

Scheme of Work

NAS 8

Unit	Objectives	Suggested activities	Resources	Homework
Unit 1	To describe the role of living things in cycling oxygen and carbon through an ecosystem citing the processes of respiration, photosynthesis and combustion. To describe and illustrate through examples key ecological relationships between organisms, including competition, predation and symbiosis To ensure that students are well aware of the impact of changes that occurred and adversely affected our ecosystems.	Starter Activity (5 min) Put pictures of at least three ecosystems on the board. Ask students to observe in order to identify the living and non-living things in the pictures. Take their responses and write on the board. Tiger grasshopper trees rabbit owl grass pond frog. Then share the word 'Ecosystem' and define it.	Textbook (NAS Book 7) Charts Videos Images of various ecosystems (aquatic, rain forest, desert)	Ask students to prepare a poster of 10x10 inches and cut and paste pictures of animals and plants in any specific ecosystem marking: Consumers Producers Predators
	To give clear concept of 'cycling' in the ecosystem. To introduce sub-topics of the lesson with definitions and examples. To explain natural processes like migration and global warming and emphasize upon our role in saving the environment on Earth.	Starter Activity (5 min) Write the following jumbled letters along with hints on the board, and ask students to unscramble: They prepare food through photosynthesis. RSDUCEPRO (PRODUCER) They eat food prepared by green plants	Textbook (NAS Book 7) Charts Worksheet	- Students will be asked to revise the topic. - Some web sites will be suggested to students to visit at home. (e.g., National Geographic Special, Jev Salvacion videos).

		RSUMECON (CONSUMER) The seasonal movement of animals from one place to another for better conditions or breeding TIONGRAM (MIGRATION) The organisms use it to grow, move, reproduce and carry out other activities ERGYNE (ENERGY) Carbon traps the energy from the sun to keep the earth's surface warm, but not too much so it does not over heat EEHOUSE ECTEFF (GREENHOUSE EFFECT)		
Unit 2	To explain in detail the Human nervous System To name and elaborate different parts and organs of CNS	Starter Activity (5 min) Write the topic on the board and ask students to share any experience when they touched something and instantly moved their arm away from it. Listen and comment at the end. For example, a student touched a hot object like a hot cup of tea and quickly moved back. This is a reflex action. This happens because the neurons or nerve cells of our body which are part of our human nervous system.	Textbook (NAS Book 7) Charts /Posters—CNS	Ask students to revise the topic at home. Have them collect further information by searching for videos of grade 8 level and noting down the links.

	To enable students to comprehend the structure and working of spinal cord and PNS. To understand the spinal network of nerve cells and how it works.	Starter Activity (5 min) Write key words on the board and draw nerve cells prior to the start of the science class. Ask them to pick up a book and place it back. Ask them how long did it take? (Answer should be: A very short time), there mention that there is a system in place for the action or response	Textbook (NAS Book 7) Poster of PNS (Ref. page no. 21) Worksheets	Ask students to study the topic for better comprehension.
Unit 3	Describe variation and adaptation in living organisms. Explain and illustrate the difference between variation and adaptation. Identify sources of variation from environmental and genetic factors. To explain how different adaptations affect the chances of survival of different species of organisms. The chances of survival of different species of organisms.	Starter Activity (10 min) The teacher will share the list of words with the students and ask them to define them based on prior study. Once students answer, the right definitions will also be mentioned. 1. Genetics - study of inheritance 2. Variation – The differences in characteristics of the individuals of the same species. 3. Environment-The surroundings/ conditions in which a person, animal or plant lives	• Textbook (NAS Book 8) • Charts • Word puzzle sheet • Video on Camouflage in nature	Ask students to study the topic at home for clarity of concepts

	The chances of survival of different species of organisms. Recognize Genetics as the study of heredity and describe heredity as the transfer of genetic information that specifies structures, characteristics and functions from parents to offspring.	4. Camel- a desert animal, with special features 5. Shark- a large predator of oceans 6. Cactus- a plant found in desert and semi-deserts 7. Genes-the basic unit of heredity passed from parents to child 8. Cell- the basic unit of life 9. Nucleus- a membrane enclosed organelle within a cell that contains the chromosome 10.Ecosystem- It consists of all the organisms and the physical environment with which they interact		
	Differentiate between the concept of genes and chromosomes and relate them to how genetic characteristics are inherited. Describe the composition and characteristics of DNA. Design a model of DNA to demonstrate its structure, function and components.	Starter Activity (20 min) Prior to the lesson, make arrangements in the science laboratory to show cell division (different phases of mitosis and meiosis). Temporary slides can be prepared in front of students or	• Textbook (NAS Book 8) • Microscope • Slides of onion cells (showing different phases of mitosis and meiosis). • Pen, pencil, paper • DNA, Chromosome, cell division	• Ask students to read the topic for revision. • Ask them to watch videos on cell division on Internet.

	Describe cell and its types- mitosis and meiosis and relate them to the passage of genetic information and identify their key phases.			
Unit 4	Define biotechnology as the use of living cells and organisms in product and processes that can improve the quality of life. Illustrate how biotechnology is a discipline / field that has the potential to transform how we live. Discuss the application of biotechnology in the Pakistani context and their effect on the people and the environment of Pakistan overtime. Illustrative examples: Bread making, making of yoghurt and cheese, vaccines for immunization, insulin production and dyes, etc.	Starter Activity (5 min) • Arrange a trip to a local bakery or bread manufacturing plant before the topic starts. Starter Activity • At the start of this topic , discuss the trip and the various steps in the process of baking. Identify when fermentation took place.	• Textbook (NAS Book 8) • Chart	

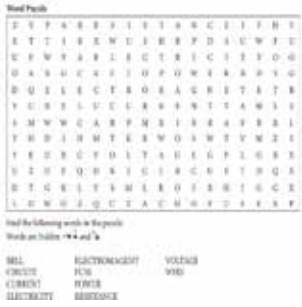
	Illustrate how biotechnology has the potential to transform how we live. Relate the use of biotechnology in food sciences, in producing food with higher nutritional value and improved taste and quality (how fermentation has been improved by genetically modified organisms or the introduction of certain genes to raise iron content in rice; can be taken as example.)	Starter Activity (5 min) Ask students some relevant questions: • Have you seen new varieties of tomato which are bigger than Teacher Ideas 39 local varieties? • Have you eaten fruits without seeds? For example, grapes, watermelon, banana, papaya. • Ask them to name some seedless fruits they have consumed lately.	• Textbook (NAS Book 8) • Charts	Ask students to study the topic for better comprehension
Unit 5	Recognise periodic table as a way of classifying elements in groups and periods. Identify the name and location of first 18 elements.	Starter Activity: (5 min) Display the objects (Nails, Plastic Cups, Mobile phones) in front of students and ask them to identify whether it is a metal, nonmetal or a semi-metal. Then, write the words Periodic Table on the board and point towards the elements on the chart displayed. Incorporate, the two parts of the activity accordingly.	• Textbook – NAS 8 • Charts: Periodic Table • Material for Starter Activity: Metal (Nails), Non-metal (Plastic cups), Semi-metal (Mobile Phone – contains semi-conductor elements)	• Ask the students to study the topic. • Ask the students to draw the atomic structure of elements, one from each group.

	Identify the properties of metals and non-metals. Relate the properties and uses of non-metals	On the internet, find a video on the uses of metals and in the lab or as per convenience, show it to the students.	- Textbook – NAS 8 - Charts - Video – on the uses of metals	
Unit 6	To elaborate on chemical reactions and what enables us to confirm / deduce that a chemical reaction occurred. To fully comprehend the law of conservation of mass. To learn about writing a chemical equation.	Starter Activity: (5 min) Teacher will write key words (Chemicals, Elements , Periodic Table) on the board. Students will then be asked a few related questions such as What are elements? / Can they be destroyed? Teacher will talk about matter and mass and write the law of conservation of mass on the board.	- Textbook – NAS 8 - Charts	
	Students will fully comprehend how energy is released or absorbed during a chemical reaction Heat energy is given out in exothermic reactions and absorbed in endothermic reaction, everyday life examples/ experiences further supporting learning theory. To understand classification of chemical reactions into different types of reaction.	Starter Activity: (10 min) Place ice cubes in a beaker on the table alongside a candle. Carefully, light the candle. Ask students to observe. As the ice and candle wax melts , ask the students whether heat is given out or taken in by the ice and candle wax. Teacher Ideas 62 Then, correctly relating talk about absorption of heat (Endothermic) and release of heat (Exothermic). Write the two keyword onto the board.	- Textbook – NAS 8 - Charts - Materials required for starter activity : Ice cubes , glass beaker, candle and match sticks	Ask students to read the topic for revision. Make a list of 5 chemical reactions they can observe in their surroundings.

Unit 7	Classify acids, alkalis, and salts, and give examples of each. Identify the physical and chemical properties of acids, alkalis and salts. Define pH and its ranges with reference to indicators. Interpret the pH scale and identify acids, alkalis, and salts. Describe neutralisation reactions with real life examples. Observe and write the uses of acids, alkalis and salts in daily life.	In separate labelled clear glasses, pour the liquids. a. Window cleaner b. toilet bowl cleaner c. orange juice d. apple juice. (Warn Teacher Ideas 71 the students that these are not to be consumed or tempered with) Place a red litmus paper in each and then ask the students to observe the colour change on the litmus paper in their notebooks. Repeat, using a blue litmus paper this time. Then, discuss the colour change whilst recognising which liquid is acidic or alkaline. Write the colour changes on the board	• Textbook – NAS 8 • Charts • Materials required for starter activity such as litmus paper, different liquids required.	• Ask students to study the topic for revision. Ask students to make a list of 5-6 substances that are used in everyday life and categorise them.
	Define pH and its ranges with reference to indicators. Interpret pH scale and identify acids, alkalis and salts. Describe neutralisation reactions with real life examples.	Starter Activity: (10 min) Arrange a visit to the computer lab and show a video relevant to indicators. Reference link: https://youtu.be/xYQlvTbIgCY Ask them to make notes	• Textbook – NAS 8 • Charts • Video on pH indicators	

Unit 8	Recognise that several forces may act on an object and that they may or may not balance each other. Explain the effect of unbalanced force on an object. Differentiate between floating and sinking objects in terms of density.	Starter Activity: (10 min) Share that an interesting topic will start with the beginning of this activity. Distribute A-4 or any plane paper sheet, one each to every students. Then, ask them to follow you while you make a paper plane. When done, ask them to fly their planes ideally in an open area. Share that all objects fly due to application of force on them.	• Textbook – NAS 8 • Charts • Materials required for starter activity (A-4 papers) for making paper planes. • Video Link: https://youtu.be/rfeVINL7d9U	Ask students to make a list of at least 5 actions we see or perform where a force is applied.																																																																																																																																																																																																																														
	Differentiate between floating and sinking objects in terms of density. Define pressure with examples and its units. Relate pressure with force and area. Investigate effects related to pressure (e.g. water pressure increasing with depth, a balloon expanding when inflated etc). Examine the effect of force in presence of air pressure.	Divide the class into a group of 4 and give a printed word puzzle to each group. Ask them to look for the words and the first team to find all wins. WORD PUZZLE <table><tr><td>S</td><td>E</td><td>W</td><td>T</td><td>I</td><td>S</td><td>T</td><td>C</td><td>R</td><td>L</td><td>F</td><td>E</td><td>N</td><td>G</td></tr><tr><td>R</td><td>E</td><td>W</td><td>E</td><td>O</td><td>N</td><td>P</td><td>E</td><td>C</td><td>V</td><td>U</td><td>H</td><td>E</td><td></td></tr><tr><td>U</td><td>M</td><td>S</td><td>P</td><td>E</td><td>R</td><td>B</td><td>F</td><td>R</td><td>A</td><td>C</td><td>A</td><td>V</td><td>E</td></tr><tr><td>S</td><td>E</td><td>T</td><td>M</td><td>S</td><td>C</td><td>P</td><td>O</td><td>V</td><td>U</td><td>P</td><td>G</td><td>I</td><td>M</td></tr><tr><td>S</td><td>I</td><td>Z</td><td>B</td><td>A</td><td>N</td><td>S</td><td>I</td><td>D</td><td>E</td><td>X</td><td>B</td><td>E</td><td>I</td></tr><tr><td>E</td><td>M</td><td>F</td><td>E</td><td>M</td><td>A</td><td>I</td><td>L</td><td>V</td><td>B</td><td>U</td><td>R</td><td>M</td><td>I</td></tr><tr><td>R</td><td>F</td><td>C</td><td>E</td><td>E</td><td>S</td><td>A</td><td>T</td><td>M</td><td>S</td><td>I</td><td>W</td><td>M</td><td>M</td></tr><tr><td>P</td><td>E</td><td>O</td><td>R</td><td>O</td><td>A</td><td>O</td><td>Q</td><td>V</td><td>I</td><td>Z</td><td>W</td><td>M</td><td>I</td></tr><tr><td>F</td><td>A</td><td>P</td><td>U</td><td>M</td><td>B</td><td>L</td><td>I</td><td>J</td><td>M</td><td>I</td><td>T</td><td>T</td><td>E</td></tr><tr><td>T</td><td>E</td><td>P</td><td>A</td><td>C</td><td>V</td><td>P</td><td>R</td><td>I</td><td>S</td><td>N</td><td>E</td><td>A</td><td></td></tr><tr><td>P</td><td>M</td><td>T</td><td>I</td><td>E</td><td>N</td><td>V</td><td>D</td><td>E</td><td>T</td><td>R</td><td>A</td><td>E</td><td>T</td></tr><tr><td>B</td><td>A</td><td>P</td><td>A</td><td>N</td><td>G</td><td>U</td><td>Q</td><td>B</td><td>E</td><td>O</td><td>H</td><td>E</td><td>N</td></tr><tr><td>S</td><td>E</td><td>E</td><td>B</td><td>P</td><td>V</td><td>B</td><td>A</td><td>C</td><td>R</td><td>I</td><td>V</td><td>C</td><td>O</td></tr><tr><td>V</td><td>E</td><td>Q</td><td>M</td><td>I</td><td>O</td><td>G</td><td>R</td><td>T</td><td>S</td><td>Q</td><td>Z</td><td>O</td><td>E</td></tr><tr><td>I</td><td>A</td><td>G</td><td>V</td><td>O</td><td>E</td><td>M</td><td>I</td><td>Q</td><td>R</td><td>I</td><td>F</td><td>M</td><td></td></tr></table> WORD LIST Write any letter → ↓ ← and ↑ <table><tr><td>WATER</td><td>FORCE</td><td>AREA</td><td>NEWTON</td><td>METRE</td><td>DISPLACE</td></tr><tr><td>BALLOON</td><td>PRESSURE</td><td>AREA</td><td>NEWTON</td><td>METRE</td><td>DISPLACE</td></tr></table>	S	E	W	T	I	S	T	C	R	L	F	E	N	G	R	E	W	E	O	N	P	E	C	V	U	H	E		U	M	S	P	E	R	B	F	R	A	C	A	V	E	S	E	T	M	S	C	P	O	V	U	P	G	I	M	S	I	Z	B	A	N	S	I	D	E	X	B	E	I	E	M	F	E	M	A	I	L	V	B	U	R	M	I	R	F	C	E	E	S	A	T	M	S	I	W	M	M	P	E	O	R	O	A	O	Q	V	I	Z	W	M	I	F	A	P	U	M	B	L	I	J	M	I	T	T	E	T	E	P	A	C	V	P	R	I	S	N	E	A		P	M	T	I	E	N	V	D	E	T	R	A	E	T	B	A	P	A	N	G	U	Q	B	E	O	H	E	N	S	E	E	B	P	V	B	A	C	R	I	V	C	O	V	E	Q	M	I	O	G	R	T	S	Q	Z	O	E	I	A	G	V	O	E	M	I	Q	R	I	F	M		WATER	FORCE	AREA	NEWTON	METRE	DISPLACE	BALLOON	PRESSURE	AREA	NEWTON	METRE	DISPLACE	• Textbook – NAS 8 • Charts	
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Unit 9	Identify basic properties of light (i.e. speed) transmission through different media , absorption , reflection , and dispersion. Describe and show how an image is formed by the plane mirror. Describe different optical instruments which use curved mirrors. Identify spherical mirrors. Describe the characteristics of an image (s) formed by concave and convex mirror. Describe use of different optical instruments in which plane and spherical mirrors are used.	Ask students to write their names in capital letters on the sheet of paper. Ask the students to hold the mirror in one-hand and sheet of paper in the other in a way that they can read their names in the mirror. Ask them to observe and note how the image in the mirror looks different. Share how it's different. Write the title of the lesson on the board.	• Textbook – NAS 8 • Materials required for starter activity : Hand-held mirrors, paper, markers	Ask students to study the topic for revision. Ask students to write down learning points of the starter activity
	State the law of reflection. Explain that light is refracted at the boundary between air and any transparent materials. Distinguish between reflection and refraction of light with daily life examples.	Starter Activity: (10 min) • Ask students to observe the demonstration. Teacher Ideas 97 • Turn off the light.	• Textbook – NAS 8 • Charts • Material required for starter activity : prism and torch	• Ask students to study the topic for revision. • To watch relevant videos to further strengthen concepts.

	Investigate that light is made up of many colours. Relate the approved colour of objects to reflected or absorbed light.	Ask a student to hold the torch and let light pass through the prism. Light will refract in 7 colours (VIBGYOR)		
Unit 10	Define voltage and current , and state their SI unit. Define resistance and its SI unit. Formulate that resistance is the ratio of voltage to current. Define Electric power and state its unit. Recognise the terms earth, wire , fuse and circuit breaker.	Starter Activity : (5 min) Ask students a few questions such as - What makes up an electric bell? - Environmental friendly cars run on what? - Technology in our everyday life runs mostly with what energy? - Write down the keywords on the board along with the title of the topic.	- Textbook – NAS 8 - Charts	Ask students to make a list of a least 10 machines/ other objects that run on electricity
	Analyze the danger of overloading and short circuit and identify the importance of earth wire, fuses and circuit breakers. List precautionary measures to ensure the use of safe use of electricity. Investigate the factors that affect the strength of an electromagnet.	Starter Activity : (10 min) Distribute the word puzzle worksheet among the students. 	- Textbook – NAS 8 - Charts	Ask students to draw a diagram to show an electric bell circuit ; using a battery ell.

	Describe the properties that are unique to electromagnets (i.e., the strength varies with current, number of coils, and type of metal in the core, the magnetic attraction can be turned on and off, and poles can switch) Describe briefly the working principals of Electromagnetic devices such as speaker and door bells		• Textbook – NAS 8 • Charts	Ask students to draw a diagram to show an electric bell circuit ; using a battery cell.
Unit 11	Explore and understand the terms stars, galaxy, milky way and the black hole. Relate the life of a star with formation of black hole, neutron star, pulsar, white dwarf, red giants.	Arrange and show a video on the topic. Link: https://youtu.be/2IMSjEs8qww	• Textbook – NAS 8 • Charts • Internet access for starter activity	Ask students to study with a short note on the video they watched.
	Compare the types of galaxies. Relate the type of star with the formation of black hole, neutron star, pulsar. Discuss the birth and eventual death of our Sun.	Starter Activity: (10 min) The class will be conducted in the library. Ask students to search for geography books on stars, telescope, universe that contain its images.	• Textbook – NAS 8 • Charts • Visit to the school library	Suggest students to visit a Planetarium with their parents.

	Show how information is collected from space by using telescope (e.g., Hubble Space Telescope) and space probes (e.g., Galileo) Describe advancements in space technology and analyse the benefits generated by the technology of space exploration.	Open the books and randomly search for images and share in class.		
Unit 12	Make bio-plastics from milk and vinegar as an application of biotechnology. Make toothpaste, soap and detergent as an application of acids, and bases in daily life. Assemble a concave mirror type solar cooker to convert solar energy into heat energy. Assemble and operate a simple wind turbine to produce electricity. Demonstrate the working of UPS and use it to operate a fan or an energy saver bulb.	Starter Activity: (10 min) Teacher will display some models / items prepared beforehand and share that they will be preparing these in class and at home	- Textbook – NAS 8 - Materials for various class activities given in the books	Ask students share their learning with their parents and encourage them to perform assigned activities at home