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NEW Amazing Science

TEACHING GUIDE

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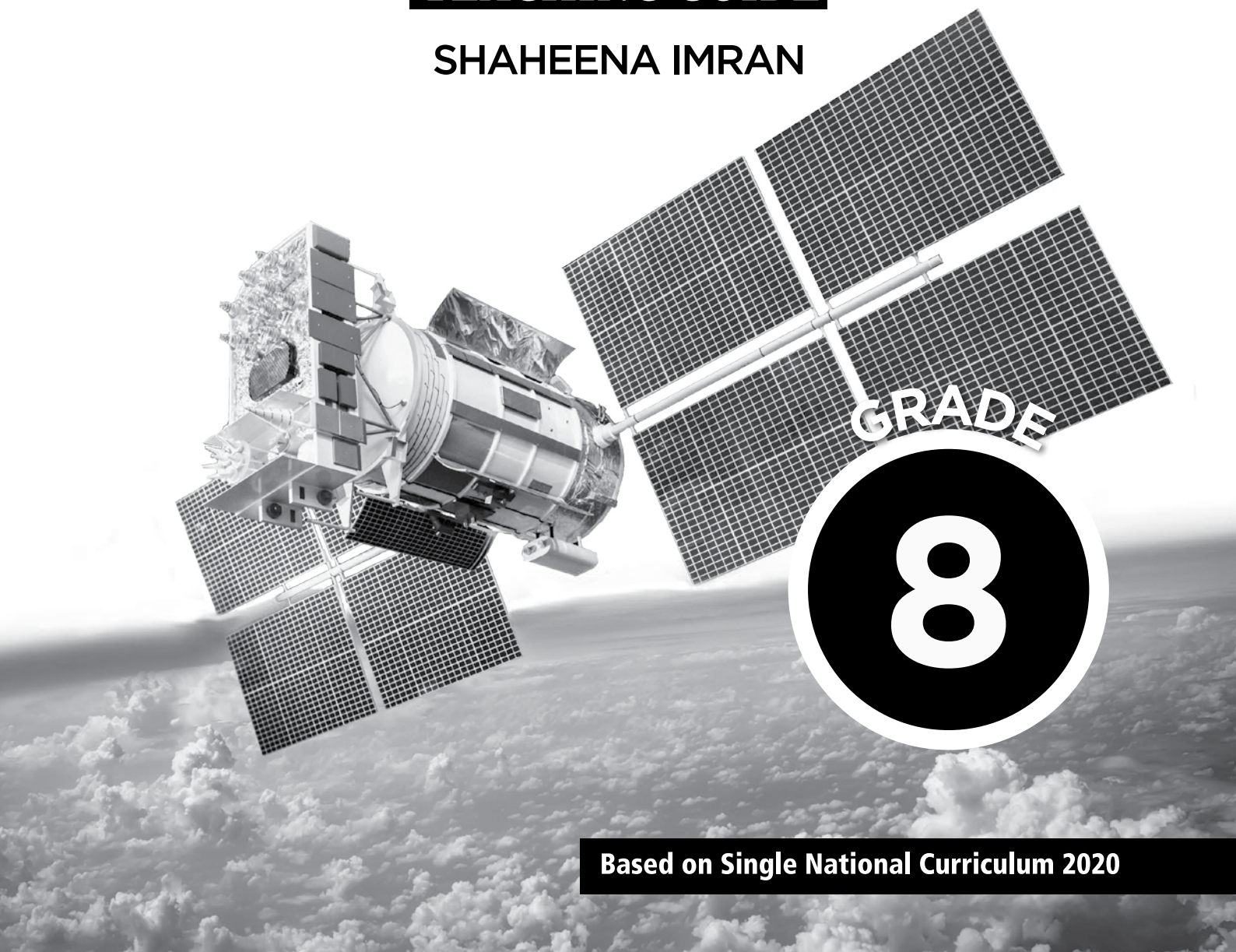

GRADE 8

Based on Single National Curriculum 2020

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Introduction

New Amazing Science Teaching Guide is a vital resource for science teachers in class to help deliver knowledge, problem-solving and thus reach academic objectives.

Key Terms

Starter Activity:

These help in bringing focus to the lesson and set the tone for learning.

Lesson Methodology:

It suggests the method to cover the learning objectives for having a complete teaching and learning experience.

PMI Chart:

It is a type of graphic organizer in which student examines pluses, minuses and interesting factors of the lesson.

Plus – Advantages

Minus – Disadvantages

Interesting -Implications

It is filled using ticks or cross

PLUS MINUS INTERESTING

PLUS	MINUS	INTERESTING
X	-	x
-	X	x

Home Learning:

For revision and reinforcement of the topic learned for strengthening knowledge of students.

Worksheets present at the end of the lessons.

Remember to use Mind Tree and STEM at the end of every unit.

Contents

Unit 1 | ECOLOGY

SUBTOPICS

- Describe the role of living things in cycling oxygen and carbon through an ecosystem, citing the processes of respiration, photosynthesis, and combustion.
- Relate how oxygen and carbon cycles are complementary processes that bring balance and symmetry to life on earth.
- 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.
- 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.
- Draw a food web diagram to illustrate the food relationships between organisms.
- Describe and illustrate through examples key ecological relationships between organisms, including competition, predation, and symbiosis.
- 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.
- Hypothesize what would happen in the ecosystem if the population of one of the participants in different ecological relationships is affected.
- Explain ways in which human behaviour (e.g., replanting forests, reducing air and water pollution, protecting endangered species) can have positive effects on the local environment.

Lesson Plan 1

Class: 8 **Subject:** General Science

Unit: 1

Topic: Ecology

Subtopics:

- Ecology - Introduction
- Plants needs for the survival
- Living organisms in an ecosystem, habitat, community, and population
- Competition
- Predation
- Symbiosis and mutualism, parasitism and commensalism

Date: _____ **Duration:** **2 x 40**
Term: _____ **Week:** _____

Learning Objectives:

- To introduce the topic and give clear concepts of ecosystem.
- To ensure that students are well aware of the impact of changes that occurred and adversely affected our ecosystems.

Learning Outcomes:

- Describe the role of living things in cycling oxygen and carbon through an ecosystem citing the processes of respiration, photosynthesis and combustion.
- Describe and illustrate through examples key ecological relationships between organisms, including competition, predation and symbiosis.

Resources:

- Textbook (NAS Book 8)
- Charts
- Videos
- Images of various ecosystems (aquatic, rain forest, desert)

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.

Teacher Ideas

Lesson Methodology (30 min)

- With the starter activity introduce the term 'Ecology' and define it.
- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate while taking rounds.
- Next, teacher will read and explain using charts and various examples given in the book, especially images of ecosystem could be used affectively to generate more interest in the topic.
- To enhance the learning experience, ask students to collect information during their library period.
- A discussion will follow, ask students if they have aquarium in their home and how it is maintained. Then give a give quick analysis of the lesson.
- Make necessary arrangements in advance and show videos on the topic.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessment Opportunities (30 min)

- Quick Reviews on page 4 and 6 will be done. Give some relevant questions from unit review as well.

Home learning

- 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

Lesson Evaluation

- Ask students to define the following:

  Ecosystem

  Producers

  Consumers

  Community

Further Notes

Lesson Plan 2

Class: 8 **Subject:** General Science

Unit: 1

Topic: Ecology

Subtopics:

- Flow of matter and energy in the ecosystem
- Food chain
- Trophic levels of a food chain
- Changing conditions
- Moving home; migration
- Changes in the water supply

Date: _____ **Duration:** 2 x 40
Term: _____ **Week:** _____

Learning Objectives:

- 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.

Learning Outcomes:

- Relate how Oxygen and Carbon cycles are complementary processes that bring balance and symmetry to life on earth.
- Describe global warming and explain how threat to the carbon oxygen balance such as over population, reliance on fossil fuels and deforestation are contributing to global warming and climate change.
- Describe how energy flows from producers to consumers and how only part of the energy flows from one level of the pyramid to another.
- Draw a food web diagram to illustrate the food relationships between the organisms.
- Predict how the 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 population.
- Hypothesize what would happen in the ecosystem if the population of one of the participants in the different ecological relationship is affected.

Teacher Ideas

- Explain ways in which human behaviour (e.g., replanting forests, reducing air, water pollution, protecting endangered species) can have positive effects in the local environment.

Resources:

- Textbook (NAS Book 8)
- Charts

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 (PRODUCERS)

They eat food prepared by green plants

RSUMECON (CONSUMER)

The seasonal movement of animals from one place to another for better conditions or breeding

TIONGRAMI (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

EEGRNHOSEU ECTEFF (GREENHOUSE EFFECT)

Lesson Methodology (30 min)

- As students are engaged now, ask them to open their books to assigned page numbers and to read silently.
- Next, teacher will read loudly, followed by explanation. The key words will be written down on the board earlier. Teacher should utilize chart and text book images effectively.
- A quick analysis will be done at the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessment Opportunities (5 min)

Students will be asked to attempt Quick Review (page 13) and remaining questions of unit review.

Home learning

- 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).

Lesson Evaluation

- Ask students to write a note on Greenhouse Effect.

Worksheet # 1

Name: _____

Date: _____

Q1. Define the following:

- Individual

  _____

- Population

  _____

- Community

  _____

- Ecosystem

  _____

Q2.Name the following using the hints given:

- Plant needs these to survive

  _____

  _____

  _____

- Animals need these to survive

  _____

  _____

  _____

Q3. Match the following

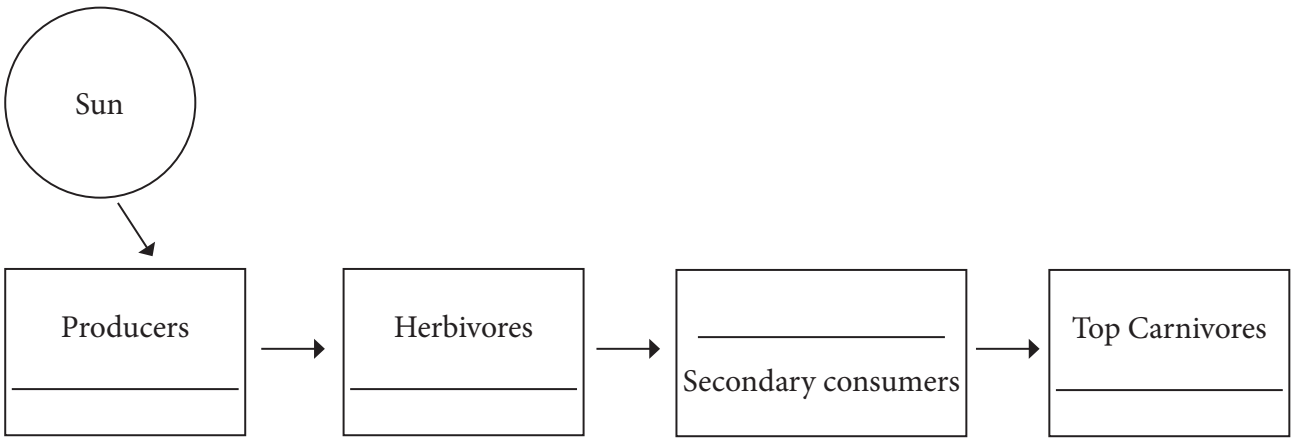
Tiger	Prey
Deer	Predator
Grass	Producer
Frog	Living together
Symbiosis	Consumer

Worksheet # 2

Name: _____

Date: _____

Q1. Complete the flow charts.



Q2. Write a short note on pollution.

Worksheet # 1 Answer key

Name: _____

Date: _____

Q1. Define the following:

- Individual

  Its one organism.
- Population

  The total number of organisms in each community.
- Community

  All of the populations of organisms in a an ecosystem.
- Ecosystem

  All of the organisms and physical conditions.

Q2. Name the following using the hints giving:

- Plant needs these to survive

  Sunlight

  Water

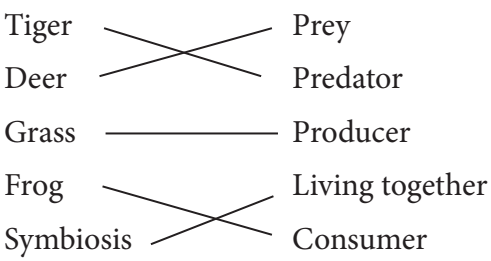
  Nutrients
- Animal need these to survive

  Food

  Water

  Suitable territory—For food and shelter

Q3. Match the following

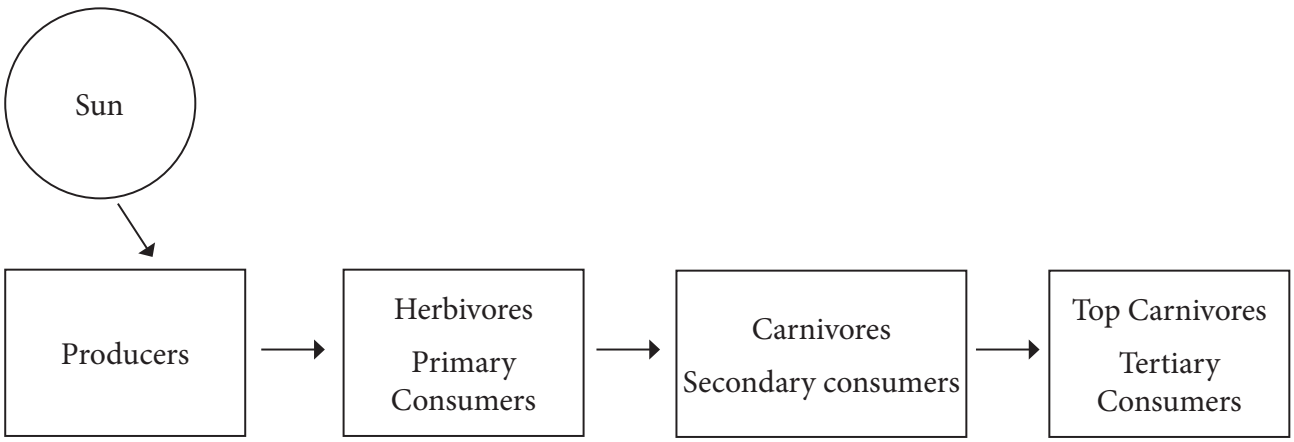


Worksheet # 2 Answer key

Name: _____

Date: _____

Q1. Complete the flow charts.



Q2. Write a short note on pollution.

Pollution can be defined as change in the environment by introduction of or presence of a substance which has harmful or poisonous effects. Land, air and water on Earth are showing effects of pollution due to pollutants. For example, land has effects of excess fertilizers , landfills or waste dumps which has effects on life.

Similarly, air pollution is caused by burning of fossil fuels and over use of aerosols and cooling agents, etc. Thus, air quality is poor with serious health hazards.

Water pollution is caused by poring of untreated industrial waste and sewage in water bodies.

Measures need to continue to reduce pollution thus improving quality of life.

Answer key

NAS book 8

Unit 1

Unit Review

Quick Review

Page 4

1. a. Plants need sunlight, water, carbon dioxide and nutrients to survive.

   b. Animals need food, water and a suitable territory to survive.

2.

ecosystem	place where an organism lives
population	the conditions that surround an organism
environment	the habitat and the living organisms within it
habitat	the different species living in a habitat
community	numbers of the same species living in a habitat

Page 13

1. The carbon cycle shows the movement of carbon throughout the biosphere. Carbon dioxide is removed from the atmosphere when plants photosynthesise. It is then transferred to animals when they eat these plants. Carbon dioxide is returned to the atmosphere when organisms respire, when organisms die and decompose, or when fossil fuels are burned.
2. Respiration and burning of fossil fuels.

Choose the correct answer

1. a. to survive
2. d. both a and b
3. a. producers
4. b. atmosphere -> living things -> dead organisms
5. b. photosynthesis

Vocabulary Review

1. Symbiosis
2. Predation
3. Community

Observe and Answer

Following are some ways of reducing CO_2 emissions:

- Plant trees
- Make our homes more energy efficient

- Reduce air travel
- Make the driving more efficient
- Switch to clean energy
- Eat less red meet

Recall and Analyse

1. food/grass fox heat movement (answers are in order from 1st blank to the last)

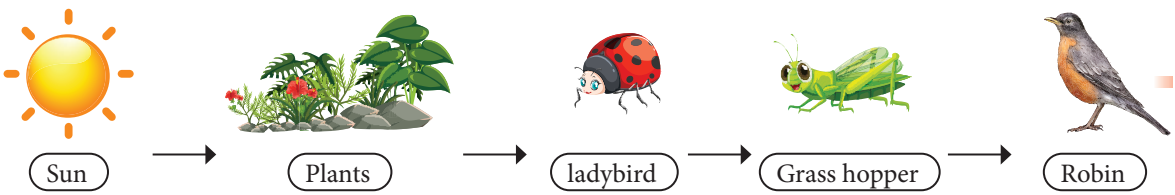
2.

Biological change	Impact
Rising sea levels	Low-lying areas flood resulting in loss of habitat
Hotter or colder seasons	Loss of plant species
Less rainfall in areas	Loss of habitats for polar bears
Melting ice sheets	Change in migration patterns

Recall and Apply

1.

a.



b.

c. Robin is a prey to the owl , if the predator do decreases their population would increase.

Recall And Analyse

1. a.Green plants absorb carbon dioxide, during the process of photosynthesis. It reacts with water to produce glucose and oxygen.

   b. Carbon Dioxide is released into the atmosphere through respiration during the carbon cycle. In respiration, food molecule is broken down to release energy and carbon dioxide and other by products.

2. The decomposers are found in the end of the food chain as they break down bodies of dead animals and plants. These decomposers are mainly bacteria and fungi.

Unit 2 | HUMAN NERVOUS SYSTEM

SUBTOPICS

- Identify organs, functions, and processes of the human nervous system.
- Sketch and label a diagram of the human nervous system.
- Explain how the brain works as the control station of a human body.
- Identify the three major parts of the brain – forebrain, mid brain, and hindbrain, and describe their various functions.
- 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.
- 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.
- Map the various steps in the transmission of messages through the body and to the brain via reflex arch.
- Describe the role and function of neurons in transmitting messages through the body.
- Create a plan of activities and exercises they can do to maintain a healthy brain.
- Predict what would happen if a nerve connection broke.
- Match various body functions with the relevant part of the brain that controls or regulates them (For instance, associating breathing with the brain stem).

Lesson Plan 1

Class: 8 **Subject:** General Science

Unit: 2

Topic: Human Nervous System

Subtopics:

- Introduction - Coordination
- Central Nervous System

The brain, The Forebrain, The Mid brain, The Hind Brain

Date: _____ **Duration:** 2 x 40
Term: _____ **Week:** _____

Learning Objectives:

- To explain in detail the Human nervous System
- To name and elaborate different parts and organs of CNS

Learning Outcomes:

- Identify organs, functions and processes of the human nervous system.
- Sketch and label a diagram of the human nervous system.
- Explain how the brain works as the control station of a body.
- Identify the three major parts of the brain, i.e., forebrain, mid brain and hind brain
- Describe the structure of the cerebrum its division into two hemisphere (left and right) and how the role of each hemisphere is the control of the body.

Resources:

- Textbook (NAS Book 8)
- Charts /Posters—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 reflex action. This happens because the neurons or nerve cells of our body, which are part of our human nervous system.

Lesson Methodology (30 min)

- Write key words of the topic on the board.

Teacher Ideas

- Ask students to open their books to assigned page numbers. Get loud reading done by calling out students randomly. Facilitate when required.
- The poster or a large panaflax of human nervous system will be placed and teacher will explain the lesson. At the end of the lesson a quick analysis will be given.
- A video on human nervous system will also be shown.

Reference video link :

https://youtu.be/NsBaPtemAjs

https://youtu.be/HiuXfbwND9s

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessment Opportunities (30 min)

- Ask students to draw and label human nervous system.
- Have them attempt some relevant questions from unit review.

Home learning

- 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.

Lesson Evaluation

- Students should be asked to summarize their learning and mention the videos they watched.

Further Notes

Lesson Plan 2

Class: 8 Subject: General Science

Unit: 2

Topic: Human Nervous System

Subtopics:

- Spinal cord
- Peripheral Nervous System (PNS)
- Nerve cells—neuron and its types
- Reflex Action
- Reflex Arc
- A Healthy Brain

Date: _____ **Duration:** **2 x 40**
Term: _____ **Week:** _____

Learning Objectives:

- 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.

Learning Outcomes:

- 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.
- Map the various steps in the transmission of messages through the body and to the body via reflex arc.
- Describe the role and function of neurons in transmitting messages through the body.
- Create a plan of activities and exercises they can do to maintain a healthy brain.
- Predict what would happen if a nerve connection broke.
- Match various body functions with the relevant part of the brain that contracts and regulates them (for example associating breathing with the brain stem).

Resources:

- Textbook (NAS Book 8)
- Poster of PNS (Ref. page no. 21)

Starter Activity (5 min)

Write key words on the board and draw nerve cells prior to the start

Teacher Ideas

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.

Lesson Methodology (30 min)

- Teacher will start the lesson by defining key words.
- Students will be asked to read silently the assigned page numbers.
- Teaches will read and further explain by using posters, and diagrams will also be drawn on the board, simultaneously.
- Quick Review will be done.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessment Opportunities (30 min)

- Remaining questions of Unit Review will be done.
- Presentations: Divide the class into 4 groups. Assign topics for presentation in the next class. Topics are: a. Reflex Action b. A Healthy Brain
- Conduct a presentation session in the next class.

Home learning

Ask students to study the topic for better comprehension.

Lesson Evaluation

- Monitor the presentations for success of the lesson.

Further Notes

Worksheet # 1

Name: _____

Date: _____

Q1. Label the parts of the human brain in the given diagram.

Q2. Draw the table below and write the differences between voluntary actions and involuntary actions.

Worksheet # 2

Name: _____

Date: _____

Q1. Draw and label a reflex arc.

Q2. Give one-word answers:

a. It's a bundle of nerves that runs along the back inside the spine.

_____

b. This should be worn by motorcyclists for safety.

_____

c. This allows the brain and spinal cord to receive and send information to other areas of the body.

_____

d. A stimulus is received by a sense organ called the _____.

e. A tiny gap where the nerve fibre of one neuron meets the cell body of another.

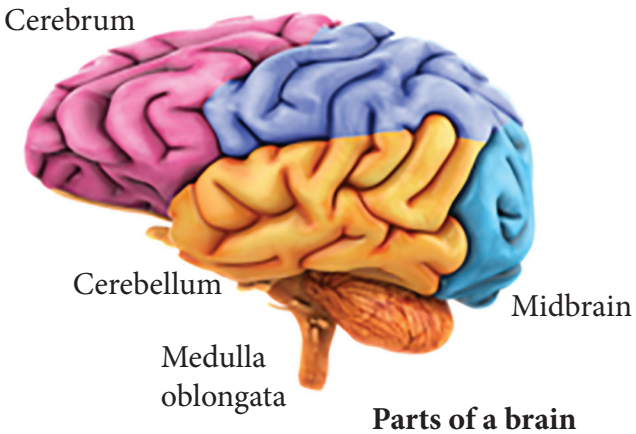
_____

Worksheet # 1 Answer key

Name: _____

Date: _____

Q1. Label the parts of the human brain on the given diagram:



Parts of a brain

Q2. Draw the table below and write the differences between voluntary actions and Involuntary actions.

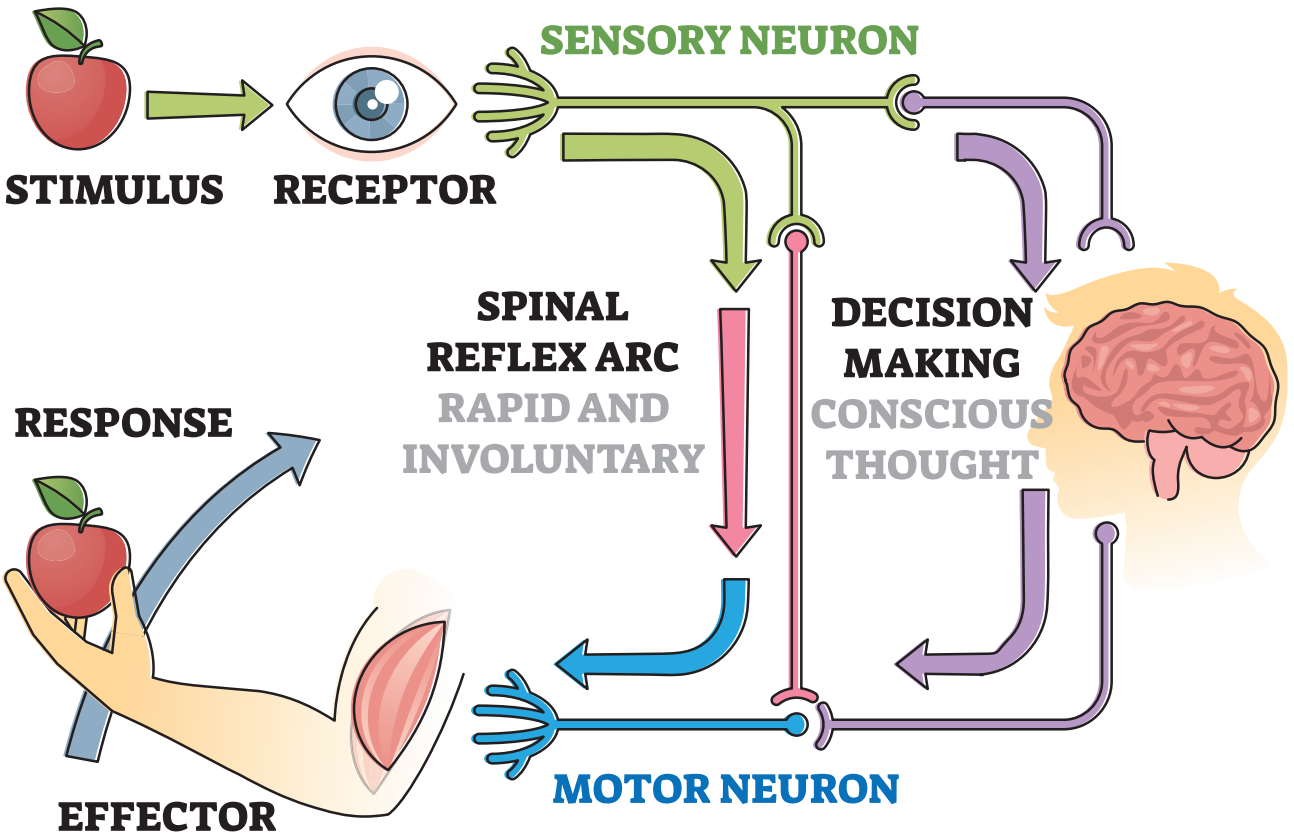
	Voluntary actions	Involuntary actions
Types of response	Not automatic - with awareness	Automatic - without awareness
Part of the brain that controls the action	Cerebrum	Medulla oblongata
Nervous pathway	Receptor ⟶ Spinal cord ⟶ Cerebrum ⟶ Spinal cord ⟶ Effectors	Receptor ⟶ Spinal cord ⟶ medulla oblongata ⟶ Spinal cord ⟶ Effectors
Speed	Slow	Fast
Examples	Speaking, hearing, writing, walking and etc.	Heartbeat, peristalsis, respiration and etc.

Worksheet # 2 Answer key

Name: _____

Date: _____

Q1. Draw and label a reflex arc.



Q2. Give one-word answers:

a.	Spinal cord
b.	Helmet
c.	PNS
d.	Receptor
e.	Synapse

Answer key

NAS book 8

Unit 2

Unit Review

Quick Review

Page 22

The central nervous system consists of the brain and spinal cord whereas the peripheral nervous system includes the network of nerves. The CNS is controlling all the body functions and the PNS is responsible for connecting CNS to all parts of the body.

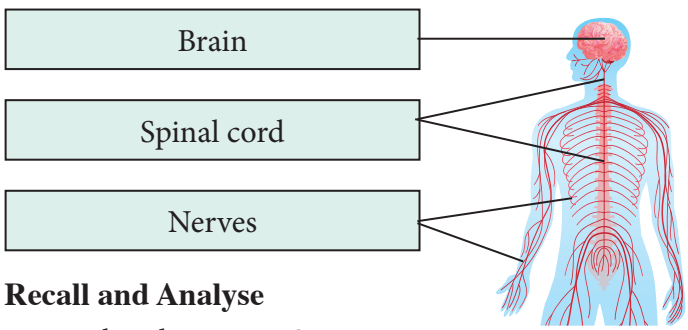
Choose the correct answer

1.	a.
2.	b.
3.	c.
4.	d.
5.	c.

Vocabulary Review

1.	Voluntary
2.	Spinal cord
3.	Neuron (nerve cells)

Observe and Answer



Recall and Analyse

1. Peripheral Nervous System

2. Frontal lobes

3. a.eyes

   b. ears

   c. nose

4. A stimulus can be defined as anything that can trigger physical or behavioural changes.

5. A voluntary action is under the control of one's will, means under the control of the brain.

Example-dancing. Whereas an involuntary action is not under the control of one's will. Example—breathing.

6. The main difference is that a sensory neuron will carry information towards the CNS for processing, while motor neuron will carry information away from the CNS to muscle tissue. They are similar in the way that they carry nerve impulses to and away from the CNS.

2.

Part of the nervous system	Function
Receptor cells	Detects changes in your environment
Effectors	Cause a response
Neurons	Carry electrical impulses
Brain	Decide on a response

Recall and Apply

1. Following are the steps that allow our bodies to shiver:
   - Stimulus (blood and skin temperature falls).
   - Receptor (Temperature Receptors) detect, changes and send nerve impulse to the brain
   - Hypothalamus of the brain is stimulated and sends nerve impulses to relevant body parts
   - Corrective mechanism decrease in heat loss, increase in production
   - Shivering occurs when insufficient heat is produced.

2.

Brain	Spinl Cord	Sensory nerve	Motor nerve
part of the central nervous system	part of the central nervous system	part of the peripheral nervous system carries message to the spinal cord and brain	part of the peripheral nervous system carries message from brain or spinal cord
interprets information	connects nerves and brain	receives information directly from sense organs	carries message to muscle

3. Doctor uses a reflex hammer in a quick striking motion by the wrist on various tendons to produce an involuntary response.

4. a. Reflex action

   b. voluntary action

   c. voluntary action

   d. reflex action

5. a. The person blinks and closes eyes momentarily are the two reflex actions that occur when dust blows into our eyes.

   b. The iris responds by constricting the pupil thus protecting the retina. We tend to almost close our eyes.

c. When we tend to run fast in hot weather, it becomes harder for our bodies to cool down itself. It can lead to heat related illnesses such as heat cramps, heat exhaustion.

d. It can lead to eye or respiratory infections and muscle spasm, runny nose, cold, soar throat, are some of the problems.

e. If food accidentally enters our windpipe, it is partially blocked. Some air can still move in and out of the lungs. We can gag, cough, or have trouble breathing.

Recall and Analyse

1. Receptor → Sensory neuron → spinal cord → motor neuron → muscle

2. The dendrites have a high surface area which allows for communication with other neurons.

(Myelin sheath around the neuron acts as insulator.

3. A reflex action happens quickly because the reflex pathway is kept short and involves the smallest number of neurons and synapses possible. This minimizes any damage to the body from potentially harmful condition.

Unit 3

VARIATION, HEREDITY AND CELL DIVISION

SUBTOPICS

- Describe variation and adaptation in living organisms.
- Explain and illustrate the differences between variation and adaptation.
- Identify sources of variation from environmental and genetic factors.
- Explain how different adaptations affect 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 structure, characteristics, and function, from parents to offspring.
- Differentiate between the concept of genes and chromosomes and relate them to how genetic characteristics are inherited.
- Describe the composition and structure of DNA.
- Design a model of DNA to demonstrate its structure, functions, and various components.
- Describe cell division and its types – mitosis and meiosis and relate them to the passage of genetic information through reproduction.
- Explain the process of mitosis and meiosis and identify their key phases.

Lesson Plan 1

Class: 8 **Subject:** General Science

Unit: 3

Topic: Variation, Heredity and Cell Division

Subtopics:

- Introduction
- Variation in animals -Genetic variation
  -Environmental Variation
  -Inherited Variation
- Environmental causes of variation
- Variation in plants
- Camouflage
- Adaptations for survival:

  to aquatic ecosystem

  to desert and arid regions
- Life in polar regions

Date: _____ **Duration:** 2 x 40
Term : _____ **Week:** _____

Learning Objectives:

- To introduce the subject of Genetics and highlight its various disciplines.
- To cite various examples of variations, etc., in past and present scenario.

Learning Outcomes:

- 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.
- 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.

Resources:

Teacher Ideas

- Textbook (NAS Book 8)
- Charts
- Word puzzle sheet
- Video on Camouflage in nature.

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
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

Lesson Methodology (25 min)

- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate.
- Loud reading will be done by the teacher.
- Explanation will follow with reference to charts, video and textbook. Teacher will also draw diagrams to further enhance the learning experience.
- A quick analysis will be given at the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessment Opportunities (5 min)

Relevant question from unit review will be done

Home learning

Ask students to study the topic at home for clarity of concepts.

Lesson Evaluation

Ask students to attempt worksheet # 1.

Lesson Plan 2

Class: 8 **Subject:** General Science

Unit: 3

Topic: Variations, heredity and cell division

Subtopics:

- Heredity
- Organizing DNA
- Cell Division
- Mitosis
- Meiosis

Date: _____ **Duration:** 2 x 40
Term: _____ **Week:** _____

Learning Objectives:

- To enable students to comprehend fully how the inheritance works in nature.
- To give clear picture of DNA structure and how it works.
- To enable students to understand the types of cell division.

Learning Outcomes:

- 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.
- Describe cell and its types- mitosis and meiosis and relate them to the passage of genetic information and identify their key phases.

Resources:

- Textbook (NAS Book 8)
- Microscope
- Slides of onion cells (showing different phases of mitosis and meiosis).
- Pen, pencil, paper
- DNA, Chromosome, cell division

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

Teacher Ideas

permanent slides can be used.

- Take students to the laboratory and ask few questions:
  - Do you recognize a microscope?
  - Can you point towards it?
  - What is the building block of a cell?

Now show the slides and ask students to draw any one phase on the paper.

Lesson Methodology (25 min)

- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate.
- Loud reading will be done by the teacher.
- Explanation will be done by the teacher. Charts and board will also be used to explain cell division.
- A quick analysis will be done.
- Ask students to attempt Quick Review on page #34.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessment Opportunities (5 min)

Ask students to attempt remaining questions of Unit Review.

Home learning

- Ask students to read the topic for revision.
- Ask them to watch videos on cell division on Internet.

Lesson Evaluation

- Divide the board in two halves and write mitosis and meiosis on either side.
- Randomly select two students and ask them to draw the phases of each type.
- Comment and correct when done.

Further Notes

Worksheet #1

Name: _____

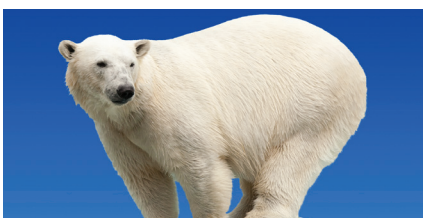
Date: _____

Q1. Identify the animal. Give one distinct feature that either shows adaptation, variation or camouflage.

a. 

b. 

c. 

d. 

Q2. Draw a cactus plant and write a short note on it.

_____

_____

_____

_____

_____

_____

Answer key Worksheet #1

Name: _____

Date: _____

Q1. Identify the animal. Give one distinct feature that either shows adaptation, variation or camouflage.

a. 

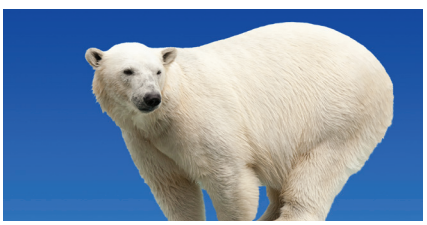
Camel Hump It has fatty tissues which are stored fats that are consumed when food is scarce

b. 

Moth Colour and design The colour, design and shape matches with the environment

c. 

Shark Streamlined body and fins Aquatic animal with streamlined body To help in maneuvering

d. 

Polar Bear Thick fur, colour change In winter the colour of fur changes from brown to white and thick fur protects from extreme weather conditions

Q2. Draw a cactus plant and write a short note on it.

Cactus like many other plants found in deserts and semi deserts are adapted to live in an environment with scarcity of water. Hence, they have evolved features that ensure minimum loss of water. The leaves have transformed into thorns. The process of photosynthesis takes place in green, fleshy stems. Cacti mostly have extensive, fleshy roots in order to collect water quickly, when it is available. The flowers are only produced when conditions are better.

Worksheet # 2

Name: _____

Date: _____

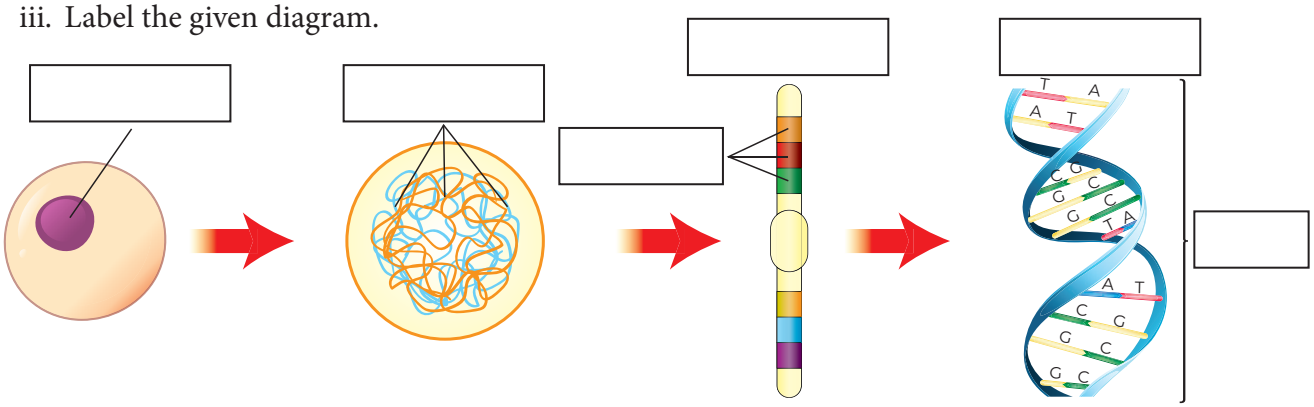
Q1.

i. Define Genetics.

_____

ii. Draw a diagram to show the structure of chromosomes.

iii. Label the given diagram.



Q2. Mark whether True or False and if false write the correct statement:

a. DNA is found in cell membrane of a cell. ( )

_____

b. The number of chromosomes in a butterfly cell is 46. ( )

_____

c. Human cell has 380 chromosomes in the nucleus. ( )

_____

d. The life of a moth begins as multicellular body. ( )

_____

e. The new nuclear membrane forms before the cell divides out. ( )

_____

Answer key Worksheet # 2

Name:_____

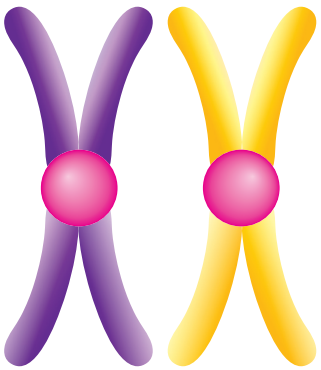
Date:_____

Q1.

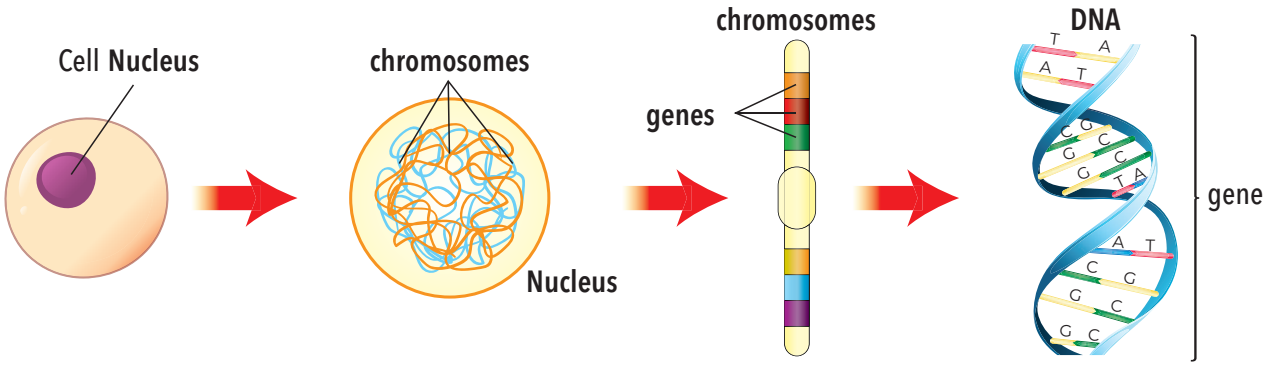
i. Define Genetics.

genetics is defined as the study of inheritance.

ii. Draw a diagram to show the structure of chromosomes.



iii. Label the given diagram.



Q2. Mark whether True or False and if false write the correct statement:

a. DNA is found in cell membrane of a cell. (False)

DNA is found in cell nucleus.

b. The number of chromosomes in a butterfly cell is 46. (False)

The number of chromosomes in a butterfly cell is 380.

c. Human cell has 380 chromosomes in the nucleus. (False)

Human cell has 46 chromosomes.

d. The life of a moth begins as multicellular body. (False)

The life of a moth begins as unicellular body.

e. The new nuclear membrane forms before the cell divides out. (True)

Answer key

NAS book 8

Unit 3

Quick Review

Page 34

1.False

2.True

3.True

Unit Review

Choose the correct answer

1.	d. To absorb oxygen from water
2.	d. The spines will protect the plant from animals that want to eat it.
3.	d. Unique feature and behaviour that help animals to survive in a certain environment
4.	a. Adenine, guanine, thyamine, cytosine
5.	b. replication

Vocabulary Review

1.	Variation
2.	Camouflage
3.	Genetics

Observe and Answer

The flounder has adapted to its environment by blending in it through camouflage. The colour, shape is matched fully to its environment.

Recall and Response

1.

a.	desert
b.	humps
c.	genes

2. a. Camouflage: It is an adaptation. The variation results in adaptation that results in change in organism's colour, shape, behaviour, or chemical make-up.

b. Heredity: The passing on of characteristics from one generation to the next is called heredity.

c. DNA: It is short form of deoxyribonucleic acid. These are the molecules inside the cells that contain genetic information responsible for the development and function of organism. DNA allows the information to pass from one generation to next.

Recall and Apply

Plants are more susceptible to genetic variations than animals as they show quick evolutionary response to change in the environment, as they produce variations in second/ third generation for example Gregory Mendel's experiment on peas.

Recall and Analyse

Living organisms adapt to their environment by blending in through change in colour, shape, etc. For example:

- Shark has fins and stream lined bodies for life in water.
- Camels have many distinct features including humps that have fatty tissue which is reserved food that is consumed when food is scarce.

Unit 4 | BIOTECHNOLOGY

SUBTOPICS

- Define biotechnology as the use of living cells and organisms in products 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 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 yoghurt and cheese, vaccines for immunization, insulin production, dyes, etc.
- 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].

Lesson Plan 1

Class: 8 **Subject:** General Science

Unit: 4

Topic: Biotechnology

Subtopics:

- Introduction
- Bread Making
- Making of cheese
- Making of yoghurt
- Genetic Engineering
  - Examples of genetic engineering
  - Genetically modified crops

Date: _____ **Duration:** 2 x 40
Term: _____ **Week:** _____

Learning Objectives:

- To introduce the topic and explain various aspects of genetic engineering.
- To discuss how genetically modified crops could be of advantage or disadvantage to the environment and health.

Learning Outcomes:

- 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.

Resources:

- Textbook (NAS Book 8)
- Chart

Starter Activity (5 min)

- Arrange a trip to a local bakery or bread manufacturing plant before the topic starts.
- At the start of this topic , discuss the trip and the various steps in the process of baking. Identify when fermentation took place.

Teacher Ideas

Lesson Methodology (30 min)

- As the students engage in the lesson, ask them to open their books to assigned page numbers and read silently. Facilitate.
- Loud reading will be done by the teacher.
- Explanation will be done. Teacher will cite examples from daily life. For example, Pizza making. Diagrams must be drawn during the progress of the lesson.
- A quick analysis will be done at the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessment Opportunities (30 min)

Students will attempt relevant questions from unit review.

Home learning

Ask students to study the topic at home.

Lesson Evaluation

Ask students to attempt Worksheet #1.

Further Notes

Lesson Plan 2

Class: 8 Subject: General Science

Unit: 4

Topic: Biotechnology

Subtopics:

- Biotechnology and animals
- Biotechnology and food
- Technology and fuel
- Biotechnology and health
- Industrial production of insulin
- Impacts of biotechnology in Pakistan
  - Agriculture
  - Biotechnology and health
  - Biotechnology and food
  - Textile and biotechnology

Date: _____ **Duration:** **2 x 40**
Term: _____ **Week:** _____

Learning Objectives:

- To impart knowledge of relatively new discipline of biotechnology and its implications in everyday life.
- To discuss the effect of biotechnology in different countries of the world and present-day scenario in Pakistan.

Learning Outcome:

- 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.)

Resources:

- Textbook (NAS Book 8)
- Charts

Starter Activity (5 min)

Ask students some relevant questions:

- Have you seen new varieties of tomato which are bigger than

Teacher Ideas

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.

Lesson Methodology (30 min)

- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate.
- Loud reading will be done by the teacher.
- Explanation will be done by the teacher with the help of charts. Important headings will be written on the board.
- At the end quick analysis will be done by the teacher.
- A video on genetic engineering will be shown. Reference video https://youtu.be/S0JfVd-DhGw
- Ask students to take notes.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessment Opportunities (30min)

- Students will be asked to write briefly on 'Genetic Engineering'.
- Students will attempt Quick Review on page #43.
- Unit Review will be completed.

Home learning

Ask students to study the topic for better comprehension.

Lesson Evaluation

Ask students to attempt Worksheet # 2.

Further Notes

Worksheet # 1

Name:_____

Date:_____

Q1. Write a comprehensive note on' Biotechnology'.

_____

_____

_____

_____

Q2. Complete the following:

a. _____ milk is heated at a very high temperature that kills the bacteria and makes the milk safe for human _____.

b. _____ advise consumption of _____as it is a probiotic thus good for health.

c. _____ help to restore bacteria which are good for health in the gut which are killed by _____.

d. _____ milk is commonly used to make yoghurt.

Worksheet # 2

Name:_____

Date:_____

Q1. Name three crops, which have more nutritional value and better yield due to genetic engineering.

_____

Q2. How did the health sector benefit from genetic engineering? Using an example, explain your answer.

_____

_____

_____

_____

Q3. How did Pakistan progress in the textile sector, due to biotechnology? Briefly highlight.

_____

_____

_____

Answer key Worksheet # 1

Name:_____

Date:_____

Q1. Write a comprehensive note on 'Biotechnology'.

Biotechnology is the use of plants, animals, microorganisms to produce useful products including food, drinks, medicine, fuel, etc.

It is interesting to note that food and drinks we consumed daily are made available due to advancement in genetic technology. Milk is used to make yoghurt and cheese on commercial scale. This has increase the production as well as nutritional value and shelf life of these and other products.

Q2. Complete the following:

a. Pasteurized milk is heated at a very high temperature that kills the bacteria and makes the milk safe for human consumption.

b. Pharmacist advise consumption of yoghurt as it is a probiotic thus good for health.

c. Probiotics help to restore bacteria which are good for health in the gut which are killed by antibiotics.

d. Cow's milk is commonly used to make yoghurt.

Answer key Worksheet # 2

Name: _____

Date:_____

Q1. Name three crops, which have more nutritional value and better yield due to genetic engineering.

- Rice
- corn
- tomato

Q2. How did the health sector benefit from genetic engineering using an example explain your answer?

The health sector greatly benefited over the past century due to tireless efforts of scientists in the field of Biotechnology. One of the major advancements in the field of biotechnology in health sector is the production of vaccines to production of vaccines to protect against disease ranging from polio, TB, and cholera to COVID-19 and influenza.

Q.3. How did Pakistan progress in the textile sector, due to biotechnology? Briefly highlight.

Pakistan is well known for vivid colours and quality of its textiles, which not only has local demand but are exported worldwide. The colours were from natural sources but now artificial dyes are used which are cheaper. The genetically engineered microorganisms and plants break down synthetic dyes in the environment cleaning our water and soil, thus making it useful for growing crops again.

Answer key

NAS book 7

Unit 4

Quick Review

Page 43

Q1.

It results in the formation of cheese, yoghurt and acidified milk.

Q2.

Milk is heated at very high temperature that kills the bacteria and it is now safe for consumption. This milk is called pasteurized.

Unit Review

Choose the correct answer

1. c. yeast

2. a. glucose ⟶ ethanol+ Carbon dioxide + (energy)

3. a. methane

4. a.35 degree ^{o}C

5. b. Resist frost

Vocabulary Review

1. New Castle's Disease

2. Fermentation

3. Biodigesters

Observe and Answer

The picture shows a vaccine being administered to a chicken. Genetic engineering has resulted in the production of several vaccines successfully. New Castle's disease is a common infection treated through immunization.

Recall and Response

Q1. Answer

Biotechnology: is the use of plants, animals and microorganism to produce useful products.

Fermentation: It is a type of anaerobic respiration, where microorganism respires without oxygen. It can be represented by the following word equation:

Glucose ⟶ ethanol+ carbon dioxide+ (energy)

Genetic Engineering: It involves modifying(changing) the genetic material of an organism. The genes for a desirable characteristics is cut out of one organism and this gives a new desirable characteristic to other organism.

Q2. Answer

Glucose ⟶ ethanol+ carbon dioxide+ (energy)

Q3. Carbon dioxide gas is produced during the fermentation of bread (dough) and causes it rise.

Recall and Analyse

Q1. Banana grows in tropical climate and is economically viable for the countries with its plantations as it is exported all year round. However, if it is genetically engineered and its plantation would be possible in cold countries, this will hit the economy of poor countries, very hard.

Q2. Eventually, the native plants will perish away and the crossed plants will become more dominant in the area.

Recall and Apply

Q1 a. • Wear PPE (Appropriate personal protection equipment)

• Label the work space.

b. Pasteurization means partial sterilization of a product such as milk to make it safe for consumption and improve its keeping quality. It is done by heating it on very high temperature that kills bacteria.

c. The mixtures of milk and bacteria can be kept warm by maintaining required temperature of the container.

d. When bacteria ferment milk sugar in case its kept warm for long hours the bacteria multiply and ferment lactose into lactic acid (milk sugar).

e. • Used as probiotics

• Prevent yeast infection

Q2. a. The genetically engineered tomatoes stay firm for longer therefore they have longer shelfed life and more storage time as well.

b. The tomato grower can choose to improve growth and yield of tomato plants through genetic engineering.

c. There are several advanced techniques developed through genetic engineering. For example: Agrobacterium-mediated genetic engineering techniques were developed in the late 1980's that could successfully transfer genetic material into the nuclear genome of tomatoes.

Unit 5 PERIODIC TABLE

SUBTOPICS

- Recognize a periodic table as a way of classifying the elements in groups and periods.
- Identify the names and location of the first 18 elements only.
- Identify the properties of metals and non-metals.
- Relate the properties to the uses of metals.

Lesson Plan: 1

Class: 8

Unit: 5

Topic: Periodic Table

Sub-topics:

- Introduction
- Sorting out the elements
- First 20 elements in the periodic table - Groups
- Periods

Date : _____ **Duration :** **2x40**
Term: _____ **Week:** _____

Learning Objectives

- To give clear concept of the topic.
- To explain in detail how the knowledge helps us in studying elements through Periodic Table.

Learning Outcomes

- Recognise periodic table as a way of classifying elements in groups and periods.
- Identify the name and location of first 18 elements.

Resources:

- Textbook – NAS 8
- Charts: Periodic Table
- Material for Starter Activity: Metal (Nails), Non-metal (Plastic cups), Semi-metal (Mobile Phone – contains semi-conductor 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, non-metal 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.

Lesson Methodology: (30 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate accordingly.
- Explanation will follow with the use of the periodic table chart as a resource throughout the lesson. Special focus will be on the

Teacher Ideas

divisions, groups and periods.

- A quick analysis will be given at the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Ask students to attempt Quick Review on page 52 and relevant questions of Unit Review.

Home Learning:

- Ask students to read the topic again for revision.

Lesson Evaluation: (5 min)

- Ask students to solve worksheet #1.

Further Notes

Lesson Plan: 2

Class: 8

Unit: 5

Topic: Periodic Table

Sub-topics:

- Metal, Non-metals and metalloids in the periodic table.
- Table: Properties of Metals and Non-metals
- The Spider Diagrams
- Group I: The Alkali Metals

Group VII: Halogens

Group 0: Nobel Gases

Date: _____ **Duration:** 2x40
Term: _____ **Week:** _____

Learning Objectives

- To discuss the topic in detail.
- To elaborate further the properties of elements.

Learning Outcomes

- Identify the properties of metals and non-metals.
- Relate the properties and uses of non-metals

Resources:

- Textbook – NAS 8
- Charts
- Video – on the uses of metals

Starter Activity : (10 min)

- On the internet, find a video on the uses of metals and in the lab or as per convenience, show it to the students.

Lesson Methodology :

- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate and read loud accordingly next.
- The topic will be explained with the efficient use of resources.
- A quick analysis will be given at the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Teacher Ideas

Assessments Opportunities :

- Ask students to attempt the remaining questions of the Unit Review.

Home Learning :

- Ask the students to study the topic.
- Ask the students to draw the atomic structure of elements, one from each group.

Lesson Evaluation :

- Students will be asked to attempt worksheet # 2.

Further Notes

Worksheet # 1

Name: _____

Date: _____

Q1. Fill in the blanks with the correct option:

i. Different substances occur on Earth in _____ (millions/billions).

ii. Periodic means repeated at _____ (regular/irregular) intervals.

iii. A scientist named _____ (Mendeleev/ Mendel) arranged the elements in groups.

iv. The number of elements that exist naturally in nature is _____ (82/92).

v. The vertical columns in periodic table are known as _____ (periods/groups).

Q2. Define:

Periodic table.

_____

Groups.

_____

Periods.

_____

Worksheet # 2

Name: _____

Date: _____

Q1. Name the three parts periodic table is divided into, based on some properties.

-
-
-

Q2. i. Complete.

- Group I-III are _____ (except Boron). There atoms form positive ions by losing electrons.
- Group IV and V have _____.
- Group VI and VII are mainly _____. The atoms of group VI and VII form negative ions by gaining electrons.

ii. Following is group IV. Label them based on their metallic and non-metallic properties.

C	Carbon
Si	Silicon
Ge	Germanium
Bn	Tin
Pb	Lead

Answer key Worksheet # 1

Name: _____

Date: _____

Q1. Fill in the blanks with the correct option:

i. Different substances occur on Earth in millions.

ii. Periodic means repeated at regular intervals.

iii. A scientist named Mendeleev arranged the elements in groups.

iv. The number of elements that exist naturally in nature is 92.

v. The vertical columns in periodic table are known as groups.

Q2. Define:

Periodic table. The elements are arranged in order of increasing atomic masses. This arrangement is called the periodic table. In modern periodic table the elements are arranged in order of their atomic numbers.

Groups. The vertical columns in the periodic table are called as groups. All the elements in the periodic table have similar properties.

Periods. They are the rows across the periodic table.

Answer key Worksheet # 2

Name: _____

Date: _____

Q1. Name the three parts periodic table is divided into, based on some properties.

- Metals
- Semi-metals
- Non-metals

Q2. Complete.

- Group I-III are metals (except Boron). There atoms form positive ions by losing electrons.
- Group IV and V have non-metals.
- Group VI and VII are mainly non-metals. The atoms of group VI and VII form negative ions by gaining electrons.

ii. Following is group IV. Label them based on their metallic and non-metallic properties.

C	Carbon
Si	Silicon
Ge	Germanium
Sn	Tin
Pb	Lead

- Carbon is non-metal
- Si and Ge are called non-metals. They are on the border line between metals and non-metals.
- Sn and Pb are metals

Quick review

Page # 52

Q1. Elements in the same group have similar chemical properties. This is due to the fact that each element in the group has the same number of electrons in the outer most shell.

Group I elements have one electron.

Group II elements have two and so on.

The number of outer electrons in the Periodic Table varies with the group number. Within each group we can identify trends in the physical and chemical properties down the group. As we move down the group I, the elements get more reactive, as their atomic radius increases. However, when we move down group VII, the elements get more reactive.

Q2.a.

Metals	Semi-metals	Non-metals
Sodium	Silicon	Phosphorus
Iodine		
Calcium		
Vanadium		

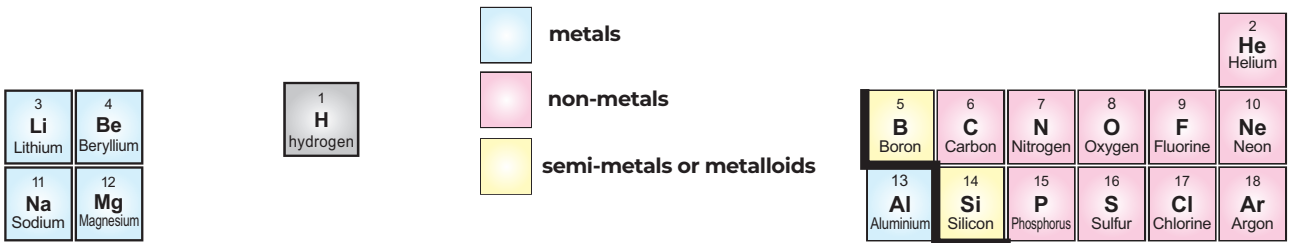
b. Another word for semi-metals is metalloids.

Q3

Elements	Property of heat conduction
Sulphur	
Argon	
Potassium	
Helium	

Q4

- The first 18 elements of periodic table are Hydrogen, Helium, Lithium, Beryllium, Boron, Carbon, Nitrogen, Oxygen, Fluorine, Neon, Sodium, Magnesium, Aluminium, Silicon, Phosphorus, Sulphur, Chlorine and Argon.
- The location is as shown below:



Unit Review

Choose the correct answer

1.	d. Calcium
2.	b. Argon
3.	b. Phosphorus
4.	c. 2
5.	c. Periods

Vocabulary Review

1.	Aluminium
2.	Halogens
3.	Silicon

Observe and Answer

a. Metal B and C are high due to their high melting points.

b. Metal A and D due to their low melting points.

Recall and Response

Q1. a, b, c. All three statements relate to properties of metals.

Q2. a. The major difference between atoms is their atomic number.

b. Elements are arranged in the periodic table based on their atomic number. The elements are arranged in groups and they have similar patterns/properties.

Q3.

Properties of metals	**Properties of Non-metals**
High density	Poor thermal conductivity
Ductile	Dull
Good Electrical Conductivity	Brittle

Q4. The atomic number is the number of **protons** in the atom. The mass number equals the number of **protons** plus the number of **neutrons**. The **electrons** are arranged in **shells** around the nucleus. Elements are arranged in **groups** in the **periodic table**.

1. Protons

2. Protons and neutrons

3. a. Electrons b. Shells

4. a. Groups b. Periodic Table

Recall and Analyse

- Hydrogen gas is very reactive due to its one electron in the outer most shell. Whereas , Helium has 2 electrons in the outermost shell, making it unreactive.

- The structure differs in the number of protons, neutrons and electrons. Helium needs to have at least two neutrons to provide stability and hold the positively charged electrons together.

a. Halogens- Group VII. They are similar as elements have seven electrons in the outer most shell. So, they are very reactive non-metals. In chemical reactions they tend to gain an electron to become negatively charged ions.

b. Halogens- They are different as their reactivity decreases with because of the increasing size of the atoms.

3. This element is more likely to be a non-metal, as its melting point is not very high and its less dense in comparison to non-metals..

1.Melting point determination: Prepare a small sample of the element and heat it gradually while observing the temperature. If the sample melts around 115°C, it could be an indicative that the element matches the given melting point.

2. Density measurement: Take a known volume of the element, for example, using a graduated cylinder or a specific container and measure its mass accurately using a balance. Divide the mass by the volume and to calculate the density. If the calculated density is close to 1.96 g/cm^3 , it suggests that that the element may be a match.

3. Additional physical properties. Check other physical properties of the element such as colour, appearance, hardness, electrical conductivity, and magnetism.

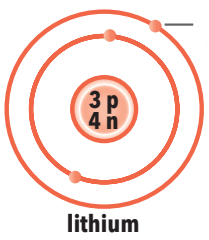
These properties can help further.

Recall and Apply

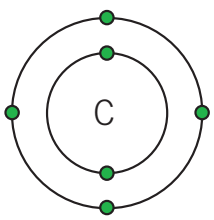
1. Elements within a period share same number of electron shells and the same highest electron energy level.

2. 1. Each next element in a period has one more proton and is less metallic than its predecessor.

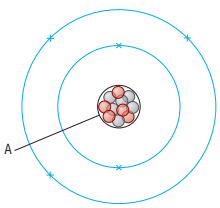
3. The elements from Period 2 are Lithium, Carbon, and Boron.



lithium



Carbon

2. 

Boron

2. The three properties of metals with example:

- Appear shiny e.g., gold jewellery
- Ductile e.g., copper wires in electronic cables
- Conduction of heat e.g., aluminium cooking utensils

Unit 6 CHEMICAL REACTIONS

SUBTOPICS

- Identify chemical reactions and give examples.
- Define the law of conservation of mass and demonstrate the law with an experiment.
- Write and balance chemical equations.
- Distinguish between different types of reactions (combination, displacement, double displacement, combustion).
- Distinguish between endothermic and exothermic reactions.
- Recognize the importance of exothermic and endothermic reactions in daily life.

Lesson Plan :1

Class: 8

Unit: 6

Topic: Chemical Reactions

Sub-topics :

- Introduction
- How do you know if it is a chemical reaction?
- Law of conservation of mass
- Chemical Equation – in writing chemical equations

Date: _____ **Duration:** **2 x 40**
Term: _____ **Week:** _____

Learning Objectives

- To ensure that students are well aware of the difference between physical change and chemical change / reactions.
- To understand the law of conservation of mass.

Learning Outcomes

- 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.

Resources:

- Textbook – NAS 8
- Charts

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.

Lesson Methodology: (30 min)

- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate.
- Then, the teacher will read loudly which would be followed by explanation and elaboration. All resources will be effectively used as the lesson progresses.

Teacher Ideas

- At the end a quick analysis will be given.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Ask students to attempt Quick Review on page 60.
- Ask students to do relevant questions of the Unit Review.

Home Learning :

- Ask students to study the topic for revision.

Lesson Evaluation: (5 min)

- Ask students to attempt Worksheet # 1.

Further Notes

Lesson Plan: 2

Class: 8

Unit: 6

Topic: Chemical Reactions

Sub-topics:

- Changes in energy
- Exothermic reaction
- Endothermic reaction
- Classifying chemical reactions
- Two ways to bond:
  - Ionic bond
  - Covalent bond

Date: _____ **Duration:** 2 x 40

Term: _____ **Week:** _____

Learning Objectives:

- To explain the topic in detail, with examples.
- To introduce and elaborate bonding and its types.
- To give practice to students of finding out valences and types of bonds through diagrams.

Learning Outcomes:

- 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.

Resources:

- Textbook – NAS 8
- Charts
- Materials required for starter activity : Ice cubes , glass beaker, candle and match sticks.

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

- Then, correctly relating talk about absorption of heat (Endothermic) and release of heat (Exothermic).
- Write the two keyword onto the board.

Lesson Methodology: (25 min)

- Ask the students to voluntarily read assigned page numbers.
- The teacher will then explain the topic in detail with reference to everyday life examples. Ask students for examples as well.
- At the end, a quick analysis will be given.

Assessments Opportunities: (30 min)

- Ask the students to attempt all the remaining questions from the unit review.

Home Learning:

- Ask students to read the topic for revision.
- Make a list of 5 chemical reactions they can observe in their surroundings.

Lesson Evaluation:

- Attempt worksheet # 2.

Further Notes

Worksheet # 1

Name: _____

Date: _____

Q1. Complete the following statements.

i. Chemical reactions transfer _____.

ii. The bread mold is an example of _____.

iii. _____ of iron is a chemical reaction.

iv. _____ is a reactive metal that explodes on contact with water.

v. Some chemical reactions are _____.

Q2. Define law of 'Conservation of mass'.

Worksheet # 2

Name: _____

Date: _____

Q1 a. When does a chemical reaction take place?

b. What are the two type of reactions due to changes in energy?

Q2. Make a list to show classification of chemical reactions into different types.

Q3. Name the types of bonds.

Answer key Worksheet # 1

Name:_____

Date:_____

Q1. Complete the following statements.

i. Chemical reactions transfer energy.

ii. The bread mold is an example of food rotting.

iii. Rusting of iron is a chemical reaction.

iv. Sodium is a reactive metal that explodes on contact with water.

v. Some chemical reactions are reversible.

Q2. Define law of 'Conservation of mass'.

The law of conservation of mass states that mass of a substance in closed system will remain constant though matter may change its form, it can neither be created nor destroyed. The mass of the reactants must be equal to the mass of products.

Answer key Worksheet # 2

Name: _____

Date: _____

Q1 a. When does a chemical reaction take place?

The chemical reaction takes place when chemical bonds between atoms are formed or broken.

b. What are the two types of reactions due to changes in energy?

The two types of chemical reactions are:

- Exothermal Reactions
- Endothermal Reactions.

Exothermal Reactions: More energy is released in an exothermal reaction in the products than is needed to break the bonds between the reactants.

Endothermal Reactions: In an endothermal reaction, more energy is required to break the bonds of the reactants than is released by the formation of the products.

Q2. Make a list to show classification of chemical reactions into different types.

- Combination or synthesis reaction
- Decomposition Reaction
- Combustion Reaction
- Single Displacement Reaction
- Double Displacement Reaction

Q3. Name the two types of bonds between the atoms that form between atoms in chemical reactions.

The two types of bonds that form between atoms in chemical reactions are:

- Ionic Bond
- Covalent Bond

Answer Key

Quick review

Page # 60

a. Respiration: It is a chemical reaction as new substances like Carbon dioxide and water are formed.

b. Photosynthesis: It is a chemical reaction. In the presence of sunlight in chloroplast , carbohydrates are formed.

c. Making Biryani: While cooking biryani all the ingredients go through a chemical reaction. Raw meat, rice, etc., change into a tasty recipe/ Food.

d. Digestion: In digestion, food goes through a process by which nutrients are absorbed and waste material is excreted out. The chemical reactions during the process change the nature of substances and new substances are formed. Therefore it is a series of chemical reactions.

Unit Review

Choose the correct answer

1. Both a and b. a. Chemical reactions produce new substances. b. Chemical substances are irreversible reactions

2. b. Photosynthesis

3. c. Synthesis

4. a. Single displacement reaction

5. d. All of them

Vocabulary Review

1. Reactants

2. MgO

3. Neutralization

Observe and Answer

It is a decomposition reaction . As the single chemical substance NH^3 breaks down into two or more substances, i.e., Nitrogen and Hydrogen.

Recall and Response

Q1. a. Iron reacts with copper sulphate to form Iron sulphate and copper

$Fe + CuSO_4 \longrightarrow FeSO_4 + Cu$

b. Sodium reacts with chlorine gas to form sodium chloride

$2Na + Cl \longrightarrow 2\ NaCl$

Q2. a. Chemical reactions are the processes by which chemicals interact to form new chemicals with different composition.

b. Chemical Equations are symbolic representations of chemical reactions in which the reactants and the products are expressed in terms of their respective chemical formulae.

Q3 Draw arrows

Sentence starters	Sentence endings
Reactants are	The starting chemicals
Products are	The substances made in a chemical reaction
Hazards are	Possible sources of danger
Risks are	The chances of damage or injury from hazard

Recall and Analyse

Q1. a. Burning
Burning in general is a useful process as it helps in everyday life. For example burning of fuels in vehicles.

b. Moldy Bread
Moldy bread is not good for human consumption as its hazardous for health. It is discarded as it looks and tastes bad too.

c. Acid rain
Acid rain has disastrous effect on buildings as it damages the surface of the buildings
The acidic particles corrode the metals and cause paint, stones to deteriorate more quickly.

d. Cleaning Products
They are necessary for maintaining attractive and healthy conditions both in the home and the work place.
The commercial use of cleaning products affect the outdoor and indoor environment and can lead to pollution and waste.

Q2. When reactants are added or take part, this sign(+) is used in a chemical equations.

Q3. Ethane+Oxygen $\longrightarrow$ Carbon dioxide+ water

Reactants Products

Recall and Apply

Q1. Lemon juice contains plenty of vitamin C also known as ascorbic acid, which is a powerful antioxidant that prevents spoilage and rotting.

Q2. The raw egg when cooked on stove in oils , it changes chemically.The change is evident as the form changes.

Unit 7 | ACIDS, BASES, AND SALTS

SUBTOPICS

- 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.

Lesson Plan: 1

Class: 8

Unit: 7

Topic: Acids, bases, and salts

Sub-topics:

- Introduction
- Common acids
  - Properties of acids
  - Uses of acids
- Alkalis
  - Properties of alkalis
  - Uses of alkalis
- Salts
  - Properties of salts
  - Uses of salts

Date: _____ **Duration:** 2 x 40

Term: _____ **Week:** _____

Learning Objectives

- To explain the topic in detail.
- To elaborate further in uses and properties of acids and alkalis.

Learning Outcomes

- 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.

Resources:

- Textbook – NAS 8
- Charts
- Materials required for starter activity such as litmus paper, different liquids required.

Starter Activity: (10 min)

- In separate labelled clear glasses, pour the liquids. a. Window cleaner b. toilet bowl cleaner c. orange juice d. apple juice. (Warn

Teacher Ideas

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.

Lesson Methodology: (25 min)

- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate.
- It will then be followed by the teacher reading and explaining.
- The topic will be explained in depth using all available resources effectively.
- At the end, a quick analysis will be done.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (25 min)

- Ask the students to attempt Quick Review on page 75.
- Ask students to attempt relevant questions of the Unit Review.

Home Learning:

- 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.

Lesson Evaluation: (5 min)

- Worksheet # 1 will be attempted.

Further Notes

Lesson Plan: 2

Class: 8

Unit: 7

Topic: Acids, bases, and salts

Sub-topics:

- Indicators – Litmus paper
- Which plants make a good indicator
- pH scale
- Universal Indicator
- Neutralisation
- Uses of neutralisation
  - Soil for crops
  - Acidic Lakes
  - Indigestion
  - Tooth decay
  - Treating stings

Date: _____ **Duration:** **2 x 40**

Term: _____ **Week:** _____

Learning Objectives

- To explain the topic in detail.
- To emphasize upon the importance of universal indicators.
- To discuss neuralisation and its uses and its effects in nature.

Learning Outcomes

- Define pH and its ranges with reference to indictors.
- Interpret pH scale and identify acids, alkalis and salts.
- Describe neutralisation reactions with real life examples.

Resources:

- Textbook – NAS 8
- Charts
- Video on pH indicators

Starter Activity: (10 min)

- Arrange a visit to the computer lab and show a video relevant to indicators.
  Reference link: https://youtu.be/xYQlvTblgCY
  (Rewrite to prevent copyright strike)
- Ask them to make notes.

Teacher Ideas

Lesson Methodology: (25 min)

- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate.
- It will then be followed by the teacher reading and explaining.
- The topic will be explained in depth using all available resources effectively.
- At the end a quick analysis will be done.

Assessments Opportunities: (30 min)

- Ask students to attempt all the remaining quick reviews and questions from the unit review.

Home Learning:

- Ask the students to write a topic summary for revision.

Lesson Evaluation:

- Ask the students to attempt Worksheet # 2.

Further Notes

Worksheet # 1

Name: _____

Date: _____

Q1. i. Write properties of acids.

ii. Give an example for each, acid, base and salt .

Q2. Mark whether True or False.

1. Acid turns blue litmus paper red. (True/False)
2. Alkalis turn blue litmus paper red. (True/False)
3. When an acid reacts with a base in a chemical reaction, the products are salt and water. (True/False).

Q3. Identify the given symbols.

Worksheet # 2

Name: _____

Date: _____

Q1. Define:

a. Indicators

b. Dyes

c. pH scale

Q2. What is universal indicator? Briefly explain.

Q3. Describe neutralisation reaction.

Answer key Worksheet # 1

Name: _____

Date: _____

Q1. i. Write properties of acids.

- They have a sour taste.
- They turn blue paper red.
- Acids can conduct electricity.
- Strong acids are corrosive to skin and clothes.
- All acids contain at least one Hydrogen atom.
- They are soluble in water and they produce H+ ions in a solution.
- Acids can be weak or strong.
- The more H+ ions are produced in a solution the stronger it is.

ii. Give an example for each, acid ,base and salt .

a. HCl

b. NaOH

c. NaCl

Q2. Mark whether True or False.

1. Acid turns blue litmus paper red. (True/~~False~~)
2. Alkalis turn blue litmus paper red. (~~True~~/False)
3. When an acid reacts with a base in a chemical reaction, the products are salt and water. (True/ ~~False~~).

Q3. Identify the given symbols.

Toxic

Harmful

Answer key Worksheet # 2

Name: _____

Date: _____

Q1. Define:

a. Indicators

They are substances that change colour of solutions of acid and base.

b. Dyes

They are good indicators which are extracted from plants.

c. pH scale

The pH scale is a measure of how acidic or alkaline a solution is on a pH scale.

Q2. What is universal indicator? Briefly explain.

Universal indicators can tell us how strongly acidic or alkaline solutions are by changing colour. It shows a different colour at each pH level.

It can even show whether a solution is acidic or basic.

Q3. Describe neutralisation reaction.

When acids and alkalis are mixed in right amount, they will form a neutral solution. This reaction is known as neutralisation reaction.

Quick review

Page # 75

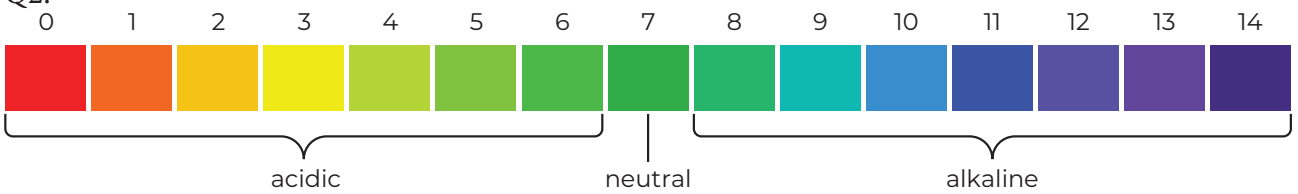
HCl	Nitrate
Nitric Acid	Chloride
Sulphuric Acid	Sulphate

Quick review

Page # 77

Q1. Universal indicator contains a mixture of dyes and therefore it can turn a whole range of colours in comparison with other indicators.

Q2.



The diagram shows a pH scale. The colours indicate acidity, alkalinity or neutral properties of a substance. From 0 to 6 is acidic, 7 is neutral and from 8 to 14 is alkaline range. Indicators are used to find out pH value.

Q3. i. 2, 3, 6 are in the acidic range.

ii. 7 pH value shows neutral range of the solution, green in colour.

Unit Review

Choose the correct answer

1.	d. all of these
2.	b. baking soda solution
3.	a. red in acid, yellow in base
4.	d. antacids
5.	a. and b both. a. acid and alkali react together to form salt. b. when acids and alkalis react together neutralisation takes place

Vocabulary Review

1.	Irritant
2.	NaCl
3.	Sulphuric acid

Observe and Answer

1 a. Red

b. Purple

c. Purple

Recall and Response

1. i. red, less than

ii less, 7.

2. a. Indicators: A dye that changes colour when it is put into an acid or alkaline solution.

b. pH scale: A pH scale is a measure of how acidic or alkaline a solution is on a pH scale.

c. Salt: A compound formed by reaction of an acid and a base.

d. Neutralisation: A reaction of alkali with an acid of similar concentration that gives salt and water as products.

Recall and Analyse

Q1. Indicators are substances that change colour in solutions of acids and alkalis. It's a quick way to differentiate between acidic and basic solutions.

Q2.

a. When acids and alkalis are mixed in right proportions, salt and water are end products. Salt is neutral in properties. H^+ ions are produced by acid and OH^- ions are produced by base. During the reaction these ions form water and other ions form salt.

b. When an acid and a alkali are mixed in right amount, neutralisation takes place, and salt is produced.

c. Examples of salts are Sodium chloride or table salt, Potassium chloride, Copper sulphate.

Recall and Apply

- Hibiscus flower juice will turn dark green.
- The red cabbage juice turned yellow, which shows that the solution is alkaline. Therefore when we add Hibiscus juice in an alkaline solution, it will change colour to dark green, confirming that the test substance is alkaline in nature.

Unit 8 FORCES AND MOTION

SUBTOPICS

- Recognize that several forces may act on an object and that they may or may not balance each other.
- Examine the effect of an unbalanced force on an object.
- Differentiate between floating and sinking objects in terms of density.
- Define 'pressure' with examples and its unit.
- 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 the presence of air pressure.
- Make a hydraulic elevator.
- Build a two-stage rocket model.

Lesson Plan : 1

Class : 8

Unit: 8

Topic: Forces and Motion

Sub-topics :

- Introduction
- Forces in Balance
- Looking both ways
- Unbalanced Forces – A moving car has forces acting on it.
- Forces on an aircraft – Upthrust, floating and sinking
- Making ships float

Date: _____ **Duration:** **2 x 40**

Term: _____ **Week:** _____

Learning Objectives

- To enable students to grasp the concepts of the topic.
- To comprehend and relate the knowledge to our surroundings.

Learning Outcomes

- 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.

Resources:

- Textbook – NAS 8
- Charts
- Materials required for starter activity (A-4 papers) for making paper planes.
- Video Link: https://youtu.be/rfeVlNL7d9U Rewrite to prevent copyright

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.

Teacher Ideas

- Write the terms “Force and Pressure” on the board.

Lesson Methodology : (25 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate.
- Loud reading will be done by the teacher.
- Explanation will follow. All available resources and everyday examples will be used.
- A quick analysis will be at the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Ask students to attempt Quick Review on page 85.
- Ask students to attempt relevant questions of Unit Review.

Home Learning :

- Ask the students to study the topic for revision.
- Ask students to make a list of at least 5 actions we see or perform where a force is applied.

Lesson Evaluation : (5 min)

- Ask the students to attempt Worksheet #1.

Further Notes

Lesson Plan : 2

Class: 8

Unit: 8

Topic: Force and Pressure

Sub-topics :

- Pressure
- Increasing the pressure by reducing the area
- Air pressure
- Air pressure and atmospheric pressure
- How does air exert pressure?
- Fluids – Fluids exert pressure
- Water pressure
- Effect of forces in the presence of air pressure.

Date: _____ **Duration:** **2 x 40**
Term: _____ **Week:** _____

Learning Outcomes

- 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.
- Make a hydraulic elevator.
- Build a two- stage hydraulic elevator.

Resources:

- Textbook – NAS 8
- Charts

Starter Activity : (10 min)

- 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.

Teacher Ideas

WORD PUZZLE

E	L	W	I	J	Z	Y	C	K	L	E	Z	E	N	U
R	N	E	W	T	O	N	P	T	L	C	Y	U	H	T
U	H	M	S	F	E	B	R	F	K	A	C	A	V	Z
S	K	T	M	L	C	P	O	V	U	F	G	L	B	K
S	L	Z	R	A	N	X	O	E	X	R	V	I	I	O
E	M	Y	L	M	A	T	L	Y	B	U	F	N	M	U
R	F	C	X	F	L	A	Z	D	D	S	L	W	M	M
P	F	O	R	O	A	O	N	Q	Y	J	Z	W	R	I
F	A	P	U	R	B	L	U	J	R	I	Y	T	E	O
T	K	P	A	C	Y	F	K	N	I	S	X	H	T	A
F	M	T	I	E	K	V	D	F	T	Y	B	X	E	F
D	A	P	A	M	Q	D	Q	B	Y	O	H	Z	M	N
S	E	U	K	P	V	R	A	I	R	I	V	C	C	D
V	R	Q	H	M	I	U	G	R	Y	S	Q	Z	O	E
J	A	G	G	V	V	O	E	N	I	Q	F	J	F	W

WORLD LIST:

Words are hidden → ↓ ← and ↑

PRESSURE FORCE AREA NEWTON METER SURFACE
BALANCE FLOAT SINK AIR

ANSWER

E	L	W	I	J	Z	Y	C	K	L	E	Z	E	N	U
R	N	E	W	T	O	N	P	T	L	C	Y	U	H	T
U	H	M	S	F	E	B	R	F	K	A	C	A	V	Z
S	K	T	M	L	C	P	O	V	U	F	G	L	B	K
S	L	Z	R	A	N	X	O	E	X	R	V	I	I	O
E	M	Y	L	M	A	T	L	Y	B	U	F	N	M	U
R	F	C	X	F	L	A	Z	D	D	S	L	W	M	M
P	F	O	R	O	A	O	N	Q	Y	J	Z	W	R	I
F	A	P	U	R	B	L	U	J	R	I	Y	T	E	O
T	K	P	A	C	Y	F	K	N	I	S	X	H	T	A
F	M	T	I	E	K	V	D	F	T	Y	B	X	E	F
D	A	P	A	M	Q	D	Q	B	Y	O	H	Z	M	N
S	E	U	K	P	V	R	A	I	R	I	V	C	C	D
V	R	Q	H	M	I	U	G	R	Y	S	Q	Z	O	E
J	A	G	G	V	V	O	E	N	I	Q	F	J	F	W

Lesson Methodology : (25 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate.
- Loud reading will be done by the teacher.
- Explanation will be done with effective use of resources. Key words will be written on the board and explanation will include examples where force is in play.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities : (30 min)

- Ask students to attempt all remaining quick reviews and questions from unit review.

Home Learning :

- Ask students to study the topic for revision.

Lesson Evaluation :

Ask students to attempt worksheet #2.

Further Notes

Worksheet # 1

Name: _____

Date: _____

Q1. Give one word answer:

i. They stretch and squash, pull and push, twist and bend, speed things up and slow things down.

_____

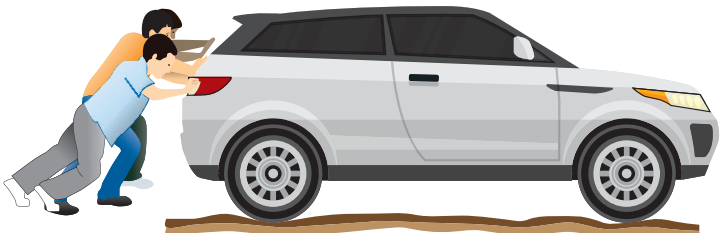
ii. A paper clip can be moved by a force exerted by it.

_____

iii. When a car is pushed its opposite force is produced.

_____

Q2. Label the two forces in the car which balance each other.



Look at the image and elaborate what keeps the object afloat.

Worksheet # 2

Name: _____

Date: _____

Q1. Give definition of pressure and air pressure.

Q2. Define fluids and give some examples:

Q3. Name the pressure that you think exists under water. What do driver must wear under water as shown in the image below?

Answer key Worksheet # 1

Name: _____

Date: _____

Q1. Give one word answer:

i. They stretch and squash, pull and push, twist and bend, speed things up and slow things down.

Forces

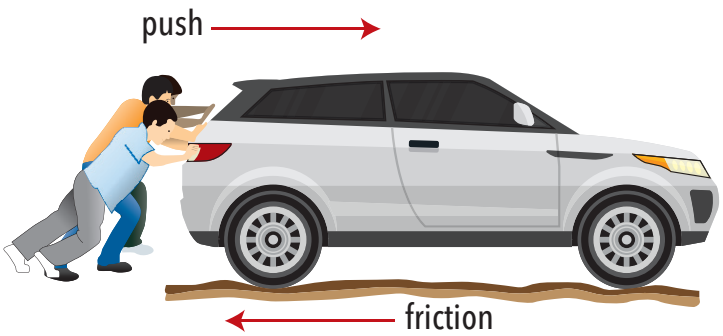
ii. A paper clip can be moved by a force exerted by it.

Magnet

iii. When a car is pushed its opposite force is produced.

Friction

Q2. Label the two forces in the car which balance each other.



Look at the image and elaborate what keeps the object afloat.

Some super tankers weigh over five billion Newtons. The upthrust from the water keeps them afloat.

Answer key Worksheet # 2

Name: _____

Date: _____

Q1. Give definition of pressure and air pressure.

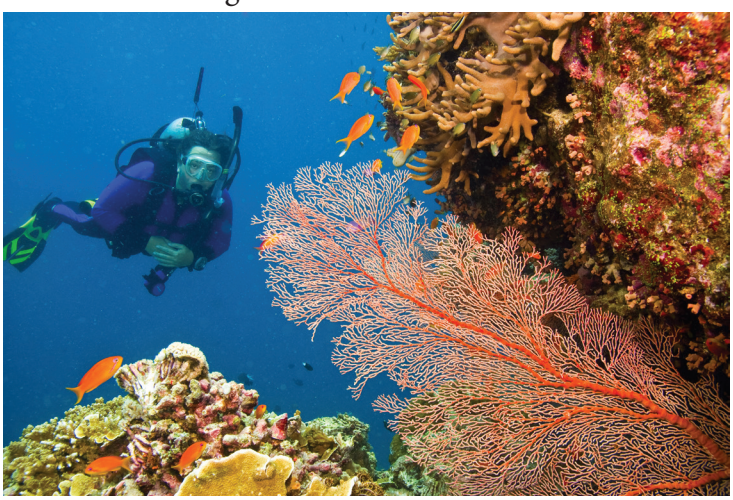
Pressure is the force per unit area. The unit of pressure is pascal (Pa), which is equal to one Newton per square metre.

Air Pressure: When we pump air into a tyre, we push in molecules of air. These molecules are constantly moving. They bump into each other and into the walls of the tyre. This movements creates a force on the walls. This force is air pressure. The tyre inflates evenly because air exerts pressure evenly in all directions.

Q2. Define fluids and give some examples:

Fluids are any materials that can flow. The fluids take the shape of the container it is kept in. They include gases, liquids. Honey, milk, petrol, Nitrogen, steam are some examples.

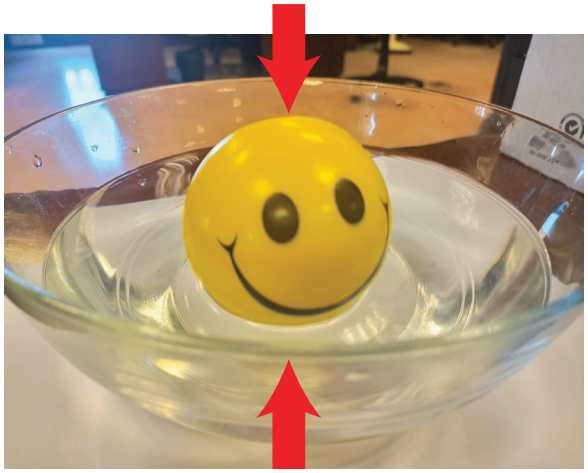
Q3. Name the pressure that you think exists under water. What do driver must wear under water as shown in the image below:



It is called as water pressure. The picture shows a diver wearing special suit to survive there.

Quick review

Page # 84



The pressure on floating ball is
shown to be of two types:
i. Upwards -It is the upthrust.
ii. Downwards-It is the gravity

Quick review

Page # 86

Q1. • Pressure is the measure of how much force there is on certain areas.
- If you exert small force on a small area the pressure will be large.
- Pressure is measured in N/m^2.

Q3. The three examples of balanced forces are:
- The floating ship
- The flying aeroplane
- Moving car with uniform speed

Quick review

Page # 89

a. False (P=F/area)
b. True
c. False
d. True

Unit Review

Choose the correct answer

1. a. P=F/A
2. b. liquids and gases
3. b. liquid pressure decreases with depth
4. b. the fluids inside our body also exert pressure outwards and that pressure balances atmospheric pressure.
5. C, to balance the atmospheric pressure outside

Vocabulary Review

1. Upthrust
2. Pressure
3. Atmosphere

Observe and Answer

As the force of one hand is 20 N which is more than two hands(15 N), therefore the wooden piece will move towards left (b).

Recall and Response

Q1. a. Force

b. More

c. More

d. Fluids

Q2. a. i. saliva

ii. Blood

b. i. water

ii. Air

c. i. barometer

ii. manometer

Q3. Pressure is the force per unit area. The unit of pressure is pascal, which is N/m^2

Recall and Analyse

Q1. The gravity of Earth pulls air above it to the Earth, hence atmospheric pressure is produced.

Q2. If the altitude is high the air pressure is low.

Q3. The reason we are not crushed under the weight of air is that the pressure inside our body is equal to the atmospheric pressure and cancels atmospheric pressure exerted from outside.

Numerical Questions: Solutions.

1. Data

Weight= 5000 N

Area = 2.5 m^2

Pressure?

Solution:

P = W/A

P = 5000/ 2.5

P = 2000 Nm^{-2}

2. Data

Base= 0.01 m^2= Area

Pressure= 500 N/m^2

Force=?

Solution:

P= F/A

F= P × A

F = 0.1 × 500 = 0.05 N

3. Data

Weight = 4500N= Force

Pressure= 1,000,000 Pa

= 1000000 Nm^{-2}

Area=?

Solution:

P= W/A = 4500/ 100000 = 0.0045 m^2

Therefore= 1 tyre = 0.0045/2 = .00225

4. Data

Size of box

Weight=?

Pressure = 100Pa

Solution:

W = P × A

W = 100 × 0.0125 = 1.25N

5. Data

Force= 100 N

Area= 1m^2

Pressure=?

Solution:

P= F/A=100/1 = 10

5 × 5 × 5 = 125cm^3 = 0.0125m^2

Recall and Apply

a. If the shoulder strap of school bag were thin, the pressure will increase, while the area is reduced. In other words, bags will feel heavier.

b. If the feet of waterfowls were not broad, they would not walk easily on lily pads. As the area is increased, the pressure is decreased, so broader the feet, lesser the pressure.

c. A loaded truck makes deeper compression on muddy ground than an empty track because on a soft surface as mud, the pressure might be big enough to cause deeper compression.

Unit 9

REFLECTION AND REFRACTION OF LIGHT

SUBTOPICS

- 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.
- State the Laws of Reflection.
- Describe different optical instruments which use curved mirror.
- Relate the apparent colour of objects to reflected or absorbed light.
- Explain that light is refracted at the boundary between air and any transparent material.
- Distinguish between reflection and refraction of light with daily life examples.
- Investigate that light is made up of many colours. Relate the apparent colour of objects to reflected or absorbed light.
- Identify spherical mirrors. Describe the characteristics of an image(s) formed by concave and convex mirror.
- Describe use of different optical instruments in which planes and spherical mirrors are used.

Lesson Plan : 1

Class: 8

Unit: 9

Topic: Reflection and Refraction of Light

Sub-topics :

- Introduction
- Types of Mirrors– Plane mirrors
  - Character of an image formed by a mirror
- Features of spherical mirrors
  - Types of spherical mirrors
    a. Concave mirror
    b. Convex mirror
- Uses of mirrors
  - Used in automobiles
  - Plane mirrors in terms of safety and security
  - Solar cooker
  - Mirrors found in torches.
  - Microscope
  - Telescope

Date: _____ **Duration:** 2x40
Term: _____ **Week:** _____

Learning Objectives

- To enable students to grasp the concept.
- To give awareness of types and uses of various types of mirrors.

Learning Outcomes

- 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.

Resources:

- Textbook – NAS 8
- Charts

Teacher Ideas

- Materials required for starter activity : Hand-held mirrors, paper, markers.

Starter Activity: (10 min)

- 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.

Lesson Methodology: (25 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate.
- Loud reading will be done by the teacher.
- Explanation will be done with effective use of resources with a quick analysis in the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Ask students to do Quick Review on page 94 and 98.
- Ask students to attend relevant questions of Unit Review

Home Learning:

- Ask students to study the topic for revision.
- Ask students to write down learning points of the starter activity.

Lesson Evaluation: (5 min)

- Ask students to attempt Worksheet # 1.

Further Notes

Lesson Plan : 2

Class: 8

Unit: 9

Topic: Reflection and Refraction of Light

Sub-topics:

- To make the room look bigger
- Periscope
- Kaleidoscope
- Light Rays
- Speed of Light in different mediums
- The behaviour of light rays
- Reflection
- Types of reflection
- Refraction of light with daily life examples
- Splitting Light
- Reflecting Colours

Date: _____ **Duration:** 2x40

Term: _____ **Week:** _____

Learning Objectives

- To explain in detail the topic with examples.
- To enable students to observe and understand the working of mirrors in their surroundings.

Learning Outcomes

- 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.
- Investigate that light is made up of many colours. Relate the approved colour of objects to reflected or absorbed light.

Resources:

- Textbook – NAS 8
- Charts
- Material required for starter activity : prism and torch

Starter Activity: (10 min)

- Ask students to observe the demonstration.

Teacher Ideas

- Turn off the light.
- Ask a student to hold the torch and let light pass through the prism. Light will refract in 7 colours (VIBGYOR)

Lesson Methodology: (25 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate accordingly.
- Different students will be asked to volunteer to read loudly.
- The topic will be explained in detailed with the use of all resources available to assist.
- A quick unit analysis will be provided in the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Ask students to attempt Quick Review on page 100.
- Ask students to do relevant questions of the unit review.

Home Learning:

- Ask students to study the topic for revision.
- To watch relevant videos to further strengthen concepts.

Lesson Evaluation:

- Ask students to attempt Worksheet # 2.

Further Notes

Worksheet # 1

Name: _____

Date: _____

Q1. Fill in the blanks:

- The speed of light in a vacuum is _____.
- Sunlight reaches the Earth in _____ minutes.
- _____ is the most vital source of life on Earth, due to sunlight.
- The _____ objects give out light.

Q2. Write four characteristics of image formed by a mirror.

Worksheet # 2

Name: _____

Date: _____

Q1. Write the use of the following instruments:

- **Periscope**

- **Kaleidoscope**

Q2. Answer the following:

a. What are light rays?

b. What happens when a ray of light falls on a surface?

Q3. Draw a diagram to show reflection of light.

Answer key Worksheet # 1

Name: _____

Date: _____

Q1. Fill in the blanks:

- The speed of light in a vacuum is 300,000km/sec.
- Sunlight reaches the Earth in 8 minutes.
- Sun is the most vital source of life on Earth, due to sunlight.
- The luminous objects give out light.

Q2. Write four characteristics of image formed by a mirror.

The four characteristics are:

- The image is at the same distance from the mirror as we are from the mirror.
- Our image is upright.
- Our image is same size as us.
- Our image is laterally inverted, left becomes right and right becomes left.

Answer key Worksheet # 2

Name: _____

Date: _____

Q1. Write the use of the following instruments:

- Periscope

  An instrument used in submarines to see objects on the surface.

- Kaleidoscope

  It uses reflection of light to generate very interesting patterns which are used to create toys.

Q2. Answer the following:

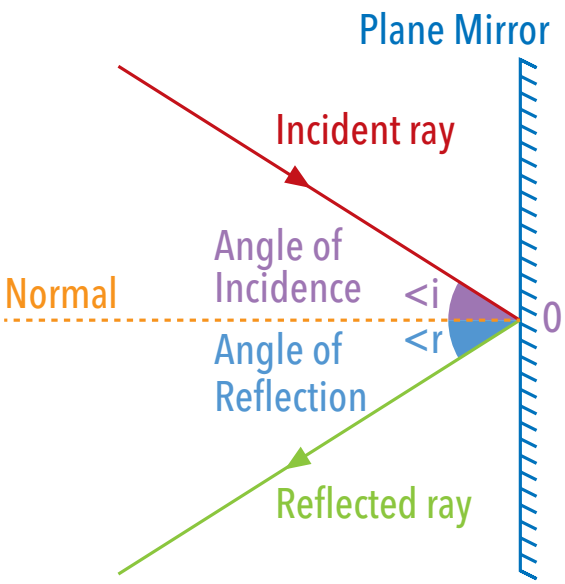
a. What are light rays?

A beam of light is made up of rays light which travel in one straight line.

b. What happens when a ray of light falls on a surface?

The ray of light is absorbed, transmitted, or reflected depending on the properties of material it is falling on.

Q3. Draw a diagram to show reflection of light.



Quick review

Page # 94

1. • Star
   - Television
   - Candle

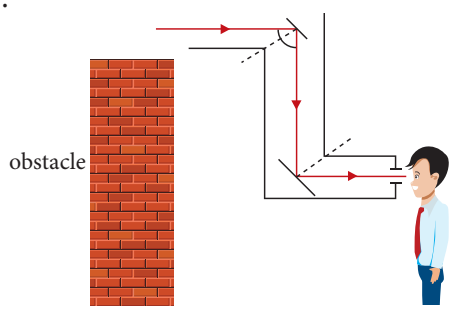
2. The ten light sources are:
   1. Torches
   2. Fireworks
   3. Lightning
   4. Fireflies
   5. Sun
   6. Stars
   7. Natural fires or bush fires
   8. Glow worms
   9. Jellyfish
   10. Viper fish

3. When light strikes on an object that does not produce its own light, e.g., mirror. The light falls on the object, it is reflected and reflected light enters our eyes. This enables us to see the object.

Quick review

Page # 98

1.



These parallel mirrors are used to make a **periscope**

2. A looking glass is always a plane mirror because the image formed is always erect and of the same size as the object.

3. The mirrors used in a torch are concave mirrors. We have a more focused light beam which will not diverge out and hence help in searching. It is used for light rays falling on it to a single point.

Quick review

Page # 100

1. Reflection on a window:

   When light hits a glass window, some of the light bounces back(or reflects) off the glass window. The rest of the light keeps going through the glass of window, but the light is bent. It moves from the air to the glass.

Reflection on a piece of paper:

On a smooth surface light reflects at the same angle. However if the paper surface is rough it will not reflect at the same angle.

2. Example of regular surface: Plane mirror

   Example of diffuse reflection: Frosted mirror.

3. When Kiran polished the table, she could see a better image of herself, due to smoothness of the surface. This results in light being reflected at the same angle.

Unit Review

Choose the correct answer

1. c. mirror
2. a. 5m
3. C and E. c. the image is same size as her. e. when she raised her right hand the image raised her left hand.
4. c. Microscope
5. b. non-luminous

Vocabulary Review

1. Concave
2. Angle of incidence
3. Rainbow

Observe and Answer

The writing on the front of an ambulance is back to front so that other car drivers will see the image of the writing as front to back, which enables them to read the word correctly.

Recall and Response

Q1. a. We see planets because they reflect light from the sun. (True)

b. We see a book because it reflects light from the surface. (corrected)

c. The image formed in plane mirror is upright. (corrected)

d. A plane mirror is opaque. (True)

Q2. ROYGBIV

Red, Orange, Yellow, Green, Blue, Indigo, Violet

Recall and Analyse

a. Laws of reflection:

1. The angle of incident ray is equal to the angle of reflection.
2. The incident ray the reflected ray and normal, all lie in the same plane.

b. The dentist uses a concave mirror to look at the teeth. (Photo at the bottom) The driver uses convex mirror for monitoring traffic and it appears closer but smaller which assist drivers.

Recall and Apply

1. Real images are formed when light rays converge to form to form the image. In plane mirror virtual image is formed. Real images are formed in spherical(concave) mirrors.
2. Plane mirrors and concave mirrors produce virtual image.
3. When we illuminate a rose petal, the red light is reflected while rest of the light is absorbed. Similarly the leaf looks green because green light is reflected back, while rest of the spectrum is absorbed.

Unit 10 | ELECTRICITY AND MAGNETISM

SUBTOPICS

- 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.
- Recognize the electric power of various electrical appliances.
- Recognize the terms earth wire, fuse, and circuit breaker.
- Analyse the danger of overloading and short circuit and identify the importance of earth wire, fuses, and circuit breakers.
- List precautionary measures to ensure the safe use of electricity.
- Investigate the factors that affect the strength of an electromagnet.
- 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 the poles can switch).
- Describe briefly the working principles of electromagnetic devices such as speaker and doorbell.

Lesson Plan : 1

Class : 8

Unit: 10

Topic: Electricity and Magnetism

Sub-topics :

- Introduction
- Electricity Circuits
- Measuring electric current , voltage , resistance, circulating power.
- For any electric appliance
- Circuit essentials
- Circuit components

Date: _____ **Duration:** 2x40

Term: _____ **Week:** _____

Learning Objectives

- To give clear concepts of the topic.
- To emphasize and elaborate further on related topics of electricity and magnetism

Learning Outcomes

- 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.

Resources:

- Textbook – NAS 8
- Charts

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.

Teacher Ideas

Lesson Methodology : (30 min)

- Ask students to open their books to assigned page numbers and read silently. Teacher will facilitate.
- Teacher will do loud reading.
- Explanation will follow with effective use of resources. Take input from students on the use of electricity in everyday life.
- At the end, quick analysis will be given.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Ask students to attempt the relevant questions of Unit Review.

Home Learning :

- Ask students to study the topic at home.
- Ask students to make a list of a least 10 machines/ other objects that run on electricity.

Lesson Evaluation : (5 min)

- Ask students to attempt Worksheet # 1.

Further Notes

Lesson Plan : 2

Class: 8

Unit: 10

Topic: Electricity and Magnetism

Sub-topics :

- Safety First – Electrical Hazards
- Paying for electricity
- Magnetic Effect of Current
- Electromagnet
- The electric bell
- The Speaker
- Loud Speaker

Date: _____ **Duration:** 2x40

Term: _____ **Week:** _____

Learning Objectives

- To highlight the importance of safety and security with reference to electrical power.
- To give useful insight on the everyday effects, etc. of electric supply.

Learning Outcomes

- 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.
- 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.

Resources:

- Textbook – NAS 8
- Charts

Starter Activity : (10 min)

- Distribute the word puzzle worksheet among the students.

Teacher Ideas

Word Puzzle

Z	V	P	A	R	E	S	I	S	T	A	N	C	E	I	F	H	I
X	T	T	I	R	X	W	U	S	H	B	P	D	S	U	W	F	U
U	F	W	Y	A	E	L	E	C	T	R	I	C	I	T	Y	O	O
O	A	B	G	C	K	F	J	O	P	O	W	E	R	B	D	S	G
D	Q	E	L	E	C	T	R	O	R	A	G	N	E	T	E	T	B
Y	U	B	E	L	U	C	U	R	R	E	N	T	T	A	M	L	J
S	M	W	W	C	A	B	P	M	X	I	B	R	A	F	B	B	L
Y	H	D	I	H	M	T	K	K	W	O	S	W	T	V	M	Z	I
Y	E	U	R	C	V	O	L	T	A	G	E	G	P	L	G	B	X
U	Z	U	E	Q	D	K	I	C	I	R	C	U	I	T	D	Q	S
D	T	G	K	L	Y	S	M	L	R	O	J	R	H	J	G	G	X
L	D	W	O	Z	Q	C	Z	A	C	H	H	F	U	S	E	X	P

Find the following words in the puzzle.
Words are hidden → ↓ and ↘

BELL
CIRCUIT
CURRENT
ELECTRICITY
ELECTROMAGENT
FUSE
POWER
RESISTANCE
VOLTAGE
WIRE

Solution

.	.	.	.	**R**	**E**	**S**	**I**	**S**	**T**	**A**	**N**	**C**	**E**	.	.	.	.
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.	.	.	.	.	**E**	**L**	**E**	**C**	**T**	**R**	**I**	**C**	**I**	**T**	**Y**	.	.
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.	.	**E**	**L**	**E**	**C**	**T**	**R**	**O**	**M**	**A**	**G**	**N**	**E**	**T**	**E**	.	.
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.	.	.	**R**	.	**V**	**O**	**L**	**T**	**A**	**G**	**E**	.	.	.	.	.	.
.	.	.	**E**	.	.	.	.	**C**	**I**	**R**	**C**	**U**	**I**	**T**	.	.	.
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.	.	.	.	.	.	.	.	.	.	.	.	**F**	**U**	**S**	**E**	.	.

Lesson Methodology : 25 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate accordingly.
- Different students will be asked to volunteer to read loudly.
- The topic will be explained in detailed with the use of all resources available to assist.
- A quick unit analysis will be provided in the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Ask students to attempt Quick Review on page 112.
- Ask students to attempt relevant questions of Unit Review.

Home Learning :

- Ask students to study the topic.
- Ask students to draw a diagram to show an electric bell circuit ; using a battery cell.

Lesson Evaluation :

- Ask students to attempt Worksheet # 2.

Further Notes

Worksheet # 1

Name: _____

Date: _____

Q1. Describe electricity circuits.

Q2. Define:

- Current
- Ammeter
- Voltage

Q3. Join the power ratings of electrical appliances:

Iron	400 W
Drill	1100 W
Lamp	11 W
LED Tv	2.4 KW
Blender	80 W

Worksheet # 2

Name: _____

Date: _____

Q1. Make a list of five hazards:

Q2. Draw and label a diagram to show magnetic effect of current:

Answer key Worksheet # 1

Name: _____

Date: _____

Q1. Describe electricity circuits.

An electrical current results from the movement of negatively charged particles, around an electrical circuit. The electrons move or are conducted from the negative terminal of the energy source to the positive terminal.

Q2. Define:

- Current

  Electrical current is the flow of charge.

- Ammeter

  It is a device that measures the current passing a particular point in an electric circuit.

- Voltage

  The difference of energy per unit charge is known as voltage or potential difference.

Q3. Join the power ratings of electrical appliances:

Iron	400 W
Drill	1100 W
Lamp	11 W
LED Tv	2.4 KW
Blender	80 W

Answer key Worksheet # 2

Name: _____

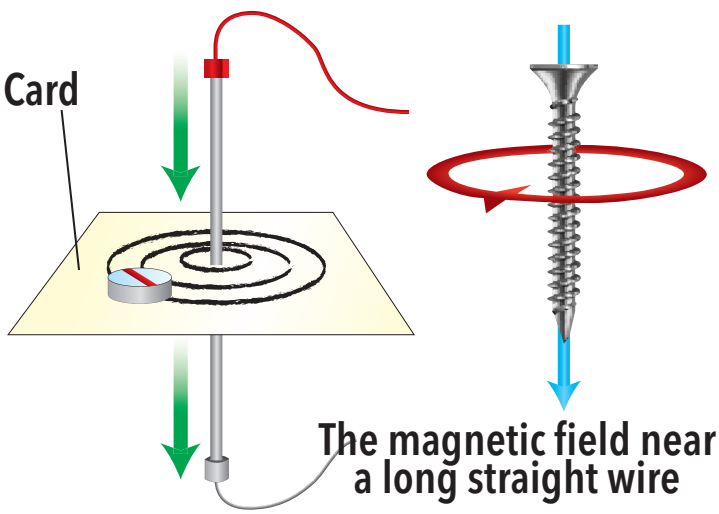
Date: _____

Q1. Make a list of five hazards:

The five hazards are:

- High voltage circuits
- Low voltage circuits
- Old, frayed wiring
- Long, extension leads
- Water in sockets or plugs

Q2. Draw and label a diagram to show magnetic effect of current:



Answer Key

Quick review

Page # 112

1. It is dangerous because a worn mains cable will have a higher resistance at one point. When a current flows through it, the heating effect may be enough to melt the insulation and cause a fire.
2. As more electrons collide with atoms the wire gains more kinetic energy and therefore its temperature increases.

Unit Review

Choose the correct answer

1. c. watts
2. a. current x time
3. b. by melting if current is too high
4. d. al the above
5. b. voltmeter

Vocabulary Review

a. Switched, current

b. Heat

Observe and Answer

Current

Formula Current= Power/Voltage (solutions as per US standards)

- Washing machine =4000 / 120= 33.3 A
- Lap Top =85/120= 0.708 A
- LED Tv =300/120= 2.5 A

Recall and Response

Q1.

- Voltage

  It is the pressure from one electrical power source that pushes charged electrons (current) through a conducting loop, enabling them to do work such as, illuminating a light.
- Resistance

  Resistance is the measure of the opposition to current flow in an electric current.
- Current

  It is the rate at which electrons flow past a point in a complete electrical circuit.

Q2. The voltage measured (in volts) of a battery is the energy (measured in joules) supplied to each unit of charge(measured in Coulombs).

Recall and Analyse

Q1. They are:

1. High voltage circuits: They are dangerous for many reasons. If a bare wire or high voltage terminal is touched, the person would receive an electric shock, which could be fatal.
2. Old frayed wiring: Broken strands means that a wire will have a higher resistance at one point. When a current flows through it , the heating effect may be enough to melt the insulation and cause a fire.
3. Long extension leads: They may over heat when used when coiled up. The current warms the wire but the heat has less area to escape from a tight bundle.
4. Water in sockets or plugs: Water will conduct current, so if electrical equipment gets wet, there is a risk that someone might be electrocuted.

Q2. If a fault develops and a current gets too high the fuse blows and breaks the circuit before the cable can overheat and catch fire.

Q3. The earth wire is important safety wire. If a live wire comes loose and touches the metal body, a current flows to earth and blows the fuse. Then the object is safe to use. E.g., kettle.

Q4. An earth wire protects by connecting metal body of an object to Earth and stops it from becoming live. If the live wire becomes loose and touches the metal body, a current immediately flows to earth and blows the fuse.

Recall and Apply

Q1. The frayed broken wires have higher resistance. When a current flows through it, the heating effect may be enough to melt the insulation and cause a fire.

Q2. If too much current passes through electrical cables, it warms the wires because of resistance. The resistance creates heat. With more resistance, heat is increased.

Q3. The cable becomes dangerous if too much current passes through it. It heats up due to resistance.

Q4. If you have wet hands, there is a high chance that you may be electrocuted. The shock could be strong and hurt you badly.

Unit 11 | OUR UNIVERSE

SUBTOPICS

- Explore and understand the terms star, galaxy, milky way, and the black holes.
- Compare the types of galaxies.
- Relate the life of a star with the formation of black hole, neutron star, pulsar white dwarf, red giant.
- Discuss the birth and eventual death of our Sun.
- Show how information is collected from space by using telescopes (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.

Lesson Plan : 1

Class : 8

Unit: 11

Topic: Our Universe

Sub-topics :

- Introduction
- The Sun
- Moving across the sky
- Stages of a star
  - Beginning
  - Main – sequence Stars
  - Death of a star
- Red giants
- Super giants

Date: _____ **Duration:** 2x40

Term: _____ **Week:** _____

Learning Objectives

- To give clear concepts of the topic.
- To explain and discuss how vast our universe is.

Learning Outcomes

- 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.

Resources:

- Textbook – NAS 8
- Charts
- Internet access for starter activity

Starter Activity: (10 min)

- Arrange and show a video on the topic.

  Reference Link: https://youtu.be/2IMSjEs8qww

Lesson Methodology: (25 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate accordingly.
- Different students will be asked to volunteer to read loudly.

Teacher Ideas

- The topic will be explained in detailed with the use of all resources available to assist.
- A quick unit analysis will be provided in the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Ask students to attempt relevant questions of unit review.

Home Learning :

- Ask students to study the topic.
- Ask students to study with a short note on the video they watched.

Lesson Evaluation : (5 min)

- Ask students to attempt Worksheet #1.

Further Notes

Lesson Plan : 2

Class : 8

Unit: 11

Topic: Our Universe

Sub-topics :

- Stages of a star
- Black Hole
- The birth and death of a Sun
- Galaxies
- Types of Galaxies
  - A spiral galaxy
  - An elliptical galaxy
  - An irregular galaxy

Date: _____ **Duration:** 2x40

Time: _____ **Week:** _____

Learning Objectives

- To explain in detail with images and text.
- To create interest in our universe through further elaboration.

Learning Outcomes

- 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.
- 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.

Resources:

- Textbook – NAS 8
- Charts
- Visit to the school library

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.
- Open the books and randomly search for images and share in class.

Teacher Ideas

Lesson Methodology : (25 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate accordingly.
- Different students will be asked to volunteer to read loudly.
- The topic will be explained in detail with the use of all resources available to assist.
- A quick unit analysis will be provided in the end.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities : (30 min)

- Ask students to attempt Quick Review on page 112.
- Ask students to attempt remaining questions of the Unit Review.

Home Learning :

- Ask students to study the topic.
- Suggest students to visit a Planetarium with their parents.

Lesson Evaluation :

- Ask students to attempt Worksheet #2.

Worksheet # 1

Name: _____

Date: _____

Q1. Complete the following statements:

a. A ball of burning gas in space visible as point of light in the sky is called as _____.

b. _____ are area in space that even light cannot escape from because gravity is strong their.

c. A giant star called _____ has shrunken so much that it looks smaller than the Earth.

d. The pattern of stars that we see in the sky are known as _____.

e. After four billion years our sun will become a _____.

Q2. Draw a diagram and label it to show death of our sun.

Worksheet # 2

Name: _____

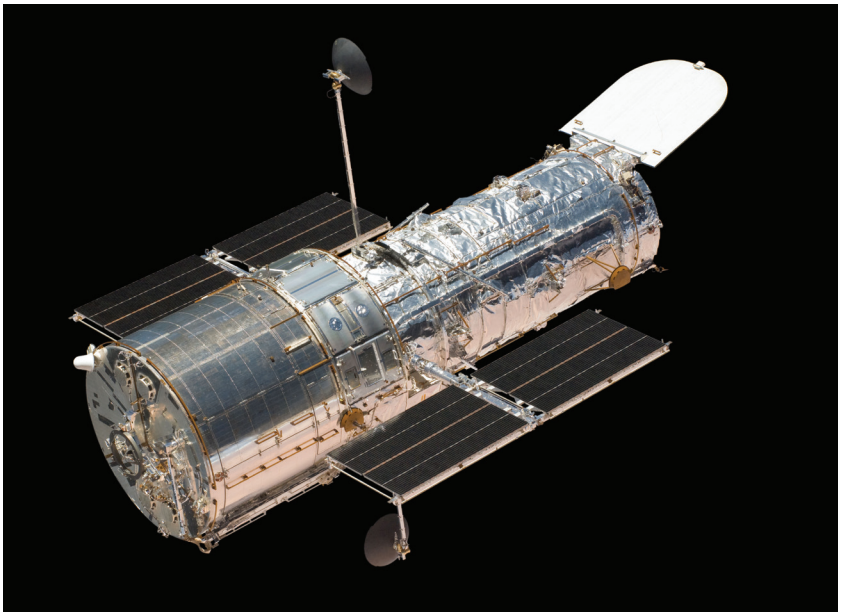
Date: _____

Q1. Name the three types of galaxies.

Q2. Why is space exploration by scientists important?

Q3. How can we see the constellations which are very far from Earth?

Q3. Look at the image below and answer



a. What is this object?

b. What is a telescope?

c. When was this telescope launched?

Answer key Worksheet # 1

Name: _____

Date: _____

Q1. Complete the following statements:

a. A ball of burning gas in space visible as point of light in the sky is called as star.

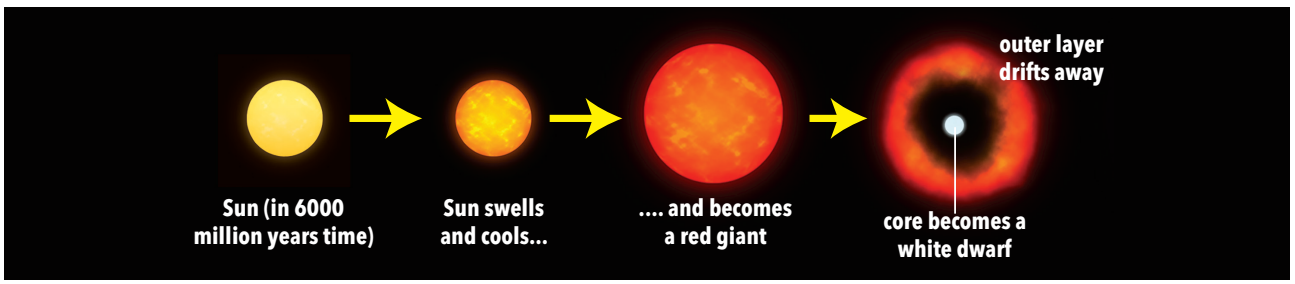
b. Black holes are areas in space that even light cannot escape from because gravity is strong there.

c. A giant star called pulsar has shrunken so much that it looks smaller than the Earth.

d. The pattern of stars that we see in the sky are known as constellations.

e. After four billion years our sun will become a red giant.

Q2. Draw a diagram and label it to show death of our sun.



Answer key Worksheet # 2

Name: _____

Date: _____

Q1. Name the three types of galaxies.

The three types of galaxies are:

- Spiral
- Elliptical
- Irregular

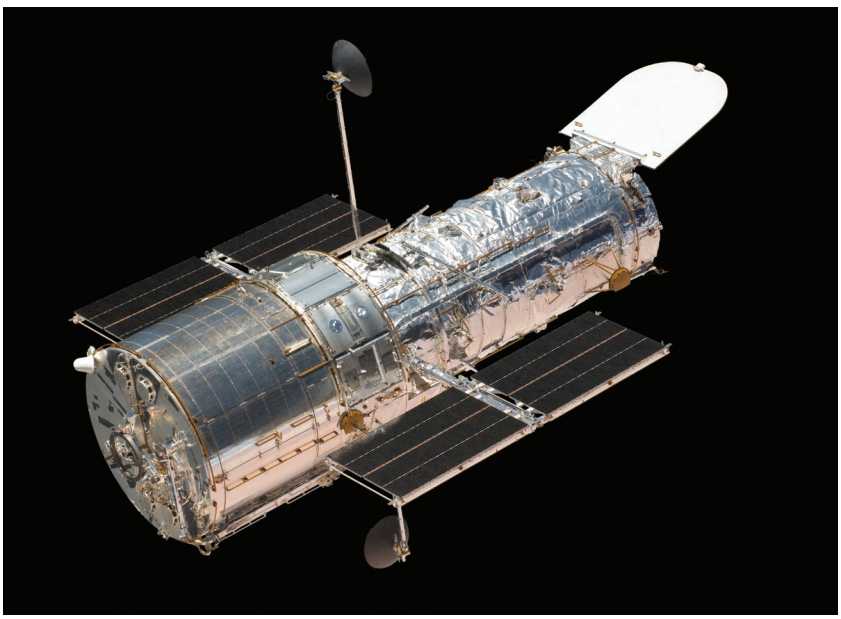
Q2. Why is space exploration by scientists important?

The scientists explore new frontiers in space which provides with tremendous knowledge of space and beyond. This benefits life on Earth.

Q3. How can we see the constellations which are very far from Earth?

Instruments like telescope help us to see the constellations. The telescopes are providing data which is collated and made useful.

Q4. Look at the image below and answer



a. What is this object?
This is Hubble telescope.

b. What is a telescope?
It helps us to see thigs very far in the universe.

c. When was this telescope launched?
It was launched in 1990.

Answer Key

Quick review

Page #120

Sun	Gigantic nuclear explosion
Light year	The distance light travels in a year about a trillion kilometres
White dwarf	150 kilometres away from us
Supernova	Enormous clouds of H and dust
Neutron Star	Remnants of Supernova
Protostar	The white hot star

Unit Review

Choose the correct answer

1. b. black hole
2. c. constellations
3. d. round
4. a. the core of the most massive star explodes and continues to collapse forming a black hole
5. d. All of the above

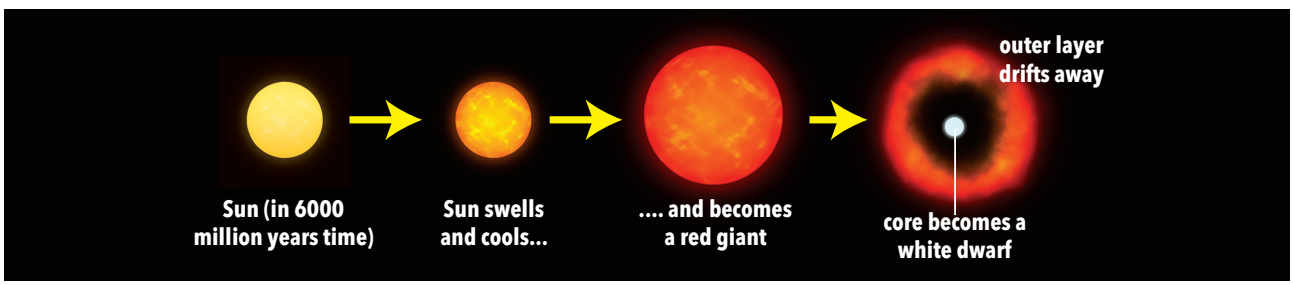
Vocabulary Review

a. Star

b. Light year

c. Pulsar

Observe and Answer



Recall and Response

a. Galaxies: A system of million and billion of stars together with gas and dust held together by gravitational attraction.

b. Black Hole: A type of space having a gravitational field so intense that matter and radiation cannot escape.

c. Pulsar: Sometimes neutron stars seem to be blinking on and off and like light house. When this happens the star is called a pulsar.

Recall and Analyse

Q1. a. A supernova is a powerful and luminous explosion of a star. It occurs during the last evolutionary stages of a massive star or while a white dwarf is triggered into a runaway nuclear fusion.

b. After a core collapse supernova all that remains is a dense core and hot gas called a nebula. When the stars are specially large the core collapses. The black hole is the result. Otherwise, the core becomes white dwarf neutron star.

Q2. a. It is a huge cloud of gas and dust where sun and other planets formed.

b. In the centre of the nebula, one blob grew bigger it will become the Sun. Around it smaller blobs are formed. These would be planets and moons. As more and more materials were pulled in. Gravitational potential energy was changed into thermal energy so the central blob became hotter and hotter. Eventually its core became hot and compressed that fusion started and it started to lit up to become a star. Other stars formed and being formed in the same way.

Q3. a. Red Giant: Stars of the similar size and smaller become red giants. In a red giant core both Hydrogen and Helium are changed into heavier elements. Energy is also released and its gravity is not strong enough to hold onto its outer layer of gas. This gas slowly spreads out into the space.

b. In about 6000 million years from now the sun will become a red giant.

c. The sun when it becomes red giant, passing through different phases will eventually fade away, as its outer layer will drift into space leaving a hot dense core called a white dwarf. This tiny star will use Helium as fuel. When this runs out the star will fade forever.

Recall and Apply

Q1.

In final states, the stars become red giants with further change as the stars core continue to shrink. The surface heats up and becomes white hot. This star has become a white dwarf. In case of massive stars, they blow up in a gigantic nuclear explosion, supernova. Most supernova remnants become a neutron star. With massive explosions the core cannot resist the pull of gravity and goes on collapsing this results in a black hole.

Q2.

Gravity holds the stars together. Those stars are also moving and orbit the centre of their galaxies. Same as the ball that is pulled down by gravity.

Q3.

Galaxies are of three different types:

Spiral, elliptical and irregular.

Differences: the shapes of galaxies are different.

Spiral galaxy has dust, whereas elliptical galaxy has no dust. The irregular galaxy is involved in collision with other galaxies.

Similarities: All the galaxies are made up of stars, asteroids, planets and galactic clouds.

Unit 12 TECHNOLOGY IN EVERYDAY LIFE

SUBTOPICS

- Make bioplastic 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 energy saver bulb.

Lesson Plan:1 1

Class : 8

Unit: 12

Topic: Technology In Everyday life

Sub-topics :

- Making Soap
- Bioplastics from milk and vinegar
- Making toothpaste and detergent at home
- Making a solar pressure cooker
- Making a wind turbine
- What is UPS?
  - Working of a UPS
  - The basic parts of a UPS are?
  - Using a UPS to operate a fan

Date: _____ **Duration:** 3x40

Term: _____ **Week:** _____

Learning Objectives

- To learn the use of technology in everyday life.
- To carry on various hands-on activities at home and school to make different things or learn how things operate.

Learning Outcomes

- 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.

Resources:

- Textbook – NAS 8
- Materials for various class activities given in the books.

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.

Teacher Ideas

Lesson Methodology: (25 min)

- Ask students to open their books to assigned page numbers and silently read. Teacher will facilitate accordingly.
- Different students will be asked to volunteer to read loudly.
- The topic will be explained in detail with the use of all resources available to assist.
- The activities will be carried out.
- Arrange materials required for the activities.
- Divide the class into 4 groups. Assign one task to each group. Also, assign a group leader and take support from faculty and lab staff to coordinate with students throughout the activities. The teacher will supervise.
- Distribute the materials and task details as given in the book to each group leader.
- Give a time duration for the activity.
- At completion, collect the projects and display in science lab or classroom.
- At the end a quick analysis for the whole will be given.

Plenary (5 min)

- Quick PMI chart (Plus, minus, interesting) will be filled.

Assessments Opportunities: (30 min)

- Give your comments and issue certificates.
- Have the Head visit the exhibition and give their remarks to motivate the students and teachers.
- Encourage and celebrate the student progress.

Home Learning:

- Ask students share their learning with their parents and encourage them to perform assigned activities at home.

Lesson Evaluation: (5 min)

- The products produced and activities carried out will indicate success of the lesson.

Further Notes