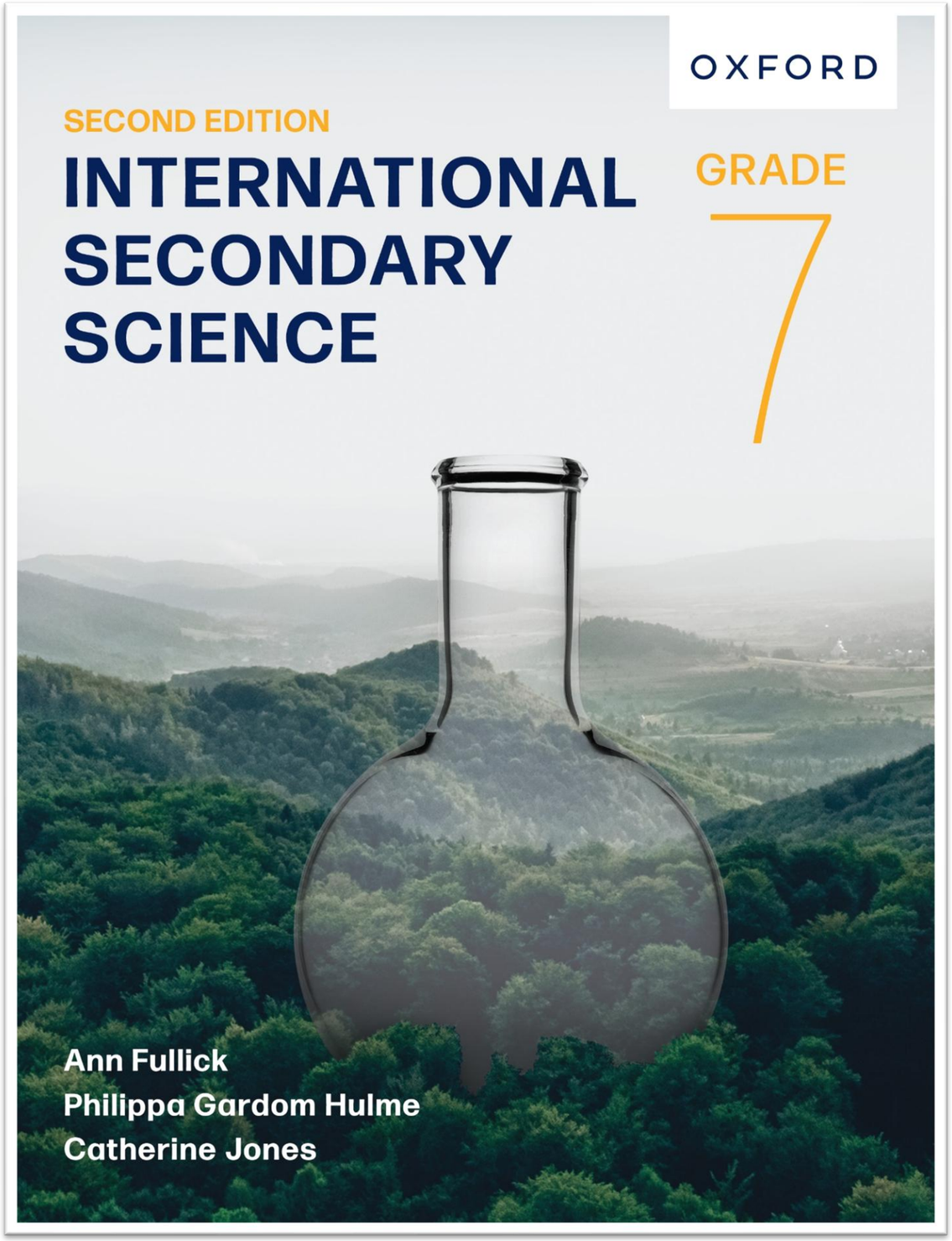

INTERNATIONAL SECONDARY SCIENCE 7 CURRICULUM MAPPING

Please find below the curriculum mapping for International Secondary Science 7 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 7

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
1. Plant systems				
1.1	Explain the root and shoot system in plants. Label different parts of leaf, stem and root (external and internal structure).	✓	**3Bs.01** - Describe the function of the major parts of flowering plants (limited to roots, leaves, stems and flowers).	
1.1	Predict the role of xylem and phloem in transport of water and food in plants by observing the cross section of the stem.	✓	**9Bs.01** - Describe the pathway of water and mineral salts from the roots to the leaves in flowering plants, including absorption in root hair cells, transport through xylem and transpiration from the surface of leaves.	
1.2	Define the process of photosynthesis and derive word equations for it.	✓	**9Bp.07** - Know and use the summary word equation for photosynthesis (carbon dioxide + water → glucose + oxygen, in the presence of light and chlorophyll).	
1.3	Define the process of photosynthesis	✓	**9Bp.07** - Know and use the summary word equation for photosynthesis (carbon dioxide + water → glucose + oxygen, in the presence of light and chlorophyll).	
1.3	Explain that the structure of leaves is adapted to the process of photosynthesis.	✓		
1.4	Define the process of photosynthesis and derive word equations for it.	✓	**9Bp.07** - Know and use the summary word equation for photosynthesis (carbon dioxide + water → glucose + oxygen, in the presence of light and chlorophyll).	
1.5	Describe the process of respiration and write word equations for it. Compare and contrast the processes of photosynthesis and respiration.	✓	**8Bp.05** - Know and use the summary word equation for aerobic respiration (glucose + oxygen → carbon dioxide + water).	
1.6	Know that plants require minerals to maintain healthy growth and life processes (limited to magnesium to make chlorophyll and nitrates to make protein).	✓	**9Bp.05** - Know that plants require minerals to maintain healthy growth and life processes (limited to magnesium to make chlorophyll and nitrates to make protein).	
1.7	Plants need minerals to maintain healthy growth and life processes			✓
1.8	Predict the role of xylem and phloem in the transport of water and food in plants by observing the cross section of the stem	✓	**9Bs.01** - Describe the pathway of water and mineral salts from the roots to the leaves in flowering plants, including absorption in root hair cells, transport through xylem and transpiration from the surface of leaves.	
1.9	Investigate the phenomena of transpiration and its importance in a plant (wind, temperature, light, humidity affecting rate of transpiration in plants).	✓		

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
1.9	Explore and apply natural raise of water based on the principle of transpiration.	✓		
1.10.	predict the role of xylem and phloem in the transport of water and food in plants by observing the cross section of the stem	✓	**9Bs.01** - Describe the pathway of water and mineral salts from the roots to the leaves in flowering plants, including absorption in root hair cells, transport through xylem and transpiration from the surface of leaves.	
2. Human Respiratory and Circulatory Systems				
2.1	Explain that living organisms have a complex transport system for transfer of various solids, liquids, and gases across the body.	✓		
2.2	Differentiate between aerobic and anaerobic respiration.	✓	**8Bp.05** - Know and use the summary word equation for aerobic respiration (glucose + oxygen → carbon dioxide + water).	
2.3	Describe the role and function of major organs in the human respiratory system including trachea, lungs and alveoli (air sacs)	✓		
2.3	Trace the path of air in and out of the body and how the oxygen it contains is used during the process of respiration.	✓	**8Bs.03** - Describe the structure of the human respiratory system and its function of gas exchange.	
2.4	Differentiate between aerobic and anaerobic respiration.	✓	**8Bp.05** - Know and use the summary word equation for aerobic respiration (glucose + oxygen → carbon dioxide + water).	
2.5	Differentiate between the processes of respiration and breathing.	✓	**8Bs.03** - Describe how the structure of the human respiratory system is related to its function of gas exchange (in terms of lung structure and the action of the diaphragm and intercostal muscles) and understand the difference between breathing and respiration.	
2.5	Trace the path of air in and out of the body and how the oxygen it contains is used during the process of respiration.	✓	**8Bs.03** - Describe the structure of the human respiratory system and its function of gas exchange.	
2.6	Describe the role and function of major organs in the human respiratory system including trachea, lungs and alveoli (air sacs)	✓	**8Bs.03** - Describe the structure of the human respiratory system and its function of gas exchange.	
2.7	Describe asthma, its causes and how it can be treated			✓
2.8	Sketch and label the human circulatory system.	✓	**6Bs.01** - Describe the human circulatory system in terms of the heart pumping blood through arteries, capillaries and veins, describe its function (limited to transporting oxygen, nutrients and waste).	

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2.8	Describe the structure and function of the human heart.	✓		
2.9	Hypothesize how exercises of varying intensity (from rest to high-intensity interval training) would impact their pulse rate, test their hypothesis, calculate their pulse rate and record their findings.	✓	**8Bs.03** - Describe the structure of the human respiratory system and its function of gas exchange.	
2.9	Explain how blood circulates in the human body through a network of vessels (arteries, veins and capillaries), and transports gases, nutrients, wastes and heat.	✓	**6Bs.01** - Describe the human circulatory system in terms of the heart pumping blood through arteries, capillaries and veins.	
2.9	Compare and contrast arteries, veins and capillaries.	✓		
2.10.	Describe the composition of blood and the functions of red cells, white cells, platelets and plasma.	✓	**8Bs.02** - Describe the components of blood and their functions (limited to red blood cells transporting oxygen, white blood cells protecting against pathogens and plasma transporting blood cells, nutrients and carbon dioxide).	
3. Immunity and Diseases				
3.1	Identify the various types of pathogens that cause infectious diseases.	✓	**6Bp.04** - Know that humans have defence mechanisms against infectious diseases, including skin, stomach acid and mucus.	
3.3	Explain the various lines of defenses that the body has against pathogens.	✓	**6Bp.04** - Know that humans have defence mechanisms against infectious diseases, including skin, stomach acid and mucus.	
3.3	Describe the three types of immunity in humans – innate, adaptive, and passive.	✓		
3.3	Describe the parts of the immunity system and how they function to produce an immune response.	✓		
3.4	Explain the various lines of defenses that the body has against pathogens.	✓	**6Bp.04** - Know that humans have defence mechanisms against infectious diseases, including skin, stomach acid and mucus.	
3.4	Describe the three types of immunity in humans – innate, adaptive, and passive.	✓		
3.4	Describe the parts of the immunity system and how they function to produce an immune response.	✓		
3.4	Illustrate how adaptive immunity develops over time.	✓	**4Bp.02** - Vaccinations can prevent some infectious diseases of animals.	
3.5	Suggest ways in which communities of people can safeguard against the spread of infectious diseases.	✓		

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3.5	Visualize the ways to add additional layers of defense (such as wearing masks, using sanitizers, etc.).	✓	**6Bp.03** - Describe how good hygiene can control the spread of diseases transmitted in water, food and body fluids, and describe ways to avoid being bitten by insect vectors.	
3.6	Propose some common strategies for strengthening their immune system.	✓		
3.6	Illustrate how adaptive immunity develops over time.	✓	**4Bp.02** - Vaccinations can prevent some infectious diseases of animals.	
3.6	Visualize the ways to add additional layers of defense (such as wearing masks, using sanitizers, etc.).	✓	**6Bp.03** - Describe how good hygiene can control the spread of diseases transmitted in water, food and body fluids, and describe ways to avoid being bitten by insect vectors.	
3.6	Propose some common strategies for strengthening their immune system.	✓		
3.6	Describe the role of vaccines in immunity and explore some strategies on how vaccines can be created			✓
3.6	Suggest ways in which communities of people can safeguard against the spread of infectious diseases.	✓		
3.7	Identify the various types of pathogens that cause infectious diseases.	✓	**6Bp.02** - Know that some diseases can be caused by infection with viruses, bacteria, parasites or fungi that can be passed from one host to another.	
3.7	Propose some common strategies for strengthening their immune system.	✓		
3.8	Explain how infectious diseases such as hepatitis, covid-19, typhoid, and dengue are caused /contracted, how they are tested and diagnosed, and how they can be prevented.	✓		
3.9	Explain how infectious disease such as covid-19, is caused/contracted, how it is tested and diagnosed, and how it can be prevented	✓		
4. Structure of an Atom				
4.1	Explain that the Periodic Table is a way to organize elements in a systematic order.			✓
4.2	Recognize periods and groups in the Periodic Table.	✓	**9Cm.01** - Understand that the structure of the Periodic Table is related to the atomic structure of the elements and the Periodic Table can be used to predict an element's structure and properties.	

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
4.2	Explain that the Periodic Table is a way to organize elements in a systematic order.	✓	**7Cm.02** - Know that the Periodic Table presents the known elements in an order.	
4.3	Describe and draw the structure of an atom in terms of electrons, protons and neutrons.	✓	**7Cm.01** - Understand that all matter is made of atoms, with each different type of atom being a different element. 8Cm.02 Know that electrons have negative charge, protons have positive charge and neutrons have no charge.	
4.3	Describe how an atom is electrically neutral	✓		
4.4	Differentiate between atomic number and mass number.	✓		
4.4	Describe and draw the structure of an atom in terms of electrons, protons and neutrons.			✓
4.5	Determine the atomic number and mass number of elements on the basis of the number of protons, electrons and neutrons.	✓		
4.5	Differentiate between atomic number and mass number.			✓
4.6	Show the arrangement of electrons in K, L and M shells of elements	✓		
4.6	Draw the atomic structure of the first eighteen elements of the Periodic Table.	✓		
4.6	Draw atomic structures of elements in the Periodic Table.	✓		
5. Chemical Bonds				
5.1	Define valency and explain the formation of ions.	✓	**9Cm.04** - Describe an ion as an atom which has gained at least one electron to be negatively charged or lost at least one electron to be positively charged.	
5.1	draw dot and cross diagrams showing the formation of ionic compounds			✓
5.2	Recognize that a chemical bond results from the attraction between atoms in a compound and that the atoms' electrons are involved in this bonding.	✓		
5.3	Discuss types and formation of covalent bonds as a result of mutual sharing of electrons between atoms		**9Cm.03** - Describe a covalent bond as a bond made when a pair of electrons is shared by two atoms (limited to single bonds).	✓
5.3	Draw dot-and-cross diagrams showing the formation of covalent compounds			✓
5.3	Name certain covalent compounds			✓

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
5.3	Recognize that a chemical bond results from the attraction between atoms in a compound and that the atoms' electrons are involved in this bonding.	✓		
5.4	Recognize that a chemical bond results from the attraction between atoms in a compound and that the atoms' electrons are involved in this bonding.	✓		
5.5	Define valency			✓
5.5	Write chemical formulae on the basis of valency of the constituent elements. such as H_2O NaCl, NH_3, CO_2, CO, etc.	✓ ✓		
	6. Physical and Chemical Change			
6.1	Differentiate between physical and chemical changes while considering daily life examples.	✓	**6Cc.01** - Identify and describe physical changes that are reversible. **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.	
6.2	Distinguish between physical and chemical properties of matter.	✓		
6.2	Relate uses of materials to their physical properties	✓		
6.2	Relate uses of materials to their chemical properties	✓		
6.3	Relate uses of materials to their physical properties: thermal conductivity	✓		
6.4	Evaluate some physical properties of materials			✓
6.4	Evaluate impact of combustion reaction on environment			✓
6.5	Differentiate between physical and chemical changes while considering daily life examples.	✓	**6Cc.01** - Identify and describe physical changes that are reversible. **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.	
6.5	Recognize that oxygen is needed in rusting	✓		
6.5	Relate uses of materials to their chemical properties (e.g., tendency to rust, flammability).	✓		
6.6	Explore methods of preventing rusting.	✓		
6.5	Relate uses of materials to their chemical properties (e.g., tendency to rust, flammability).	✓		

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
6.5	Relate uses of materials to their physical properties (e.g., melting point, boiling point, solubility, thermal conductivity).	✓		
7. Solutions				
7.1	Demonstrate the process of solution formation (using water as universal solvent).		**5Cc.03** — Investigate and describe the process of dissolving, and relate it to mixing.	✓
7.1	Distinguish among solute, solvent and solution; saturated and unsaturated solution.			✓
7.1	Identify ways of accelerating the process of dissolving materials in a given amount of water and provide reasoning (i.e., increasing the temperature, stirring, and breaking the solid into smaller pieces increases the process of dissolving).	✓	**6Cc.02** - Describe how temperature affects solids dissolving in liquids and relate it to the particle model.	
7.2	Identify ways of accelerating the process of dissolving materials in a given amount of water and provide reasoning (i.e., increasing the temperature, stirring, and breaking the solid into smaller pieces increases the process of dissolving).	✓	**6Cc.02** - Describe how temperature affects solids dissolving in liquids and relate it to the particle model.	
7.3	Explain what is meant by a concentrated and dilute solution.	✓	**8Cp.01** - Understand that the concentration of a solution relates to how many particles of the solute are present in a volume of the solvent.	
7.4	Recognize that the amount of solute which dissolves in a given solvent has an upper limit at a given temperature	✓		
7.5	Evaluate an issue that requires science understanding		**5SIC.03** — Use science to support points when discussing issues, situations or actions.	✓
7.6	Define solubility.	✓		
7.6	Distinguish among solute, solvent and solution; saturated and unsaturated solution.			✓
7.6	Identify the factors which affect the solubility of a solute in a solvent and recognize the importance of these factors in homes and industries.	✓	**6Cc.02** - Describe how temperature affects solids dissolving in liquids and relate it to the particle model.	
7.6	Recognize that the amount of solute which dissolves in a given solvent has an upper limit.	✓		

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
7.6	Identify the factors which affect the solubility of a solute in a solvent and recognize the importance of these factors in homes and industries.	✓	**6Cc.02** - Describe how temperature affects solids dissolving in liquids and relate it to the particle model.	
7.7	Identify the factors that affect the solubility of a solute in a solvent.			✓
7.8	Identify the factors that affect the solubility of a solute in a solvent			✓
7.9	Identify the factors which affect the solubility of a solute in a solvent and recognize the importance of these factors in homes and industries.	✓	**6Cc.02** - Describe how temperature affects solids dissolving in liquids and relate it to the particle model.	
7.9	Make a rock candy with sugar using crystal seeding technique. (STEAM).	✓		
8. Heat and Temperature				
8.1	differentiate between heat and temperature on the basis of particle theory		**9Pf.02** - Describe the difference between heat and temperature.	✓
8.1	Define the terms heat and temperature on the basis of Kinetic Molecular Theory.	✓	**9Pf.02** - Describe the difference between heat and temperature.	
8.1	Compare all three scales of temperature (including inter-conversion of temperature scales).	✓		
8.2	Describe the expansion of the three states of matter on heating, and contraction on cooling, in terms of particles.	✓		
8.2	Identify the effects of thermal expansion and contraction with their applications in daily life.	✓		
8.3	Explain why metals are good thermal conductors and fluids are poor conductors of heat using the particle model.	✓		
8.3	Construct the concept of heat conduction, convection and radiation by applying particle theory including daily life examples.	✓	**9Pf.05** - Describe thermal transfer by the processes of conduction, convection and radiation.	
8.4	Construct the concept of heat conduction, convection and radiation by applying particle theory including daily life examples.	✓	**9Pf.05** - Describe thermal transfer by the processes of conduction, convection and radiation.	

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
8.5	Construct the concept of heat conduction, convection and radiation by applying particle theory including daily life examples.	✓	**9Pf.05** - Describe thermal transfer by the processes of conduction, convection and radiation.	
8.6	State and explain the practical methods of thermal insulation used for constructing buildings.	✓		
8.7	Predict the effects of heat gain and heat loss.	✓	**9Pf.04** - Know that thermal energy will always transfer from hotter regions or objects to colder ones, and this is known as heat dissipation.	
	9. Waves and energy			
9.1	Define a wave.	✓		
9.1	Compare the types of waves (mechanical and electromagnetic) with daily life examples.	✓		
9.1	Distinguish between Longitudinal and Transverse waves.	✓		
9.2	Identify; 1. water wave and Sound wave as mechanical wave; 2. light wave as electromagnetic wave.	✓		
9.2	Define the terms: Wavelength, frequency, and time period of wave.	✓		
9.2	Construct the inverse relation between time, period and frequency	✓		
9.3	Relate common phenomenon (e.g., echo, hearing thunder after seeing lightning) to the properties of sound.	✓		
9.3	Explain the factors affecting pitch and loudness of sound.	✓		
9.3	Compare the types of waves (mechanical and electromagnetic) with daily life examples.	✓		
9.4	Describe how the ear detects sound			✓
9.4	Explain how your hearing can be damaged			✓
9.4	Describe how a microphone works			✓

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
9.5	Define and relate: 1. Pitch and frequency. 2. Amplitude and frequency.	✓		
9.5	Explain the factors affecting pitch and loudness of sound.	✓		
9.5	Compare and interpret waveforms in terms of pitch and loudness.	✓		
9.6	Describe some of the risks of loud sounds and how to reduce the risks			✓
9.6	Name the unit of sound intesnity, or loudness			✓
	10 Forces and Motion			
10.1	Define and state the SI unit of force.	✓		
10.1	Give examples of contact forces and non-contact forces.	✓	**5Pf.01** - Identify a range of forces (limited to gravity, applied forces, normal forces, upthrust, friction, air resistance and water resistance).	
10.2	Demonstrate that forces always work in action and reaction pairs (equal in magnitude, opposite in direction).	✓	**5Pf.02 -** Know that an object may have multiple forces acting upon it, even when at rest.	
10.3	Describe how air resistance is produced			✓
10.3	Describe where it causes a problem, and where it is useful			✓
10.3	Describe what happens in a vaccum			✓
10.4	Describe how explanations about motion were developed			✓
10.4	Explain why ideas take long time to change		**4SIC.01** — Describe how scientific knowledge and understanding changes over time through the use of evidence gained by enquiry.	✓
10.5	Describe how to plan an investigation to test an idea in science		**5TWSp.01** — Ask scientific questions and select appropriate scientific enquiries to use. **5TWSp.04** — Plan fair test investigations, identifying the independent, dependent and control variables.	✓
10.5	Describe how to write a conclusion		**3TWSa.03** — Make a conclusion from results and relate it to the scientific question being investigated. **5TWSa.03** — Make a conclusion from results informed by scientific understanding.	✓
10.5	Describe how to write an evaluation			✓
10.6	State SI (System International) unit of speed.	✓		

Spread number	Student Learning Outcomes in Book	National Curriculum Pakistan 2022	Student Learning Outcomes in Cambridge Curriculum	Value added Student Learning Outcomes
10.6	Calculate average speed.	✓		
10.7	Describe the effect of force on changing the speed and direction of motion with time	✓	**6Pf.04** - Describe the effect of different forces on an object at rest and in motion.	
10.7	Calculate average speed.	✓		
10.8	Interpret a distance-time graph.	✓	**8Pf.02** - Interpret and draw simple distance/time graphs.	
10.8	Formulate the relationship between speed, distance and time.	✓	**8Pf.01** - Calculate speed (speed = distance / time).	
10.9	State SI (System International) unit of speed.	✓		
10.10.	explain which type of graph to plot from different types of data		**5TWSa.05** - Present and interpret results using tables, bar charts, dot plots and line graphs.	✓
10.10.	Apply ideas about distance-time graphs		**8Pf.02** - Interpret and draw simple distance / time graphs.	✓
11. Technology in Everyday Life				
11.1	Make a simple Stethoscope.	✓		
11.2	Use different techniques of preserving foods like orange juice, apple jam and pickles.	✓		
11.3	Design a model to demonstrate drip & sprinkler irrigation system for conservation of water.	✓	**2TWSm.02** – Make and use a physical model of a familiar system or idea.	
11.4	Make a sanitizer using suitable substances.	✓		
12. Earth and space				
12.1	Differentiate between mass and weight, using examples of weightlessness experienced by astronauts on the surface of the Moon.	✓	**6Pf.01** – Describe the difference between mass, measured in kilograms (kg), and weight, measured in newtons (N). **6Pf.02** – Describe the effect of gravity and know that when gravity changes, the weight of an object changes but the mass does not.	
12.2	Recognize that the force of gravity keeps planets and moons in their orbits.	✓	**7ESs.02** – Know that gravity is the force that holds components of the Solar System in orbit around the Sun.	
12.3	Describe how scientific knowledge about gravity has developed overtime			✓
12.3	Describe some reasons why scientific explanations change			✓
12.4	Recognize that tides are caused by the gravitational pull of the Moon	✓	**7ESs.03** – Describe tidal forces on Earth as a consequence of the gravitational attraction between the Earth, Moon and Sun.	

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12.5	Describe the effects of the Earth's annual revolution around the Sun, given the tilt of its axis (e.g., different seasons, different constellations visible at different times of the year).	✓	**5ESs.02** – Describe how the tilt of the Earth can create different seasons in different places. **9ESs.01** – Describe the orbit of the Earth around the Sun. **4ESs.01** – Explain why the spinning of the Earth on its axis leads to the apparent movement of the Sun, night and day, and changes in shadows.	
12.6	Describe how seasons in Earth's Northern and Southern Hemispheres are related to Earth's annual movement around the Sun.	✓	**5ESs.02** – Describe how the tilt of the Earth can create different seasons in different places. **9ESs.01** – Describe the orbit of the Earth around the Sun. **6ESs.01** – Describe the relative position and movement of the planets, the Moon and the Sun in the Solar System.	
12.7	Describe the difference between primary and secondary sources of data			✓
12.7	Name some secondary sources			✓
12.7	Use information from secondary sources to answer questions			✓