

Cambridge IGSCE Physics

- PS 1 Newton's Laws of Motion: Understand Newton's Third Law so that for any given system, the forces acting on the objects of that system can be identified by pairs, magnitude, and direction. Describe the ways in which a force may change the motion of a body. Understand that the total momentum of a closed system remains constant.
- PS 2 A net force will cause an object to accelerate or change direction. A less massive object will speed up more quickly than a more massive object to the same force. (Newton's Second Law of Motion, $F = ma$). Recognize from the shape of a speed/time graph when a body is at rest, moving with constant speed, moving with changing speed. Demonstrate some understanding that acceleration is related to changing speed. Describe the ways in which a force may change the motion of a body.
- PS 3 Work, Energy, Power: Understand the definition of work, including when it is positive, negative, or zero, and apply the work-energy theorem. Describe energy changes in terms of work done. Relate power to work done and time taken, using appropriate examples.
- PS 4 Gravitation: Understand Newton's Law of Universal Gravitation. Understand that the acceleration of free fall for a body near to the Earth is constant. Understand that the force of gravity is proportional to the product of two masses and inversely proportional to the square of the distance between the masses' centers.
- PS 5 Laws of Thermodynamics: Apply the first law of thermodynamics and understand the second law of thermodynamics, the concept of entropy. Interpret the temperature of a gas in terms of the motion of its molecules. Describe qualitatively the effect of a change of temperature on the volume of a gas at constant pressure.
- PS 6 Fluid Mechanics: Understand the concept of hydrostatic pressure, buoyancy, fluid flow continuity, and Bernoulli's equation. Relate pressure to force and area, using appropriate examples. Relate the pressure beneath a liquid surface to depth and density.
- PS 7 Wave motion (including sound): Understand the properties of traveling waves. Describe the use of water waves to show reflection at a plane surface, refraction due to a change in speed, and diffraction produced by wide and narrow gaps. Describe an experiment to determine the speed of sound in air.
- PS 8 Physical Optics: Understand the electromagnetic spectrum as a wave phenomenon. Describe the role of electromagnetic waves in radio and television communications, satellite television and phones, electrical appliances, medicine, and security. Describe the formation of images by plane mirrors (reflection) and lenses (refraction).
- PS 9 Electrostatics: Understand electric charge and properties of electrostatics. Describe simple experiments to show the production and detection of electrostatic charges. Describe an electric field as a region in which an electric charge experiences a force.
- PS 10 Electric Circuits: Understand electric current and potential difference as they apply to electric circuits. Show that current is related to the flow of charge. Draw and interpret circuit diagrams containing sources of potential difference, switches, resistors, lamps, ammeters, voltmeters, etc. Understand the relationship between emf and potential difference and that the two are measured in the same units.
- PS 11 Understand the magnetic effects of electric current in both DC and AC circuits. Describe an experiment that shows that a changing magnetic field can induce an emf in a circuit. Describe the construction of a basic iron-core transformer and how it is used for voltage transformations.
- PS 12 Atomic Physics: Understand nuclear structure, nuclear reaction equations, isotopes, and α , β , and γ radioactivity. State the meaning of radioactive decay, using equations to represent changes in the composition of the nucleus when particles are emitted. Understand the term half-life in simple calculations which might involve information in tables and decay curves.
- PS 13 Lab Activities: Develop skills needed to carry out experimental and investigational work. Plot data on a graph and evaluate the relationships between the manipulated and responding variables. Manipulate equipment and measuring devices in a manner that maximizes the accuracy of data gathered.
- PS 14 Analyze scientific investigations for validity of method and reliability of results. Explain the purpose of the steps of an investigation in terms of the validity of the investigation. Explain an appropriate type of investigation to

ensure reliability and validity for a given investigative question.

- PS 15 Science is a human endeavor that involves logical reasoning and creativity and entails the testing, revision, and occasional discarding of theories as new evidence comes to light. Evaluate an investigation to determine if it was a valid means of answering the question. Demonstrate that science is a human endeavor that involves logical reasoning and creativity using development of a scientific theory.
- PS 16 11-12.RST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
- PS 17 11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- PS 18 11-12.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
- PS 19 11-12.RST.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- PS 20 11-12.WHST.1 Write arguments focused on discipline-specific content.
- a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
 - b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.
 - c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
 - d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
 - e. Provide a concluding statement or section that follows from or supports the argument presented.
- PS 21 11-12.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- PS 22 11-12.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.