

## Examination Scope: Science

Year: 9

# Checkpoint examinations

### Key information:

- The Checkpoint examinations are external examinations marked by Cambridge International.
- The mocks for the Checkpoint examinations are in March, with the actual examinations held in April.
- The Checkpoints assess all skills and content the students have learnt in years 7, 8 and 9.
- The full framework is included in this document. The framework contains all the learning objectives for Key Stage 3 Science. Students need to know all of these points, and be able to apply them to solve problems, if they wish to obtain the highest grades in the Checkpoint Examinations.

### Prepare:

1. It is important to be positive about yourself because people who think they can do well find it easier to learn.
2. Make yourself a revision timetable.
3. The ideal length to revise one topic is 25 to 45 minutes.
4. You remember more at the beginnings and the ends of sessions, so create more beginnings and ends by stopping for a brief break or doing a brain gym exercise.
5. The ideal study room is light, airy, quiet, with shelves and a desk.
6. Vary your revision place. It's a good idea to put up posters, lists and post-it notes in other places in the house.
7. Get someone to test you after you have learned something new.
8. Feed your brain! Fresh fruit, water, fish and vegetables give you brain power!

### Suggested Revision Materials:

<http://www.bbc.co.uk/education/subjects>

CGP KS3 Science Complete Study and Practice

ISBN: 978 1 84146 385 8

Exercise Book

### Exam Materials:

Black Pens, HB Pencil, Clear Plastic 30cm Ruler, Protractor, Calculator, Pencil Sharpener, Rubber.

N.B. Whiteout is not allowed in science exams.

## Topics that are covered in the Checkpoint Examinations:

	Year 7	Year 8	Year 9
<b>Biology</b>	Unit 1: Plants and Humans as Organisms	Unit 1: Plants	Unit 1: Plants
	Unit 2: Cells and Organisation	Unit 2: Food and Digestion	Unit 2: Living things in their environment
	Unit 3: Living things and the environment	Unit 3: The Circulatory System	Unit 3: Variation and Inheritance
	Unit 4: Variation and Classification	Unit 4: Respiration	
		Unit 5: Reproduction and Development	
<b>Chemistry</b>	Unit 5: States of Matter	Unit 6: States of Matter	Unit 4: Material Changes
	Unit 6: Material Properties	Unit 7: Elements and Compounds	Unit 5: Energy Changes
	Unit 7: Material Changes	Unit 8: Mixtures	Unit 6: Reactivity
	Unit 8: The Earth	Unit 9: Material Changes	Unit 7: Salts
			Unit 8: Rates of Reaction
<b>Physics</b>	Unit 9: Forces and Motion	Unit 10: Measuring Motion	Unit 9: Forces in Action
	Unit 10: Energy	Unit 11: Sound	Unit 10: Electricity
	Unit 11: The Earth and Beyond	Unit 12: Light	Unit 11: Energy
		Unit 13: Magnetism	

## Key learning points from the Cambridge lower secondary framework (in order of year taught):

### Scientific enquiry

#### Ep Ideas and evidence

- **7Ep1** Be able to talk about the importance of questions, evidence and explanations
- **7Ep2** Make predictions and review them against evidence

#### Ep Plan investigative work

- **7Ep3** Suggest ideas that may be tested
- **7Ep4** Outline plans to carry out investigations, considering the variables to control, change or observe
- **7Ep5** Make predictions referring to previous scientific knowledge and understanding
- **7Ep6** Identify appropriate evidence to collect and suitable methods of collection
- **7Ep7** Choose appropriate apparatus and use it correctly

#### Eo Obtain and present evidence

- **7Eo1** Make careful observations including measurements
- **7Eo2** Present results in the form of tables, bar charts and line graphs
- **7Eo3** Use information from secondary sources

#### Ec Consider evidence and approach

- **7Ec1** Make conclusions from collected data, including those presented in a graph, chart or spreadsheet
- **7Ec2** Recognise results and observations that do not fit into a pattern, including those presented in a graph, chart or spreadsheet
- **7Ec3** Consider explanations for predictions using scientific knowledge and understanding and communicate these
- **7Ec4** Present conclusions using different methods

### Biology

#### Bp Plants

- **7Bp1** Recognise the positions, and know the functions of the major organs of flowering plants, e.g. root, stem, leaf

#### Bh Humans as organisms

- **7Bh1** Explore the role of the skeleton and joints and the principle of antagonistic muscles
- **7Bh2** Recognise the positions and know the functions of the major organ systems of the human body.
- **7Bh3** Research the work of scientists studying the human body

#### Bc Cells and organisms

- **7Bc1** Identify the seven characteristics of living things and relate these to a wide range of organisms in the local and wider environment
- **7Bc2** Know about the role of micro-organisms in the breakdown of organic matter, food production and disease, including the work of Louis Pasteur
- **7Bc3** Identify the structures present in plant and animal cells as seen with a simple light microscope and/or a computer microscope
- **7Bc4** Compare the structure of plant and animal cells
- **7Bc5** Relate the structure of some common cells to their functions. Secondary sources can be used
- **7Bc6** Understand that cells can be grouped together to form tissues, organs and organisms

#### Be Living things in their environment

- **7Be1** Describe how organisms are adapted to their habitat, drawing on locally occurring examples. Secondary sources can be used
- **7Be2** Draw and model simple food chains
- **7Be3** Discuss positive and negative influence of humans on the environment, e.g. the effect on food chains, pollution and ozone depletion
- **7Be4** Discuss a range of energy sources and distinguish between renewable and non-renewable resources. Secondary sources can be used

#### Bv Variation and classification

- **7Bv1** Understand what is meant by a species
- **7Bv2** Investigate variation within a species. Secondary sources can be used
- **7Bv3** Classify animals and plants into major groups, using some locally occurring examples

## Chemistry

### Cs States of matter

- **7Cs1** Show in outline how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state

### Cp Material properties

- **7Cp1** Distinguish between metals and non-metals
- **7Cp2** Describe everyday materials and their physical properties

### Cc Material changes

- **7Cc1** Use a pH scale.
- **7Cc2** Understand neutralisation and some of its applications
- **7Cc3** Use indicators to distinguish acid and alkaline solutions

### Ce The Earth

- **7Ce1** Observe and classify different types of rocks and soils
- **7Ce2** Research simple models of the internal structure of the Earth
- **7Ce3** Examine fossils and research the fossil record
- **7Ce4** Discuss the fossil record as a guide to estimating the age of the Earth
- **7Ce5** Learn about most recent estimates of the age of the Earth

## Physics

### Pf Forces and motion

- **7Pf1** Describe the effects of forces on motion, including friction and air resistance
- **7Pf2** Describe the effect of gravity on objects. Secondary sources can be used

### Pe Energy

- **7Pe1** Understand that energy cannot be created or destroyed and that energy is always conserved
- **7Pe2** Recognise different energy types and energy transfers

### Pb The Earth and beyond

- **7Pb1** Describe how the movement of the Earth causes the *apparent* daily and annual movement of the sun and the stars
- **7Pb2** Describe the relative position and movement of the planets and the sun in the solar system
- **7Pb3** Discuss the impact of the ideas and discoveries of Copernicus, Galileo and more recent scientists
- **7Pb4** Understand that the sun and other stars are sources of light and that planets and other bodies are seen by reflected light

## Scientific enquiry

### Ep Ideas and evidence

- **8Ep1** Discuss the importance of developing empirical questions which can be investigated, collecting evidence, developing explanations and using creative thinking
- **8Ep2** Test predictions with reference to evidence gained

### Ep Plan investigative work

- **8Ep3** Select ideas and turn them into a form that can be tested
- **8Ep4** Plan investigations to test ideas
- **8Ep5** Identify important variables; choose which variables to change, control and measure
- **8Ep6** Make predictions using scientific knowledge and understanding

### Eo Obtain and present evidence

- **8Eo1** Take appropriately accurate measurements
- **8Eo2** Use a range of equipment correctly
- **8Eo3** Discuss and control risks to themselves and others
- **8Eo4** Present results as appropriate in tables and graphs

### Ec Consider evidence and approach

- **8Ec1** Make simple calculations
- **8Ec2** Identify trends and patterns in results (correlations)
- **8Ec3** Compare results with predictions
- **8Ec4** Identify anomalous results and suggest improvements to investigations
- **8Ec5** Interpret data from secondary sources
- **8Ec6** Discuss explanations for results using scientific knowledge and understanding. Communicate these clearly to others
- **8Ec7** Present conclusions to others in appropriate ways

# Biology

## Bp Plants

- **8Bp1** Explore how plants need carbon dioxide, water and light for photosynthesis in order to make biomass and oxygen
- **8Bp2** Describe the absorption and transport of water and mineral salts in flowering plants

## Bh Humans as organisms

- **8Bh1** Identify the constituents of a balanced diet and the functions of various nutrients. Secondary sources can be used
- **8Bh2** Understand the effects of nutritional deficiencies
- **8Bh3** Recognise the organs of the alimentary canal and know their functions. Secondary sources can be used
- **8Bh4** Understand the function of enzymes as biological catalysts in breaking down food to simple chemicals
- **8Bh5** Recognise and model the basic components of the circulatory system and know their functions
- **8Bh6** Understand the relationship between diet and fitness
- **8Bh7** Discuss how conception, growth, development, behaviour and health can be affected by diet, drugs and disease
- **8Bh8** Recognise the basic components of the respiratory system and know their functions
- **8Bh9** Define and describe aerobic respiration, and use the word equation
- **8Bh10** Explain gaseous exchange
- **8Bh11** Describe the effects of smoking. Secondary sources can be used
- **8Bh12** Discuss the physical and emotional changes that take place during adolescence
- **8Bh13** Describe the human reproductive system, including the menstrual cycle, fertilisation and foetal development

# C Chemistry

## Cs States of matter

- **8Cs1** Show how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state, gas pressure and diffusion

## Cp Material properties

- **8Cp1** Describe and explain the differences between metals and non-metals
- **8Cp2** Give chemical symbols for the first twenty elements of the Periodic Table
- **8Cp3** Understand that elements are made of atoms
- **8Cp4** Explain the idea of compounds
- **8Cp5** Name some common compounds including oxides, hydroxides, chlorides, sulfates and carbonates
- **8Cp6** Distinguish between elements, compounds and mixtures

## Cc Material changes

- **8Cc1** Use a word equation to describe a common reaction. Secondary sources can be used
- **8Cc2** Describe chemical reactions which are not useful, e.g. rusting

# P Physics

## Pf Forces and motion

- **8Pf1** Calculate average speeds, including through the use of timing gates
- **8Pf2** Interpret simple distance/time graphs

## Ps Sound

- **8Ps1** Explain the properties of sound in terms of movement of air particles
- **8Ps2** Recognise the link between loudness and amplitude, pitch and frequency, using an oscilloscope

## Pl Light

- **8Pl1** Use light travelling in a straight line to explain the formation of shadows and other phenomena
- **8Pl2** Describe how non-luminous objects are seen
- **8Pl3** Describe reflection at a plane surface and use the law of reflection
- **8Pl4** Investigate refraction at the boundary between air and glass or air and water
- **8Pl5** Explain the dispersion of white light
- **8Pl6** Explain colour addition and subtraction, and the absorption and reflection of coloured light

## Pm Magnetism

- **8Pm1** Describe the properties of magnets
- **8Pm2** Recognise and reproduce the magnetic field pattern of a bar magnet
- **8Pm3** Construct and use an electromagnet

## Scientific enquiry

### Ep Ideas and evidence

- **9Ep1** Discuss and explain the importance of questions, evidence and explanations, using historical and contemporary examples
- **9Ep2** Test explanations by using them to make predictions and then evaluate these against evidence
- **9Ep3** Discuss the way that scientists work today and how they worked in the past, including reference to experimentation, evidence and creative thought

### Ep Plan investigative work

- **9Ep4** Select ideas and produce plans for testing based on previous knowledge, understanding and research
- **9Ep5** Suggest and use preliminary work to decide how to carry out an investigation
- **9Ep6** Decide whether to use evidence from first hand experience or secondary sources
- **9Ep7** Decide which measurements and observations are necessary and what equipment to use
- **9Ep8** Decide which apparatus to use and assess any hazards in the laboratory, field or workplace
- **9Ep9** Use appropriate sampling techniques where required

### Eo Obtain and present evidence

- **9Eo1** Make sufficient observations and measurements to reduce error and make results more reliable
- **9Eo2** Use a range of materials and equipment and control risks
- **9Eo3** Make observations and measurements
- **9Eo4** Choose the best way to present results

### Ec Consider evidence and approach

- **9Ec1** Describe patterns (correlations) seen in results
- **9Ec2** Interpret results using scientific knowledge and understanding
- **9Ec3** Look critically at sources of secondary data
- **9Ec4** Draw conclusions
- **9Ec5** Evaluate the methods used and refine for further investigations
- **9Ec6** Compare results and methods used by others
- **9Ec7** Present conclusions and evaluation of working methods in different ways
- **9Ec8** Explain results using scientific knowledge and understanding. Communicate this clearly to others

## Biology

### Bp Plants

- **9Bp1** Define and describe photosynthesis, and use the word equation
- **9Bp2** Understand the importance of water and mineral salts to plant growth
- **9Bp3** Understand sexual reproduction in flowering plants, including pollination, fertilisation, seed formation and dispersal

### Be Living things in their environment

- **9Be1** Explain the ways in which living things are adapted to their habitats. Secondary sources can be used
- **9Be2** Research the work of scientists studying the natural world. Secondary sources can be used
- **9Be3** Explain and model food chains, food webs and energy flow
- **9Be4** Explain the role of decomposers
- **9Be5** Describe factors affecting the size of populations
- **9Be6** Describe and investigate some effects of human influences on the environment

### Bv Variation and classification

- **9Bv1** Use and construct keys to identify plants and animals
- **9Bv2** Understand that organisms inherit characteristics from their parents through genetic material that is carried in cell nuclei
- **9Bv3** Describe how selective breeding can lead to new varieties
- **9Bv4** Discuss the work of Darwin in developing the scientific theory of natural selection

## Chemistry

### Cp Material properties

- **9Cp1** Describe the structure of an atom and learn about the methods and discoveries of Rutherford
- **9Cp2** Compare the structures of the first twenty elements of the Periodic Table
- **9Cp3** Describe trends in groups and periods
- **9Cp4** Talk about the contribution of scientists. Secondary sources can be used

### Cc Material changes

- **9Cc1** Explore and explain the idea of endothermic processes, e.g. melting of ice, and exothermic reactions, e.g. burning, oxidation
- **9Cc2** Describe the reactivity of metals with oxygen, water and dilute acids
- **9Cc3** Explore and understand the reactivity series
- **9Cc4** Give examples of displacement reactions
- **9Cc5** Explain how to prepare some common salts by the reactions of metals and metal carbonates and be able to write word equations for these reactions
- **9Cc6** Give an explanation of the effects of concentration, particle size, temperature and catalysts on the rate of a reaction

## P Physics

### Pf Forces and motion

- **9Pf1** Explain that pressure is caused by the action of a force on an area
- **9Pf2** Determine densities of solids, liquids and gases
- **9Pf3** Explain pressures in gases and liquids (qualitative only)
- **9Pf4** Know that forces can cause objects to turn on a pivot and understand the principle of moments

### Pm Electricity

- **9Pm1** Describe electrostatics and the concept of charge, including digital sensors
- **9Pm2** Interpret and draw simple parallel circuits
- **9Pm3** Model and explain how common types of components, including cells (batteries), affect current
- **9Pm4** Explain how current divides in parallel circuits
- **9Pm5** Measure current using ammeters and voltage using voltmeters, including digital meters

### Pe Energy

- **9Pe1** Use knowledge of energy sources including fossil fuels and renewable energy resources to consider the world's energy needs, including research from secondary sources
- **9Pe2** Identify and explain the thermal (heat) energy transfer processes of conduction, convection and radiation
- **9Pe3** Explain cooling by evaporation

### Answers/Responses:

- ✓ Ensure your hand writing is clear; especially with numerical answers and when writing units.
- ✓ All answers should fit in the space provided. In the very rare case you need more space put an asterisk next to the question and then find space elsewhere on the paper and finish the answer there.
- ✓ If you have to use a different space for a rewritten another answer or to continue an answer, put a note to tell the examiner where it is, e.g. 'see page 5'.
- ✓ If you are stuck on a question simply circle the question number and then move on. Ensure you have enough time to answer the questions you do know and then come back to solve ones you are unsure of.
- ✓ Show your working for calculations.
- ✓ Do not waste time, and space, by writing out the question before you start to answer.
- ✓ If you wish to change an answer, cross out your first answer and rewrite. Do not write over what you have already written.
- ✓ If you have to cross out something, put a line through it, do not scribble over it.
- ✓ For questions that are long try highlighting the key terms to help you focus on what the question is asking you to do.
- ✓ Always try to write accurately using the correct scientific terms. Candidates often lose marks because they do not use the vocabulary correctly.
- ✓ Do not use words like 'it', 'they', 'effect', 'affect' without any more explanation. A sentence like 'It has an effect on the body' or 'They affect the process' does not say anything.
- ✓ If you want to use the word 'it' or 'they' – think 'what is it?' or 'what are they?' and then phrase your answer more precisely.
- ✓ If you want to use the word 'affect' or 'effect' – think 'how do they affect' or 'what is the effect that they have?'
- ✓ If you are asked to compare something then ensure you mention both things (e.g. "solar cells are renewable but fossil fuels are not" is fine as a comparison but "solar cells are renewable" is not).
- ✓ Once finished ensure you have not missed out any questions (students often miss out answers when asked to add to a diagram/graph/table).