

Physics (S4 – S6) Curriculum Framework of National Security Education**1. General teaching foci**

- 1.1. By studying related topics “Radioactivity and Nuclear Energy”, “Energy and Use of Energy” and “Astronomy and Space Science”, students should understand the impact of human activities (such as the use of energy and the development in space science) on the environment. They should then understand the needs of sustainable development, and recognise the necessity of safeguarding ecological security, resource security, nuclear security and new security domains (e.g. space security).
- 1.2. The Physics Curriculum includes topics “Radioactivity and Nuclear Energy” and “Energy and Use of Energy”, in which students should learn about radiation safety, nuclear fission and fusion, renewable and non-renewable energy sources, and the environmental impact of energy consumption, etc. In addition, they should realise the impact of using different energy sources on the environment and the importance of making good use of resources. They should then understand the necessity of safeguarding ecological security, resource security and nuclear security.
- 1.3. The Physics Curriculum includes the topic “Astronomy and Space Science”, in which students should learn about various phenomena in astronomy and the knowledge in space science. Students should understand the implications of the advances in space science for us and their impact on society, and thereby understand the necessity of safeguarding new security domains (e.g. space security).
- 1.4. Through studying issues such as the use of energy and development in space technology, students should recognise the development in nuclear power and space technology of our country. They should understand the impact of human activities on the ecological environment and share the responsibility for sustainable development, and then being nurtured to become responsible citizens of Hong Kong, our country and the world.

2. Learning foci

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Chapter / Topic	Learning Elements	Strand	Learning Elements
V. Radioactivity and Nuclear Energy <ul style="list-style-type: none"> • Radiation safety • Nuclear fission and fusion 	<ul style="list-style-type: none"> • Understand potential hazards of ionising radiation and the ways to minimise the radiation dose absorbed • Realise safety precautions in handling radioactive sources • Realise the release of energy in nuclear fission and fusion • Realise nuclear chain reaction <ul style="list-style-type: none"> ➤ When teaching “Radioactivity and Nuclear Energy”, teachers can ask students to search for information on the benefits and potential risks of using nuclear energy, as well as nuclear disasters. Through exploring the complicated impacts of using nuclear energy on ecological security and resource security, students should recognise the necessity of safeguarding nuclear security. 	7	<ul style="list-style-type: none"> • Understand the impact of human activities on the ecological environment and our responsibilities, understand the needs of sustainable development, and recognise the necessity of safeguarding ecological security, resource security, nuclear security and new security domains
VI. Astronomy and Space Science	<ul style="list-style-type: none"> • Understand the implications of the advances in space technology to us and their impact on society <ul style="list-style-type: none"> ➤ When teaching “Astronomy and Space Science”, teachers can ask students to search for information on the applications of modern technologies in space science (including artificial satellites and spacecraft) to enhance their understanding of related physical phenomena. Through exploring the interplay between space science 	7	<ul style="list-style-type: none"> • Understand the impact of human activities on the ecological environment and our responsibilities, understand the needs of sustainable development, and recognise the necessity of safeguarding ecological

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	and our lives, students should recognise the importance of safeguarding new security domains (e.g. space security).		security, resource security, nuclear security and new security domains
VII. Energy and Use of Energy <ul style="list-style-type: none"> Renewable and non-renewable energy sources Environmental impact of energy consumption 	<ul style="list-style-type: none"> Recognise the characteristics of renewable and non-renewable energy sources Recognise the impact of extraction, conversion, distribution and use of energy on the environment and society Understand the effect of greenhouse gases on global warming <ul style="list-style-type: none"> When teaching “Energy and Use of Energy”, teachers can ask students to study and analyse information on the interaction of energy sources with greenhouse gases. Through exploring the ecological impact of the use of energy and energy sources, students should recognise the necessity of safeguarding ecological security and resource security. 	7	<ul style="list-style-type: none"> Understand the impact of human activities on the ecological environment and our responsibilities, understand the needs of sustainable development, and recognise the necessity of safeguarding ecological security, resource security, nuclear security and new security domains

3. Suggested learning and teaching activities (examples)

✧ Project learning

- ◆ **【Radioactivity and Nuclear Energy】** Explore the benefits and potential risks of using nuclear energy, as well as the ecological and environmental impact of nuclear disasters (e.g. the Chernobyl and the Fukushima nuclear power plant accidents).
- ◆ **【Energy and Use of Energy】** Analyse information on the interaction of energy sources with greenhouse gases, and explore the impact of the use of energy and energy sources on ecological security, such as inquiring about the environmental impact of the popularisation of electric cars.

- ◆ **【Astronomy and Space Science】** Search for information on the applications of modern technologies in space science (including artificial satellites and spacecraft) to deepen the understanding of related physical phenomena, and to explore the relationship between space science and our lives.
- ◆ Design appropriate self-learning activities in line with the curriculum aims and objectives, so that students can understand other countries' concerns on ecological security, resource security, nuclear security and new security domains (e.g. space security).

✧ **Exchange activities with the Mainland**

- ◆ **【Radioactivity and Nuclear Energy】** Arrange for students to visit “Daya Bay Nuclear Power Plant” in Shenzhen, so that they can understand the operation and contingency measures of the nuclear power plant.

✧ **Cross-curricular collaboration**

- ◆ **【Energy and Use of Energy】** Collaborate with the panel of Computer Literacy to design and make portable devices for measuring ionising radiation level in the community.

✧ **Visits**

- ◆ **【Radioactivity and Nuclear Energy】** Arrange for students to visit the “CLP Power Low Carbon Energy Education Centre”, so as to deepen their understanding on the use of low-carbon energy sources to cope with climate change and to reduce air pollution, as well as the latest developments of nuclear power of our country.
- ◆ **【Astronomy and Space Science】** Arrange for students to visit the Hong Kong Space Museum, so that they can recognise the latest developments of space technology of our country and the implications of advances in space science to us.