

Science

Lower and Upper Secondary (NT)

Science in daily life

- Showing curiosity, interest and enjoyment in science
- Making informed decisions that are related to the social, environmental, economic and technological aspects of science, e.g. lifestyle choices that affect personal health

Science in society

- Showing awareness of science and technology on society, industry, business, home and leisure, e.g. sensitivity to the benefits and abuses of the applications of science

Science and the environment

- Showing care and concern for the environment, e.g. importance of conserving energy, reducing pollution

Upper Secondary (NA/E)

Chemistry – Syllabus 6092, Biology – Syllabus 6093

- 1.1 Students will acquire sufficient understanding and knowledge to become confident citizens in a technological world, able to take or develop an informed interest in matters of scientific importance
4. Students will have interest in and care for the local and global environment.
5. Students will have an awareness that
 - 5.1 the study and practice of science are co-operative and cumulative activities, and are subject to social, economic, technological, ethical and cultural influences and limitations
 - 5.2 the applications of science may be both beneficial and detrimental to the individual, the community and the environment
 - 5.3 science transcends national boundaries and that the language of science, correctly and rigorously applied, is universal

Lower Secondary (NA/E)

SE 1: Science is a study of the physical and natural world.

- Show an awareness that Science is not confined to the laboratory, but is manifested in all aspects of our lives
- Show a healthy curiosity about the natural and physical world.

SE 2: Scientific knowledge is derived partly from systematic observation, experimentation and analysis and partly from human imagination and creativity. Scientific knowledge is subject to change

- Understand how scientific knowledge is built from systematic collection and analyses of evidence and rigorous reasoning based on the evidence
- Show an awareness that scientific evidence is subject to multiple interpretations
- Recognise that scientific evidence can be quantitative or qualitative, and can be gathered through one's senses or instruments as extensions of one's senses

SE 3: Scientific knowledge can be applied to bring benefits and harm.

- Discuss the uses and benefits of science and technology to society.
- Relate applications of science to some social and ethical issues
- Recognise the need to be responsible towards society and the environment in using technology and scientific knowledge

Geography

Lower Secondary

Students will develop **knowledge** with regard to

- relationships and interactions between and within physical and human phenomena at local, regional and global scales
- different approaches through which challenges faced can be managed by local, regional and global communities.

Students will develop **skills** in

- recognise patterns in geographical data and suggest relationships

Values

Through their geographical training, students should develop:

- an interest in, and valuing of, the ways that the environment supports life
- a sense of appreciation, care and responsibility for the quality of the environment

Upper Secondary (NA/Express) - Syllabus 2236

Students will develop **knowledge** with regard to

- relationships and interactions between and within physical and human phenomena at local, regional and global scales
- different approaches through which challenges faced can be managed by local, regional and global communities

Students will develop **skills** in

- interpret and recognise patterns in geographical data and deduce relationships
- analyse, evaluate and synthesise geographical data to make informed and sound decisions.

Values

Through their geographical training, students should develop:

- judgements on values and attitudes in the use and management of resources
- a sense of appreciation, care and responsibility for the quality of the environment
- respect and sensitivity towards the attitudes, values and beliefs of people in different human environments

Planet or Plastic? Exhibition Curriculum Links (Secondary)

English and Literature

Listening and viewing

Focus area: Listening and viewing critically

LO3 Develop critical listening and viewing by focusing on implied meaning, higher-order thinking and evaluation

Focus area: listening and viewing extensively

LO4 Listen to, view and respond to a variety of texts

Reading and viewing

Focus area: Reading and viewing critically

LO3: Analyse, evaluate and appreciate age-/year-level appropriate texts by focusing on implied meaning, high-order thinking and judgement

Social Studies (Upper Secondary)

As informed citizens, students would:

- apply reflective thought in making quality decisions
- analyse, negotiate and manage complex situations
- evaluate information, consider different viewpoints and exercise discernment in reaching well-reasoned conclusions and making responsible decisions.

As concerned citizens, students would:

- appreciate the importance of engaging in issues of societal concern;

As participative citizens, students would:

- be motivated to identify issues of concern and take action

History

Lower Secondary / Upper Secondary (NA/E) – Syllabus 2174

Students should be able to demonstrate their knowledge and understanding of

- key individuals, groups, forces, events and ideas that shaped the development of the political, social and cultural contexts of the societies studied

Students should also demonstrate their knowledge and understanding by employing the following skills

- examining the causes and consequences of historical events and situations

Students demonstrate the internalisation of key values and mind-sets associated with History learning when they

- are aware of how cultural, intellectual and emotional contexts shape the thinking, value systems, decisions and actions of different peoples and groups in different times and places

Character and Citizenship Education

LO2: Act with integrity and make responsible decisions that uphold moral principles

LO8: Reflect on and respond to community, national and global issues, as an informed and responsible citizen

[Art](#)

Lower Secondary

LO1: Identify qualities in and interpret what they see and experience

LO2: Record and present their observations using different ways

LO3: Generate questions and ideas from visuals

LO6: Reflect and share views on their own and others' art making

Upper Secondary (NT) – Syllabus 6128

LO 1: Gather and record information from observation and personal experiences

LO 3: Explore materials, techniques and technologies in art

Communicate

LO5: Apply art elements and design principles in their artworks from the study of the works of others

Upper Secondary (NA/Express) – Syllabus 6123

Perceiving

- record from observation and experience
- identify and define problems, issues and themes in visual expressions

Communicating

- apply art elements and design principles in the creation of artworks
- explore creative use of materials, techniques and technologies to generate ideas and solutions to problems
- acquire competence in manipulating art media towards the expression of an idea

Appreciating

- make connections between visual expressions and personal experiences
- critically appraise artists and artworks
- value local artworks as part of the development of Singapore's history and cultural heritage
- develop an inquiring attitude and lifelong interest in the visual arts

Lower Secondary Science

	Normal (Technical)	Normal (Academic)/Express	
Module/Topic/Theme	Science / Matter around us - Water Pollution	19. Interactions within Ecosystems	5. Understanding Diversity of Living Things
Domains	<p>Science in society Becoming confident, responsible and productive citizens in a technological world</p> <p>Science and the environment Showing care and concern for the environment, e.g. importance of conserving energy, reducing pollution</p>	<p>Science in society Engaging in meaningful scientific discourse with others e.g. social and moral issues related to advances in science</p> <p>Science and the environment</p> <ol style="list-style-type: none"> 1. Understanding the place of humanity in the natural world e.g. man's connections with living things and the environment 2. Demonstrating care and concern for the environment e.g. understanding the causes and effects of global warming 	
Relevant syllabus aims	<p>Enable students to develop 21st century competencies which would:</p> <ol style="list-style-type: none"> 1. enable them to become responsible individuals and productive citizens 2. enable them to show care and concern for people and the environment <p>Enable students to be suitably prepared for post-secondary courses, such that they:</p> <ol style="list-style-type: none"> 1. become aware of the impact of science and technology on society, industry, and business 	<p>Engage students in Science-related issues that concern their lives, the society and the environment</p> <p>This involves stimulating the students' curiosity, interest and enjoyment in science and matters relating to science and technology as well as developing the students' interest and care for the environment.</p>	
Knowledge with understanding and applications	<ol style="list-style-type: none"> 1. State common types and sources of water pollution 2. Discuss some methods of water pollution control 	<ul style="list-style-type: none"> • Show an understanding of an ecosystem as the interactions between a community and its physical environment • Recognise how adaptive traits (structural or behavioural) and changes in environmental 	<ul style="list-style-type: none"> • Recognise the importance of biodiversity to the stability of natural systems, and its benefits to humans (provision of resources like food, medicine, raw materials, etc.)

Planet or Plastic? Exhibition Curriculum Links (Secondary)

		<p>conditions can affect the survival of organisms</p> <ul style="list-style-type: none"> • Show an understanding of the interrelationship among the various organisms in a community (Examples of interrelationships are predator-prey relationship, mutualism and parasitism) • Explain the importance of conserving the environment 	
Skills and processes	Investigate the effects of water pollution on living things		
Ethics and attitude:	<ol style="list-style-type: none"> 1. Appreciate that water is a precious resource that can be polluted by human's activities 2. Appreciate that preventing water pollution is essential to ensure that Singapore has a long-term supply of clean water 	<ul style="list-style-type: none"> • Show an awareness of how some cultures practise sustainable living through their interactions with the environment • Evaluate the impact of human activities and technologies on the environment (e.g. motor vehicles and modern lifestyle) 	<ul style="list-style-type: none"> • Discuss the reasons for the depletion or extinction of some plants or animals (e.g. hunting, disease, invasive species, changes to or destruction of habitat)

Upper Secondary Science

Subject	GCE O level Biology (6093) Theme IV: Man and his environment Topic: 16. Organisms and their environment	GCE O level Chemistry (6092) Section VI: Organic Chemistry Topic: 11. Organic chemistry 11.6 Macromolecules
Learning outcome(s)	<p>Students should be able to:</p> <p>(b) explain the terms producer, consumer and trophic level in the context of food chains and food webs</p> <p>(e) describe how carbon is cycled within an ecosystem and outline the role of forests and oceans as carbon sinks</p> <p>(f) evaluate the effects of</p> <ul style="list-style-type: none"> • water pollution by sewage and by inorganic waste • pollution due to insecticides including bioaccumulation up food chains and impact on top carnivores <p>(h) discuss reasons for conservation of species with reference to the maintenance of biodiversity and how this is done, e.g. management of fisheries and management of timber production</p>	<p>Students should be able to:</p> <p>(a) describe macromolecules as large molecules built up from small units, different macromolecules having different units and/or different linkages</p> <p>(c) state some uses of poly(ethene) as a typical plastic, e.g. plastic bags; clingfilm</p> <p>(f) state some uses of poly(ethene) as a typical plastic, e.g. plastic bags; cling film</p> <p>(g) describe the pollution problems caused by the disposal of non-biodegradable plastics</p>
Content	<ul style="list-style-type: none"> • Energy Flow • Food Chains and Food Webs • Carbon Cycle • Effects of Man on the Ecosystem • Environmental Biotechnology • Conservation 	<p>11.1 Fuels and crude oil 11.6 Macromolecules</p> <p>In this section, students should recognise that materials such as plastics, detergents and medicines, and even the food that we eat are examples of organic compounds. Students should be able to value the need for assessing the impacts of the use of synthetic materials and the environmental issues related to the use of plastics.</p>

Art

	Lower Secondary	Upper Secondary
Learning outcome(s)	<p>LO1: Identify qualities in and interpret what they see and experience</p> <ol style="list-style-type: none"> Describe the details and visual qualities of what they see Infer the ideas, feelings and meanings of visuals through the use of art elements and principles, media, processes and/or techniques Express personal ideas and opinions about what they see and experience <p>LO2: Record and present their observations using different ways</p> <ol style="list-style-type: none"> Talk/write/draw/create visuals about what they see <p>LO3: Generate questions and ideas from visuals</p> <ol style="list-style-type: none"> Examine visuals from different perspectives, e.g. related topics, subject matter, visual qualities, media and techniques. Formulate questions about what they see Derive ideas from what they see Enjoy looking at visuals <p>LO6: Reflect and share views on their own and others' art making</p> <ol style="list-style-type: none"> Evaluate artworks based on given criteria 	<p>Upper Secondary (NT) – Syllabus 6128</p> <p>LO 1: Gather and record information from observation and personal experiences</p> <p>LO 3: Explore materials, techniques and technologies in art Communicate</p> <p>LO5: Apply art elements and design principles in their artworks from the study of the works of others</p> <p>Upper Secondary (NA/Express) – Syllabus 6123</p> <p>Perceiving</p> <ul style="list-style-type: none"> Record from observation and experience Identify and define problems, issues and themes in visual expressions <p>Communicating</p> <ul style="list-style-type: none"> Apply art elements and design principles in the creation of artworks Explore creative use of materials, techniques and technologies to generate ideas and solutions to problems Acquire competence in manipulating art media towards the expression of an idea <p>Appreciating</p> <ul style="list-style-type: none"> Make connections between visual expressions and personal experiences Critically appraise artists and artworks Value local artworks as part of the development of Singapore's history and cultural heritage Develop an inquiring attitude and life-long interest in the visual arts

<p>Artistic processes</p>	<p>Observe, record, and reflect on what they see and experience</p> <ul style="list-style-type: none"> • Observe closely and accurately i.e. <ul style="list-style-type: none"> ○ Examine from different perspectives, and ○ Represent details and visual qualities of what they see around them and in artworks • Be curious about what they see, i.e. <ul style="list-style-type: none"> ○ Generate questions and ideas about what they see ○ Take initiative to learn or find out more about visual phenomena and what they see around them and in artworks <p>Generate visual possibilities by experimenting with different materials, tools, methods, images and ideas</p> <ul style="list-style-type: none"> • Evaluate, select and develop ideas to express ideas and achieve intentions • Evaluate their own and others' use of visual strategies and experimentation 	<p>Assessment objectives (Syllabus 6128 Paper 1 – Art task)</p> <p>Candidates should be able to:</p> <ol style="list-style-type: none"> 3. Visual Presentation <ul style="list-style-type: none"> • Select relevant visuals and information to illustrate work processes 4. Personal Response <ul style="list-style-type: none"> • Demonstrate personal expression through modes of visual expression <p>Assessment objectives (Syllabus 6123 Paper 3 – Study of Visual arts)</p> <p>Candidates should be able to:</p> <ol style="list-style-type: none"> 1. Artistic Perception and Interpretation <ul style="list-style-type: none"> • Discuss and analyse visual aspects in works of art, based on an understanding of art elements and design principles • Discuss, analyse and interpret how artists express their intentions in their artworks. 2. Cultural and Aesthetic Appreciation <ul style="list-style-type: none"> • Describe and discuss how society, culture and personal beliefs influence artists and artworks • Forge links between different artists and artworks. 3. Personal Response <ul style="list-style-type: none"> • Form and express personal opinions regarding artists and artworks • Demonstrate critical thinking and reflection
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Character and Citizenship Education

Subject/theme	Lower Secondary Focus: Being an active citizen in a globalised world	Upper Secondary Being an active citizen in a globalised world
Domain	World	
Learning outcome(s) Key question(s)	<p>LO8: Reflect on and respond to community, national and global issues, as an informed and responsible citizen</p> <p>Key questions:</p> <p>Identity: What does it mean to be an active citizen in a globalised world?</p> <p>Relationships: How do we interact with the people in a globalised world?</p> <p>Choices: How would we use our strengths and abilities to meet the needs of a globalised world?</p>	
Knowledge with understanding and applications	Know that it is important to care for the environment and the lives of others in the world	
Skills and processes	<i>Reflection</i> - on how one can better contribute to the environment and the lives of others	
Ethics and attitude	<p>Values <i>Civic responsibility</i> in being informed about global issues</p> <p>Attitudes</p> <ol style="list-style-type: none"> 1. Being concerned about what affects the world 2. Being proactive to keep oneself informed 	

Geography

Subject/theme	Lower Secondary Issue 2: Water supply: will our taps run dry?	GCE 'O' level Geography (2236) Theme 2: Our Changing World (Human Geography) Topic 4: Global Tourism – Is tourism the way to go?
Key Questions(s)	Which locations in the world are facing water shortage? Why does water shortage occur?	Developing tourism at what cost?
Learning outcome(s)	<p>Geographical investigation 2 What is the quality of water in a waterway or water body? How do human activities affect the quality of water in a waterway or water body?</p> <p>Students should be able to:</p> <p><u>Knowledge</u></p> <ul style="list-style-type: none"> • Explain how water quality is measured and the acceptable range for use by humans and to support freshwater fishes. • Describe how human activities (e.g. by individuals, industries and government agencies) affect the quality of water in Singapore and the assigned waterway or water body. <p><u>Values/Attitudes</u></p> <ul style="list-style-type: none"> • Appreciate water as a precious resource and the need for water conservation. • Understand that everyone has a role to play in water conservation • Be aware that varying levels of water quality is required to support aquatic life and cater to the needs of people. 	Students will be able to: <ul style="list-style-type: none"> • Assess the impact of tourism on a country • Explain how tourism can be made sustainable

Planet or Plastic? Exhibition Curriculum Links (Secondary)

<p>Content</p>	<p>Students will learn that Earth's freshwater supply is actually very limited. However due to increasing demand, the pressure on scarce water supplies is mounting.</p> <p>Through this issue, it is envisioned that students would come to value water as a precious resource which has to be protected and used wisely.</p>	<ul style="list-style-type: none">• Impact of the growth of tourism on a country<ul style="list-style-type: none">- Environmental<ul style="list-style-type: none">○ Advantages<ul style="list-style-type: none">➤ Conservation of natural environments○ Disadvantages<ul style="list-style-type: none">➤ Vandalism➤ Littering and pollution➤ Destruction of habitat➤ Carbon footprint➤ Increased congestion• Managing the impact of tourism<ul style="list-style-type: none">- Conserve fragile environments- Promote sustainable tourism through laws and regulation and support from local population
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