Subject Overviews

Sciences

MYP0: GENERAL SCIENCE

Unit 1: Cell – Basic building block

Through research about nature and its parts students will get to know which sciences study nature and how. Students will develop skills to use microscopes safely and to draw what they see under a microscope. They will investigate cells and types of organisms.

Key concept: Systems
Related concepts: Function, Transformation
Global context: Scientific and technical innovation
Statement of inquiry: Scientific and technological advances enable societies to understand, use and manipulate systems of organelles in plant and animals' cells and cure diseases.

Main content addressed:

- What is nature?
- Microscope
- Structure and roles of cells
- Division of cells
- Monocellular and multicellular organisms

Objectives: A, D
ATL skills:
Thinking – transfer skills
Research – information literacy skills, media literacy skills

Unit 2: Animal organism

Through the activities of researching and observing animal organisms, students will learn about structure and roles of animal organisms, different systems in animal organisms, behaviour of animals and the way they take care of their young and why some animals live in groups.

Key concept: Systems
Related concepts: Interaction, Balance
Global context: Identities and relationships
Statement of inquiry: Balanced interactions and relationships between all systems in an organism result in its health and well-being.

Main content addressed:

- Structure and roles of animal organism
- Movement system
- Blood circulation
- Digestive system

- Reproduction of animals (fish, birds and mammals)
- Taking care of young
- Behaviour of animals

Objectives: A, B, C
ATL skills:
Thinking – critical thinking skills, creative thinking skills, transfer skills

Unit 3: The necessities of human life and eating habits

Through the activities of researching and observation, and from their own life experience, students will learn about the needs of Humans, puberty and development of humans from the moment they are born. Students will study healthy eating habits and develop positive attitudes towards healthy and balanced diets. At the end of this unit, students will research the problems which young people encounter during growing-up.

Key concept: Change
Related concepts: Balance, Function
Global context: Identities and relationships
Statement of inquiry: Changes in some functions of our organism during puberty cause changes in chemical and emotional balance with new relationships and identities being created.

Main content addressed:
- The necessities of human life
- Puberty – path to maturity
- Human development
- Problems of growing-up

Objectives: A, B, C
ATL skills:
Communication – communication skills
Self-management – reflection skills

Unit 4: Plant organism

Through research of parts of a flowering plant, using a microscope, and planting their own plants, students will get to know all the parts of a flowering plant, their structure and roles. Students will understand the importance of photosynthesis and how and where it happens.

Key concept: Systems
Related concepts: Interaction, Function
Global context: identities and relationships
Statement of inquiry: Interaction between different systems inside the plant body forms an organism and allows all life functions to be performed.

Main content addressed:

- Flowering plant
- Seed and germination
- Root: structure and roles
- Diffusion and osmosis
- Stem: structure and roles
- Leaves: structure and roles
- Breathing of plants
- Flower: structure
- Flower: pollination and fertilisation
- Fruits: structure and roles
- Distribution of fruits and seeds
- Growing food
- Distribution of food - hunger

Objectives: A, B, C, D
ATL skills:
Thinking – critical-thinking skills

MYP1: GENERAL SCIENCE

Unit 1: Introduction to Science

Through a very simple experiment (dissolving sugar and salt in water) students will learn how to plan an investigation, how to organise an experiment and how to write a lab-report. Students will learn the metric measuring units (mass, volume, length, time) and how to work with them.

Key concept: Systems
Related concepts: Patterns, Forms
Global context: Scientific and technical innovation
Statement of inquiry: The system of measuring units and measurements evolved and developed from everyday life forms and patterns enabling the development of science and technology.

Main content addressed:

- Measuring units
- Being a scientist
- Working in a lab
- Scientific methods

Objectives: B, C
ATL skills:
Self-management – reflection skills
Research – information literacy skills

Unit 2: Energy efficiency

Interdisciplinary Unit – Design

This is created as an interdisciplinary unit so that students can fully explore energy efficiency and ways to save resources, energy and money right in our homes. In Design they investigate how environment influences the house design and construction along with the energy-saving strategies in house design, In Sciences they study about the forms of energy and about alternative sources of energy. This leads to a strong understanding of how humans are responsible for creating changes towards sustainable development. Students' interdisciplinary task is to design an energy-efficient house design in a program for 3-D modelling.

Key concept: Development
Related concepts: Energy, Environment
Global context: Globalization and sustainability
Statement of inquiry: Sustainable development brings positive changes and conserves natural resources for future generations, offering opportunities for adaptation in the built environment.

Main content addressed:

- Types and forms of energy
- Energy conversion

- Renewable energy sources
- Fossil fuels and carbonisation
- Carbon footprint
- Environmental consequences of fossil fuel use
- Types of pollution (air, water, noise, light, etc.)
- Climate factors and their impact on energy consumption
- Scientific principles behind environmentally sustainable housing
- Impact of climate change on natural resources
- Endangered species and biodiversity
- Protected natural areas and conservation efforts

Objectives: D
ATL skills:
Research – information literacy skills
Thinking – creative thinking skills, transfer skills

Unit 3: Living beings and their habitat

Through the activities of researching and observing the students will learn about different parts of nature and about organisation of living beings in nature.

Key concept: Systems
Related concepts: Environment, Energy, Interaction
Global context: Globalization and sustainability
Statement of inquiry: Organisms interact with the natural environment through the exchange of matter and the flow of energy.

Main content addressed:
- Living beings and their habitats
- Food chains and food webs
- Living community in continental deciduous forest
- Living community sea and freshwater
- Living community on grasslands

Objectives: A, D

ATL skills:

Communication – communication skills

Unit 4: The Earth and the Universe

Through the activities of making models of a Solar System students will understand the ratios in the Universe and will broaden their knowledge about planet Earth and its position in the Universe.

Key concept: System
Related concepts: Models, Movement
Global context: Identities and relationships
Statement of inquiry: The solar system may be used to create scientific models which will explain the movement and relationships between other space objects.

Main content addressed:

- Solar system
- The Earth
- The biosphere

Objectives: A, B, C, D

ATL skills:
Self-management - organisation skills
Research – information literacy skills
Thinking – critical thinking skills

MYP2: BIOLOGY

Unit 1: Golden ratio

Through activities of sorting and naming living beings, students will understand how scientists sort and name living organisms. Students will search for the golden ratio and Fibonacci numbers in living beings and learn what all living beings have in common. Students will observe animal and plant cells under the microscope and learn more about them.

Key concept: Relationships
Related concepts: Patterns, Function
Global context: Identities and relationships
Statement of inquiry: Idealistic proportion/golden ratio is recognized in the human body and visual arts, as an interrelationship system.

Main content addressed:

- Classifying living beings
- Golden ratio and Fibonacci numbers in living nature
- Structure of a cell
- Cell divisions

Objectives: A, B, C
ATL skills:
Communication – communication skills
Self-management – reflection skills
Thinking – critical thinking skills

Unit 2: Evolution

Through researching the topic, students will understand the concept of evolution (of the Universe, Earth and living world). Students will research various theories which try to explain evolution.

Key concept: Change
Related concepts: Consequences, Balance
Global context: Fairness and development
Statement of inquiry: Population change is a consequence of the unbalanced opportunities provided by natural selection.

Main content addressed:

- Big Bang Theory
- Formation of Earth
- Formation of atmosphere
- Formation of life

Objectives: A, D
ATL skills:
Self-management - organisation skills
Research - information literacy skills

Unit 3: Bacteria and viruses

Through the activities of researching and very simple experiments, students will broaden their knowledge about microorganisms, and will learn about antibiotics and how to protect themselves from bacteria and viruses.

Key concept: Systems
Related concepts: Interaction, Consequences
Global context: Scientific and technical innovation
Statement of inquiry: Most of the diseases are a consequence of the direct interaction of viruses and bacteria with living organisms.

Main content addressed:

- Idea of prokaryotes and eukaryotes
- Viruses
- Bacteria
- Autotrophic and heterotrophic organisms
- Saprophytes and parasites

Objectives: A, D
ATL skills:
Communication – communication skills
Thinking – transfer skills

Unit 4: Development of living world: Animals and plants

Through activities of observing animals and plants under a microscope, or in their natural habitat, or in the zoo, or in a school garden, students will broaden their knowledge about animals, the way animal organisms are organised, the evolution of animals and the most important groups of animals.

Key concept: Systems
Related concepts: Form, Function
Global context: Globalization and sustainability
Statement of inquiry: Systematics organises living beings into groups according to the development of their forms and functions of their organs.

Main content addressed:

1. Invertebrates
   - Protozoa
   - Sponges
   - Hydra
   - Corals
   - Nematodes
   - Molluscs
   - Annelids
   - Arthropods

2. Vertebrates
   - Amphioxus
   - Fish
   - Amphibians
   - Reptiles
   - Birds
   - Mammals

3. Plants
   - Euglena
   - Fungi
   - Algae
   - Lichens
   - Mosses and Ferns
   - Evergreen Plants (gymnosperms)
   - Flowering Plants (Angiosperms)

Objectives: A, B, C, D
ATL skills:
Communication – communication skills
Research – media literacy skills
Thinking – critical thinking skills

MYP3: BIOLOGY

Unit 1: DNA and heredity

Through researching human cells, mitosis and meiosis of human cells, and observing a model of the human body, students will understand the way the human body is organised from cells to organism and how it works.

Key concept: Relationships
Related concepts: Models, Consequences, Function
Global context: Identities and relationships
Statement of inquiry: Models can represent the structural and functional relationship between DNA and inherited traits.

Main content addressed:

- Cells, tissues and organs
- Mitosis and meiosis
- Human evolution
- Structure of human body

Objectives: A, D
ATL skills:
Self-management – reflection skills
Research – information literacy skills

Unit 2: Human reproductive system

Through researching the topic, students will broaden their knowledge about the reproductive system, sexually transmitted diseases, pregnancy and protection of health. Students will develop positive attitudes towards protection of their health.

Key concept: Systems
Related concepts: Form, Function
Global context: Identities and relationships
Statement of inquiry: The form and functions of the reproductive system enable the species to be continued and changed if necessary.

Main content addressed:

- Reproductive organs
- Menstrual cycle and hormones
- Pregnancy and labour
- Methods of contraception
- Sexually transmitted diseases
- AIDS

Objectives: A, D
ATL skills:
Communication – communication skills
Research – media literacy skills

Unit 3: Respiratory and locomotion system

Through researching and very simple experiments, students will broaden their knowledge about the breathing system and locomotion system and the connection between exercising and health.

Key concept: Systems
Related concepts: Function, Movement
Global context: Scientific and technical innovation
Statement of inquiry: The role of the respiratory system is to provide oxygen necessary to produce the energy needed for movement and all the other functions.

Main content addressed:

- Bones
- Muscles
- Skeleton
- Diseases of movement system
- Upper and lower breathing paths
- Diseases of breathing system

Objectives: A, B, C
ATL skills:
Social – collaboration skills
Thinking – critical thinking skills

Unit 4: Control mechanisms in human body (nerve system, senses and hormone regulation)

Through activities of observing nerve cells under a microscope, and performing simple experiments with senses, students will broaden their knowledge about the nerve system and senses. Through class discussions students will observe how they change under the influence of hormones.

Key concept: Systems
Related concepts: Consequence, Function
Global context: Scientific and technical innovation
Statement of inquiry: The responses in the human organism, which control the functions of all systems, are a consequence of stimuli that come from within the body itself or from our surroundings.

Main content addressed:

- Nerve cell and impulse
- Brain and spinal cord
- Senses
- Control of body temperature
- Hormones and hormonal disorders
- Diseases of nerve system and senses

Objectives: A, D
ATL skills:
Communication – communication skills
Social – collaboration skills

MYP2: CHEMISTRY

Unit 1: Atoms and Periodic Table of Elements

Through researching the development of the idea of an atom, students will learn about atoms and their structure. Students will broaden their previous knowledge about atoms and their structure. Students will learn about isotopes and how they are used. Through research of elements and their properties and very simple experiments students will learn about the PTE and how to read it and use it. They will be able to read simple electron configuration from the table.

Key concept: Relationships
Related concepts: Patterns, Form, Function
Global context: Identities and relationships
Statement of inquiry: Knowledge-challenging discoveries evolve the periodic table's form to enhance its function of showing trends in the physical and chemical properties of the elements.

Main content addressed:

- Idea of atom from the past till today
- Structure of atom
- Isotopes
- Symbols and their origin
- Idea of compounds and elements
- History of PTE
- Structure of PTE
- Simple electron configuration

Objectives: A, B, C, D
ATL skills:
Research – information literacy skills
Thinking – critical thinking skills, transfer skills

Unit 2: Matter

Through simple experiments and research students will broaden their knowledge about matter, learn how to separate substances from mixtures and how we can use that in everyday life. The students will research mass fraction, its meaning and use in daily life.

Key concept: Change
Related concepts: Conditions, Energy, Transfer
Global context: Scientific and technical innovation
Statement of inquiry: Scientific research allowed the understanding of specific conditions and the substantial amount of energy needed for daily changes of one type of matter into another.

Main content addressed:

- Physical and chemical properties of substances
- Pure substances and mixtures
- Separating substances from mixtures
- Mass fraction

Objectives: A, B, C, D
ATL skills:
Communication – communication skills
Social – collaboration skills
Research – media literacy skills

Unit 3: Chemical reactions

Through research, observation and simple experiments students will understand the differences between physical and chemical change. Through research and experiments students will learn about mass and energy change during chemical reactions. Students will carry out a series of experiments to compare the speed of chemical reactions in different circumstances.

Key concept: Change
Related concepts: Balance, Energy, Interaction
Global context: Scientific and technical innovation
Statement of inquiry: Chemical reactions are balanced changes that involve interactions between different atoms and the participation of energy.

Main content addressed:

- Physical and chemical change
- Mass and energy change in chemical reaction
- Types of chemical reactions
- Equations of chemical reactions
- Balancing equations of chemical reactions
- Speed of chemical reactions

Objectives: A, B, C

ATL skills:
Social – collaboration skills
Self-management – organisation skills
Thinking – critical thinking skills

Unit 4: Chemical bonds

Through activities of researching and making models of molecules, students will learn about covalent and ionic bonds between atoms.

Key concept: Change
Related concepts: Models, Interaction, Patterns
Global context: Identities and relationships
Statement of inquiry: Atoms interact with each other creating chemical bonds in chemical changes, following certain patterns and models.

Main content addressed:

- Electron configuration
- Covalent bond
- Ions
- Ionic bond

Objectives: A, D
ATL skills:
Self-management – reflection skills
Research – information literacy skills

MYP3: CHEMISTRY

Unit 1: Periodic Table of Elements (PTE)

Through research and a series of simple experiments, students will learn about properties of elements which are in the same group of PTE and how and why they are similar. Students will learn to define and search for trends and patterns.

Key concept: Relationships
Related concepts: Patterns, Form, Function
Global context: Identities and relationships
Statement of inquiry: The modern form of PTE evolved through a series of scientific discoveries, showing the properties of each element as well as relationships, patterns and trends within each group and period.

Main content addressed:

- Group 18 of PTE
- Group 17 of PTE
- Group 1 of PTE
- Group 2 of PTE

Objectives: A, D
ATL skills:
Research – information literacy skills

Unit 2: Acids, bases and salts

Through research and a series of simple experiments, students will learn about properties and reactions of acids, bases and salts, their use in everyday life and the dangers they may cause.

Key concept: Relationships
Related concepts: Patterns, Interaction
Global context: Scientific and technical innovation
Statement of inquiry: Chemical properties of acids and bases follow the same pattern, and their interaction results in the formation of salts.

Main content addressed:

- Acids: properties and reactions
- Bases: properties and reactions
- Salts: properties and reactions

Objectives: A, B, C
ATL skills:
Social – collaboration skills
Thinking – transfer skills

Unit 3: Organic Chemistry

Through researching and very simple experiments, students will learn about simple organic compounds, their properties and use in everyday life. Students will learn about poisonous organic compounds. Students will develop positive attitudes about consuming alcohol and alcoholism.

Key concept: Systems
Related concepts: Form, Patterns, Interactions
Global context: Scientific and technical innovation
Statement of inquiry: Organic compounds are sorted into families that have similar forms and follow the same patterns when reacting with other substances.

Main content addressed:

- Hydrocarbons (Alkanes, Alkenes, Alkynes)
- Alcohols
- Oxidation of alcohols
- Carboxylic acids
- Esters

Objectives: A, B, C, D
ATL skills:
Research – information literacy skills, media literacy skills

Unit 4: Biologically Important Compounds (BIC)

Through activities of researching and performing simple experiments, students will learn about BIC, their properties, use in life and roles in our organism. Students will develop positive attitudes towards a healthy and balanced diet.

Key concept: Systems
Related concepts: Patterns, Consequence, Energy
Global context: Scientific and technical innovation
Statement of inquiry: Biologically important compounds are sorted into groups that follow the same patterns, build up the most complex systems in all living beings, and yield energy necessary for life.

Main content addressed:

- Fats and oils
- Carbohydrates
- Proteins
- Nucleic acids (DNA and RNA)

Objectives: A, B, C, D
ATL skills:
Communication – communication skills
Self-management – organisation skills

MYP2: PHYSICS

Unit 1: Measurement and matter

Through hands-on measurement activities and using different SI units, students will gain a better understanding of different quantities and how they interact. Students will learn how fundamental quantities combine to give a derived quantity. Students will be able to develop basic skills performing practical activities of measurement in physics.

Key concept: Systems
Related concepts: Form, Transformation
Global context: Personal and cultural expressions
Statement of inquiry: Exploring systems, forms and transformations deepens our understanding of bodies around us.

Main content addressed:

- Methods, standards of measurement, using scientific units
- Area and volume, mass and time
- Density
- Floating and sinking in liquids

Objectives: A, D
ATL skills:
Self-management – organisation skills
Thinking – creative thinking skills
Thinking – critical thinking skills

Unit 2: Forces

Through the activities of practical scientific investigation on properties of different forces and discussion of possible applications students will understand how to use forces of nature for our purposes.

Key concept: Relationships
Related concepts: Interaction, Change, Energy, Environment
Global context: Scientific and technical innovation
Statement of inquiry: The interactions of different forces in our environment cause changes. Understanding these interactions helps us better predict outcomes and manage natural resources.

Main content addressed:

- Forces in equilibrium, types of forces
- Investigation of spring
- Universal forces
- Forces in moving fluids, fluid pressure
- Atmospheric pressure, weather and climate

Objectives: A, B, C
ATL skills:
Research – information and media literacy skills
Communication – communication skills
Self-management – affective skills

Unit 3: Work, energy, power

Students will distinguish between the concepts of work, energy and power. By distinguishing between kinetic, potential, and energy contained by a field, students will recognize that energy undergoes constant change from one form to another, but is never created or destroyed, fostering a deeper appreciation for the role of energy in technological advancements and the innovative redesign of devices.

Key concept: Change
Related concepts: Function, Energy, Transformation, Development
Global context: Scientific and technical innovation
Statement of inquiry: We can creatively apply the principles of energy transformations to develop and reinvent devices demonstrating an understanding of the interrelationship between work, energy, and power.

Main content addressed:

- Work and power
- Work and machines
- Energy and its forms
- Measuring and using energy
- The law of conservation of energy
- Transfer of heat
- Heat and matter

Objectives: B, C, D
ATL skills:
Communication – communication skills
Thinking – transfer skills
Social – collaboration skills
Self-management – reflection skills

MYP3: PHYSICS

Unit 1: Magnetism and electricity

Through the activities of investigation students will research about impact that electricity has on our lives. The students will see that electricity and magnetism are both part of a single electromagnetic force that is fundamental to today's society.

Key concept: Change
Related concepts: Environment, Consequences, Development, Energy
Global context: Globalization and sustainability
Statement of inquiry: Increasing electrical energy production to meet the needs of an expanding global population can have environmental consequences.

Main content addressed:

- Electrical charge
- Static electricity
- Electric current
- Electric circuits, voltage, resistance
- Magnetic fields
- Magnetism from electric currents
- Electricity from magnetism

Objectives: A, D
ATL skills:
Research – information literacy skills
Research – media literacy skills
Thinking – transfer skills

Unit 2: Motion and force

Through the activities students will identify forces that result in motion. They will be able to measure and graph movement of an object to calculate velocity. Students will apply their knowledge and understandings to a real-life experience through technology.

Key concept: Relationships
Related concepts: Function, Movement, Interaction
Global context: Orientation in time and space
Statement of inquiry: The laws of physics are closely connected to everyday situations, demonstrating the fundamental principles of mechanical movement through various interactions.

Main content addressed:

- Motion and speed
- Uniform and non-uniform motion
- Change of speed and acceleration

- Uniformly accelerated motion
- Force and motion

Objectives: A, B, C
ATL skills:
Research – information literacy skills
Communication – communication skills
Social – collaboration skills

Unit 3: Waves sound, light and optics

Through engaging activities, students will explore the nature of sound as a mechanical wave, examining its properties alongside those of light and their interactions with matter. This inquiry will enable students to analyse the role of scientific understanding in technological innovations, highlighting how knowledge of sound and light has led to advancements that impact our environment and everyday lives.

Key concept: Change
Related concepts: Environment
Global context: Scientific and technical innovation
Statement of inquiry: Knowledge of sound and light has led to advancements that impact our environment and everyday lives.

Main content addressed:
- Origin and types of waves
- Description of waves
- Wave reflection and refraction
- Sound
- Behaviour of light
- Visible light and colour
- Ray optics – reflection and refraction of light
- Optical devices

Objectives: B, C, D
ATL skills:
Thinking – critical thinking skills
Thinking – creative thinking skills
Self-management – reflection and affective skills