

International GCSE Science (Double Award)

Please note that a number of minor amendments have been made to the Edexcel International GCSE Science (Double Award) specification.

The changes clarify the demands of the specification, and demonstrate links to practical activities. The majority of these changes will **not** require you to revisit areas of the specification that you have already taught. However, a small number of changes involve the removal of material from Double Award into separate sciences; or the addition of new material. There is also a small change in the Assessment Objective weightings in the question papers, although the style of the question papers is unchanged. It has been necessary to make these changes immediately for first examination in the June 2013 series.

If you have any questions about these changes, please contact the Edexcel Science Advisor (ScienceSubjectAdvisor@edexcelexperts.co.uk) for all subject specific enquires. Alternatively, please contact your Regional Development Manager.

The mapping document below outlines the changes to the Science (Double Award) specification. Please take the time to review this document. To assist you with the nature of the changes, they have been colour-coded as follows:

Changes in red show where the command word used in the specification has changed. This is unlikely to affect what you have already taught, but may help to indicate the depth of knowledge that an examination question will require.

Changes in blue show where a specification statement has been reworded to highlight a practical opportunity. This should not affect what you have already taught, as practical-based questions (AO3) could still be asked on any aspect of the specification.

Changes in green show where minor changes have been made to clarify the meaning or depth of a specification statement, or to improve its wording. There is unlikely to be any effect on what you have already taught.

Changes in pink show where new material has been added, or a deletion has occurred. In some cases, a specification statement has been removed from Science (Double Award) and will only appear in the separate science papers. These changes may require you to look back at areas that you have already taught to ensure that the entire specification has been covered; or that candidates for Science (Double Award) know which areas they will no longer be examined on.

NB - Please contact the Science Subject Advisor team for assistance if you do not have a colour version of this document.

Biology

Section 1: The nature and variety of living organisms

- 1.1 "understand that living organisms..."
removal of the word "basic"
- 1.2 the ambiguous "they" which occurs in the paragraphs on Plants, Animals and Fungi has been altered to "their cells"

Section 2: Structure and functions in living organisms

- 2.2 "describe cell structures..."
- 2.4 "compare the structures of plant and animal cells"
- 2.5 "identify the chemical elements..."
- 2.9 "understand how the functioning of enzymes can be affected by changes in temperature, including changes due to change in active site"
- 2.10 "describe controlled experiments to investigate how enzyme activity..."
- 2.11 "understand definitions of diffusion..."
- 2.14 "describe experiments to investigate diffusion and osmosis..."
- 2.16 "write the word equation..."
- 2.17 "understand how varying carbon dioxide concentration... affects the rate of photosynthesis"
- 2.18 "describe the structure of the leaf and explain how it is adapted..."
- 2.19 "understand that plants require mineral ions..."
- 2.20 remove "simple controlled"
- 2.21 "identify sources and describe functions..."
- 2.22 "describe the structures of the human alimentary canal..."
remove "in outline"
- 2.26 "understand that bile is produced by the liver..."
- 2.27 "describe the structure of a villus and explain how this helps absorption..."
- 2.28 "understand that the process of respiration..."
- 2.30 "write the word equation..."
- 2.31 "write the word equation..."
- 2.39 "...in relation to lungs and the circulatory system, including coronary heart disease"

- 2.40 "describe experiments to investigate..."
- 2.45 "understand that transpiration..."
- 2.47 "describe experiments to investigate the role..."
- 2.48 "describe the composition of the blood..."
- 2.50 "explain how adaptations of red blood cells, including shape, structure and the presence of haemoglobin, make them suitable for the transport of oxygen"
- 2.53 "explain how the heart rate changes..."
- 2.55 "understand the general structure of the circulation system..."
- 2.56 "understand the origin of carbon dioxide..."
- 2.57 "understand that the lungs, kidneys and skin are organs of excretion"
- 2.65 "understand that urine contains water..."
- 2.73 "understand that the central nervous system..."

Section 3: Reproduction and inheritance

- 3.1 "understand the differences..."
- 3.6 "describe the structure and explain the function of the male and female..."
- 3.8 "understand the roles of oestrogen and testosterone..."
- 3.9 "understand that the nucleus of a cell..."
- 3.10 "understand that a gene is a section of a molecule of DNA and that a gene codes for a specific protein"
- 3.13 "understand the meaning of the terms..."
- 3.17 "understand that the sex of a person..."
- 3.23 "know that in human cells..."
- 3.25 "understand that mutation is a rare, random change..."
- 3.28 "understand how resistance to antibiotics can increase in bacterial populations, and appreciate how such an increase can lead to infections being difficult to control"

Section 4: Ecology and the environment

- 4.2 "explain how quadrats can be used to estimate..."
- 4.3 "explain how quadrats can be used to sample the distribution..."
- 4.4 "explain the names given to different trophic levels..."
- 4.10 "understand that water vapour..."

Section 5: Use of biological resources

- 5.7 "interpret and label a diagram of an industrial fermenter..."
this outcome has been removed from Science (Double Award) and
so will only be tested in Biology (as 5.8)

Chemistry

Due to some of the changes made to the existing International GCSE Science (Double Award) specification for chemistry, the numbering of specification points for the Edexcel Certificate in Science (Double Award) is slightly different.

The numbering used below refers to the numbering of the existing International GCSE Science (Double Award) specification.

Section 1: Principles of chemistry

- 1.2 "understand how the interconversions..."
- 1.3 "explain the changes in arrangement..."
- 1.4 "describe and explain experiments to investigate the small size..."
- 1.7 "describe experimental techniques for the separation of mixtures..."
- new (1.8) "explain how information from chromatograms can be used to identify the composition of a mixture"
this has been highlighted as a clarification, rather than new material, as it has been regularly tested as an associated practical skill to 1.7
- 1.8 "understand that atoms consist of a central nucleus..."
- 1.34 "understand that substances with simple molecular structures..."
- 1.35 "...substances with simple molecular structures have low melting and boiling points..."
- 1.36 "explain the high melting and boiling points of substances..."
- 1.37 "understand that a metal can be described as a giant structure..."
- 1.39 "understand that an electric current is a flow of electrons..."
- 1.43 "understand that electrolysis involves the formation..."
- 1.44 "describe experiments to investigate electrolysis... ..lead (II) bromide and predict the products"

Section 2: Chemistry of the elements

- 2.5 "understand that the noble gases (Group 0) are a family..."
- 2.7 "describe the relative reactivities..."
- 2.12 "describe the relative reactivities..."
- 2.13 "describe experiments to demonstrate that a more reactive halogen..."
- 2.16 "explain how experiments... can be used to investigate the percentage..."
- 2.17 "...from hydrogen peroxide, using manganese(IV) oxide as a catalyst"

- 2.18 "describe the reactions of magnesium, carbon and sulfur with oxygen in air, and the acid-base character..."
- 2.21 "describe the properties of carbon dioxide..."
- 2.23 "recall the reactions of carbon dioxide and sulfur dioxide..."
this outcome has been removed, as it is tested within 2.18
- 2.24 "recall that sulfur dioxide and nitrogen oxides are pollutant gases..."
this outcome has been moved to Section 5(b)
- new to (2.23) "understand that carbon dioxide is a greenhouse gas and may contribute to climate change"
- 2.29 "understand that metals can be arranged..."
- 2.34 "describe the conditions under which iron rusts"
- 2.37 remove "...simple..."
- 2.38 remove "...simple..."
- 2.39 remove "...simple..."

Section 3: Organic chemistry

- 3.5 "describe the substitution reaction of methane..."
- 3.7 "...(knowledge of cis- and trans- isomers is not required)"

Section 4: Physical chemistry

- 4.6 "understand the general rules..."
- 4.7 "describe experiments to prepare..."
- 4.8 "describe experiments to prepare..."
- 4.9 "describe experiments to carry out..."
- 4.10 "understand that chemical reactions..."
- 4.12 remove "...molar..."
- 4.14 "understand that the breaking of bonds..."
- 4.19 "explain that a catalyst speeds up a reaction..."
- 4.20 "understand that some reactions are reversible..."

Section 5: Chemistry in industry

- 5.6 "understand that crude oil is a mixture..."

- 5.7 "describe and explain how the industrial process..."
- 5.10 "understand that incomplete combustion..."
- 5.11 "understand that, in car engines, the temperature..."
- new the old outcome 2.24 ("understand that nitrogen oxides and sulfur
(5.12) dioxide...") is inserted here
- 5.12 "understand that fractional distillation of crude oil... and explain why this makes cracking necessary"
- 5.14 "understand that an addition polymer..."
- 5.15 "...including poly(ethene) and poly(propene)"
...and poly(chloroethene)" is removed from Science (Double Award) and so will only be tested in Chemistry
- new "describe some uses for polymers, including poly(ethene) and
(5.18) poly(propene)"
- new "explain that addition polymers are hard to dispose of as their inertness
(5.19) means that they do not easily biodegrade"
- 5.17 "understand that nitrogen from the air..."
- 5.20 "describe the use of ammonia..."

Physics

Due to some of the changes made to the existing International GCSE Science (Double Award) specification for physics, the numbering of specification points for the Edexcel Certificate in Science (Double Award) is slightly different.

The numbering used below refers to the numbering of the existing International GCSE Science (Double Award) specification.

Section 1: Forces and motion

- 1.2 "plot and interpret distance–time graphs"
- 1.3 "know and use the relationship..."
- new (1.4) "describe experiments to investigate the motion of everyday objects such as toy cars or tennis balls"
Note: this has not been highlighted as new material, as it has been regularly tested as an associated practical skill within Section 1(b)
- 1.4 "know and use the relationship..."
- 1.5 "plot and interpret velocity–time graphs"
- 1.8 "describe the effects of forces between bodies such as changes in speed, shape or direction"
- 1.9 "identify different types of force such as gravitational or electrostatic"
- 1.11 "know and use the relationship..."
- 1.12 "know and use the relationship..."
- new (1.15) "describe experiments to investigate the forces acting on falling objects, such as sycamore seeds or parachutes"
- 1.15 "know and use the relationship..."
- 1.17 "describe experiments to investigate how extension varies..."
- 1.18 "understand that the initial linear region..."
- 1.19 "describe elastic behaviour as the ability of a material to recover..."
- 1.20 "recall that the moon orbits the Earth and that some planets also have moons"
this outcome has been deleted, but the content has been used to create new specification point 1.24
- 1.22 "explain that gravitational force..."
this has been re-written to split the middle bullet point "causes the moon and artificial satellites to orbit the Earth" into "causes moons to orbit planets" and "causes artificial satellites to orbit the Earth"
- 1.24 "describe the differences in the orbits of comets, moons and planets"

this has been re-written to incorporate the deleted 1.20, and now becomes before outcome 1.23 ("use the relationship...", renumbered 1.25)

- 1.25 "understand that..."
note that this statement has also been re-written so that the information appears in decreasing size, from universe to galaxy to solar system

Section 2: Electricity

- 2.2 "understand and identify the hazards..."
- 2.3 "understand the uses of insulation..."
- 2.4 combined to form a new statement: "understand that a current in a resistor
& 2.5 results in the electrical transfer of energy and an increase in temperature, and how this can be used in a variety of domestic contexts"
- 2.6 "know and use the relationship..."
- 2.8 "understand the difference between mains electricity being alternating current (a.c.) and direct current (d.c.) being supplied by a cell or battery"
- 2.15 "know and use the relationship..."
- 2.17 "know and use the relationship..."
- 2.18 "identify common materials which are electrical conductors..."
& 2.19 "know that electric current in solid metallic conductors..."
these two outcomes have been swapped round and renumbered, so that (old) 2.19 comes before (old) 2.18

Section 3: Waves

- 3.2 "understand the difference between longitudinal and transverse waves and describe experiments to show longitudinal and transverse waves in, for example, ropes, springs and water"
- 3.3 "define amplitude..."
- 3.4 "understand that waves transfer energy..."
- 3.5 "know and use the relationship..."
- 3.9 "identify the order of the electromagnetic spectrum in terms of..."
- 3.10 "explain some of the uses of electromagnetic radiations..."
- 3.11 "understand the detrimental effects... and describe simple protective measures against the risks"
- 3.12 "understand that light waves are transverse waves..."
- 3.13 "use the law of reflection (the angle of incidence..."

- 3.16 "know and use the relationship..."
- 3.19 "explain the meaning of the critical angle, c "
- 3.20 "know and use the relationship..."
- 3.21 "understand that sound waves are longitudinal waves and how they can be reflected..."
- 3.22 "understand that the frequency range..."
- 3.23 "describe an experiment to measure the speed of sound in air"

Section 4: Energy resources and energy transfer

- 4.4 "know and use the relationship..."
- 4.6 "describe how energy transfer may take place..."
- 4.7 "explain the role of convection..."
- 4.8 "explain how insulation is used..."
- 4.9 "know and use the relationship..."
- 4.11 "know and use the relationship..."
- 4.12 "know and use the relationship..."
- 4.16 "describe the energy transfers involved..."

Section 5: Solids, liquids and gases

- 5.2 "know and use the relationship..."
- 5.3 "describe experiments to determine density..."
- 5.4 "know and use the relationship..."
- 5.6 "know and use the relationship..."
- 5.7 "understand the significance of Brownian motion, as supporting evidence for particle theory"
- 5.8 "understand that molecules in a gas..."
- 5.9 "understand why there is an absolute zero of temperature..."

Section 6: Magnetism and electromagnetism

- 6.3 "describe experiments to investigate the magnetic field pattern..."
- 6.4 "describe how to use two permanent magnets..."

- 6.5 "understand that an electric current in a conductor..."
- 6.6 "understand that a force is exerted..."
- 6.8 "describe how the force on a current-carrying conductor..."
- 6.9 "understand that a voltage is induced... when a magnetic field changes through it and describe the factors..."

Section 7: Radioactivity and particles

- 7.9 "explain the sources..."
- 7.11 "understand the term 'half-life' and that it is different..."
- 7.14 "...and describe how the associated risks can be reduced"
- 7.18 "understand that the fission of U-235..."