** DNA.

[1 mark]

.....

.....

1(b)(ii) Use the information in **Table 1** to explain how the geneticist knew that the sample was double-stranded rather than single-stranded.

[2 marks]

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1(c) The percentage of thymine in a sample of DNA is 21%.

Calculate the percentage of cytosine in the same sample of DNA.

[2 marks]

.....

.....

.....

Percentage = ...

Total 7 marks

4 When anhydrous sodium carbonate is added to dilute hydrochloric acid, carbon dioxide gas is produced. The sodium carbonate dissolves to give a solution of sodium chloride, which gives off heat.

$$Na_2CO_3\,(s) + 2HCl\,(aq) \rightarrow 2NaCl\,(aq) + H_2O\,(l) + CO_2\,(g)$$

4(a)(i) Draw a labelled energy profile for this reaction on the grid below.

[3 marks]

4(a)(ii) Calculate the relative molecular mass of anhydrous sodium carbonate.
(Relative atomic masses: Na = 23, C = 12, O = 16)

[1 mark]

.....

Relative molecular mass = ...

4(a)(iii) Use your answer to part (a)(ii) to calculate the number of moles in 1.00 g of anhydrous sodium carbonate.

[1 mark]

.....

.....

4(b) A chemist added 1.00 g of sodium carbonate to 50 cm^3 of hydrochloric acid of concentration 1.00 mol dm^{-3}. The temperature rise of the solution was 5.1 °C.

Calculate the heat energy transferred in the reaction. Use the formula $q = mc\Delta T$

Assume that the density of the solution is 1 g cm^{-3} and that it has a specific heat capacity of 4.18 J $K^{-1}g^{-1}$.

[1 mark]

.....

Heat energy = ...

Total 6 marks

8(a) An architect is designing a new energy-efficient house for a client. The client lives in a sunny area, so the architect suggests that the house should use solar energy to provide both hot water and electricity. Photovoltaic cells and solar thermal panels are two ways of using solar energy.

8(a)(i) Describe the role of photovoltaic cells and solar thermal panels.

[2 marks]

Photovoltaic cells.....

.....

Solar thermal panels.....

.....

8(a)(ii) Explain why solar thermal panels are covered with **black** glass.

[1 mark]

.....

.....

8(b) The architect also suggests that the client should install a small wind turbine to provide additional electricity.

8(b)(i) State **one** advantage of using a small wind turbine rather than a solar-powered device to generate electricity.

[1 mark]

.....

.....

8(b)(ii) Explain why wind turbines cannot be used during very high winds.

[2 marks]

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8(b)(iii) State **two** other disadvantages of using a small wind turbine rather than a solar-powered device to generate electricity.

[2 marks]

1.....

.....

2.....

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