Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning

GCSE subject criteria for physics

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Contents

Introduction

1. GCSE subject criteria set out the knowledge, understanding, skills and assessment objectives common to all GCSE specifications in physics. They provide the framework within which an awarding organisation creates the detail of the specification.

2. Specifications must also meet the regulators' general requirements, including the common and GCSE criteria as defined in *The statutory regulation of external qualifications* (QCA/04/1293).

3. Subject criteria are intended to:

    - help ensure consistent and comparable standards in the same subject across the awarding organisations
    - ensure that the rigour of GCSEs is maintained
    - ensure that specifications build on the knowledge, understanding and skills established by the national curricula for England, Northern Ireland and Wales, and facilitate progression to higher level qualifications in physics
    - help higher education institutions, employers and other stakeholders, such as learners and parents/guardians, know what has been studied and assessed.

4. Any GCSE specification that contains significant elements of physics must be consistent with the relevant parts of these subject criteria

5. Specifications must contain sufficient additional appropriate content to merit 120-140 guided learning hours.

Aims and learning outcomes

6. GCSE specifications in physics should encourage learners to be inspired, motivated and challenged by following a broad, coherent, practical, satisfying and worthwhile course of study. They should encourage learners to develop their curiosity about the physical world, and provide insight into and experience of how science works. They should enable learners to engage with physics in their everyday lives and to make informed choices about further study in physics and related disciplines and about career choices.

7. GCSE specifications in physics must enable learners to:

   - develop their knowledge and understanding of physics
   - develop their understanding of the effects of physics and its applications on society
   - develop an understanding of the importance of scale in physics
   - develop and apply their knowledge and understanding of the nature of science and of the scientific process
   - develop their understanding of the relationships between hypotheses, evidence, theories and explanations
   - develop their awareness of risk and the ability to assess potential risk in the context of potential benefits
   - develop and apply their observational, practical, modelling, enquiry and problem-solving skills and understanding in the laboratory, and in other learning environments
   - develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions both qualitatively and quantitatively
   - develop their skills in communication, mathematics and the use of technology in scientific contexts.

Subject content

8. The content of GCSE specifications in physics must reflect the learning outcomes.

9. GCSE specifications in physics must be consistent with the national curriculum key stage 4 programmes of study requirements for science in the orders for England and Wales, and the statutory requirements for key stage 4 in Northern Ireland.

10. GCSE specifications in physics must require learners to develop the knowledge, skills and understanding specified below.

11. GCSE specifications in physics must ensure the qualification is comparable in content and range with other GCSE science qualifications

12. GCSE specifications in physics must require learners to demonstrate knowledge and understanding of:

    - physics as an evidence-based discipline
    - the collaborative nature of science as a subject discipline and the way new scientific knowledge is validated
    - how scientific understanding and theories develop and the limitations of science
    - how and why decisions about science and technology are made
    - the ethical implications of physics and its applications
    - the importance of scale in terms of size, time and space in physics
    - the importance of working accurately and safely
    - hazard identification and risk assessment
    - risk factors and risk assessment in the context of potential benefit
    - the use of modelling, including mathematical modelling, to explain aspects of physics
    - energy conservation, the efficiency of energy transfer and the associated economic and environmental implications
    - the relationship between work and energy, and changes in kinetic energy and gravitational potential energy

- the use of kinetic theory and atomic structure as models to explain physical phenomena
- Newton’s laws of motion and their theoretical and practical uses
- calculating changes in the velocity and acceleration of bodies acted on by forces, including momentum
- the generation and control of electrical power and the relationship between power, current and voltage
- the distribution and uses of electricity
- the relationship between power, energy and time
- electrical circuits, including the relationship between resistance, current and voltage
- the wave equation and the transfer of energy and information by waves
- the relationship between the properties of electromagnetic waves and their uses
- radioactivity, sources of background radiation
- ionising radiations, including that they are emitted all the time by radioactive materials and that they can transfer energy
- effects of ionising radiations
- radioactive decay, half-life, fission and fusion
- the evidence for the origin, structure and continuing evolution of the universe

13. GCSE specifications in physics must require learners to develop the ability to:

- develop hypotheses and plan practical ways to test them including risk assessment; manage risks when carrying out practical work; collect, process, analyse and interpret primary and secondary data including the use of appropriate technology to draw evidence-based conclusions; review methodology to assess fitness for purpose, and review hypotheses in light of outcomes
- use scientific theories, models and evidence to develop hypotheses, arguments and explanations; develop and use models to explain systems, processes and abstract ideas
- communicate scientific information using scientific, technical and mathematical language, conventions, and symbols.

Assessment objectives

14. All specifications in physics must require candidates to demonstrate their ability to:

	Assessment objectives	Weighting (%)
AO1	Recall, select and communicate their knowledge and understanding of physics	30–40
AO2	Apply skills, knowledge and understanding of physics in practical and other contexts	30–40
AO3	Analyse and evaluate evidence, make reasoned judgements and draw conclusions based on evidence	25–35

Scheme of assessment

15. GCSE specifications in physics must allocate a weighting of 75 per cent to external assessment and a weighting of 25 per cent to controlled assessment in the overall scheme of assessment.

16. Question papers in physics must be targeted at either foundation or higher tier.

Grade descriptions

17. Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by candidates awarded particular grades. The descriptions must be interpreted in relation to the content in the specification; they are not designed to define that content.

18. The grade awarded will depend in practice upon the extent to which the candidate has met the assessment objectives overall. Shortcomings in some aspects of candidates' performance in the assessment may be balanced by better performances in others.

Grade	Description
A	
C	
F	

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