Science Education Key Learning Area: Physics
Curriculum Framework of National Security Education (2025)

Introduction

This Curriculum Framework[1] illustrates, in tabular form, how learning in Physics can be connected to the relevant learning elements of national security education, facilitating schools in planning the learning content for national security education. Schools should integrate national security education into the curriculum planning and learning and teaching of this subject through "organic integration", "natural connection", "diversified strategies", "mutual coordination", "learning within and beyond the classroom" and "whole-school participation". In addition, schools should also refer to the *Curriculum Framework of National Security Education in Hong Kong (2025)* and other relevant curriculum documents to implement national security education more effectively.

1. Overall Teaching Foci

1.1 The Physics curriculum includes topics related to nuclear energy, the use of energy, and space science. Through these topics, students can understand the impact of human activities on the environment, appreciate the importance of sustainable development and recognise the necessity of safeguarding ecological security, resource security, nuclear security, outer space security and science and technology security.

1.2 By discussing the relevant topics of radioactivity, nuclear fission and fusion, and renewable energy sources, students can learn about the detection of radiation, nuclear power generation and the environmental impact of energy consumption. They will also gain an

[1] The content of this framework is set out in the form of examples. Schools should adopt or adapt the relevant suggestions based on students' learning needs and abilities.

awareness of the environmental impact of different energy sources and the importance of resource utilisation, thereby understanding the necessity of safeguarding ecological security, resource security and nuclear security.

1.3 The Physics curriculum covers the topic of orbital motions under gravity. Through studying the physics of the motion of celestial bodies and spacecrafts, students can understand the positive impact of advances in space science on various aspects of life and social development, as well as the importance of safeguarding outer space security and science and technology security for national interests, thereby supporting the development of our country's aerospace industry.

1.4 The Physics curriculum covers topics that highlight connection between physics and technology, society and the environment, such as nuclear power generation and space science. When studying relevant topics, citing examples from our country and Hong Kong can help students deepen their understanding of our country, recognise the important role of national security in national developments, and strengthen their sense of mission to consciously safeguard national security.

2. Learning Foci

Science Education Key Learning Area: Physics [Key Stage 4 (Senior Secondary)]		Curriculum Framework of National Security Education in Hong Kong (2025)
Learning Areas (Examples)	**Learning Elements (Examples)**	**Related Learning Elements / Major Fields of National Security (Examples)**
• Detection of radiation • Nuclear fission and fusion	• Understand the nature and properties of radiation, the wide range of uses of ionising radiation and nuclear fission and fusion ➢ Through discussing the characteristics of ionising radiation and methods for reducing absorbed radiation dose, along with conducting related physics experiments, students can learn about safety precautions for handling radioactive sources and recognise the necessity of safeguarding nuclear security ➢ Through studying and calculating the immense energy released during nuclear fission and fusion, as well as collecting information on nuclear power generation and	• 4.8 Further understand the challenges and opportunities faced by our country in the process of development, thereby strengthening the sense of vigilance against potential danger in times of peace • 4.19 Learn about the potential security risks that people in our country and even the world may face in the fields of society, morality, economy, environment,

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Learning Areas (Examples)	**Learning Elements (Examples)**	**Related Learning Elements / Major Fields of National Security (Examples)**
	nuclear accidents, students can discuss the benefits and potential risks of using nuclear energy and explore its ecological impacts, thereby recognising the necessity of safeguarding ecological security, resource security and nuclear security	science and technology, etc.; and be able to make wise decisions and judgments on relevant issues that are in line with the national interests • Related major fields of national security: ecological security, resource security and nuclear security
• Orbital motions under gravity	• Understand the development of science and technology in modern space science ➢ Through studying and calculating the orbital motion of objects in space (such as satellites and space stations),	• 4.5 Further understand and care about the achievements of our country in various aspects (e.g. society, economy, national defence,

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Learning Areas (Examples)	**Learning Elements (Examples)**	**Related Learning Elements / Major Fields of National Security (Examples)**
	students can understand the immense energy required for rocket launches and the corresponding technological developments. Students can understand the insights brought by advances in space technology and its positive impact on society, thereby developing a sense of identity and mission for science and technology security and outer space security ➢ In the process of collecting information on space science applications (including the BeiDou Navigation Satellite System and the Tiangong Space Station), students can deepen their understanding of relevant physical phenomena, explore the relationship between space science and human living, and thus recognise the	environment, diplomacy, technology, healthcare, transportation and infrastructure), and have pride in our country's achievements • Related major fields of national security: science and technology security and outer space security

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Learning Areas (Examples)	**Learning Elements (Examples)**	**Related Learning Elements / Major Fields of National Security (Examples)**
	necessity of safeguarding science and technology security and outer space security	
• Renewable and non-renewable energy sources • Environmental impact of energy consumption	• Understand the energy efficiency of different energy sources and their impact on the environment ➢ Students can study and analyse data related to the use of renewable and non-renewable energy and greenhouse gases emissions, and discuss the impact of greenhouse gases emitted by energy consumption on global warming and the global ecosystems, thereby recognising the necessity of safeguarding ecological security and resource security ➢ Students can study, analyse and discuss concepts such as nuclear fission and binding energy, as well as learn our	• 4.8 Further understand the challenges and opportunities faced by our country in the process of development, thereby strengthening the sense of vigilance against potential danger in times of peace • 4.9 Have a deeper understanding of the importance of the science and innovation and technology industries in our country and Hong

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Learning Areas (Examples)	**Learning Elements (Examples)**	**Related Learning Elements / Major Fields of National Security (Examples)**
	country's development of nuclear power generation, thereby recognising the necessity of safeguarding ecological security, resource security and nuclear security	Kong in safeguarding national security and promoting sustainable development • Related major fields of national security: ecological security, resource security and nuclear security

3. Suggested Learning and Teaching Activities (Examples) (Senior Secondary)

The following are examples for reference. Teachers can design appropriate activities based on their school context and subject characteristics to promote national security education.

✧ **Project learning**

- [Radiation and radioactivity] Explore the benefits and potential risks of using nuclear power generation, as well as the ecological and environmental impacts of nuclear accidents
- [Orbital motions under gravity] Collect information on our country's space technology development (including the BeiDou Navigation Satellite System and the Tiangong Space Station) to gain a deeper understanding of related physical phenomena and explore the connections between our country's space science and people's lives

✧ **Extended learning activities**

- [Radiation and radioactivity] Use board games related to radiation monitoring and assessment to learn about nuclear safety in an accessible and engaging way
- [Orbital motions under gravity] Watch the "Tiangong Class" Chinese Space Station space lecture to gain a deeper understanding of space experiments
- [Space science] Read stories about the contributions of renowned national scientists (including Qian Xuesen, the "Father of Chinese space programme") to our country's science and technology development

✧ **Competitions**

- [Space science] Arrange students to participate in space science competitions to raise their awareness of the latest developments in our country's space technology and the importance of constructing a national self-developed space station, space engineering and technology
- [Hydrogen-oxygen fuel cells] Arrange students to participate in energy technology competitions to enhance their understanding of developing energy technologies (such as hydrogen energy) as a strategy for achieving carbon neutrality and show them the importance of developing low-carbon new energy sources for safeguarding ecological security and sustainable development

✧ **Visits**

- [Radioactivity and nuclear energy] Arrange students to visit the CLP Power Low Carbon Energy Education Centre to deepen their understanding of using low-carbon energy to combat climate change and reduce air pollution, as well as methods for reducing carbon emissions in daily life. The visit can also enhance students' knowledge of our country's nuclear energy development
- [Astronomy and space science] Arrange students to visit the Hong Kong Space Museum and the Hong Kong Base for Aerospace Science Education to deepen their understanding of our country's aerospace technology development

✧ **Exchanges with the Mainland**

- [Radioactivity and nuclear energy] Arrange students to visit the Daya Bay Nuclear Power Plant in Shenzhen to learn about its operations and emergency response measures
- [Astronomy and space science] Arrange students to visit the Zhuhai Aerospace Land in Zhuhai to learn about our country's latest achievements in the fields of space, aviation and national defence

Disclaimer:

- *In case of any discrepancy in the meaning of wording between the English text and the Chinese text, the Chinese text shall prevail.*