Advance information June 2022

GCSE Combined Science: Synergy (8465)

Version 1.0

Because of the ongoing impacts of the Coronavirus (COVID-19) pandemic, we are providing advance information on the focus of June 2022 exams to help students revise.

This is the advance information for GCSE Combined Science: Synergy (8465).

Information

- The format/structure of the papers remains unchanged.
- This advance information covers all examined components.
- For each set of papers the list shows the major focus of the content of the exam.
- Each paper may cover some, or all, of the content in the listed topic.
- Another list shows which required practical activities will be assessed.
- Topics **not** assessed either directly or through 'linked' content have also been listed.
- The information is presented in specification order and not in question order.
- Assessment of practical skills, maths skills, and Working Scientifically skills will occur throughout all the papers.
- It is **not** permitted to take this advance information into the exam.

Advice

- It is advised that teaching and learning should still cover the entire subject content in the specification, so that students are as well prepared as possible for progression to the next stage of their education.
- Topics not explicitly given in any list may appear in low tariff questions or via 'linked' questions. Linked questions are those that bring together knowledge, skills and understanding from across the specification.
- Students will still be expected to apply their knowledge to unfamiliar contexts.

Focus of the June 2022 exam

Life and environmental sciences: Papers 1F and 2F 8465/1F, 8465/2F

For these papers, the following list shows the major focus of the content of the exam:

- 4.1.1 States of matter
- 4.1.2 Atomic structure
- 4.1.3 Cells in animals and plants
- 4.1.4 Waves
- 4.2.1 Systems in the human body
- 4.2.2 Plants and photosynthesis
- 4.3.1 Lifestyle and health
- 4.3.3 Preventing, treating and curing disease
- 4.4.2 Ecosystems and biodiversity
- 4.4.3 Inheritance
- 4.4.4 Variation and evolution

Required practical activities that **will be assessed**:

- Required practical activity 1: use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. Volume should be determined from the dimensions of a regularly shaped object and by a displacement technique for irregularly shaped objects. Dimensions to be measured using appropriate apparatus such as a ruler, micrometer or Vernier callipers.
- Required practical activity 4: investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.
- Required practical activity 5: make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.
- Required practical activity 7: use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict's test for sugars, iodine test for starch and Biuret reagent for protein.
- Required practical activity 9: investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate R_f values.
- Required practical activity 12: measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.

Topics **not assessed** in these papers:

- 4.1.1.5 Meanings of purity
- 4.2.2.6 Factors affecting the rate of photosynthesis
- 4.2.2.7 Translocation
- 4.2.2.8 Plant diseases
- 4.3.2.3 Half-life
- 4.3.2.4 Penetration properties of radiations
- 4.3.2.5 Contamination and irradiation
- 4.4.1.1 Development of the Earth's atmosphere
- 4.4.1.2 The carbon cycle
- 4.4.1.3 The greenhouse effect
- 4.4.1.4 Human impacts on the climate
- 4.4.1.5 Climate change: impacts and mitigation
- 4.4.1.6 Pollutants that affect air quality
- 4.4.1.7 The water cycle
- 4.4.2.1 Levels of organisation in an ecosystem
- 4.4.2.6 Negative human impacts on ecosystems

Life and environmental sciences: Papers 1H and 2H 8465/1H, 8465/2H

For these papers, the following list shows the major focus of the content of the exam:

- 4.1.1 States of matter
- 4.1.2 Atomic structure
- 4.1.3 Cells in animals and plants
- 4.1.4 Waves
- 4.2.1 Systems in the human body
- 4.2.2 Plants and photosynthesis
- 4.3.1 Lifestyle and health
- 4.3.2 Radiation and risk
- 4.3.3 Preventing, treating and curing diseases
- 4.4.2 Ecosystems and biodiversity
- 4.4.3 Inheritance
- 4.4.4 Variation and evolution

Required practical activities that **will be assessed**:

- Required practical activity 1: use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. Volume should be determined from the dimensions of a regularly shaped object and by a displacement technique for irregularly shaped objects. Dimensions to be measured using appropriate apparatus such as a ruler, micrometer or Vernier callipers.
- Required practical activity 4: investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.
- Required practical activity 5: make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.
- Required practical activity 7: use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict's test for sugars, iodine test for starch and Biuret reagent for protein.
- Required practical activity 9: investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate R_f values.
- Required practical activity 12: measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.

Topics **not assessed** in these papers:

- 4.1.1.5 Meanings of purity
- 4.1.3.4 Mitosis and the cell cycle
- 4.1.3.5 Meiosis
- 4.2.1.7 The human endocrine system
- 4.2.2.2 Plant structures
- 4.2.2.6 Factors affecting the rate of photosynthesis
- 4.2.2.8 Plant diseases
- 4.3.1.8 Treatments for infertility
- 4.3.2.3 Half-life
- 4.3.2.4 Penetration properties of radiations
- 4.3.2.5 Contamination and irradiation
- 4.3.3.5 Vaccination
- 4.3.3.9 Stem cells
- 4.4.1.1 Development of the Earth's atmosphere
- 4.4.1.2 The carbon cycle
- 4.4.1.3 The greenhouse effect
- 4.4.1.4 Human impacts on the climate
- 4.4.1.5 Climate change: impacts and mitigation
- 4.4.1.6 Pollutants that affect air quality
- 4.4.1.7 The water cycle
- 4.4.2.1 Levels of organisation in an ecosystem
- 4.4.2.6 Negative human impacts on ecosystems
- 4.4.3.2 Sex determination in humans
- 4.4.4.3 Evidence for evolution

Physical sciences: Papers 3F and 4F 8465/3F, 8465/4F

For these papers, the following list shows the major focus of the content of the exam:

- 4.5.2 Chemical quantities
- 4.6.1 Forces and energy changes
- 4.6.2 Structure and bonding
- 4.6.3 Magnetism and electromagnetism
- 4.7.1 Forces and motion
- 4.7.2 Electricity
- 4.7.3 Acids and alkalis
- 4.7.4 The rate and extent of chemical change
- 4.8.1 Carbon chemistry

Required practical activities that **will be assessed**:

- Required practical activity 13: investigate the relationship between force and extension for a spring.
- Required practical activity 15: use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements including a filament lamp, a diode and a resistor at constant temperature.
- Required practical activity 16: use circuit diagrams to set up an appropriate circuit to investigate the factors affecting the resistance of an electrical component.
  This should include:
  - the length of a wire at constant temperature
  - combinations of resistors in series and in parallel.
- Required practical activity 19: investigate how changes in concentration affect the rates of reactions.
- Required practical activity 21: investigate what happens when aqueous solutions are electrolysed using inert electrodes.

Topics **not assessed** in these papers:

- 4.5.1.3 Group 0
- 4.7.4.6 Catalysts
- 4.7.4.7 Enzymes
- 4.8.2.4 Energy resources
- 4.8.2.8 Life cycle assessment
- 4.8.2.9 Recycling

Physical sciences: Papers 3H and 4H 8465/3H, 8465/4H

For these papers, the following list shows the major focus of the content of the exam:

- 4.5.2 Chemical quantities
- 4.6.1 Forces and energy changes
- 4.6.2 Structure and bonding
- 4.6.3 Magnetism and electromagnetism
- 4.7.1 Forces and motion
- 4.7.2 Electricity
- 4.7.3 Acids and alkalis
- 4.7.4 The rate and extent of chemical change
- 4.8.2 Resources of materials and energy

Required practical activities that **will be assessed**:

- Required practical activity 13: investigate the relationship between force and extension for a spring.
- Required practical activity 14: investigate the effect of varying the force on the acceleration of an object of constant mass and the effect of varying the mass of an object on the acceleration produced by a constant force.
- Required practical activity 15: use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements including a filament lamp, a diode and a resistor at constant temperature.
- Required practical activity 16: use circuit diagrams to set up an appropriate circuit to investigate the factors affecting the resistance of an electrical component.
  This should include:
  - the length of a wire at constant temperature
  - combinations of resistors in series and in parallel.
- Required practical activity 19: investigate how changes in concentration affect the rates of reactions.

Topics **not assessed** in these papers:

- 4.6.3.5 Motor effect
- 4.6.3.6 Electric motors
- 4.7.1.3 Circular motion
- 4.7.4.6 Catalysts
- 4.7.4.7 Enzymes
- 4.8.2.4 Energy resources

END OF ADVANCE INFORMATION