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| Unit title | **Key concept** | **Related concepts** | **Global context** | **Statement of inquiry** | **MYP subject group objectives** | **ATL skills** | **Content (topics, knowledge, skills)** |
| Measurement of length  (pMYP PHY) | Systems | Model, function | personal and cultural expression | Measured length of an object (model) depends on the accuracy of measuring device used. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v | Self-managment skills  Social skills  Thinking skills | Units of length  Unit conversion  International system of units  Different types of rulers  History of units of length  Errors in measurement  Accuracy |
| Measurement of volume  (pMYP PHY) | systems | Balance, environment | personal and cultural expression | Using the same unit for measuring the volume of the objects makes the world more balanced. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  D: i, ii, iii, iv | Self-managment skills  Social skills  Thinking skills  Research skills  communication | Units of volume  Unit conversion  Cubic and metric system of units  Measuring cylinder  History of units of volu  Errors in measurement  Accuracy |
| Measurement of mass  (pMYP PHY) | systems | Environment, function | Personal and cultural expression | Mass of the object depends on the environment (gravitation force) as well as on the choosen scale and method used. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v | Self-managment skills  Social skills  Thinking skills  communication | Units of mass  Unit conversion  Different types of scales  Mass of small objects  Errors in measurement  Accuracy |
| Density  (pMYP PHY) | Relationships | Environment, change | Scientific and technical investigations | Each change of the object density is related with the change of its behaviour in the given environment. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  D: i, ii, iii, iv | Self-managment skills  Social skills  Thinking skills  Research skills  communication | Behavior of objects placed into liquids  Floating and sinking  Mixing of different liquids  Hydrometer  Submarines, ships  Formula: density = mass / volume  Units of density |
| Time  (pMYP PHY) | Relationships | change | Scientific and technical investigations | Time changes simultaneously and does not depend on the clock we use. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v | Self-managment skills  Social skills  Thinking skills  communication | Different types of clocks  Historical development of clocks  Units of time  Timetable graphic  Errors in measurement  Accuracy |
| Properties of matter  (MYP1 PHY) | Relationships | Patterns, evidence, models | Identities and relationships | **Patterns** found in all matter in Universe provide **evidence** for the **model** that everything is made of very small particles. | A: i, ii, iii  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills | Properties of liquids  Hydraulic machines, water level  Properties of gases  Diffusion  Properties of solids  Interactions between particles  change of state  fog, rain  anomaly of water |
| Temperature  (MYP1 PHY) | Change | Consequences, environment | Identities and relationships | Temperature **change** brings **consequences** for our life and balance in nature needed for life on Earth. | A: i, ii, iii  B: I, iii, iv  C: i, ii, iii, v  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills | The feeling of temperature – is water warm or cold?  °C, °F, K  Absolute zero, freezing point, boiling point, change of freezing and boiling point in different conditions  Types of thermometers– mercury, alcohol, bimetallic, liquid crystals, digital  Thermal expansion of solids, liquids and gases,  Practical use of expansion  Bimetallic strip and its use  Thermostat  Anomaly of water |
| Static electricity  (MYP1 PHY) | change | Patterns, environments | Scientific and technical innovations | Static electricity is built up on an object when charge **changes** its position, it creates some **patterns** and we can utilize it in many electronic devices used in various **environments**. | A: i, ii, iii | Thinking skills  Social skills | An atom, ion, electric charge  Attractive and repulsive electric force  Electric field, electric field lines  Electrostatic induction  Electroscope  Charge up, charge off, ground something  Electric conductors and insulators  Antistatic sprays  Lightning and lightning rod, thunder  Van de Graaff generator  Capacitors  Safety and static electricity |
| Magnetism  (MYP1 PHY) | Relationships | Environment, evidence, interaction | Orientation in time and space | **Interaction** between magnets gives us an **evidence** of magnetic properties of matter and has allowed us to explore various **environments**. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | Magnet and its parts  Attractive and repulsive magnetic force  Magnetic field lines, magnetic field and its properties  Permanent and temporary magnets  Magnetic domains  Magnetization, demagnetization,  Magnetic field of the Earth, compass  Magnetic properties of matter  Soft and hard magnetic materials  Use of magnets  Electromagnet |
| Heat  (MYP2 PHY) | systems | Form, energy, environment | globalization and sustainability | Heat is a **form** of **energy** that moves from one **system** at a higher temperature to another **system** at a lower temperature. | A: i, ii, iii  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | heat – symbol, unit  conductors, insulators  conduction, convection, radiation  keeping warm  specific heat capacity  phase changes  evaporation, boiling |
| Forces  (MYP2 PHY) | relationships | Movement, interaction | Orientation in space and time | Nothing **moves** without force, which can only exist as a result of an **interaction**. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | What is force, what kind of forces we know, effects of forces  Unit of force, newtonmeter  Difference between mass and weight  Gravitational force, types of forces  *W* = *mg*, not only for Earth  Adding forces, subtracting forces  the resultant force, balanced forces, parallelogram method  Friction  Air resistance, streamlined shape  The Newton’s Laws and their use |
| Electric current 1 (DC)  (MYP2 PHY) | systems | Form, function | Scientific and technical innovations | Communities rely on electrical **systems** that humans have developed through using components that have specific **forms** and **functions**. | A: i, ii, iii  C: i, ii, v | Communication skills  Social skills  Thinking skills | Electric circuits and its properties (parts of a circuit, symbols of the components, sources of el. current, switch, …)  Electric current  Voltage  Voltmeter, ammeter  Connection in series and in parallel Different types of sources (series connection of batteries)  Battery from fruit and vegetable  El. current in solids – what it is, real and conventional el. current  Resistance  Factors influencing the resistance  Heat produced by el. current  Filament lightbulb  Short circuit and protection against it, fuse  Protection against el. Current  Potentiometer, rheostat, resistor  Ohms law (only *V* = *RI*) |
| Light and colours  (MYP2 PHY) | change | Interaction, environment | Personal and cultural expression | White light consists of many colours and when two coloured lights **interact**, final colour **changes** according to the **environment** the light travels through. | A: i, ii, iii | Self management | Sources of light, “light environments”, scattering  Light and its properties  Light as part of electromagnetic spectrum  Speed of light, light-year  Pinhole camera  Shadows, lunar and solar eclipse  Colours of objects  Primary, secondary colours – for painters and for physicists  Addition and subtraction of colours  Filters  Rods and cones in eye |
| Mirrors and lenses  (MYP3 PHY) | change | Interaction, environment | Scientific and technical innovation | Mirrors and lenses **change** the path of light in different **environments** and affect the images that you see. | A: i, ii, iii  B: i, iv  C: i, ii, iii, iv, v  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | law of reflection, law of refraction  total reflection, optical fibres  Plane mirror, spherical mirrors  Formation of image, properties of image  Use of mirrors  Lenses, images created by lenses and their properties, ray diagrams  Focal length of lenses  Eye and its parts  Defects of vision, glasses  Magnifying glasses |
| Uniform straightline motion  (MYP3 PHY) | relationships | Movement | Orientation in time and space | To know where we are and where we are moving to we need to describe the **relationship** between **space and time**. | A: i, ii, iii  C: i, ii, iii, iv, v  C2: ii  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | Velocity, speed, displacement, distance traveled  Average speed  Distance – time graph, displacement – time graph, speed – time graph + deducing velocity from them  The equations of motion  Relative speeds |
| Energy  (MYP3 PHY) | Change | Energy, form | Globalization and sustainability | **Energy** can be **changed** from one **form** to another, but it cannot be created or destroyed. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | Work done, units of work  Kinetic energy, gravitational potential energy + formulas (*Ek = W = F x s, Ek = ½ mv2, Ep = mgh*)  power  Energy as agent of a change and mechanical energy is a stored work  Forms of energy  The Law of conservation of energy  Sankey diagrams  Energy transfer in everyday situations  Efficiency  Renewable and non – renewable sources of energy  Different types of power plants |
| Uniformly accelerated motion  (MYP4 PHY) | Change | Movement, function | Orientation in time and space | The rate of change of velocity is an acceleration, which influences the change in movement of an object. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  C2: ii  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | Velocity - speed, displacement -distance traveled  Average speed  Distance – time graph, displacement – time graph, speed – time graph + deducing velocity from them  Acceleration + formula  The equations of motion  Braking distance, reaction time  Uniform and non – uniform acceleration  Relative speeds  Free fall  Measurement of gravitational acceleration |
| Pressure  (MYP4 PHY) | Change | Environment, consequences | Identities and relationships | Change of pressure influences our environments and its consequences affect our lives. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | Pressure, hydrostatic and atmospheric pressure  Units of pressure  Pascal’s law, hydraulic machines  Buoyant force, Archimedes law  Bernoulli’s equation; continuity equation |
| Sound  (MYP4 PHY) | Change | Energy, movement  development | Personal and cultural expression | **Vibrating** objects can create a sound wave, which transfers **energy** and create pressure **changes** in air. | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  D1: i, ii, iii, iv  D2:i | Research  Self management  Social skills  Communication skills  Thinking skills | Wave and its properties (wave length, frequency, period, amplitude)  Sound and its properties (reflection, interference, diffraction)  Resonance  Sources of sound  Speed of sound in different environments  Loudness, tone, intensity, pitch  Human ear, noise hygiene  Ultrasound and infrasound +their use  Musical instruments  Doppler effect  Sonic boom and supersonic speed |
| Rigid objects  (MYP4 PHY) | Systems | Models, movement | Scientific and technical innovation | Actual objects (**systems**) have dimensions and they require the expansion of the point particle **model** to consider the possibility of different points on an object having different states of **movement**. | A: i, ii, iii  B: I, iii, iv  C: i, ii, iv, v | Research  Self management  Social skills  Communication skills  Thinking skills | Model of rigid object  Torque  Turning forces, torque  Bodies in equilibrium  Lever, parts of lever  Center of mass, stability and balance  Rotational motion, moment of inertia, rotational kinetic energy |
| Dynamics  (MYP5 PHY) | Change | Consequences, movement  Interaction | Scientific and technical innovations | Every change in movement is a consequence of action of force(s). | A: i, ii, iii  B: i, ii, iii, iv  C: i, ii, iii, iv, v  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | Newton’s law of motion  Free-body force diagrams  Resultant force in different situations  Friction: static, dynamic friction  Momentum, law of conservation of momentum  Impulse, collisions  Uniform circular motion  Centripetal force  Motion of Moon and planets in space  - quantitative tasks on force – acceleration - momentum |
| Electricity AC-DC  (MYP5 PHY) | Change | Energy, transformation  form | Scientific and technical innovation | **Changing** magnetic field creates electric field and thus the **energy** can be **transformed** into electrical energy. | A: i, ii, iii  B: i, ii, iii, iv  C1: i, ii, iv, v  C2: i, ii, iii, iv, v  D: i, ii, iii, iv | Research  Self management  Social skills  Communication skills  Thinking skills | What is el. current + formula *I = Q/t*, what is voltage, AC, DC  Resistance, resistor, rheostat + its properties ( *R = ρxl/S*, R~T, thermistor)  Resistance in series and parallel circuits + formulas  The Ohm’s Law  El. Power  Electric work, kWh  Heating effect of el. current  Efficiency  Voltage graphs  AC – electromagnetic induction  Transformer  Power transportation, power grid |
| Thermal physics  (MYP5 PHY) | Systems | Patterns, evidence | Scientific and technical innovation | **Patterns** found in the changing macroscopic behaviour of solids, liquids and gases provide **evidence** for the microscopic model of moving particles, creating **systems**. | A: i, ii, iii, C: i, ii, iv, v | Research  Self management  Social skills  Communication skills  Thinking skills | Kinetic theory of structure of matter  Diffusion  Structure of different states of matter  Systems  Temperature and thermometers  Heat and internal energy  Heat and specific heat capacity  Calorimetric equation  Heat transfer: conduction, convection, radiation  Heat conductors and insulators  First Law of Thermodynamics |
| Phase changes  (MYP5 PHY) | change | Movement, consequence | Fairness and development | Matter exists in various physical states characterized by the movement of the matter´s particles and can be changed as a consequence of external conditions. | A: i, ii, iii  B: i,ii, iii, iv  C: i,ii, iv, v  D: ii | Research  Self management  Social skills  Communication skills  Thinking skills | Melting and freezing  Evaporation and boiling  Real-life examples of changes of state  Structure of gas  Pressure and temperature of gas  Isothermal, isochoric, isobaric process  Work of gas  Real gas, liquefaction of gases  Ideal gas equation (equation of state) |
| Everyday materials  (MYP2 CHE) | relationships | Form  Funciton  Interaction | Scientific and technical innovation | Through interacting with the natural world, people have developed materials based on the interaction between the function and form of their constituent particles. | A i  B i, ii, iii, iv  C i, ii, iii, iv, v  D i, ii, iii, iv | Thinking: critical thinking  Thinking: transfer  Communication: communication  Research: information literacy | Difference between elements and compounds  Particle theory of matter  Interpretation of the word “purity”  Solutions, solutes and solvents Solubility of different substances  Practising the techniques  Comparing the properties of stainless steel, wood, glass and plastic with their everyday uses.  Conductors and insulators  Making observations, recording information  solids, liquids and gases  The arrangement of particles  Demonstration on the use of different solvents  Melting, boiling, cooling, evaporation and condensation  Classification of elements as metals and non-metals Properties of metals and non-metals  Alloys Uses of metals and non-metals in industry |
| Periodic table  (MYP2 CHE) | systems | Function  Patterns | personal and cultural expression | The function of the periodic table is to express patterns of physical and chemical properties. | A i, ii. iii | Thinking: critical thinking  Thinking: transfer  Self- management: organization | History of the periodic table  Patterns in the following in the groups and periods of the periodic table: atomic number and mass, physical states, acid/base nature, metals, non-metals and metalloids, and general reactivity with air and water  Symbols of the elements  Practising the skills of observation, comparing and contrasting, recording data accurately and making inferences and conclusions  Family names of and uses for the elements in the main groups  The transition metals and their uses Historically predictive nature of the periodic table’s design |
| Atoms and their structure  (MYP2 CHE) | systems | Development  Models  Evidince | Orientation in space and time | Models are developed, challenged and modified based on the newly discovered evidence | C i, ii ,iii, iv, v | Thinking: critical thinking  Social: collaboration  Self-management: organization | Matter is made up of atoms.  Different models of the atomtimeline (Dalton, Thompson, Rutherford and Bohr models)  Sub atomic particles: protons, neutrons and electrons  Define, and compare and contrast, atoms, molecules, elements and compounds.  Define atomic number and mass number. Isotopes and their uses Formation of ions Writing chemical formulas given a list of polyatomic ions |
| Body systems  (MYP 3 BIO) | Systems | Function Interaction | Identities and relationships: what it means to be human | The human body’s systems interact to support the common function of maintaining a person’s health. | B iv  C ii, iii, iv  D i, ii, iii, iv | Thinking: critical thinking:  Thinking: creative thinking  Communication: communication Self-management: organization Self-management: affective Research: information literacy | Understand that there are systems in the body that allow the body to fulfill the requisites of life. |
| Classification and variation  (MYP 3 BIO) | Relationships | Evidence Patterns | Globalization and sustainability: the interconnectedness of human-made systems and communities | The relationships and patterns identified amongst organisms provide evidence that allows the natural world to be classified using human-made systems. | A i, iii | Thinking: critical thinking  Communication: communication  Self-management: organization  Research: information literacy | List the five kingdoms.  State examples of features and processes common to organisms belonging to each of the five kingdoms.  Describe the purpose of classification for a common international nomenclature: facilitating the positioning of new species relative to existing species, allowing for the patterns of evolution to be traced through the kingdoms.  List the main taxonomic groups as kingdom, phylum, class, order, family, genus, species.  State that each organism has a name comprising a genus and species. |
| Photosynthesis and respiration  (MYP 3 BIO) | Systems | Transformation Energy | Globalization and sustainability: reflecting on the opportunities and tensions provided by the interconnected nature of the world | Photosynthesis and respiration form a system of energy transformation that humans can manipulate to their advantage. | B i, ii, iii, iv  C i, ii ,iii, iv, v | Thinking: critical thinking  Social: collaboration  Communication: communication  Self-management: organization  Self-management: reflection  Research: information literacy | Use words and symbols to describe how photosynthesis involves the conversion of light energy into chemical energy.  State that light from the Sun is composed of a range of wavelengths (colours).  State that chlorophyll is the main photosynthetic pigment.  Outline in simple terms the structure of the leaf as an organ of photosynthesis.  Explain the role of photosynthesis  Outline the effects of temperature, light intensity and carbon dioxide concentration on the rate of photosynthesis.  Explain how humans can manipulate photosynthesis to their advantage.  Use words and symbols to describe how cell respiration is the controlled release of energy from organic compounds in cells.  Describe the importance of respiration in carrying out the characteristics of life. |
| Ecosystems  (MYP 3 BIO) | Change | Balance Environment | Fairness and development: rights and responsibilities | Imbalance in an environment creates altered conditions for life affecting future generations of species. | C i, ii  D i, ii, iii, iv | Thinking: critical thinking  Thinking: creative thinking  Social: collaboration  Communication: communication  Self-management: affective  Research: information literacy | Definitions of key terms such as individual organism, population, community, ecosystem, biome, biosphere  Hierarchical structure of ecosystems  Relationships  Ecosystem biodiversitybiotic and abiotic factors  Competition within an ecosystem  Biomes: Forest ecosystems and the factors that impact upon them: rainforest, tropical rainforest, temperate rainforest, tropical dry forest, deciduous forest, coniferous forest  Aquatic ecosystems and the factors that impact upon them: |
| Natural selection  (MYP 3 BIO) | Relationships | Consequence Evidence | Personal and cultural expression: the ways in which we discover and express ideas and beliefs | The consequences of natural selection provide evidence to support the theory of evolution. | A i, ii, iii | Thinking: critical thinking  Communication: communication  Self-management: affective  Research: information literacy | Outline Darwin’s experiences that led to the development of the theory of natural selection.  Explain that the theory of natural selection is used to account for the diversity of organisms on the planet as it is the mechanism underpinning evolution.  Outline the theory of natural selection |
| Cells  (MYP4 BIO) | Systems | Models Form Function | Personal and cultural expression: the ways in which we discover and express ideas | Modelling allows the specific forms and specialized functions that cells exhibit to be expressed. | A i, ii, iii | Thinking: critical thinking:  Self-management: affective  Communication: communication | The cell theory  Microscopy has contributed to our knowledge of living  things.  All cells can be classified as eukaryotic or prokaryotic, each having distinct properties.  Plant, animal and bacteria cells have similarities and differences in terms of structure and function.  Cells contain different structures and organelles  Eukaryotic cells  Prokaryotic cells.  Cells may be specialized for specific functions (for example, leaf cell, root hair cell, sperm cell, red blood cell).  Many organisms are unicellular  the basic functions of life.  The cell membrane regulates the flow of substances into and out of the cell.  The surface area of the cell into and out of the cell.  The transport of substances into and out of cells  gradient. |
| DNA and heredity  (MYP4 BIO) | Relationships | Models Structure Function | Identities and relationships: identity | Models can be used to represent the structural and functional relationship between DNA and inherited traits. | D i, ii, iii, iv | Thinking: critical thinking  Self-management: organization  Communication: communication:  Research: information literacy  Research: media literacy | DNA is composed of a double helix  helix is made up of units called nucleotides.  four different nucleotides  process of DNA replication  DNA as a template for the production of proteins |
| Enzymes  (MYP4 BIO) | Change | Consequence Interaction | Scientific and technical innovation: the interaction between people and the natural world | Scientists use life processes that are the consequence of interactions between molecules to create a variety of everyday products. | B iii, iv  C i, ii, iii, iv, v | Thinking: critical thinking  Thinking: creative thinking  Social: collaboration  Communication: communication  Self-management: organization  Research: information literacy | Describe enzymes as catalysts that increase the rate of biological reactions in order to make them useful.  State that enzymes form enzyme substrate complexes when the substrate attaches to the active site.  Describe this attachment as the Lock and Key Hypothesis.  State that this catalyses the reaction and that the enzyme is subsequently released unaltered.  State that enzymes are substrate-specific.  List the factors that can affect enzyme activity including the effect of concentration of enzyme or substrate, pH and temperature.  Name three enzymes and their substrates.  Describe one industrial use of enzymes: for example, fruit juice production or production of biological washing powder. |
| Homeostasis  (MYP4 BIO) | Systems | Balance Interaction | Personal and cultural expression: the ways in which we discover and express ideas | Balance in complex organisms requires effective interaction between systems to regulate internal conditions based on feedback. | A i  B iii | Thinking: critical thinking  Thinking: creative thinking  Self-management: organization  Self-management: affective  Communication: communication  Research: information literacy | Understand the need to regulate the internal environment.  Describe that this involves an equilibrium or set point, detection of deviation from the equilibrium or set point and mechanisms that restore equilibrium.  Understand that the mechanisms that restore equilibrium might be physiological or behavioural.  Understand the term negative feedback  Describe and explain the equilibrium |
| Ecology  (MYP4 BIO) | Systems | Interaction Environment Energy | Scientific and technical innovation: the natural world and its laws | Organisms interact with the natural environment by transferring matter and energy. | B i, ii  C i, ii, iii | Thinking: critical thinking  Social: collaboration  Communication: communication  Self-management: organization  Self-management: affective  Research: information literacy | Interdependence of and interaction between populations  Carrying capacities, limiting factors and growth curves  Patterns of succession in ecosystems  The effects of natural events and human activities on ecosystems and our responsibility in managing these effects  Observation and analysis of populations (flora, fauna and micro-organisms) in a local ecosystem |
| Biochemistry  (MYP5 BIO) | Relationships | Balance Energy | Identities and relationships: physical health | A healthy body can be maintained when there is a balance between energy consumed and energy used. | A i, ii, iii  B i, ii, iii, iv  C i, ii, iii, iv, v  D i, ii, iii, iv | Thinking: critical thinking  Thinking: creative thinking  Social skills: collaboration  Communication: communication  Self-management: organization  Research: information literacy | Energy content of food: bomb calorimeter Balanced diet Macromolecules: monomers and polymers Carbohydrates and their functions  Fats and their functions Proteins and their functions Adverse effects of malnutrition |
| Reproduction  (MYP5 BIO) | Systems | Form Function | Scientific and technical innovation: the natural world and its laws | Systems of reproduction in the natural world have a variety of different forms but support the same function. | A i, ii  D i, ii, iii, iv | Thinking: critical thinking:  Thinking: creative thinking  Self-management: affective  Social: collaboration  Communication: communication:  Self-management: organization  Research: information literacy  Research: media literacy | Describe a life cycle involving sexual reproduction using the examples of a human and a flowering plant.  Describe a life cycle involving both asexual and sexual reproductionfor example, an aphid or coral.  Describe the structure of an insect-pollinated flower.  Describe the process of pollination, fertilization, seed and fruit formation and dispersal.  Label a diagram of the human male and female reproductive organs.  Describe the mechanism of fertilization, copulation, gestation and lactation. |
| Genetics  (MYP5 BIO) | Systems | Transformation Patterns  Movement | Orientation in space and time: the interconnectedness of individuals and civilizations from personal, local and global perspectives | The transformation of genetic material into inherited traits connects individuals to one another through patterns of inheritance. | A iii  C i, ii | Thinking: creative thinking  Self-management: organization  Self-management: affective  Social: collaboration  Research: information literacy  Research: med | Genetic information is contained in DNA.  Chromosomes d within cells.  Mitosis  Meiosis  Traits are characteristics that are passed from parent to offspring.  Genes  Alleles  Variation  Human chromosomes occur in pairs.  Homologous chromosomes DNA mutations may be beneficial or harmful  The genotypes and phenotypes of offspring  Construct and use the monohybrid cross |
| Evolution  (MYP5 BIO) | Change | Consequences Balance | Fairness and development: access to equal opportunities | Population change is a consequence of the unbalanced opportunities provided by natural selection. | A i | Thinking: critical thinking  Research: information literacy  Research: media literacy  Communication: communication | Evolution  When gene frequencies change within a population over time, evolution is occurring.  Artificial selection  Charles Darwin proposed the theory of evolution  Evidence for evolution Evolutionary relationships |
| Bio-technology  (MYP5 BIO) | Change | Function Transformation  Evidence | Scientific and technical innovation: the impact of scientific and technological advances on communities and environments | Scientific and technological advances enable societies to use, control and transform the function of organisms and biological molecules. | B i, iv  D iii, iv | Thinking: critical thinking  Thinking: creative thinking  Self-management: reflection  Communication: communication  Research: information literacy | Biotechnology uses cellular and biomolecular processes  Biotechnology can use organisms to make useful food products.  Biotechnology can use organisms to produce fuels.  Biotechnology can use enzymes  Selective breeding is the process of breeding organisms for desired characteristics (for example, disease resistance in wheat, increasing milk yields in cattle herds).  Genetic engineering  Gel electrophoresis is a process to separate and analyse DNA fragments.  A DNA profile is characterized by the banding patterns of genetic profiles produced by electrophoresis of treated samples of DNA.  A DNA profile contains information to help identify a person.  Artificial cloning  Stem cells |
| Atomic structure  MYP 3 CHE | Systems | Models Evidence | Personal and cultural expression: the ways in which we discover and express ideas | Models are created and modified over time to express new ideas formed by experimental evidence. | A i, ii, iii | Thinking: critical thinking  Thinking: transfer  Communication: communication  Research: information literacy  Research: media literacy | Atomic models: Thomson, Rutherford and Bohr  Subatomic particles: the electron, proton and neutron and their characteristics  Introduction to bonding ionic, covalent, and metallic bonds. How electrons are used differently in each type of bond. Simple models to demonstrate each type  Simple quark theorywhich quarks make up neutrons and protons and the models used to demonstrate this  Simple outline of the strong interaction that operates within atomic nuclei  Electronic configurations of atoms |
| Energy and chemical change  MYP 3 CHE | Change | Interaction Consequences | Scientific and technical innovation: the impact of scientific and technological advances on communities and environments | A change in matter is a consequence of energy differences between substances. Scientists and technicians make use of this to create a range of innovative products. | B i, ii  D iii,iv | Thinking: critical thinking  Self-management: reflection  Thinking: creative thinking  Communication: communication  Self-management: organization  Research: information literacy  Research: media literacy | The law of conservation of mass  Physical change, chemical change, reactant, product, combustion  Definition of the terms “catalyst” and “precipitate” Writing word and symbol equations  Importance of the subscripts (and coefficients) in equations  Changes in matter  Types of chemical reaction  common laboratory acids and alkalis.  Balancing chemical equations  Chemistry in the automobile industry  Concept that chemical potential energy is stored within compounds |
| Solutions  MYP 3 CHE | Relationships | Evidence Form | Globalization and sustainability: the relationship between local and global processes | The formation of a solution provides evidence of a relationship between the natures of substances. | B i,ii,iii,iv  C i,ii,iii,iv,v | Thinking: critical thinking  Social: collaboration  Communication: communication  Self-management: organization  Self-management: affective  Research: information literacy | Polar molecules  surface tension.  hydrogen bonds  Solutions  solute  solubility of the substance.  concentration  Some gases can dissolve in water  Electrolytes |
| Acids and bases  MYP 3 CHE | Relationships | Function | Fairness and development: rights and responsibilities | The strength of acids and bases is related to the function of the degree of dissociation and determines how they should be used and disposed of. | A i, ii, iii  B i, ii, iii, iv  C i, ii ,iii ,iv, v | Thinking: critical thinking  Thinking: creative thinking  Research: media literacy  Research: information literacy  Self-management: organization  Self-management: affective  Communication: communication  Social: collaboration | Definitions of acids and bases (Arrhenius and Brønsted−Lowry)  pH scale  Indicators (litmus, universal, phenolphthalein)  Conductivity  Concentrated, diluted, strong and weak acids and bases  Household detergents |
| Environmental cycles  MYP 3 CHE | Relationships | Balance Transformation | Scientific and technical innovation: the impact of scientific and technological advances on communities and environments | Scientific and technological advances are impacting upon the naturally balanced relationships provided by the effective transformations in environmental cycles. | D i,ii,ii,iv | Thinking: critical thinking  Self-management: reflection  Communication: communication  Social: collaboration  Self-management: organization  Research: information literacy  Research: media literacy | Importance of carbon, nitrogen and water Water cycle Treatment and recycling of water Carbon cycle  Nitrogen cycle Nitrogen-fixing |
| Periodic trends  MYP 4 CHE | Relationships | Change Form Function | Orientation in space and time: discoveries | The form of the periodic table is evolving due to knowledge- challenging discoveries, thus enhancing its function of showing trends in the physical and chemical properties of the elements. | A i,ii,iii | Thinking: critical thinking  Thinking: transfer  Thinking: creative thinking  Communication: communication  Self-management: organization | positions of metals, non-metals and metalloids.  Metals  Elements in a group  Shielding  Effective nuclear charge Electronegativity |
| Stoichiometry  MYP 4 CHE | Systems | Balance Conservation | Scientific and technical innovation: how humans use their understanding of scientific principles | The scientifically constructed systems for balancing chemical equations require the numbers and types of atoms to be conserved. | B ii, iii  C i, ii | Thinking: critical thinking  Thinking: creative thinking  Social: collaboration  Communication: communication  Communication: collaboration  Self-management: organization  Research: information literacy  Communication: media literacy | Concept of the mole Avogadro’s number Relative molecular mass and relative atomic mass Empirical and molecular formula Percentage composition Stoichiometric calculations Solutions and problems involving concentrations |
| Gas laws  MYP 4 CHE | Relationships | Movement Conditions | Scientific and technical innovation: how humans use their understanding of scientific principles | Humans can manipulate the conditions impacting upon gas particles, thereby determining their movement. | C i, ii, iii | Thinking: critical thinking  Thinking: reflection  Research: information literacy  Social: collaboration | Kinetic molecular theory Conversions for temperature and pressure Dalton’s law Boyle’s law Charles’ law Ideal gas law Graphing and calculations Standard temperature and pressure |
| Redox reactions  MYP 4 CHE | Systems | Transfer  Evidence  Balance | Scientific and technical innovation: how humans use their understanding of scientific principles | Designers use the balanced systems maintained by the transfer of electrons in redox reactions to develop a range of products. | B i, ii, iii, iv  C i, ii, iii, iv, v  D i, ii, iii, iv | Thinking: critical thinking  Thinking: creative thinking  Self-management: reflection  Social: collaboration  Communication: communication  Self-management: organization  Research: information literacy  Research: media literacy | oxidation and reduction  oxidation numbers  oxidising agent and reducing agent  Half reactions  Electrochemistry  Electrochemical cells:  Electrolysis reactions  Electrolytic cells  Applications of redox reactions |
| Food chemistry  MYP 4 CHE | Change | Consequences Influences Balance Conditions | Identities and relationships: personal health | A person’s health is influenced by cultural and conditional changes to his or her diet. | A i,ii,iii  D iii, iv | Thinking: critical thinking  Thinking: creative thinking  Self-management: reflection  Thinking: transfer  Communication: communication  Research: information literacy  Research: media literacy | Determining caloric values of food Macromolecules and enzymes Colour and flavour Shelf life  Additives Food technology |
| Chemical nomenclature  MYP 5 CHE | Systems | Patterns Development Models | Globalization and sustainability: the interconnectedness of human-made systems and communities | Systems for explaining the world are constructed by observing patterns. | A i, ii, iii | Thinking: critical thinking  Thinking: transfer  Communication: communication  Self-managem | Chemical formula review Naming of simple compounds IUPAC nomenclature Naming of organic compounds |
| Bonding  MYP 5 CHE | Relationships | Interactions Nature Models | Globalization and sustainability: the interconnectedness of human-made systems and communities | Scientists use bonding models to explain the nature of interactions between different types of particles. | A i, ii, iii  D iii, iv | Thinking: critical thinking  Self-management: reflection  Social: collaboration  Self-management: organization  Communication: communication  Research: information literacy  Research: media literacy  Self-management: affective | Bonds are formed to achieve stability.  Positive ions  Negative ions  electron configuration of the atom.  The ionic bond  A covalent bond  Single, double and triple covalent bonds  Lewis structures  The ‘octet rule’  Carbon and silicon  Intermolecular forces  A metallic bond  Alloys |
| Thermochemistry  MYP 5 CHE | Change | Energy Process | Scientific and technical innovation: how humans use their understanding of scientific principles | Physical and chemical processes involve energy changes that can be used to create a range of products and solutions that impact on humankind and the environment. | B i, ii, iii, iv  C i, ii, iii  D i, ii, iii | Thinking: critical thinking  Self-management: reflection  Thinking: transfer  Social: collaboration  Communication: communication  Self-management: organization  Research: information literacy | Energy changes  Temperature  physical and chemical changes in terms of energy  Qualitative and quantitative measurements.  Units of energy  Exothermic and endothermic processes  Combustion  complete and incomplete combustion  fossil fuels  Bond breaking  insulators  Using calorimetry  Calculating energy change |
| Kinetics and equilibrium  MYP 5 CHE | Relationships | Balance Reaction | Scientific and technical innovation: the natural world and its laws | Equilibrium is the state of balance attained when opposing reaction rates become equal. | A ii  B ii, iii, iv  C i, ii, iii, iv, v | Thinking: critical thinking  Thinking: creative thinking  Thinking: transfer  Communication: communication  Self-management: organization  Self-management: affective  Research: information literacy | Reaction rate and collision theory  Factors affecting the rate of reaction  Equilibrium |
| Organic chemistry  MYP 5 CHE | Change | Form Energy | Orientation in space and time: turning points in humankind | In order for structure and energy to continue driving change, finite fossil fuels will need to be replaced by renewable raw materials. | B i, ii, iv | Thinking: critical thinking  Thinking: creative thinking  Self-management: affective  Social: collaboration  Self-management: reflection | Identification of the following: alkane, alkene, alkyne, alcohol, aldehyde, ketone, carboxylic acid  Nomenclature for straight-chain organic molecules Combustion reactions Fossil fuels |
| pMYP BIO Living with people | relationship | Interaction | Fairness and Development | People and living organisms around are closely connected | A i, ii | Thinking skills, Social skills | Animals and plants around us, Importance of organisms for people, Harmful organisms around us |
| pMYP BIO Microorganisms | change | Balance | Scientific and Technical Innovation | Microorganisms provide benefits but also possible danger | A ii, iii  C i, ii, iii, iv, v | Research skills, Self – Management skills | Types of MO, Structure, Usage, Importance |
| pMYP BIO Cells | Systems | Form | Scientific and Technical Innovation | No living organism can exist without cellular makeup | D iii, iv | Communication skills, Thinking skills, |  |
| pMYP BIO Animal Kingdom (classification) | Systems | System | Scientific and Technical Innovation | Animal kingdom shows great variety of different life forms and complexity | B i, ii, iii, iv  D i, ii, iii | Research skills, Self – Management skills | Animal Phylla, habitat, way of life, species |
| MYP1 BIO Animal behavior | relationship | Patterns | Personal and Cultural Expression | Animals are able to express their needs and sometimes emotions | D iii, iv | Communication skills | Migrations, Parental care, Social behavior, Communication, Feeding strategies |
| MYP 1 BIO Animal body systems | Systems | Models | Scientific and Technical | Animals developed different ways of survival | A i, ii, iii  B i, ii, iii | Research skills, Self – Management skills | Body covering, Support and movement, Feeding and Digestion, Breathing, Circulation, Response, Reproduction |
| MYP 1 BIO Ecology | relationship | Consequences | Globalization and sustainability | All parts of nature interact and these interactions have consequnces | C i, ii, iii, iv, v  D i, ii | Communication skills, Research skills | Ecosystems, Relationships, Cycle of Matter |
| MYP 1 BIO Environmental problems | change | Environmnent | Scientific and Technical Innovation | Changing natural habitat can lead to serious issues | D i, ii, iii, iv | Social skills, Self – Management skills | Global Warming, Greenhouse effect, Ozone Hole, Pollution |
| MYP 2 BIO Human Body | systems | Function | Scientific and Technical | The way each body system functions can influence other body parts | A ii, iii  B iii, iv  C i, ii  D i, ii, iii | Thinking skills, Social skills | Body covering, Support and movement, Feeding and Digestion, Breathing, Circulation, Response, Reproduction |
| MYP 2 BIO Health and lifestyle | relationship | Balance | Globalization and sustainability | Balanced diet, regular excercise and calm mind help us to lead happy and succsessful life | C i, ii, iii, iv, v  D ii, iii, iv | Communication skills, Self – Management skills | Immunity, Diseases, Lifestyle diseases, Prevention, Diet and exercise |
| MYP 2 BIO History of biology | change | Transformation | Orientation in time and space | Without historical discoveries and inventions, today biology would not be the same | A i | Research skills, Self – Management skills | Important scientists, Inventions, Discoveries |
| MYP 2 BIO Biotechnologies | change | Evidence | Scientific and Technical Innovation | New methods and technologies in science can bring improvement but also controversy | B i, ii | Thinking skills, Social skills | Cloning, Stem cell research, Organ transpalnt, GMO |