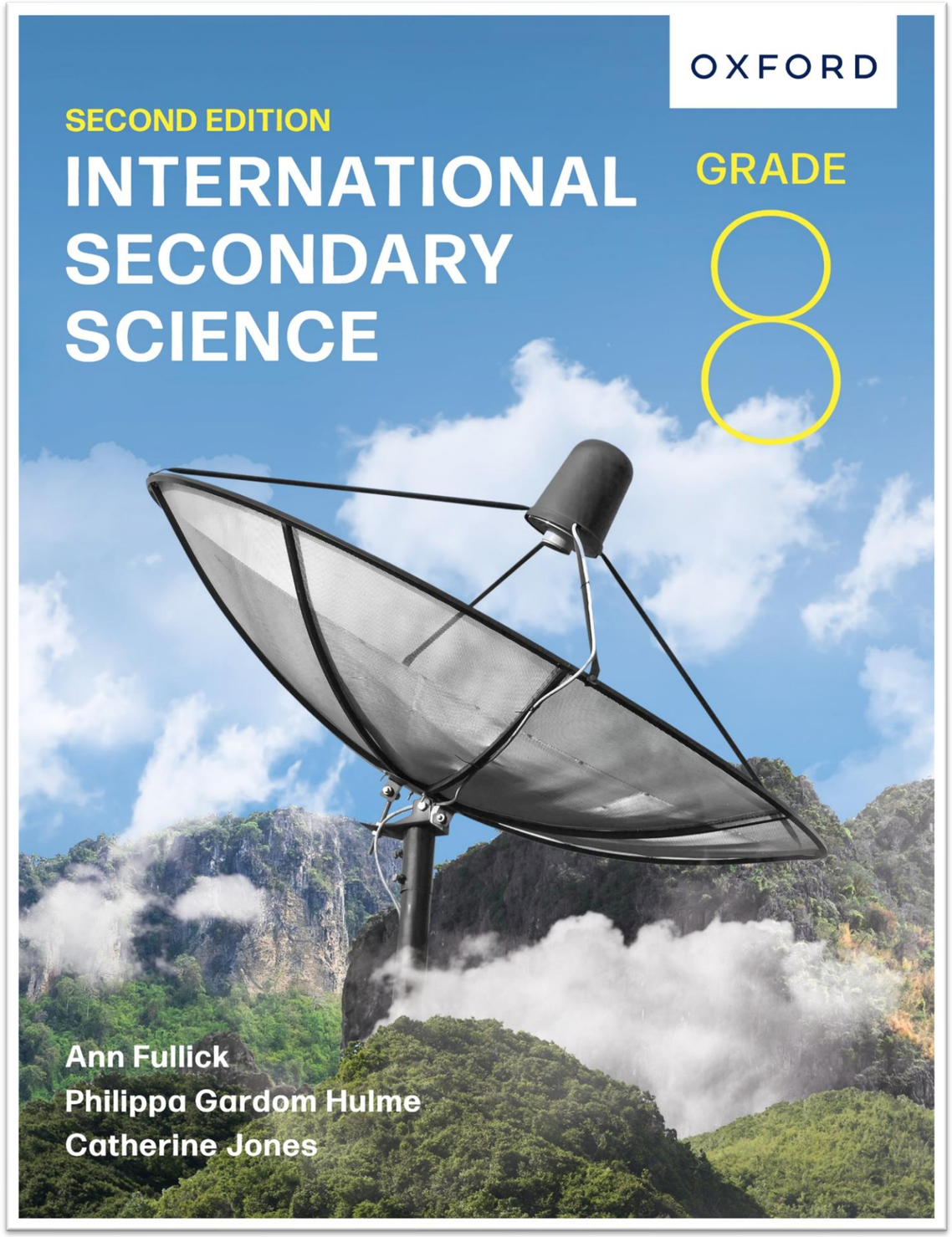

INTERNATIONAL SECONDARY SCIENCE 8 CURRICULUM MAPPING

Please find below the curriculum mapping for International Secondary Science 8 aligned with the National Curriculum of Pakistan 2022 for General Science, along with the key SLOs from the Cambridge Science Framework, ensuring relevance to age-appropriate Cambridge key stages. The mapping also includes value-added SLOs, which enrich conceptual understanding and strengthen scientific process skills.

International Secondary Science 8

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
1. Variations, Heredity & Cell division				
1.1	Describe variation and adaptation in living organisms.	✓	**9Bp.03** – Describe variation within a species and relate this to genetic differences between individuals. 5Be.01 Describe how plants and animals are adapted to environments that are hot, cold, wet and/or dry.	
1.1	Explain and illustrate the differences between variation and adaptation.	✓		
1.2	Describe variation and adaptation in living organisms.	✓		
1.2	Recognize genetics as the study of Heredity and understand and define heredity as the transfer of genetic information that specifies structure, characteristics, and functions, from parents to offspring.	✓		
1.3	Identify sources of variation from environmental and genetic factors.	✓		
1.4	Explain how different adaptations affects the chances of survivals of different species of organism.	✓	**5Be.01** – Describe how plants and animals are adapted to environments that are hot, cold, wet and/or dry. **5Be.03** – Describe the common adaptations of predator and prey animals. 9Bp.04 – Describe the scientific theory of natural selection and how it relates to genetic changes over time.	
1.5	Explain how different adaptations affect the chances of survival of different species of organism.	✓	**5Be.01** – Describe how plants and animals are adapted to environments that are hot, cold, wet and/or dry. **5Be.03** – Describe the common adaptations of predator and prey animals. 9Bp.04 – Describe the scientific theory of natural selection and how it relates to genetic changes over time.	
1.6	Explain how different adaptations affect the chances of survival of different species of organism.	✓	**5Be.01** – Describe how plants and animals are adapted to environments that are hot, cold, wet and/or dry. **5Be.03** – Describe the common adaptations of predator and prey animals. **9Bp.04** – Describe the scientific theory of natural selection and how it relates to genetic changes over time.	
1.7	Explain how different adaptations affect the chances of survival of different species of organism.	✓	**5Be.01** – Describe how plants and animals are adapted to environments that are hot, cold, wet and/or dry. **5Be.03** – Describe the common adaptations of predator and prey animals. **9Bp.04** – Describe the scientific theory of natural selection and how it relates to genetic changes over time.	
1.7	Make conclusions by interpreting results informed by seasoning			✓

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
1.7	Describe how people develop and use scientific understanding.			✓
1.8	Differentiate between the concept of genes and chromosomes and relate them to how genetic characteristics are inherited.	✓	**9Bs.03** – Know that chromosomes contain genes, made of DNA, and that genes contribute to the determination of an organism's characteristics.	
1.8	Recognize genetics as the study of Heredity and understand and define heredity as the transfer of genetic information that specifies structure, characteristics, and functions, from parents to offspring.	✓		
1.9	Describe the composition and structure of DNA.	✓	**9Bs.03** – Know that chromosomes contain genes, made of DNA, and that genes contribute to the determination of an organism's characteristics.	
1.9	Design a model of DNA to demonstrate its structure, functions, and various components.	✓		
1.10.	Describe cell division and its types – mitosis and meiosis and relate them to the passage of genetic information through reproduction.	✓	**9Bp.01** – Describe the fusion of gametes to produce a fertilised egg with a new combination of DNA.	
1.10.	Explain the process of mitosis and meiosis and identify their key phases.	✓		
2. Human Nervous System				
2.1	Identify the organs, functions and processes of the Human Nervous System.	✓		
2.1	Sketch and label a diagram of the Human Nervous System.	✓		
2.2	Describe the role and function of neurons in transmitting messages through the body.	✓		
2.2	Describe the type and function of neurons in transmitting messages through the body.	✓		FALSE
2.3	Explain how the brain works as the control station of the human body.	✓		

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
2.3	Identify the three major parts of the brain – cerebrum, cerebellum, the fore brain, mid brain and hind brain, & describe their various functions.	✓		
2.3	Describe the structure of the cerebrum, its division into two hemispheres (left and right) and the role of each hemisphere in the control of the body.	✓		
2.3	Match various body functions with the relevant part of the brain that controls or regulates them (For instance, associating breathing with the brain stem).	✓		
2.4	Map the various steps in the transmission of messages through the body and to the brain via a reflex arch	✓		
2.4	Explain and represent how messages flow through the body from and to the brain, and how the brain collaborates with the sensory organs to regulate this process.	✓		
2.4	Map the various steps in the transmission of messages through the body and to the brain.	✓		
2.4	Predict what would happen if a nerve connection broke.	✓		
2.5	Explain and represent how messages flow through the body from and to the brain, and how the brain collaborates with the sensory organs to regulate this process.	✓		
2.5	Map various steps in the transmission of messages through the body and to the brain via a reflex arc	✓		
2.6	Create a plan of activities and exercises they can do to maintain a healthy brain.	✓		
2.6	Discuss issues which involve and/or require scienftific understanding			✓
2.6	Describe how people develop and use scientific understanding.			✓
3. Ecology				
3.1	Describe and illustrate through examples key ecological relationships between organisms, including competition, predation and symbiosis	✓		
3.2	Describe how energy flows from producers to consumers, and how only part of the energy flows from one level of the pyramid to the next.	✓	**6Be.03** – Identify the energy source of a food chain or web and describe how energy is transferred through a food chain or web. **3Be.01** – Identify and describe simple food chains, where plants are producers and animals are consumers.	
3.2	Draw a food web diagram to illustrate the food relationships between organisms.	✓	**6Be.01** – Interpret food webs and identify food chains within them.	

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
3.3	Describe and illustrate through examples key ecological relationships between organisms, including competition, predation and symbiosis.	✓		
3.4	Predict how changes in an ecosystem (e.g., changes in the water supply, the introduction of a new population, hunting, migration) can affect available resources, and thus the balance among populations.	✓	**6Be.02** – Know that some substances can damage living things and move through food chains.	
3.4	Hypothesize what would happen in the ecosystem if the population of one of the participants in different ecological relationships is affected.	✓		
3.5	Describe the role of living things in cycling oxygen and carbon through an ecosystem, citing the processes of respiration, photosynthesis, and combustion	✓	**9ESc.01** – Describe the carbon cycle (limited to photosynthesis, respiration, feeding, decomposition and combustion).	
3.5	Relate how oxygen and carbon cycles are complementary processes that bring balance and symmetry to life on Earth.	✓		
3.6	Describe global warming and explain how threats to the carbon -oxygen balance such as overpopulation, reliance on fossil fuels, and deforestation are contributing to global warming and climate change.	✓	**9ESc.02** – Describe the historical and predicted future impacts of climate change, including drought, flooding and extreme weather events. **5ESp.03** – Understand that pollution is the introduction of substances by humans that harm the environment and identify examples of pollution. **8ESc.02** – Understand that the Earth's climate can change due to atmospheric change.	
3.6	Understand how using science can have a global environmental impact			✓
3.7	Describe global warming and explain how threats to the carbon - oxygen balance are contributing to climate change	✓	**9ESc.02** – Describe the historical and predicted future impacts of climate change, including drought, flooding and extreme weather events. **5ESp.03** – Understand that pollution is the introduction of substances by humans that harm the environment and identify examples of pollution. **8ESc.02** – Understand that the Earth's climate can change due to atmospheric change.	
3.8	Describe how people develop and use scientific understanding.			✓
3.8	Apply mathematical concepts to analyze data and present the data collected in the form of graphs, charts and tables			✓
3.8	Make conclusions by interpreting results informed by reasoning	✓		✓
3.9	Apply mathematical concepts to analyze data and present the data collected in the form of graphs, charts and tables			✓

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
3.9	Make conclusions by interpreting results informed by reasoning			✓
3.9	Discuss issues which involve and/or require scientific understanding. Describe how people develop and use scientific understanding.			✓
3.10.	Explain ways in which human behavior (e.g., replanting forests, reducing air and water pollution, protecting endangered species) can have positive effects on the local environment.	✓		✓
4. Biotechnology				
4.1	Define biotechnology as the use of living cells and organisms in products and processes that can improve the quality of life.	✓		
4.2	Illustrate how biotechnology is a discipline/field that has the potential to transform how we live.	✓		
4.3	Relate the use of biotechnology in food sciences in producing foods with higher nutritional value and improved taste and quality (how fermentation has been improved by genetically modified organisms or the introduction of certain genes to raise iron content in rice, can be taken as examples).	✓		
4.4	Discuss the applications of biotechnology in the Pakistani context and their effects on the people and the environment of Pakistan over time. Illustrative examples: bread-making, making of yogurt and cheese, vaccines for immunization, insulin production, dyes, etc.	✓		
5. Periodic Table				
5.1	Recognise Periodic Table as a way of classifying the elements in groups and periods.	✓	**7Cm.02** – Know that the Periodic Table presents the known elements in an order. **9Cm.01** – Understand that the structure of the Periodic Table is related to the atomic structure of the elements and can be used to predict an element's structure and properties.	
5.1	Identify the names and location of the first 18 elements only.	✓		
5.2	Identify properties of metals and non-metals.	✓	**7Cm.03** – Know metals and non-metals as the two main groupings of elements. **7Cp.05** – Describe common differences between metals and non-metals, referring to their physical properties. **6Cp.03** – Understand that electrical conductivity and thermal conductivity are properties of a substance.	
5.2	Relate the properties to the uses of metals.	✓		

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
			4Pe.04 – Know some materials are good electrical conductors, especially metals, and some are good electrical insulators.	
5.3	Identify properties of nonmetals			
5.3	Compare the properties of metals and non-metals.			✓
5.3	Deduce whether an element is a metal or a non-metal.			✓
5.4	Explain differences in the physical properties of metals and non-metals			✓
5.5	Define atomic radius and reactivity of elements.			✓
5.5	Relate reactivity of elements to their atomic sizes			✓
6. Chemical Reactions				
6.1	Identify chemical reactions and give examples.	✓	**4Cc.03** - Know that some substances will react with another substance to produce one or more new substances and this is called a chemical reaction. **6Cc.04** - Understand that chemical reactions involve substances, called reactants, interacting to form new substances, called products.	
6.2	Describe how atoms are rearranged in chemical reactions			✓
6.2	Explain why total mass does not change in chemical reactions			✓
6.2	Describe one way that science can have a global environmental impact			✓
6.2	Define the Law of Conservation of Mass and demonstrate the law with an experiment.	✓	**9Cc.05** – Understand that in chemical reactions mass and energy are conserved.	
6.3	Demonstrate the law of conservation of mass with an experiment			✓
6.3	Distinguish between different types of reactions - combustion	✓	**9Cc.02** – Identify examples of displacement reactions and predict products.	
6.3	Describe some stages in a scientific enquiry			✓
6.4	Distinguish between different types of reaction - displacement	✓	**9Cc.02** – Identify examples of displacement reactions and predict products.	
6.4	Predict whether given pairs of substances take part in displacement reactions			✓
6.5	Distinguish between different types of chemical reaction - double displacement	✓	**9Cc.02** – Identify examples of displacement reactions and predict products.	
6.5	Explain what precipitation reactions are and how explain what precipitation reactions are and how they are useful			✓
6.9	Write and balance chemical equations.	✓	**8Cc.01** Use word equations to describe reactions. **9Cc.01** – Use word equations and symbol equations to describe reactions (balancing symbol equations is not required).	

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
6.6	Distinguish between different types of reactions (combination, displacement, double displacement, combustion).	✓	**9Cc.02** – Identify examples of displacement reactions and predict products.	
6.6	Write word equations to represent chemical reactions			✓
6.7	Distinguish between endothermic and exothermic reactions	✓	**8Cc.02** – Know that some processes and reactions are endothermic or exothermic, identified by temperature change.	
6.7	Recognize the importance of exothermic and endothermic reactions in daily life.	✓		
6.7	Use temperature change to deduce whether a change is exothermic or endothermic			✓
6.8	Interpret balanced chemical equations			✓
6.9	Write and balance chemical equations.	✓	**8Cc.01** - Use word equations to describe reactions. **9Cc.01** – Use word equations and symbol equations to describe reactions (balancing symbol equations is not required).	
6.10.	Discuss formation of ionic bonds as a result of electrostatic forces between atoms (e. g., NaCl).	✓	**9Cm.04** – Describe an ion as an atom which has gained or lost electrons to become charged. **9Cm.05** – Describe an ionic bond as an attraction between a positively charged ion and a negatively charged ion. **8Cm.03** – Know that electrostatic attraction between positive and negative charges holds atoms together.	
6.10.	Name certain ionic compounds	✓		
6.10/6.11	Draw cross and dot structures showing formation of ionic compounds and covalent compounds.	✓		
6.11	Name certain ionic and covalent compounds.	✓		
6.11	Discuss types and formation of covalent bond as a result of mutual sharing of electrons between atoms (e. g., H_2, O_2, N_2).	✓	**9Cm.03** – Describe a covalent bond as a bond formed when a pair of electrons is shared between two atoms (limited to single bonds). **9Cm.02** – Understand that a molecule is formed when two or more atoms join together chemically through covalent bonding.	
7. Acids, Bases and Salts				
7.1	Classify acids, alkalis, and salts and give examples of each.	✓	**7Cp.02** – Understand that the acidity or alkalinity of a substance is a chemical property and is measured by pH.	
7.1	Give examples of acids and alkalis.			✓
7.1	State whether acidity and alkalinity are physical or chemical properties.			✓
7.1	Describe what equipment is required to carry out an investigation.			✓
7.1	Identify the physical properties of acids, alkalis, and salts.	✓		
7.2	Define pH and its ranges with reference to indicators.	✓	**7Cp.02** – Understand that acidity or alkalinity is a chemical property measured by pH.	

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
			7Cp.03 – Use indicators (including Universal Indicator and litmus) to distinguish between acidic, alkaline and neutral solutions.	
7.2	Describe some applications of science.			✓
7.2	Classify acids and alkalis	✓	**7Cp.02** – Understand that the acidity or alkalinity of a substance is a chemical property and is measured by pH.	
7.2	Interpret the pH scale and identify acids, alkalis, and salts.	✓	**7Cp.03** – Use indicators to distinguish between acidic, alkaline and neutral solutions.	
7.3	Describe how to neutralize an acid.			✓
7.3	Describe some applications of science			✓
7.3	Describe neutralization reaction with real life examples.	✓	**7Cc.04** – Describe neutralisation reactions in terms of change of pH.	
7.4	Discuss issues that require scientific understanding.			✓
7.5	Discuss issues that require scientific understanding.			
7.6	Identify the chemical properties of acids.			✓
7.6	Name the gas products of the reactions of acids with metals and with carbonates.			✓
7.6	Describe how to test for hydrogen, carbon dioxide, and oxygen gases.			✓
7.6	Observe and write the uses of acids, bases, and salts in daily life.			✓
7.7	Design a car that is powered solely by a chemical reaction and can travel.			✓
7.8	Define the term salt and give examples of salts.			✓
7.8	Describe how to make a salt from a metal and acid.			✓
7.8	Interpret the pH scale and identify salts.			✓
7.8	Choose suitable equipment.			✓
7.8	Do a risk assessment.			✓
7.9	Choose reactants to make different salts			✓
7.10.	Describe how to make a salt from an acid and an insoluble carbonate.			✓
7.10.	Evaluate a method and suggest improvements.			✓
7.10.	Observe and write the uses of salts in daily life.			✓
8. Forces and Pressure				
8.1	Explain the difference between balanced and unbalanced forces			✓

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
8.1	Recognize that several forces may act on an object and that they may or may not balance each other.	✓	**5Pf.02** – Know that an object may have multiple forces acting upon it, even when at rest. **8Pf.03** – Describe the effects of balanced and unbalanced forces on motion.	
8.1	Describe the effect of balanced forces			✓
8.1	Describe the effect of unbalanced forces		**8Pf.03** – Describe the effects of balanced and unbalanced forces on motion.	✓
8.2	Describe the effect of friction on moving objects			✓
8.2	Describe how to reduce friction			✓
8.2	Describe how friction can be useful			✓
8.3	Describe what happens when you stretch a spring			✓
8.3	Describe what is meant by elastic limit			✓
8.3	Explain how upthrust is produced			✓
8.3	Explain why things float or sink			✓
8.4	Describe how to present results in tables			✓
8.4	Describe how to draw lines of best fit and identify anomalous results			✓
8.4	Explain which data points are reliable			✓
8.5	Differentiate between floating and sinking objects in terms of density.	✓	**9Pf.01** – Use density to explain why objects float or sink in water. **6Pf.05** – Recognise that the mass and shape of an object can affect if it floats or sinks.	
8.5	Explain why some things float and some things sink in water			✓
8.6	Describe how ideas about density have been used			✓
8.6	Describe how scientists worked in the past and how they work now			✓
8.7	Explain what causes pressure			✓
8.7	Relate pressure with force and area.	✓	**8Pf.05** – Explain that pressure is caused by the action of a force exerted on an area (pressure = force / area).	
8.7	Define ‘pressure’ with examples and its unit.	✓	**8Pf.05** – Explain that pressure is caused by the action of a force exerted on an area (pressure = force / area). Unit present in physical quantites table	
8.7	Calculate pressure			
8.8	Describe how large pressure can be useful			✓
8.8	Describe how small pressure can be useful			✓
8.9	Explain liquid pressure in terms of particles			✓
8.9	Explain why liquid pressure increases with depth			✓
8.9	Investigate effects related to pressure (e.g., water pressure increasing with depth, a balloon expanding when inflated, etc.)	✓	**8Pf.06** – Use particle theory to explain pressures in gases and liquids (qualitative only)	

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
8.10.	Explain gas pressure in terms of particles			✓
8.10.	Examine the effect of force in the presence of air pressure.	✓		
8.10.	Explain the factors that affect gas pressure			✓
8.11	Build and operate a hydraulic elevator	✓		
8.11	Build and demonstrate a two stage rocket	✓		
9. Reflection & Refraction of Light				
9.1	Describe how light travels			✓
9.1	Explain how we see things			✓
9.1	Describe how light interacts with objects			✓
9.1	Identify basic properties of light (i.e., speed, transmission through different media, absorption, reflection and dispersion).	✓	**3Ps.01** – Investigate how light can pass through some materials and is blocked by others, using the terms transparent, translucent and opaque. **4Ps.01** – Know that light travels in straight lines and this can be represented with ray diagrams. **4Ps.02** – Know that light can reflect off surfaces. **8Ps.03** - Know that white light is made of many colours and this can be shown through the dispersion of white light, using a prism.	
9.2	State the Laws of Reflection.		**6Ps.01** – Describe how a ray of light changes direction when it is reflected from a plane mirror. **8Ps.01** – Describe reflection at a plane surface and use the law of reflection.	✓
9.2	Use the law of reflection to describe how light is reflected.			✓
9.3	Use the law of reflection to explain how images are formed.			✓
9.3	Describe the different types of image.			✓
9.3	Describe and show how an image is formed by the plane mirror.	✓		
9.3	Distinguish between reflection and refraction of light with daily life examples.	✓		
9.3	Illustrate the characteristics of image formed by plane mirror.	✓	**8Ps.01** – Describe reflection at a plane surface and use the law of reflection. **5TWSm.02** – Use models, including diagrams, to represent and describe scientific phenomena and ideas.	
9.4	Describe different optical instruments which use curved mirrors.	✓		
9.4	Identify concave and convex mirrors.			✓
9.4	Describe how mirrors are used in different optical instruments.			✓
9.4	Describe use of different optical instruments with plane in which spherical mirrors are used.	✓		
9.4	Describe the characteristics of image(s) formed by concave mirrors and convex mirrors.			✓

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
9.5	Explain that light is refracted at the boundary between air and any transparent material.	✓	**6Ps.02** – Describe how a ray of light changes direction when it travels through different media and know that this is called refraction. **8Ps.02** – Describe refraction of light at the boundary between air and glass or air and water in terms of change of speed.	
9.5	Distinguish between reflection and refraction of light with daily life examples.	✓		
9.5	Describe how light is refracted at a boundary between air and water.	✓	✓	
9.5	Explain why light is refracted.			✓
9.6	Describe what happens when light goes through a glass block.			✓
9.6	Explain why light is refracted by different amounts in different materials.			✓
9.7	Know how fast light travels			✓
9.7	Understand how astronomers use speed of light to describe distances			✓
9.8	Explain how a spectrum of light is produced.			✓
9.8	Explain why we see rainbows.			✓
9.9	Investigate that light is made up of many colors. Relate the apparent color of objects to reflected or absorbed light.	✓	**8Ps.03** – Know that white light is made of many colours and this can be shown using dispersion. **8Ps.04** – Describe how colours of light can be added, subtracted, absorbed and reflected.	
9.9	Explain what happens when you mix light of different colors together.			✓
9.9	Explain how filters work.			✓
9.10.	Explain why colored objects look colored in white light.			✓
9.10.	Explain why colored objects look different colors in different colors of light.			✓
9.10.	Relate the apparent color of objects to reflected or absorbed light.	✓	**8Ps.04** – Describe how colours of light can be added, subtracted, absorbed and reflected.	
9.11	Recall that there can be different explanations for the same observations.			✓
9.11	Explain why some explanations are accepted and others are not.			✓
9.12	Describe how your eye works.			✓
9.12	Describe how a camera works.			✓
9.12	Compare the camera and the eye.			✓
10. Electricity and Magnetism				
10.1	Define voltage and current and state their SI units	✓	Unit present in physical quantites table	
10.1	Describe what is meant by voltage.	✓	Unit present in physical quantites table	

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
10.1.	Describe how to measure voltage in series and parallel circuits.			✓
10.1	Describe the effect on the voltage of adding cells and lamps in series and parallel circuits.			✓
10.2	Describe how resistance affects current.			✓
10.2	Define resistance and its SI unit	✓	**9Pe.03** – Calculate resistance (resistance = voltage / current) and describe how resistance affects current. Unit present in physical quantites table	
10.2	Calculate resistance			✓
10.2	Formulate that resistance is the ratio of voltage to current.	✓	**9Pe.03** – Calculate resistance (resistance = voltage / current) and describe how resistance affects current.	
10.2	Know the circuit symbols for fixed and variable resistors.			✓
10.3	Make decisions about when to use primary data.			✓
10.3	Describe how to plan an investigation.			✓
10.4	Define electric power and state its unit.	✓		
10.4	Describe the difference between energy and power			✓
10.4	Calculate power.			✓
10.4	Recognize the electric power of various electrical appliances.	✓		
10.5	Recognize the terms earthwire, fuse, circuit breaker	✓		
10.5	Analyze the danger of overloading and short circuit and identify the importance of earth wire, fuses and circuit breakers.	✓		
10.5	List safety measures when using electricity.	✓	**2Pe.01** – Identify how we use electricity and describe how to be safe with it.	
10.5	Know how fuses, earth wires and circuit breakers keep you safe	✓		
10.6	Describe the properties of an electromagnet	✓		
10.6	Investigate the factors that affect the strength of an electromagnet.	✓	**8Pe.03** - Investigate factors that change the strength of an electromagnet.	
10.6	Describe how devices that use electromagnets work.	✓	**8Pe.02** – Describe how to make an electromagnet and know that electromagnets have many applications.	
10.7	Describe the difference between dependent and independent variables.			✓
10.7	Describe how to show that you have controlled variables in an investigation.			✓
10.7	Write an appropriate risk assessment for an investigation.			✓
11. Technology in Everyday Life				
11.1	Make bioplastic from milk and vinegar as an application of biotechnology.	✓		
11.2	Build a concave mirror type solar system.	✓		
11.2	Assemble a concave mirror type solar cooker to convert solar energy into heat energy	✓		

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
11.2	Build a working wind turbine.	✓		
11.2	Demonstrate an uninterruptible power system operating a low power appliance			✓
11.2	Assemble a concave mirror type solar cooker to convert solar energy into heat energy	✓	✓	
11.2	Assemble and operate a simple wind turbine to produce electricity.	✓		
11.2	Demonstrate the working of UPS and use it to operate a fan or energy saver bulb.	✓	✓	
11.3	Make toothpaste as an application of acids and bases in daily life.			✓
11.4	Find out how to make soap as an application of acids and bases in daily life.			✓
11.5	Find out how to make detergent as an application of acids and bases in daily life.			✓
12. Our Universe				
12.1	Describe what a nebula is.			✓
12.1	Describe how stars form and die.			✓
12.1	Discuss the birth and eventual death of our sun.	✓		
12.1	Explore and understand the terms star, galaxy, Milky Way and the black holes	✓	**8ESs.01 -** Describe a galaxy in terms of stellar dust and gas, stars and planetary systems.	
12.1	Relate the life of a star with the formation of black hole, neutron star. Pulsar White Dwarf, Red Giant.	✓		
12.2	Describe what is in a galaxy.			✓
12.2	Describe what is in the Universe.			✓
12.2	Describe the 3 different types of galaxy.			✓
12.2	Explore and understand the terms star, galaxy, Milky Way and the black holes	✓	**8ESs.01 -** Describe a galaxy in terms of stellar dust and gas, stars and planetary systems.	
12.3	Give the approximate age of the Universe			✓
12.3	Describe the Big Bang theory of the Universe, and evidence for it.			✓
12.3	Compare the time that humans have lived on Earth with the age of the Earth.			✓
12.4	Describe some ideas in ancient astronomy that have changed over time.			✓
12.4	Describe how scientists develop explanations.			✓
12.5	Describe the geocentric model.			✓
12.5	Describe evidence for the geocentric model.			✓
12.5	Explain why scientific explanations change.			✓
12.6	Describe the heliocentric model of the Universe.			✓
12.6	Describe the evidence for the heliocentric model.			✓

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
12.6	Explain how scientific explanations develop.			✓
12.7	Describe how we collect information on space.			✓
12.7	Describe advancements in space technology.			✓
12.7	Understand the benefits of space technology.			✓
12.7	Show how information is collected from space by using telescopes (e.g., Hubble Space Telescope) and space probes (e.g., Galileo).	✓		
12.7	Describe advancements in space technology and analyze the benefits generated by the technology of space exploration.	✓		