

Chapter 1: Matching Tables

Edexcel IGCSE Science Double Award specification - Biology

| | Biology Student Book page(s) | Notes |
|---|------------------------------|-------|
| SECTION 1: The nature and variety of living organisms | | |
| <p>a) Characteristics of living organisms <i>Students will be assessed on their ability to:</i></p> <p>1.1 recall that living organisms share the following basic characteristics:</p> <ul style="list-style-type: none"> • they require nutrition • they respire • they excrete their waste • they respond to their surroundings • they move • they control their internal conditions • they reproduce • they grow and develop. | 1 | |
| <p>b) Variety of living organisms <i>Students will be assessed on their ability to:</i></p> <p>1.2 describe the common features shared by organisms within the six following main groups, plants, animals, fungi, bacteria, protoctists and viruses, and for each group describe examples and their features as follows (details of life cycle and economic importance are not required)</p> | 16 | |
| <p>Plants: These are multicellular organisms; they contain chloroplasts and are able to carry out photosynthesis; they have cellulose cell walls; they store carbohydrates as starch or sucrose. Examples include flowering plants, such as a cereal (for example maize) and a herbaceous legume (for example peas or beans)</p> | 16 | |
| <p>Animals: These are multicellular organisms; they do not contain chloroplasts and are not able to carry out photosynthesis; they have no cell walls; they usually have nervous coordination and are able to move from one place to another; they often store carbohydrate as glycogen. Examples include mammals (for example humans) and insects (for example housefly and mosquito).</p> | 16–17 | |
| <p>Fungi: These are organisms that are not able to carry out photosynthesis; their body is usually organised into a mycelium made from thread-like structures called hyphae, which contain many nuclei; some examples are single-celled; they have cell walls made of chitin; they feed by extracellular secretion of digestive enzymes onto food material and absorption of the organic products; this is known as saprotrophic nutrition; they may store carbohydrate as glycogen. Examples include <i>Mucor</i>, which has the typical fungal hyphal structure, and yeast which is single-celled.</p> | 17–19 | |
| <p>Bacteria: These are microscopic single-celled organisms; they have a cell wall, cell membrane, cytoplasm and plasmids; they lack a nucleus but contain a circular chromosome of DNA; some bacteria can carry out photosynthesis but most feed off other living or dead organisms. Examples include <i>Lactobacillus bulgaricus</i>, a rod-shaped bacterium used in the production of yoghurt from milk, and <i>Pneumococcus</i>, a spherical bacterium that acts as the pathogen causing pneumonia.</p> | 19–21 | |

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|--|-------------------------------------|--|
| Protoctists: These are microscopic single-celled organisms. Some, like <i>Amoeba</i> , that live in pond water have features like an animal cell, while others, like <i>Chlorella</i> , have chloroplasts and are more like plants. A pathogenic example is <i>Plasmodium</i> , responsible for causing malaria. | 19 | |
| Viruses: These are small particles, smaller than bacteria; they are parasitic and can reproduce only inside living cells; they infect every type of living organism. They have a wide variety of shapes and sizes; they have no cellular structure but have a protein coat and contain one type of nucleic acid, either DNA or RNA. Examples include the tobacco mosaic virus that causes discolouring of the leaves of tobacco plants by preventing the formation of chloroplasts, the influenza virus that causes 'flu' and the HIV virus that causes AIDS. | 21 | |
| 1.3 recall the term 'pathogen' and know that pathogens may be fungi, bacteria, protoctists or viruses | 20 | |
| SECTION 2: Structures and functions in living organisms | Biology Student Book page(s) | Notes |
| a) Levels of organisation <i>Students will be assessed on their ability to:</i> 2.1 describe the levels of organisation within organisms: organelles, cells, tissues, organs and systems | 2 12-13 | (Organelles) (Cells, tissues, organs and organ systems) |
| b) Cell structure <i>Students will be assessed on their ability to:</i> 2.2 recognise cell structures, including the nucleus, cytoplasm, cell membrane, cell wall, chloroplast and vacuole | 1-3 | |
| 2.3 describe the functions of the nucleus, cytoplasm, cell membrane, cell wall, chloroplast and vacuole | 1-3 | |
| 2.4 describe the differences between plant and animal cells | 3 | |
| c) Biological molecules <i>Students will be assessed on their ability to:</i> 2.5 recall the chemical elements present in carbohydrates, proteins and lipids (fats and oils) | 37-40 | |
| 2.6 describe the structure of carbohydrates, proteins and lipids as large molecules made up from smaller basic units: starch and glycogen from simple sugar; protein from amino acids; lipid from fatty acids and glycerol | 37-40 | |
| 2.7 describe the tests for glucose and starch | 42-43 | |
| 2.8 understand the role of enzymes as biological catalysts in metabolic reactions | 3-4 | |
| 2.9 understand how the functioning of enzymes can be affected by changes in temperature | 4-5 | <i>Not required: Effects of changes in pH on enzymes (p.5)</i> |
| 2.10 describe how to carry out simple controlled experiments to illustrate how enzyme activity can be affected by changes in temperature | 5-6 | |
| d) Movement of substances into and out of cells <i>Students will be assessed on their ability to:</i> 2.11 recall simple definitions of diffusion, osmosis and active transport | 9-11 | |

Chemistry Revision

The format of Paper 1

The first thing to be aware of is that, **in general**, the questions will gradually become more difficult and complex as you move through the paper. The first few questions are **usually** targeted at grades E–G, the questions in the middle of the paper are **usually** targeted at grades C–D, and the questions towards the end are **usually** targeted at grades A*–B. This might not always be the case; some parts of questions at the end may be targeted at C–D and some questions in the middle may be targeted at A*–B. It is therefore important that you try to answer all of the questions if you are to achieve your best mark.

Answering the E–G questions

This section of the paper may well contain some multiple choice questions, where you may be asked to place a cross in the box next to the answer you think is correct.

An example is:

Question 1

Place a cross ☒ in **three** boxes to show how the reaction in a test tube between magnesium and dilute hydrochloric acid could be made to go faster without changing the mass of the magnesium.

- add water to the acid
- cool the acid
- increase the concentration of the acid
- powder the magnesium before use
- use a boiling tube instead of a test tube
- use one large piece of magnesium
- use warmer acid

Question 1 answer

- increase the concentration of the acid
- powder the magnesium before use
- use warmer acid

*Examiner's comment: The first temptation to avoid is that of placing crosses in more than three boxes. If you put crosses in four boxes the maximum mark you can score is **two**; a mark will be deducted for the one incorrect answer. However, if you put crosses in three boxes and one of them is incorrect, you still score two marks.*

*When answering a question such as this, make sure you read carefully the question. You are asked what will make the reaction go **faster**, so you have to decide what changes can be made to a reaction that will speed it up. These are*

- *increase the concentration of a solution*
- *increase the temperature of the reaction mixture*
- *increase the surface area of a solid*

This information should lead you to put crosses in the third, fourth and seventh boxes.

(N.B. When you powder a solid you increase its surface area.)

Just because the questions at the beginning of the paper are designed to be easier than those at the end, do not be fooled into thinking that you do not need to concentrate on your answers. The following question highlights this:

Question 2

A student adds small pieces of magnesium to dilute hydrochloric acid in a test tube. Hydrogen is produced.

- (a) What does the student **see** as the magnesium reacts?
 (b) Describe the test for hydrogen.

Question 2 answers

- (a) Bubbles of gas are seen and the magnesium disappears.

Examiner's comment: Common mistakes made when answering part (a) are to say that a gas is given off and that the magnesium dissolves. This is true, but what is seen are bubbles of gas (which is colourless hydrogen) and this should be your answer.

The magnesium does not dissolve in the acid; it reacts with the acid to form magnesium chloride. It is the magnesium chloride that dissolves, not the magnesium. Hence your answer should be the magnesium disappears or gets smaller. Try and describe clearly what you would actually see.

- (b) Apply a lit spill to the gas and there will be a squeaky pop.

Examiner's comment: When answering a question to describe a test it is important to mention both the test and the result of the test. It is also important to get the test correct, since marks cannot be given for a correct observation based on an incorrect test.

When describing the test for hydrogen, many students get confused with the test for oxygen and say 'apply a glowing spill to the gas' and there will be a 'squeaky pop'. The spill has to lit (i.e. have a flame) for this test to work, so no marks can be given even though a squeaky pop is what you would hear if the test was performed correctly.

(N.B. for this test to work, the hydrogen has to be first of all mixed with air before being ignited. Also, the test must be carried out in a test tube or a boiling tube. If it is carried out in, for example, a glass milk bottle, a loud bang, not a pop, will be heard. However, here the examiners are not trying to catch you out in this test, so these points would be overlooked.)

Answering the C-D questions

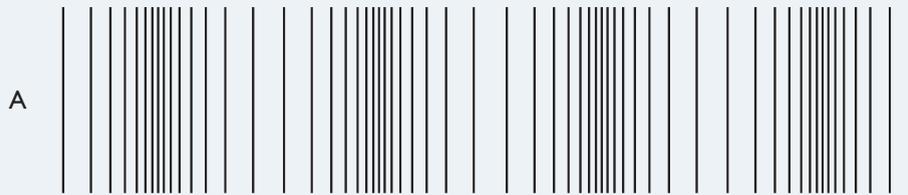
It is very important to make sure that you answer questions **precisely** and **in the correct context**. An example of this is:

Question 3

During refining, crude oil is first separated into fractions.

- (a) What is the name of the process used to obtain fractions from crude oil?
 (b) What is meant by the term **fraction**?
 (c) How are the fractions obtained?

1. The diagram represents a wave on a slinky spring.



- (a) (i) State the type of wave represented. (1)

- (ii) Mark on the diagram how the end of the spring at A is moved to make this type of wave. (1)
 (iii) Give another example of this type of wave. (1)

- (iv) Label the diagram to show the wavelength of this wave. (1)
- (b) State the equation relating the speed of a wave, its wavelength and the frequency of the wave. (1)

- (c) Light waves are transverse waves. State two *other* ways in which light waves are different from the waves in part (a). (2)

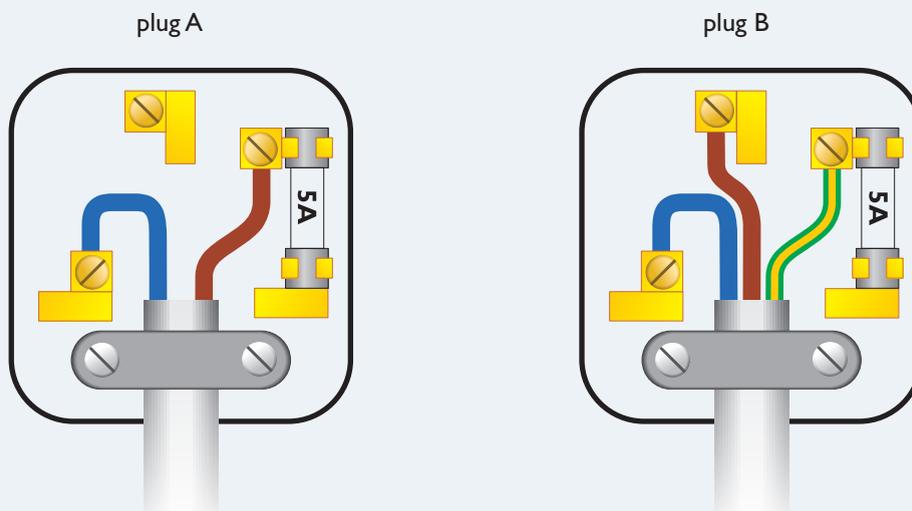
- (Total 7 marks)**

2. (a) (i) State the equation that relates current, voltage and electrical power. (1)

- (ii) A toasted-sandwich maker has a power rating of 1kW. Calculate the current that it draws from a 230V mains supply. (2)

- Current = A**

(b) The diagram shows two electric plugs with the covers removed to show the wiring and fuses.



- (i) State, with a reason, which of these plugs could be used safely with a double insulated electric drill? (1)
-
- (ii) One of these plugs is potentially very dangerous. State which one and describe the dangerous fault. (2)
-
-

(Total 6 marks)

3. A student conducts an experiment to measure the speed of sound. She intends to make a sound near a large wall and time the interval between making the sound and hearing the echo from the wall.

- (a) (i) What should she use to measure the time interval? (1)
-
- (ii) The student must also measure the distance to the wall. Suggest a way of making this measurement. (1)
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-

(b) Here is a table of her measurements:

| | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|
| Distance to the wall, d, in metres | 100 | 150 | 200 | 250 | 300 | 350 | 400 |
| Time, t, to hear echo In seconds | 0.6 | 0.9 | 1.1 | 1.5 | 1.8 | 2.0 | 2.3 |