

Law Ting Pong Secondary School
2020-21 S1 Science
Course Outline

Section	Week	Learning objectives (Students should be able to...)	Assessment
Unit 1 Introducing Science 1.1 Learning about science	2	<ul style="list-style-type: none"> • Recognize that science is a study of the Nature • Be aware that scientific knowledge is subject to change as new evidence becomes available • Appreciate that some scientific discoveries and some inventions have improved our quality of life • Be aware of the impact of scientific knowledge on natural resource management 	Formative assessment <ul style="list-style-type: none"> • Flipping Classroom and online assessment: Video watching www.goformative.com • Report: Report data like measurement including correct symbols; drawing simple experimental setup for example heating up or mixing up solution, potential hazard in different scenarios. • Experiment design: Design experiment for scientific investigation like the differences between luminous flame and non-luminous flame. • Presentation: Study the impact of scientific knowledge on natural resource management and the development of technology and use powerpoint or videos for presentation. • Data presentation skills: Present data in the form of appropriate graphs Summative assessment: Unit Test Practical Test
1.3 Science Laboratory	3	<ul style="list-style-type: none"> • Understand and observe the laboratory safety rules • Recognize the fire triangle and the various ways of putting out a fire • Identify some safety equipment in school laboratories • Identify some common hazard warning symbols • Describe how to handle some common laboratory accidents 	
1.4 Basic Practical Skills	4-5	<ul style="list-style-type: none"> • Identify and properly handle some common laboratory apparatus • Use appropriate instruments for measuring temperature, mass, length, volume and time • Manipulate basic unit conversion • Use appropriate units in recording measurement data • Be aware that there are errors in measurement • Use appropriate apparatus to transfer and mix solution properly • Use appropriate apparatus for heating solid and liquid safely 	
1.2 Practice of Science	6-7	<ul style="list-style-type: none"> • Recognize the steps in scientific investigation • Recognize the different types of scientific investigations • Acquire the concepts of 'fair test': able to identify the independent, dependent and controlled variables • read and interpret various types of graphs (e.g. bar chart, pie 	

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		chart, line graph) and present experimental results in the form of appropriate graph	
Unit 2 Water 2.1 Change in States of Water	8	<ul style="list-style-type: none"> Recognize that water exists in three physical states (ice, water and water vapour) Describe the processes (i.e. melting, freezing, boiling, condensation and evaporation) of the change in states of water Be aware that energy is released or absorbed when the physical state of water changes Recognize that temperature of water remains unchanged during the change in states Describe the factors affecting the rate of evaporation 	Formative assessment <ul style="list-style-type: none"> Flipping Classroom and online assessment: Video watching www.goformative.com Report: Use appropriate presentation skills like flowchart to show change of states of substances or a diagram to illustrate water cycle Experiment design: Design experiment for investigation of the differences between luminous flame and non-luminous flame. Project: Use recycle materials to build an evaporation or distillation setup Summative assessment: Unit Test
2.2. Water Cycle	9	<ul style="list-style-type: none"> Understand the processes in the water cycle 	
2.3 Dissolving (Extension)	(9)	<ul style="list-style-type: none"> Give some examples of soluble and insoluble substances in water Recognize that a solution is formed when a solute is dissolved in a solvent Describe the factors affecting the rate of dissolving in water 	
2.4 Water Purification	10	<ul style="list-style-type: none"> State some impurities in natural water State the needs for pure water Understand the processes involved in different methods of water purification (sedimentation, filtration and distillation) 	
Unit 3 Living Things 3.1 Living Things	12-13	<ul style="list-style-type: none"> Identify the vital functions of living things Distinguish between living things and non-living things Recognize the importance of reproduction to living things Recognize that there are a wide variety of living things, including various types of mirco-organisms, plants and animals 	Formative assessment <ul style="list-style-type: none"> Flipping Classroom and online assessment: Video watching www.goformative.com Debate: Can robot be a living thing in the coming future? Report: use appropriate presentation skills like flowchart to show the key features of vertebrates. Research: Can coral / carnivorous plant be considered as animals or plants?
3.2 Grouping of Living Things	14-15	<ul style="list-style-type: none"> Recognize the need of grouping living things Living things into different groups according to their key features 	

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		<ul style="list-style-type: none"> Identify invertebrates and vertebrates Identify the key features for distinguishing between fish, amphibians, reptiles, birds and mammals Relate the key features of different groups of living things to their functions and adaptations 	<ul style="list-style-type: none"> Essay writing: How human or plants can adapt changes like pollutions or inadequate food(sunlight) in the coming future? Or “How to plan for a new “Nora Jones” if human move out from earth?”
3.3 Biodiversity	15-16	<ul style="list-style-type: none"> Recognize the importance of biodiversity to the sustainable development of the natural environment, and its benefits to humans (e.g. provision of resources such as food, medicine, raw materials) Understand that some human activities (e.g. hunting, destruction of habitat) may threaten the survival of some species Give examples of some endangered species 	Summative assessment Unit Test Mid-year summative assessment: Unit 1 – 3
5. Energy 5.1 Energy changes	21-22	<ul style="list-style-type: none"> Recognize different forms of energy (chemical energy, electrical energy, kinetic energy, light energy, potential energy, sound energy and thermal energy) Recognize that energy can be converted from one form to another Recognize some common energy conversion processes (e.g. burning, and generation of electricity) 	Formative assessment <ul style="list-style-type: none"> Flipping Classroom and online assessment: Video watching www.goformative.com Report: use appropriate presentation skills to show the energy conversion of a device Project: Using a motor to design a energy converter device
5.2 Heat transfer	23/26	<ul style="list-style-type: none"> Identify different heat transfer processes: conduction, convection and radiation 	Summative assessment: Unit Test
Unit 4 Cells 4.1 Cells	27-29	<ul style="list-style-type: none"> Recognize cells as the basic unit of living things Plant cells and animal cells Use microscope to examine plant & animal tissues Identify the basic structures and functions of cells, including cell wall, cytoplasm, nucleus, etc. Recognize that each cell contain the genetic materials, DNA which encodes the instructions that can determine our different 	Formative assessment <ul style="list-style-type: none"> Flipping Classroom and online assessment: Video watching www.goformative.com Report: use appropriate drawing skills to show plant cell and animal cell. Preparation of slides for microscopic observation. Report: Draw the structure of different human cells like

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		traits <ul style="list-style-type: none"> Recognize that cells can divide and differentiate into different types of cells 	nerve cell, hair cell, sex cells and state the reason they are abnormal to other cells.
4.2 Human Reproduction	33-34	<ul style="list-style-type: none"> Recognize the signs of maturation of the reproductive system Describe the secondary sexual characteristics Identify the different structures of the male and female reproductive systems and the functions of these structures Identify sperms and ova as the male & female sex cells respectively Recognize what the fertilization means State that development of the embryo begins from the implantation in the uterus Development of the embryo and the birth of a baby Understand birth control and various methods of birth control 	Summative assessment: Unit Test Practical Test
(Ext) 4.3 Heredity and Variation	(34)	<ul style="list-style-type: none"> State that heredity is the passing of traits from one generation to the next as a result of the transmission of genetic information Recognize that variations are determined by heredity and the environment Give examples of continuous variation and discontinuous variation in humans 	
Unit 6 Matter as Particles 6.1 Matter and particle theory	35-36	<ul style="list-style-type: none"> State that all matter is made up of particles Recognize that particles are in random motion Recognize that there are empty spaces between particles Give examples of atoms and simple molecules Recognize that different particles have different sizes and masses 	Formative assessment <ul style="list-style-type: none"> Flipping Classroom and online assessment: Video watching www.goformative.com Research: Other than three states- Plasma, supercritical fluid. Video record: Make a supercritical water at home
6.2 Particle model	37	<ul style="list-style-type: none"> Recognize the arrangement of particles in the three states of matter Compare the properties of matter in different states 	<ul style="list-style-type: none"> Experimental design: Design an experiment to measure the design of a cube or oil.

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6.6 Density	38-39	<ul style="list-style-type: none"> Recognize that density of a substance is the relationship between its mass and its volume Calculate the density of a substance Determine whether an object will sink or float by comparing its density with that of its surrounding medium 	Summative assessment: Unit Test Final examination: Unit 4 – 6

Assessment

CA marks = Unit Test \times 67% + Practical Test \times 16.5% + Homework \times 16.5%

Year grade = CA \times 60% + SA \times 40%

Mark ranges

Performance Level	Marks
A*	≥ 85
A	75-84
B	65-74
C	50-64
D	35-49
E	< 35

Law Ting Pong Secondary School
2020-21 S2 Science
Course Outline

Section	Week	Learning objectives (Students should be able to...)	Assessment
Unit 7 Living things and air 7.1 Air	2	<ul style="list-style-type: none"> • Recognise that air is a mixture of gases • State the percentage of main gases in air • State the main properties of oxygen, carbon dioxide and nitrogen • Describe the tests for oxygen, carbon dioxide and water • Give examples of the daily applications of oxygen, carbon dioxide and nitrogen 	Formative assessment <ul style="list-style-type: none"> • Write a report on gas tests • Presentation: Uses of different gases • Draw a diagram to illustrate the process of photosynthesis • Write a report on the investigation of different factors required for photosynthesis • Draw a diagram to illustrate the process of respiration • Draw a table to compare and contrast photosynthesis and respiration
7.2 Photosynthesis	3-4	<ul style="list-style-type: none"> • Recognise that photosynthesis is the process that plants make their own food • State that light energy is converted to chemical energy in food during photosynthesis in plants • Write the word equation of photosynthesis • Understand that light, chlorophyll, carbon dioxide and water are the necessary factors for photosynthesis • Recognise that the carbohydrates (glucose) produced in plants can be used immediately or stored as starch for later use • Recognise the significance of photosynthesis of plants to other living things 	<ul style="list-style-type: none"> • Write a report on an experiment to compare the composition of exhaled air with inhaled air • Annotate a diagram of human respiratory system • Draw flowchart to show the pathway of airflow from atmosphere into air sacs Summative assessment: Unit Test Practical Test
7.3 Respiration	5	<ul style="list-style-type: none"> • State that food (e.g. carbohydrates) is the source of energy for all living things • Recognise that the chemical energy stored in food can be changed by our body into other useful forms of energy to support body activities • Describe respiration as a process in which food is broken down in cells to release energy in usable form for cells • Write the word equation of respiration 	

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7.4 -7.5 Gas exchange in plants and animals	6-8	<ul style="list-style-type: none"> • Understand that the net gas exchange in plants depends on the relative rate of photosynthesis and respiration taken place • Compare the temperature and the composition of gases (oxygen, carbon dioxide and water vapour) between inhaled and exhaled air • Identify the main parts of the breathing system in humans • State that gas exchange in humans takes place at the air sacs • State the significance of gas exchange to body cells 	
7.6 Balance of carbon dioxide and oxygen in Nature	9	<ul style="list-style-type: none"> • Understand that there is a natural balance of carbon dioxide and oxygen in the atmosphere • Recognise some human activities are disrupting the balance of carbon dioxide in Nature • State carbon dioxide as one of the greenhouse gases • Describe the effects of the increasing amount of carbon dioxide in the atmosphere on the environment 	
Unit 8 Making use of electricity 8.1 A simple circuit	10	<ul style="list-style-type: none"> • Understand that a cell and a closed circuit are required for lighting up a bulb • Recognise that cell is the energy source in a circuit • Identify electrical conductors and insulators • Understand switch as a device to open or close a circuit • Recognise the circuit symbols (cell, battery, light bulb, switch, ammeter, voltmeter, resistor and rheostat) • Draw and interpret simple circuit diagrams 	Formative assessment <ul style="list-style-type: none"> • Design a circuit to test for electrical conductors and insulators • Connect a circuit to measure current and voltage • Connect light bulbs in series and in parallel • Draw a table to illustrate the differences between connection in series and in parallel • Draw circuit diagrams to show different circuit connections • Wire a three-pin plug • Design a poster or make a video clip on safety in using electricity
8.2 – 8.3 Current & Voltage	12-13	<ul style="list-style-type: none"> • Use an ammeter to measure current • State that ampere (A) is a unit of current • Recognise electric current as a flow of charges • Recognise the heating effect of current • Use a voltmeter to measure voltage • State that volt (V) is a unit of voltage • Recognise that battery with greater voltage will cause greater current to flow in a circuit 	Summative assessment: Unit Test Mid-year summative assessment: Unit 7 – 8

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8.4 Resistance	14	<ul style="list-style-type: none"> • Recognise the differences in resistance between electrical conductors and insulators • State that ohm (Ω) is a unit of resistance • Understand that a greater resistance will result in a smaller current to flow in a circuit • Recognise the use of resistors in a circuit 	
8.5 Electrical circuits (Series and parallel circuits)	15-16	<ul style="list-style-type: none"> • Identify series circuits • Recognise that the current is the same at all points in a series circuit • Identify parallel circuits • Recognise that the current in the main loop is the sum of that in the branches and that a larger current flows in the branch with a lower resistance • Recognise that the voltage across the branches of a parallel circuit is the same 	
8.6 Household electricity	19-21	<ul style="list-style-type: none"> • Recognise that electrical appliances are energy converters • Be aware that many household electrical appliances (e.g. hair dryer and fan) are making use of the heating effect of current • State the mains voltage in Hong Kong • Explain why parallel circuits are preferred to series circuits in domestic circuits • Understand the wiring of a 3-pin plug and identify the colour coding of wires • Understand the danger of overloading in the use of universal adaptors • Understand the condition leading to short circuits and its danger • Recognise the importance of the use of earth wire • Recognise fuses and circuit breakers as devices in protecting circuits • State safety precautions in using electricity 	

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Unit 9 Common acids and alkalis 9.1 Common acids and alkalis	22	<ul style="list-style-type: none"> • Give examples of common acids and alkalis found at home and in laboratory • State the properties of acids and alkalis 	Formative assessment <ul style="list-style-type: none"> • Investigate possibilities of acid-alkali indicators in nature • Write a report on the pH test of different household products • Draw a table to compare the advantages and disadvantages of using different kinds of acid-alkali indicators • Draw a graph to present data in a neutralization reaction experiment • Design a poster or make a video clip on the impact of acid rain to the environment • Design a poster or make a video clip on proper use of cleansing products Summative assessment: Unit Test Practical Test
9.2 Measuring pH value for acids and alkalis	23	<ul style="list-style-type: none"> • Be aware that some natural pigments give different colours in acidic and alkaline solutions • Recognise that acid-alkali indicators are used to classify solutions as being acidic or alkaline • Recognise that the pH scale is used to describe the relative acidity and alkalinity of substances • Describe how pH paper, universal indicator and electronic instruments can be used to measure the pH of solutions • Compare the advantages and disadvantages of using universal indicator and electronic instruments in measuring the pH of solutions 	
9.3 Neutralisation	26	<ul style="list-style-type: none"> • Understand that salt and water will be formed when an acid is mixed with alkali • Recognise that the mass of reactants and products is conserved in neutralisation reaction • Present the change in pH in a neutralisation reaction with a pH curve • Give examples of applications of neutralisation 	
9.4 Corrosive nature of acids	27	<ul style="list-style-type: none"> • Understand the causes of acid rain and its effects on the environment and living things • Recognise that dilute acids can attack metals and some building materials (e.g. limestone, marble) to produce hydrogen and carbon dioxide respectively 	

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9.5 Potential hazards of using acids and alkalis	28	<ul style="list-style-type: none"> • Recognise that acids and alkalis can be irritating or corrosive and may cause injuries to our bodies • Recognise that mixing common cleansing products may be hazardous • Describe the emergency treatment for accidents involving acids or alkalis 	
Unit 10 Sensing the Environment 10.1 Senses and Sense Organs	29	<ul style="list-style-type: none"> • Recognise the need for living things to respond to the environment • Recognise that there are specialised sensory cells in different sense organs for detecting different stimuli • Relate our sense organs to the types of stimuli and the senses produced 	Formative assessment <ul style="list-style-type: none"> • Write a report on the dissection of an ox eye • Design a poster or make a video clip on different ways to protect our eyes • Label structures of an ear on a diagram • Design a poster or make a video clip on different ways to protect our ears Summative assessment: Unit Test
10.2 Sight	32-33	<ul style="list-style-type: none"> • Identify the main parts of an eye • State the functions of the main parts of an eye • Be aware that there are light-sensitive cells on the retina • Describe briefly how an image is formed on the retina • (Ext) Recognise the limitations of our eyes and the various ways for extending our vision • (Ext) Describe the ways of protecting our eyes • (Ext) Understand the causes and correction method of long sight and short sight 	
10.3 Hearing	34-35	<ul style="list-style-type: none"> • Understand that sound is produced by vibrations and its transmission requires a medium • Recognize that hertz (Hz) is a unit of frequency of sound and decibel (dB) is a unit of loudness of sound • Identify the main parts of an ear • State the functions of the main parts of an ear • Be aware that there are specialized sensory cells in the cochlea for detecting vibrations • Be aware that the range of frequencies audible to humans is different from other animals • Recognize the harmful effects of noise pollution on our 	

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		health <ul style="list-style-type: none"> • Describe the ways of protecting our sense of hearing 	
10.6 The brain and our senses	36	<ul style="list-style-type: none"> • Recognise that the brain integrates and interprets information from different sense organs and acts as coordinator for making appropriate responses • Be aware that our senses are not always reliable and there may be illusions 	
Unit 11 Force and motion 11.1 Motion	37	<ul style="list-style-type: none"> • Recognise the relationship between average speed, distance and time • State that metre per second (ms^{-1}) is a unit of speed • (Ext)Represent a motion using a distance-time graph • (Ext)Interpret a distance-time graph • (Ext)Identify uniform motion and non-uniform motion 	Formative assessment <ul style="list-style-type: none"> • Draw graphs to describe motions • Present the examples of contact and non-contact forces • Design a poster or make a video clip on how people make use of friction
11.2 Force	38	<ul style="list-style-type: none"> • Describe the effect of force on changing the speed and direction of motion of an object • State that newton (N) is a unit of force • Use a spring balance to measure forces • State that forces can act at a distance • Give examples of contact forces and noncontact forces 	Summative assessment: Unit Test Final Examination: Unit 9 – 11
11.4 Friction and resistance	39	<ul style="list-style-type: none"> • Recognise that friction and air resistance are forces that oppose the motion between contact surfaces • Describe ways for reducing friction and air resistance • Give examples of situations where friction or air resistance are useful 	

Assessment

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Mark ranges

Performance Level	Marks
A*	≥ 85
A	75-84
B	65-74
C	50-64
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E	< 35

Law Ting Pong Secondary School
2020-21 S3 Science
Course Outline

Section	Week	Learning objectives (Students should be able to...)	Assessment
Biology 1. Cells A. Discovery of cells	1-4	<ul style="list-style-type: none"> • Understand the technological development of microscopes • State the cell theory and use microscopes to examine cell details • Know the types of microscopes commonly used today • Calculate the total magnification of a compound microscope • Differentiate between observations at low-power and high-power magnifications 	Formative assessment <ul style="list-style-type: none"> • Presentation: Development of microscope • Presentation: Sub-cellular structures of different cell types • Focus an image under different magnifications of a light microscope • Draw a table to contrast animal cells and plant cells • Group discussion: Compare and contrast a bacterium and a leaf cell / white blood cell Summative assessment: Unit Test
B. Cellular structures		<ul style="list-style-type: none"> • Describe the functions of different sub-cellular structures in cells • Differentiate between animal cells and plant cells 	
C. Prokaryotic and Eukaryotic cells		<ul style="list-style-type: none"> • Differentiate between prokaryotic cells and eukaryotic cells 	
D. Different levels of organization		<ul style="list-style-type: none"> • Understand how cells are organized in multicellular organisms 	
Biology 2. Food and Humans A. The food requirements of humans B. Food substances	5-8	<ul style="list-style-type: none"> • Understand the simple chemistry of carbohydrates (monosaccharides, disaccharides and polysaccharides), proteins and lipids • Identify the functions and food sources of different food substances • Be aware of the corresponding deficiency diseases 	Formative assessment <ul style="list-style-type: none"> • Presentation: Compare and contrast the nutrients of two prepackaged food. Discuss the functions of the food substances present • Draw a mind map to show the functions (and deficiency diseases) of different food substances • Write a report on tests for different food substances

Section	Week	Learning objectives (Students should be able to...)	Assessment
C. Food tests		<ul style="list-style-type: none"> • Test for the presence of different food substances using appropriate food tests 	Summative assessment: Unit Test Practical Test
D. Balanced diet		<ul style="list-style-type: none"> • Understand what a balanced diet is • Understand the factors that affect our dietary requirements • Be aware of the health problems resulting from an improper diet 	
Biology 3. Nutrition in Humans A. The human digestive system	9-12	<ul style="list-style-type: none"> • Identify the main processes of nutrition in humans • Identify different parts of the digestive system 	Formative assessment <ul style="list-style-type: none"> • Draw a table to contrast the number and arrangement of different types of teeth in herbivores and carnivores • Group discussion: Design an experiment to show that amylase can break down starch to form sugar • Draw a mind map to show how different food substances are broken down in the body Summative assessment: Unit Test
B. Ingestion		<ul style="list-style-type: none"> • State the functions of different types of teeth • Know what dentition is and be able to identify the two sets of teeth in humans • Describe the structure of a tooth 	
C. Digestion		<ul style="list-style-type: none"> • Compare physical and chemical digestion • Understand the importance of peristalsis • Identify the actions of different digestive juices 	
Chemistry 1. Introducing Chemistry	13-16, 19	<ul style="list-style-type: none"> • Understand what Chemistry is • Read the hazard warning labels • Recognize the common apparatuses in the laboratory and draw the vertical-section diagrams of these • Differentiate physical change and chemical change • Differentiate physical properties and chemical properties • Define element, compound and mixture 	Formative assessment <ul style="list-style-type: none"> • Prepare a compound (iron (II) sulphide) and mixture (iron and sulphur mixture) by combination of its elements (iron and sulphur) • Group discussion: Compare and contrast a compound and a mixture • Draw a mind map to show how a mixture and a compound can be separated respectively

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		<ul style="list-style-type: none"> • Differentiate elements, compounds and mixtures • Separate mixtures by physical methods • Separate compounds by chemical methods 	Summative assessment: Unit Test Mid-year summative assessment: Biology Units 1 – 3 & Chemistry Unit 1
Chemistry 2. Elements, Atomic Structure and Metal	20-24	<ul style="list-style-type: none"> • Classify elements into different categories • Define atoms • Understand atoms consist of protons, neutrons and electrons • Understand what atomic numbers and mass numbers are • Define isotopes • Define relative isotopic mass and relative atomic mass • Calculate the relative atomic mass by relative isotopic mass • Draw electron diagrams and write electronic arrangements • Describe the properties of metals and their reactions 	Formative assessment <ul style="list-style-type: none"> • Poster design: Introducing an element • Group discussion: Compare and contrast the general properties of metals and non-metals • Draw a table to show the extraction method of different metals • Draw a mind map to show the reactions of metals Summative assessment: Unit Test
Chemistry 3. Analytical chemistry	26-28	<ul style="list-style-type: none"> • Describe the composition of air, sea water, and rocks and minerals • Perform chemical tests for different gases • Perform chemical tests for metal ions and chlorides • Perform chemical tests for water • Understand the reactions of calcium carbonate (main component of marbles) • Write word equations for reactions in calcium carbonate cycle • Perform chemical tests for carbonate • Design experiments to find out the composition of an unknown salt 	Formative assessment <ul style="list-style-type: none"> • Group discussion: The uses of different gases in the atmosphere • Draw a mind map to illustrate how different chemicals can be tested • Experiment: Find out the composition of an unknown salt Summative assessment: Unit Test Practical Test
Physics 1. Reflection	29, 32-33	<ul style="list-style-type: none"> • Know how light travels 	Formative assessment <ul style="list-style-type: none"> • Poster design: Illustrate the Laws of reflection

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A. Light enables us to see		<ul style="list-style-type: none"> • Use arrow to represent the light direction • Understand how objects reflect light to our eyes • Identify luminous & non-luminous objects 	<ul style="list-style-type: none"> • Group discussion: Application of reflection in daily life • Group project: Making a periscope with the concept of reflection
B. Laws of reflection		<ul style="list-style-type: none"> • Identify the angle of incidence and angle of reflection • Understand the Laws of reflection • Realize the difference between regular & diffuse reflection and their applications • Illustrate the formation of image in a plane mirror & its properties • Able to distinguish between real and virtual image • Making use of plane mirrors (e.g. interior design, lighting effect and reflecting sunlight etc.) 	Summative assessment: Unit Test
Physics 2. Refraction A. What is refraction	33-37	<ul style="list-style-type: none"> • Understand the meaning of optically denser and less dense medium • Able to explain how light refracts differently through different media 	Formative assessment <ul style="list-style-type: none"> • Poster design: Illustrate the Laws of refraction • Group discussion: Application of refraction / total internal reflection in daily life • Group project: Making an object seemingly invisible
B. Laws of refraction		<ul style="list-style-type: none"> • Recall the terms used in refraction, including angle of incidence, normal and angle of refraction • Understand the meaning of Snell's law: $n_1 \sin \theta_1 = n_2 \sin \theta_2$ • Use Snell's law to calculate the refractive index of liquids/solids • Draw an image formed in liquid due to refraction 	Summative assessment: Unit Test
C. Critical angle and Total Internal Reflection		<ul style="list-style-type: none"> • Explain the meaning of Critical Angle and Total Internal Reflection (TIR) 	

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		<ul style="list-style-type: none"> Realize the conditions when total internal reflection occur 	
D. Applications of total internal reflection		<ul style="list-style-type: none"> Describe the application of Total Internal Reflection in: <ol style="list-style-type: none"> Prisms Cat's eye Prismatic periscopes Optical fibre Endoscope Telecommunication 	
Physics 3. Lens A. What are lenses	37-40	<ul style="list-style-type: none"> Understand how a ray of light bends or refracts through a concave and convex lens 	Formative assessment <ul style="list-style-type: none"> Experiment: Find the focal length of a convex lens Poster design: Illustrate bending of light rays when passing through a concave lens and convex lens Group discussion: Application of lens in daily life Summative assessment: Unit Test Final Examination: Chemistry Unit 3 & Physics Unit 1-3
B. Images formed by lenses		<ul style="list-style-type: none"> Draw ray diagram showing the image formation by convex and concave lens Describe the properties of image formed by convex and concave lens 	
C. Lens Magnification		<ul style="list-style-type: none"> Use the equation to calculate the magnification of the image $M = \frac{\text{height of image (image size)}}{\text{height of object (object size)}}$ 	
D. Use of lenses		<ul style="list-style-type: none"> Describe different uses of lenses, such as hand lens and microscope 	