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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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, v | Self-managment skillsSocial skills Thinking skills  | Units of lengthUnit conversionInternational system of unitsDifferent types of rulersHistory of units of lengthErrors in measurementAccuracy |
| 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vD: i, ii, iii, iv | Self-managment skillsSocial skills Thinking skills Research skillscommunication | Units of volumeUnit conversionCubic and metric system of unitsMeasuring cylinderHistory of units of voluErrors in measurementAccuracy |
| 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, v | Self-managment skillsSocial skills Thinking skills communication | Units of massUnit conversionDifferent types of scalesMass of small objectsErrors in measurementAccuracy |
| 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vD: i, ii, iii, iv | Self-managment skillsSocial skills Thinking skills Research skillscommunication | Behavior of objects placed into liquidsFloating and sinkingMixing of different liquidsHydrometerSubmarines, shipsFormula: density = mass / volumeUnits 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, v | Self-managment skillsSocial skills Thinking skills communication | Different types of clocksHistorical development of clocksUnits of timeTimetable graphicErrors in measurementAccuracy  |
| 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, iiiD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills  | Properties of liquidsHydraulic machines, water levelProperties of gasesDiffusion Properties of solidsInteractions between particleschange of statefog, rainanomaly 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, iiiB: I, iii, ivC: i, ii, iii, vD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills  | The feeling of temperature – is water warm or cold?°C, °F, KAbsolute zero, freezing point, boiling point, change of freezing and boiling point in different conditionsTypes of thermometers– mercury, alcohol, bimetallic, liquid crystals, digitalThermal expansion of solids, liquids and gases,Practical use of expansionBimetallic strip and its useThermostatAnomaly 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 skillsSocial skills | An atom, ion, electric chargeAttractive and repulsive electric forceElectric field, electric field linesElectrostatic inductionElectroscopeCharge up, charge off, ground somethingElectric conductors and insulatorsAntistatic spraysLightning and lightning rod, thunderVan de Graaff generatorCapacitorsSafety 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | Magnet and its partsAttractive and repulsive magnetic forceMagnetic field lines, magnetic field and its propertiesPermanent and temporary magnetsMagnetic domains Magnetization, demagnetization,Magnetic field of the Earth, compassMagnetic properties of matterSoft and hard magnetic materialsUse of magnetsElectromagnet |
| 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, iiiD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | heat – symbol, unit conductors, insulatorsconduction, convection, radiationkeeping warmspecific heat capacityphase changesevaporation, 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | What is force, what kind of forces we know, effects of forcesUnit of force, newtonmeterDifference between mass and weightGravitational force, types of forces*W* = *mg*, not only for EarthAdding forces, subtracting forcesthe resultant force, balanced forces, parallelogram methodFrictionAir resistance, streamlined shapeThe 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, iiiC: 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 currentVoltageVoltmeter, ammeterConnection in series and in parallel Different types of sources (series connection of batteries)Battery from fruit and vegetableEl. current in solids – what it is, real and conventional el. currentResistanceFactors influencing the resistanceHeat produced by el. currentFilament lightbulbShort circuit and protection against it, fuseProtection against el. CurrentPotentiometer, rheostat, resistorOhms 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”, scatteringLight and its propertiesLight as part of electromagnetic spectrumSpeed of light, light-yearPinhole cameraShadows, lunar and solar eclipseColours of objectsPrimary, secondary colours – for painters and for physicistsAddition 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, iiiB: i, ivC: i, ii, iii, iv, vD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | law of reflection, law of refractiontotal reflection, optical fibresPlane mirror, spherical mirrors Formation of image, properties of imageUse of mirrorsLenses, images created by lenses and their properties, ray diagramsFocal length of lensesEye and its parts Defects of vision, glassesMagnifying 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, iiiC: i, ii, iii, iv, vC2: iiD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | Velocity, speed, displacement, distance traveledAverage speedDistance – time graph, displacement – time graph, speed – time graph + deducing velocity from themThe equations of motionRelative 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | Work done, units of workKinetic energy, gravitational potential energy + formulas (*Ek = W = F x s, Ek = ½ mv2, Ep = mgh*)powerEnergy as agent of a change and mechanical energy is a stored workForms of energy The Law of conservation of energySankey diagramsEnergy transfer in everyday situationsEfficiencyRenewable and non – renewable sources of energyDifferent 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vC2: iiD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | Velocity - speed, displacement -distance traveledAverage speedDistance – time graph, displacement – time graph, speed – time graph + deducing velocity from themAcceleration + formula The equations of motionBraking distance, reaction timeUniform and non – uniform accelerationRelative speedsFree fallMeasurement 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, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vD: i, ii, iii, iv | ResearchSelf 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, movementdevelopment | Personal and cultural expression | **Vibrating** objects can create a sound wave, which transfers **energy** and create pressure **changes** in air. | A: i, ii, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vD1: i, ii, iii, ivD2:i | ResearchSelf management Social skills Communication skills Thinking skills | Wave and its properties (wave length, frequency, period, amplitude)Sound and its properties (reflection, interference, diffraction)ResonanceSources of soundSpeed of sound in different environmentsLoudness, tone, intensity, pitchHuman ear, noise hygieneUltrasound and infrasound +their useMusical instrumentsDoppler effectSonic 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, iiiB: I, iii, ivC: i, ii, iv, v | ResearchSelf management Social skills Communication skills Thinking skills | Model of rigid objectTorque Turning forces, torque Bodies in equilibriumLever, parts of leverCenter of mass, stability and balanceRotational motion, moment of inertia, rotational kinetic energy |
| Dynamics(MYP5 PHY) | Change | Consequences, movementInteraction | Scientific and technical innovations | Every change in movement is a consequence of action of force(s). | A: i, ii, iiiB: i, ii, iii, ivC: i, ii, iii, iv, vD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | Newton’s law of motionFree-body force diagramsResultant force in different situationsFriction: static, dynamic frictionMomentum, law of conservation of momentumImpulse, collisionsUniform circular motionCentripetal forceMotion of Moon and planets in space- quantitative tasks on force – acceleration - momentum |
| Electricity AC-DC(MYP5 PHY) | Change | Energy, transformationform | Scientific and technical innovation | **Changing** magnetic field creates electric field and thus the **energy** can be **transformed** into electrical energy. | A: i, ii, iiiB: i, ii, iii, ivC1: i, ii, iv, vC2: i, ii, iii, iv, vD: i, ii, iii, iv | ResearchSelf management Social skills Communication skills Thinking skills | What is el. current + formula *I = Q/t*, what is voltage, AC, DCResistance, resistor, rheostat + its properties ( *R = ρxl/S*, R~T, thermistor)Resistance in series and parallel circuits + formulasThe Ohm’s Law El. PowerElectric work, kWhHeating effect of el. currentEfficiencyVoltage graphsAC – electromagnetic inductionTransformerPower 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 | ResearchSelf management Social skills Communication skills Thinking skills | Kinetic theory of structure of matterDiffusionStructure of different states of matterSystems Temperature and thermometersHeat and internal energyHeat and specific heat capacityCalorimetric equationHeat transfer: conduction, convection, radiationHeat conductors and insulatorsFirst 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, ivC: i,ii, iv, vD: ii | ResearchSelf management Social skills Communication skills Thinking skills | Melting and freezingEvaporation and boilingReal-life examples of changes of stateStructure of gasPressure and temperature of gasIsothermal, isochoric, isobaric process Work of gasReal gas, liquefaction of gasesIdeal gas equation (equation of state) |
| Everyday materials(MYP2 CHE) | relationships | FormFuncitonInteraction | 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 iB i, ii, iii, ivC i, ii, iii, iv, vD i, ii, iii, iv | Thinking: critical thinkingThinking: transferCommunication: communicationResearch: information literacy | Difference between elements and compoundsParticle theory of matterInterpretation of the word “purity”Solutions, solutes and solvents Solubility of different substances Practising the techniquesComparing the properties of stainless steel, wood, glass and plastic with their everyday uses. Conductors and insulatorsMaking observations, recording informationsolids, liquids and gases The arrangement of particles Demonstration on the use of different solventsMelting, boiling, cooling, evaporation and condensationClassification of elements as metals and non-metals Properties of metals and non-metals AlloysUses of metals and non-metals in industry  |
| Periodic table(MYP2 CHE) | systems | FunctionPatterns | 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 thinkingThinking: transferSelf- 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 usesHistorically predictive nature of the periodic table’s design  |
| Atoms and their structure(MYP2 CHE) | systems | DevelopmentModelsEvidince | 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 thinkingSocial: collaborationSelf-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 usesFormation of ionsWriting 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 ivC ii, iii, ivD 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, ivC 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, iiD 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 organellesEukaryotic 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 unicellularthe 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 cellsgradient.   |
| 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, ivC 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 feedbackDescribe 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, iiC 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, iiiB i, ii, iii, ivC i, ii, iii, iv, vD 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 dietMacromolecules: 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, iiD 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 iiiC 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. GenesAllelesVariationHuman chromosomes occur in pairs. Homologous chromosomes DNA mutations may be beneficial or harmfulThe genotypes and phenotypes of offspringConstruct 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  | EvolutionWhen gene frequencies change within a population over time, evolution is occurring. Artificial selectionCharles Darwin proposed the theory of evolution Evidence for evolutionEvolutionary relationships |
| Bio-technology (MYP5 BIO) | Change  | Function TransformationEvidence | 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, ivD iii, iv | Thinking: critical thinking Thinking: creative thinking Self-management: reflection Communication: communication Research: information literacy  | Biotechnology uses cellular and biomolecular processesBiotechnology can use organisms to make useful food products. Biotechnology can use organisms to produce fuels. Biotechnology can use enzymesSelective breeding is the process of breeding organisms for desired characteristics (for example, disease resistance in wheat, increasing milk yields in cattle herds). Genetic engineeringGel 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 cloningStem cells |
| Atomic structureMYP 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 changeMYP 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, iiD 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 matterTypes of chemical reactioncommon laboratory acids and alkalis. Balancing chemical equationsChemistry in the automobile industryConcept that chemical potential energy is stored within compounds |
| SolutionsMYP 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,ivC i,ii,iii,iv,v | Thinking: critical thinking Social: collaboration Communication: communication Self-management: organization Self-management: affective Research: information literacy  | Polar moleculessurface tension. hydrogen bondsSolutionssolutesolubility of the substance. concentrationSome gases can dissolve in waterElectrolytes  |
| Acids and basesMYP 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, iiiB i, ii, iii, ivC 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 cyclesMYP 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 cycleTreatment and recycling of waterCarbon 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. MetalsElements in a groupShieldingEffective nuclear chargeElectronegativity |
| 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, iiiC 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 moleAvogadro’s numberRelative molecular mass and relative atomic mass Empirical and molecular formulaPercentage compositionStoichiometric calculationsSolutions 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 theoryConversions for temperature and pressure Dalton’s lawBoyle’s lawCharles’ lawIdeal gas lawGraphing and calculationsStandard temperature and pressure  |
| Redox reactions MYP 4 CHE | Systems  | Transfer EvidenceBalance  | 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, ivC i, ii, iii, iv, vD 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 reductionoxidation numbers oxidising agent and reducing agent Half reactions ElectrochemistryElectrochemical cells:Electrolysis reactions Electrolytic cellsApplications 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,iiiD 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 flavourShelf life AdditivesFood 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 reviewNaming of simple compoundsIUPAC nomenclatureNaming 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, iiiD 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 ionsNegative ionselectron configuration of the atom. The ionic bondA covalent bond Single, double and triple covalent bondsLewis structuresThe ‘octet rule’Carbon and siliconIntermolecular forcesA metallic bondAlloys |
| 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, ivC i, ii, iiiD i, ii, iii | Thinking: critical thinking Self-management: reflection Thinking: transfer Social: collaboration Communication: communication Self-management: organization Research: information literacy  | Energy changesTemperaturephysical and chemical changes in terms of energy Qualitative and quantitative measurements. Units of energy Exothermic and endothermic processes Combustioncomplete and incomplete combustion fossil fuelsBond breakinginsulatorsUsing calorimetryCalculating 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 iiB ii, iii, ivC 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 reactionEquilibrium  |
| 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 reactionsFossil 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, iiiC 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, ivD 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, iiiB 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, vD 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, iiiB iii, ivC i, iiD 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, vD 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 |