



Government of Maharashtra

Bridge Course

Standard : Tenth

Subject : Science and Technology Part 1

Academic Year 2021-22



Academic Year 2020-21



State Council of Educational Research and
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Instructions for students / parents

Namaskar dear students!

In the academic year 2020-21, you could not go to school as usual, but your teachers were trying to bring education to you through various media. Even though our school was not regular, the education continued. Now we are getting ready for the new academic year. This bridge course has been prepared for the purpose of pre-preparation for the academic year 2021-22 as well as a review of the previous year's syllabus.

1. This year's syllabus is based on the important concepts of the previous class, the same concepts have been included in this bridge course.
2. The duration of the bridge course has been fixed at 45 days and it consists of three tests. These tests are based on the Activity Sheets in the bridge course.
3. Each Activity Sheet in the bridge syllabus has been prepared with the aim of clarifying important concepts.
4. The Activity Sheet is constructed as follows:
 - **Let's Understand** : The concepts included in the Activity Sheet are given here.
 - **Reference** : Reference is made to last year's lesson.
 - **Learning Outcomes / Competency Statements** : Learning Outcomes and developing competencies that can be achieved through the given Activity Sheet.
 - **Let's take a look** : A brief explanation is given to make the concept clearer. It includes tables, concept diagrams, flow charts, figures, etc.
 - **Let's Practice** : The questions are designed with a balance of knowledge, understanding, application and skills to further practice the concepts and contents understood.
 - **Links for more study** : To strengthen the concepts in the Activity Sheet, video links of related concepts on the Diksha portal are provided.
5. The Activity Sheet should be solved under the guidance of the teacher. Parents and students should keep in touch with the teacher to stay consistent in the study.
6. Attempts should be made to complete it within the time allotted for each Activity Sheet.
7. **The answers to the questions in the Activity Sheet should be solved in a separate notebook and preserve the notebook for internal assessment.**
8. Small activities as well as experiments are given. These should be performed by the students in the presence of parents or teachers.
9. Students should better understand the concept by watching the related videos using the links given at the end of the Activity Sheet.
10. Seek the help of your parents or teachers if you have any problems solving the Activity Sheet. We are confident that you too will successfully complete this bridge course and prepare yourself for the new academic year 2021-22 with confidence.

Best wishes for completing the bridge course with sincerity and self-effort!

Instructions for teachers

The global crisis of coronavirus outbreak in the academic year 2020-21 has led to many difficulties in direct classroom teaching. We all tried to reach out to the students using various media. We also had great success in it. But due to lack of direct teaching, our efforts were facing many limitations. The crisis is not over yet. There is a question mark over the commencement of schools in the academic year 2021-22. This bridge course is created to review the studies done by our students in the academic year 2020-21, as well as for pre-preparation of the current academic year curriculum.

1. The bridge course is to be completed in a period of 45 days.
2. In this bridge course, the most important concepts of the previous year have been included and presented in the form of Activity Sheets.
3. Each of the Activity Sheets is constructed in such a way that they contain small activities and experiments which can be easily performed by the students using the materials that are readily available .
4. Understand the structure of the Activity Sheet in a systematic way, so that it will be easier to solve.

Let's Understand : Here are the key concepts included in the Activity Sheet related to last year's lesson. Much emphasis has been placed on last year's concepts, which have been further expanded this year.

Reference : Reference is made to last year's lesson. Students should be instructed to use their last year's textbook.

Learning Outcomes / Competency Statements : Learning Outcomes and developing competencies that can be achieved through the given Activity Sheet. While solving the Activity Sheet, attention should be paid to the achievement of the learning outcome, as well as to the development of the relevant competency.

Let's take a look : A brief explanation is given to make the concept clearer. It includes tables, concept diagrams, flow charts, figures, etc. Here you can design various other learning experiences. Important points and brief information are provided to make your teaching easier. You can add explanations to those concepts as per available time.

Let's Practice : The questions are designed with a balance of knowledge, understanding, application and skills to further practice the concepts and contents understood. The practice questions in each Activity Sheet should be written by the students in an independent notebook. This will lead to revision as well as writing practice. These notebooks should be submitted after completion of the bridge course.

Links for more study: To strengthen the concepts in the Activity Sheet, video links of related concepts on the Diksha portal are provided. Students should be instructed to watch these videos at this link at home.

5. This bridge course will be useful for understanding various concepts in the present class, for awakening the students' foreknowledge as well as for reviewing the students' learning.

6. Observe that the students solve the Activity Sheets strictly as per the plan given in the index.
7. The teacher should pay attention to the fact that the students will solve the Activity Sheets in the bridge syllabus honestly and with self-effort. Understand their problems and help them accordingly.
8. After reviewing certain units, the given tests should be attempted by the students. After checking the tests, they should be evaluated by adopting proper criteria and the marks should be recorded.
9. After the evaluation of each test, the students who need therapeutic teaching should be properly guided. Thus all the three tests should be implemented.
10. After completing this 45 days bridge course, you should start teaching your regular course.

Best wishes for the academic year 2021-22 !

Preparatory Bridge Course

Standard : X

Subject: Science and Technology 01

Index

Activity sheet No.	Topic Name
1st July to 15th July 2021	
1	Study of Sound
2	Laws of Motion
3	Measurement of Matter
4	Acid, Bases and Salts
Test No. 01 (Based on Activity Sheet 01 to 04)	
16th July to 30th July 2021	
5	Current Electricity
6	Work and Energy
7	Reflection of Light
8	Carbon: an important element
Test No. 02 (Based on Activity Sheet 05 to 08)	
31st July to 14th August 2021	
9	Carbon: an important element
10	Substances in Common Use
11	Observing Space: Telescope
Test No. 03 (Based on Activity Sheet 01 to 11)	

Let's Understand : Sound waves, Velocity of sound, Reflection of sound, The human ear, audible sound, infrasound and ultrasound.

Reference : Std. IX Chapter 12 Study of Sound

Competency statement :

1. To explain the importance of various sound-related concepts in everyday life and solve various related problems.
2. To draw a diagram of a SONAR station and explain it.
3. To explain the sound-related functions of the human ear with the help of a diagram.

Let's took a look :

Sound waves:

Sound is a form of energy which creates the sensation of hearing in our ears. This energy is in the form of waves. A medium is necessary for the propagation of sound waves. Sound waves give rise to a chain of compression (place of higher density) and rarefaction (place of lower density) in the medium. The particles of the medium oscillate about their central or mean positions, in a direction parallel to the propagation of the wave. Such waves are called longitudinal waves.

Velocity of sound: The distance covered by a point on the wave (for example the point of highest density or lowest density) in unit time is the velocity of the sound wave.

The velocity of sound = wavelength $\times$ frequency

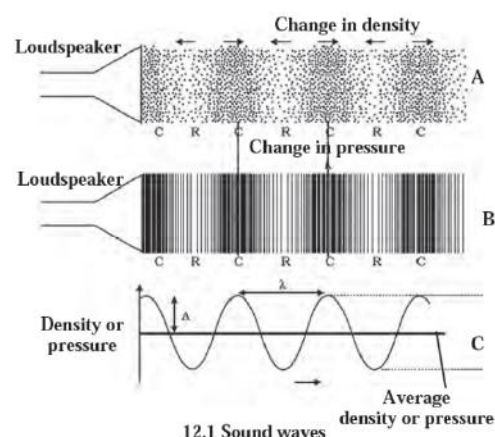
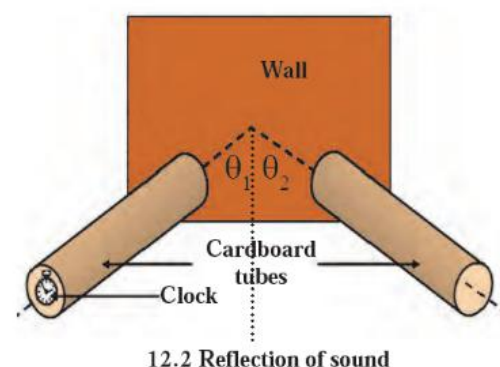
Audible, infra- and ultrasound

The limits of hearing of the human ear are 20 Hz to 20,000 Hz. That is, the human ear can hear sounds of frequencies in this range. These sounds are called audible sounds. Our ears cannot hear sounds of frequencies lower than 20 Hz and higher than 20,000 Hz (20 kHz).

Reflection of sound:

Echo: An echo is the repetition of the original sound because of reflection by some surface.

Reverberation: Sound waves get reflected from the walls and roof of a room multiple times. This causes a single sound to be heard not once but continuously. This is called reverberation.



SONAR:

SONAR is the short form for Sound Navigation and Ranging. It is used to determine the direction, distance and speed of an underwater object with the help of ultrasonic sound waves. SONAR has a transmitter and a receiver, which are fitted on ships or boats. The transmitter produces and transmits ultrasonic sound waves. These waves travel through water, strike underwater objects and get reflected by them. The reflected waves are received by the receiver on the ship.

The receiver converts the ultrasonic sound into electrical signals and these signals are properly interpreted. The time difference between transmission and reception is noted.

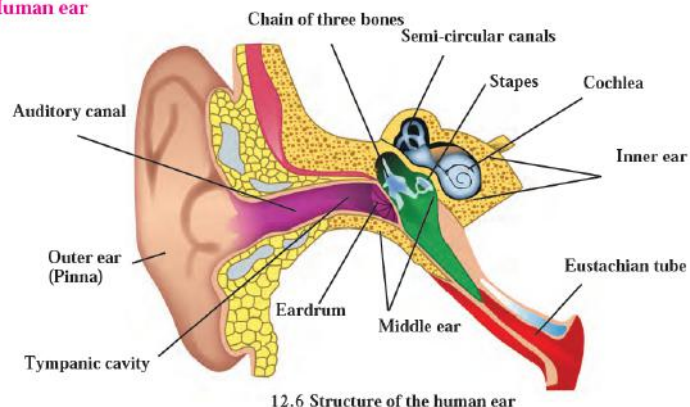
This time and the velocity of sound in water give the distance from the ship, of the object which reflects the waves.

SONAR is used to determine the depth of the sea. SONAR is also used to search underwater hills, valleys, submarines, icebergs, sunken ships etc.

Human ear:

The ear is an important organ of the human body. We hear sounds because of our ears. When sound waves fall on the eardrum, it vibrates. These vibrations are converted into electrical signals which travel to the brain through nerves. The ear can be divided into three parts: 1. Outer ear 2. Middle ear 3. Inner ear.

Human ear



Let's Practice:

1. What is the difference between sound waves and waves rising in water?

2. Give any two known examples of sound reflection?

3. You must have observed the interior of the cinema hall. What measures have been taken to reduce reverberation there?

4. Write any three uses of ultrasound.

5. Collect the information about sonography technology with the help of the internet.

Links for more study :

Study of Sound

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Study of Sound

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Activity Sheet : 02

Let's Understand : Motion, Displacement and distance, Velocity, Acceleration, Newton's laws of motion and related equations.

Reference : Std. IX Chapter 01 Laws of Motion

Competency Statements :

- To verify the cause and effect relationships between motion and laws of motion as seen in various events of everyday life.
- To obtain formulae by drawing graphs involving quantities such as displacement, distance, time and velocity.

Let's take a look :

1. Motion of an object: If the position of an object is changing with respect to its surroundings, then it is said to be in motion. Otherwise, it is said to be at rest.

2. Distance : Distance is the length of the actual path travelled by an object in motion while going from one point to another.

3. Displacement : Displacement is the minimum distance between the starting and finishing points.

4. Speed : Distance travelled by the object in unit time. It is a scalar quantity.

(Unit: m/s and cm/s)

5. Velocity : The displacement that occurs in unit time is called velocity. It is a vector quantity. (Unit : m/s and cm/s)

6. Uniform motion : If an object covers equal distance in equal time intervals, it is said to be moving with uniform speed.

7. Non Uniform motion : If an object covers unequal distance in equal time intervals, it is said to be moving with non uniform speed.

8. Acceleration : The rate of change of velocity is called acceleration. (vector quantity, unit : m/s^2 , cm/s^2)

When velocity increases, acceleration is positive while, when velocity decreases, acceleration is negative.

9. Equations of motion : When the velocity of the object is linear and uniform motion,

$$v = u + at \quad \text{----- (relation between velocity and time) --- (i)}$$

$$s = ut + at^2 \quad \text{----- (relation between displacement and time) --- (ii)}$$

$$v^2 = u^2 + 2as \quad \text{----- (relation between displacement and velocity)---(iii)}$$

here, u = initial velocity of the object,

v = Final velocity of the object in time ' t '

and s = Displacement of the object in time ' t '

10. Uniform circular motion : When an object moves with constant speed along a circular path, the motion is called uniform circular motion.

e.g. 1) The motion of a stone in a sling 2) any point on a bicycle wheel when they are in uniform motion.

Speed of an object moving along circular path = $v = \frac{2\pi r}{T}$ where r = radius of a circle

11. Newton's first law of motion : An object continues to retain at rest or in a state of uniform motion along a straight line unless an external unbalanced force acts on it.
12. Momentum (P) : Momentum is the product of mass and velocity of an object. ($P=mv$), Vector quantity, SI Unit : Kg m/s, CGS unit g cm/s.
13. Newton's second law of motion : The rate of change of momentum is proportional to the applied force and the change of momentum occurs in the direction of force.
14. Newton's third law of motion : Every action force has an equal and opposite reaction force which acts simultaneously.
15. Force = mass x acceleration
Vector quantity, SI unit : Newton (N), CGS unit : Dyne
16. Law of conservation of momentum : When no external force acts on two interacting objects, their total momentum remains constant, it does not change.

Let's Practice :

1) What factors do you consider to determine whether the object is in motion or not?

2) Find out more examples of circular motion in day to day life.

3) Observe the movement of the second hand of a clock. What can you say about its velocity and speed?

4) On which Newton's law of motion the working of the rocket depends? Write the principle of rocket launching in your words.

5) Take 5 examples from your surroundings and give explanations based on Newton's laws of motion.

6) Why is it easier to stop a tennis ball as compared to a cricket ball, when both are travelling with the same velocity?

7) Suppose a scooter collides with a truck, which one of the two do you think will be thrown away? Explain in your words.

8) An object moves 18 m in the first 3 s, 22 m in the next 3 s and 14 m in the last 3 s. What is its average speed?

Links for more study :

Laws of motion

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distance and displacement

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Equation of motion

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Type of motion

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Velocity and acceleration

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Inertia, momentum

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Activity Sheet : 03

Let's Understand : Law of chemical combination, Law of conservation of matter, Law of constant proportion, Atomic Size, The mass of an atom, Chemical symbol of elements, Molecular mass, Valency.

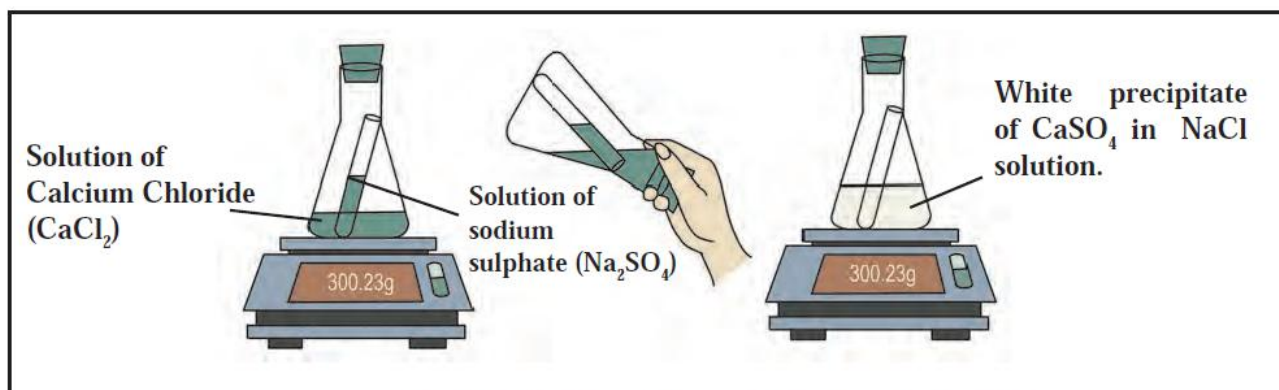
Reference : Std. IX, Chapter 04 Measurement of Matter

Competency Statement : 1) To verify the law of chemical combination, conservation of mass, and constant proportions and to make inferences based on them.

2) To state the meaning of the concept of molecular mass and mole to recognise and write some molecular formulae as also to explain them.

Let's take a look :

1) Law of chemical combination : Compounds are formed by chemical combination of elements. The composition of a substance changes during a chemical change. Scientists could write the molecular Formulae of various compounds on the basis of Dalton's atomic theory. We shall verify the laws of chemical combination by means of known molecular Formulae.



4.1 Verification of law of the chemical combination

In above activities the mass of the original matter and the mass of the matter newly formed as a result of the chemical change are equal.

2) Law of conservation of matter : In 1785, the French Scientist Antoine Lavoisier inferred from his research that 'there is no rise or drop in the mass of the matter during a chemical reaction.' In a chemical reaction the total mass of the reactants is the same as the total mass of the products formed due to the chemical reactions.

3) Law of constant proportion : "The proportion by mass of the constituent elements in the different samples of a compound is fixed."

4) Atomic Size : The size of an atom is determined by its radius. The atomic radius of an isolated atom is the distance between the nucleus of an atom and its outermost orbit. Atomic radius is expressed in nanometres.

5) The mass of an atom : The mass of an atom is concentrated in its nucleus and it is due to the protons (p) and neutrons (n) in it. The total number of protons and neutrons in the atomic nucleus is called the atomic mass number. The unit of atomic mass is Dalton (μ)

6) Chemical Symbols of elements : The symbol of an element is either the first letter or the first and second/another specific letter in its name. Of the two letters, the first is written as capital letters and the second is small.

7) Molecular Mass : The Molecular mass of a substance is the sum of the atomic masses of all the atoms in a single molecule of that substance. Like atomic mass, molecular mass is also expressed in the unit Dalton (u)

8) Valency : The capacity of an element to combine is called its valency. The number of electrons that an atom of an element gives away or takes up while forming an ionic bond, is called the valency of that element.

Let's Practice :

Q.1. Complete the following table

Complete the following chart.

Element	Atomic number	Electron configuration	Valence electrons	Valency
Hydrogen	1	1	1	1
Helium	2	2	2	0
Lithium		2,1		
Beryllium	4			2
Boron	5	2,3		
Carbon		2,4	4	
Nitrogen	7			3

Q.2. Calculate the mass of constituent elements of Copper Oxide from its molecular formula CuO.

Q.3. Write down the cations and anions obtained from the compounds in the following chart.

Base	Cation	Anion	Acid	Cation	Anion
NaOH			HCl		
KOH			HBr		
Ca(OH) ₂			HNO ₃		

Q.4. Find and give the name of two scientists from the following picture and collect the information from the Internet.



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Links for more study :

Laws of Chemical Combinations

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Atom - Size, Mass and Valency

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Molecular Mass

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Chemical symbols of an Element

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Valency

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Activity Sheet : 04

Try to understand: To classify substances of everyday use with the help of indicators and to explain their uses on the basis of experiments

Reference: Std-IX, Chapter 05, Acid Bases and Salts

Competency Statement: Can classify substances of everyday use with the help of indicators

Let's take a look:

Using indicators we can detect whether given substances are acid or base.

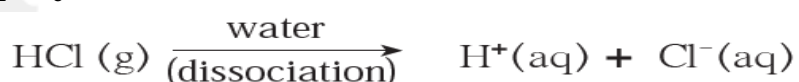


Substances	Taste	Colors in different indicators				
		Litmus		Turmeric	Methyl Orange	Phenolphthalein
Acid	Sour	Blue	Red	Yellow	Pink	Colorless
Base	Bitter	Red	Blue	Red	Yellow	Pink

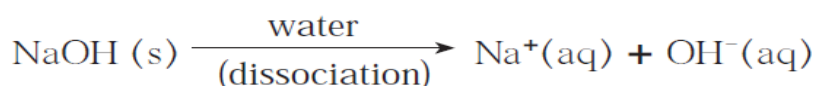
Arrhenius Theory of Acids and Bases:

Acid: Acid is a substance which on dissolving in water gives rise to H^+ ion as the only cation

Ex. HCl , H_2SO_4 , H_2CO_3



Base: A base is a substance which on dissolving in water gives rise to OH^- ion as the only anion.



Classification of acid and bases according to dissociation:

Strong Acid/Base	Complete dissociation in aqueous solution	$HCl/NaOH$
Weak Acid/Base	Does not dissociate completely in aqueous solution	CH_3COOH/NH_3
Alkali	Bases highly soluble in water	$NaOH/KOH$

Basicity of Acids: The number of H^+ ions obtainable by the dissociation of one molecule of an acid is called basicity of Acids.

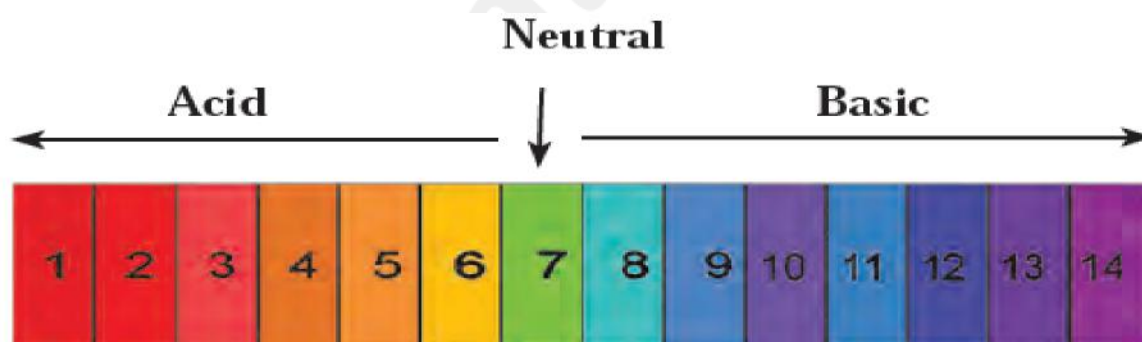
Acidity of Bases: The number of OH^- ions obtainable by the dissociation of one molecule of an base is called Acidity of Acids.

Concentration of acid and base:

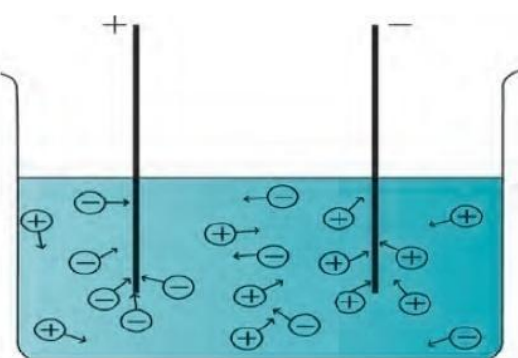
Cut a lemon into two equal parts. Take the juice of each part into two separate beakers POUR 10 ml of drinking water in one beaker and 20ml in the second. Stir the solutions in both the beakers and taste them. Is there any difference in the taste of the solutions in the two beakers? What is it?

A (10ml)	B (20ml)
More Sour	Less Sour
Quantity of solute is more	Quantity of solute is less
Concentrated Solution	Dilute Solution

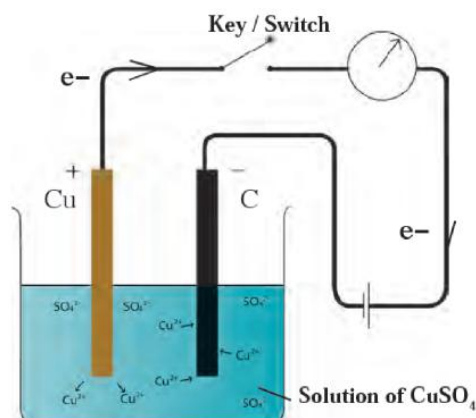
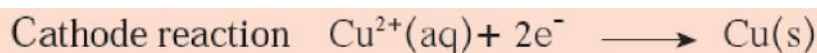
pH of the solution: Acid and Bases dissociate to a smaller or larger extent on dissolving in water forming H^+ and OH^- ions are found in different proportions in all natural aqueous Solutions and that determines the properties of those solutions.



Dissociation of ions:



Electrolysis:



Let's Practice :

1. From the following reaction find whether the given substance is Acid or Base.



2. Explain what will happen with reason.

a) Lime juice is added in baking soda

b) A litmus paper was added in 2ml of dilute HCl

c) Dilute H_2SO_4 was taken in an electrolytic cell and electric current was passed through it.

3) Correct the following sentences and write.

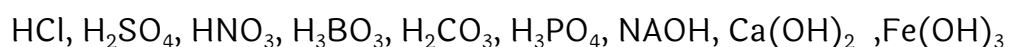
i) Strength of acid goes on increasing from 0 to 7 on pH meter scale.

ii) Blood is acidic.

iii) Gastric juice is a weak acid.

iv) To reduce acidity in our body lime water is used.

4) Classify following substances into monobasic, dibasic and tribasic acids and bases.



Monobasic: _____

Dibasic: _____

Tribasic: _____

5) Do the following activity and note the observations

Take white paper and take a little turmeric powder and make a paste of it. Give a layer of paste on white paper with cotton or brush and let it dry. Now take some lime juice in one bowl and a little soap water in the second bowl. Now with a dropper drop few drops of lime juice and soap water on paper and observe the changes and note them in a table. What type of indicator is turmeric? Try to find out different indicators like turmeric.

	Lemon Juice	Soap Water
Turmeric		

Links for more study :

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Note:1) All questions are compulsory.

2) The number to the right of the questions indicate full marks.

3) Scientifically correct, labelled diagrams should be drawn wherever necessary.

Q.1) Solve the following questions in one sentence (Any Five)

5 Marks

1) What is meant by sound?

2) Define momentum. State its SI and CGS units.

3) Which particles are present in the nucleus of an atom?

4) Write the name of each of the acidic and basic substances used in daily life.

5) What is the main difference between the frequencies of the voice of a man and that of a woman?

6) If on a turning, Manoj changes the direction as well as the speed of the motorcycle, what will be the effect on its velocity?

7) Complete the chemical reaction.



8) Explain what is meant by universal indicator? Give the two examples of natural indicators.

Q.2) Solve the following questions (Any Five)

10 Marks

A) Kiran goes to an empty, closed newly constructed house with her parents. While discussing with them, she is totally confused because she cannot hear a distinct and clear sound. So she asked the following questions to her parents. Give the answers to those questions.

1) Why do we hear mixed, unclear and loud sounds in this house?

2) What is this type of sound called?

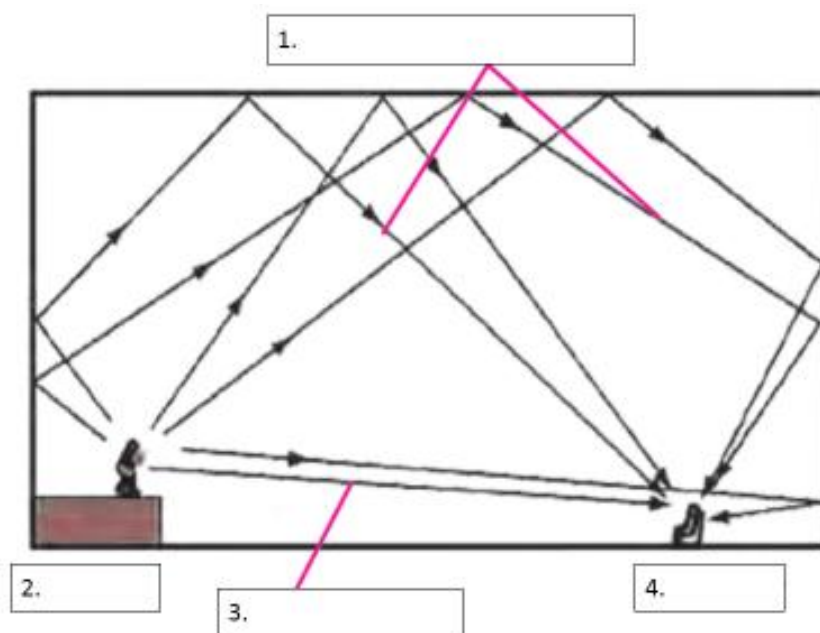
B) Identify me: I am blue in color, have a drop of water in my body. I turn it into white powder when heated. Guess who I am? What is my molecular formula?

C) Complete the following table

	u (m/s)	a (m/s ²)	t (s)	v = u + at (m/s)
1.	0	5	5	_____
2.	_____	1	8	16

D) Give scientific reason : The valency of Sodium is 1.

E) Observe the following picture and label the numbered parts.



Reverberation

F) What are electrolytes? Write their characteristics.

G) Give the chemical name of compound – KOH and Calculate its molecular mass.
(Atomic mass K=39, O=16, H=1)



Activity Sheet : 05

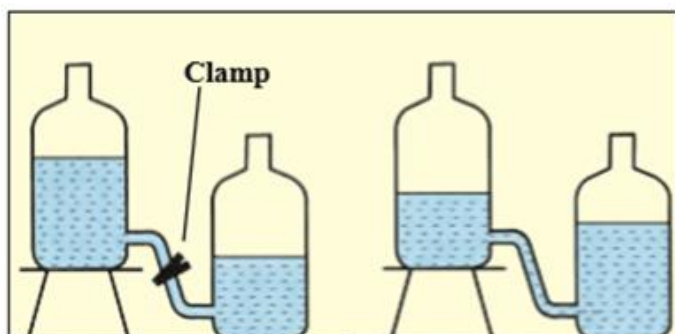
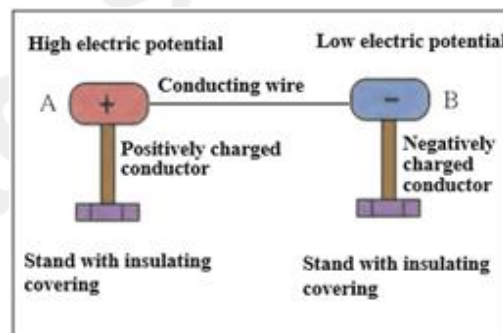
Let's Understand : Electric potential and potential difference, Flow of electric current, Electric circuit and components, Conductors and insulators Resistance and Ohm's law, Resistance connecting and effective resistance.

Reference : Std.IX Chapter 03 Current Electricity

Competency Statements :

1. To study effects of electric current.
2. To correlate different concepts related to electric current with daily life.
3. To create awareness about safety precautions while handling electric gadgets.

Let's take a look:



Electric potential and potential difference:

1. Just like water, the flow of electric charge between two points depends on a kind of electric level at those points. This level is called electric potential.
2. The difference between the values of potentials at two points A and B is called the potential difference between them.

Potential difference of a cell :

1. Just like water, the flow of electric charge between two points depends on a kind of electric level at those points. A positive charge flows from a point of higher potential to a point of lower potential.
2. If conductor A is at a higher potential than conductor B then, the difference between the values of potentials at two points A and B is called the potential difference between them.

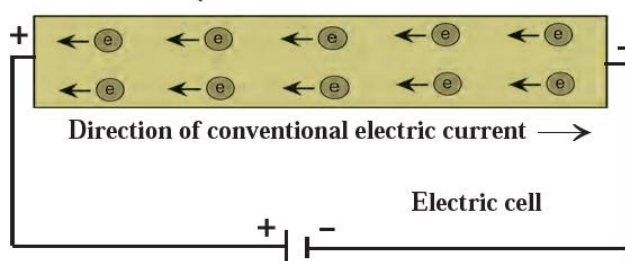
Very small values of potential difference are expressed in the following units. 1) 1mV (millivolt) = 10^{-3} V 2) 1μV (microvolt) = 10^{-6} V	Large values of potential difference are expressed in the following units. 1. 1kV (kilovolt) = 10^3 V 2. 1MV (megavolt) = 10^6 V
---	--

Flow of electric current :

Every atom of a metallic conductor has one or more outermost electrons which are very weakly bound to the nucleus. These are called free electrons.

These electrons can easily move from one part of a conductor to its other parts. The negative charge of the electrons also gets transferred as a result of this motion.

If a conducting wire is not connected to a cell, its free electrons move randomly in all directions in the space between the atoms.



When we connect the ends of the wire to the two terminals of a cell, electric force acts on the electrons. Being negatively charged, they start moving from the negative (lower potential) to the positive (higher potential) terminal of the cell.

Due to the flow of these electrons, current starts to flow through the wire.

Quantities related to electric current :

Sr. No.	Name of quantity	Meaning / Definition	Formula	Units	
1.	Potential difference	The amount of work done to carry a unit positive charge from point A to point B is called the electric potential difference between the two points.	$V = W/Q$	Volt (V)	$1V = 1J/1C$
2.	Electric current	The charge passes through a conductor in unit time.	$I = Q/t$	Ampere (A)	$1A = 1C/1S$
3.	Resistance	Ratio of Potential difference and electric current.	$R = V/I$	Ohm	$1 \text{ Ohm} = 1V / 1A$
4.	Resistivity	Resistance capacity of a substance.	$R \propto l/A$	Ohm - meter	

Ohm's law :

The relationship between the current flowing through a wire (I) and the potential difference across its ends (V) can be obtained from Ohm's law.

If the physical state of a conductor remains constant, the current (I) flowing through it is directly proportional to the potential difference (V) between its two ends.

$$I \propto V, \quad I = kV \quad (k = \text{constant of proportionality})$$

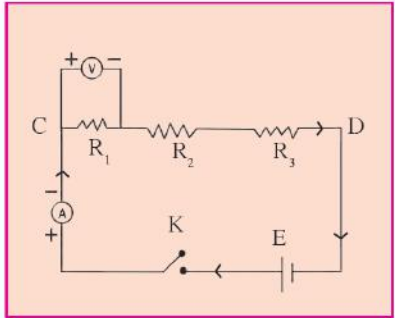
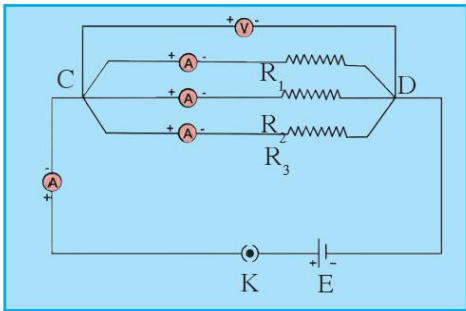
$$I \times 1/k = V \quad (1/k = R = \text{Resistance of the conductor})$$

$$I \times R = V \quad \text{Hence } V = IR \text{ or } R = V/I \text{ This is known as Ohm's law.}$$

Electric circuit: A continuous path of an electric current through conducting wires connected to the two ends of a cell and other resistances is called an electric circuit.

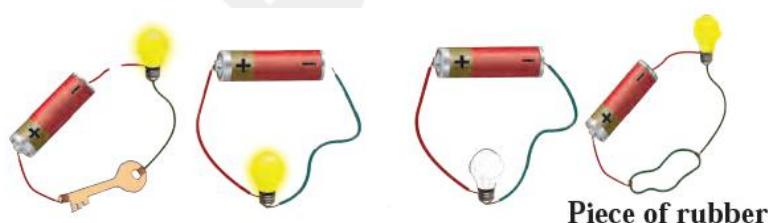
Conductors	Insulators
Current can flow easily through such materials.	Current cannot flow through such materials.
They consist of free electrons.	Does not consist of free electrons.
They have very low resistance.	They have extremely high resistance
Ex. Metals	Ex. Non metals

System of resistors and effective resistance :

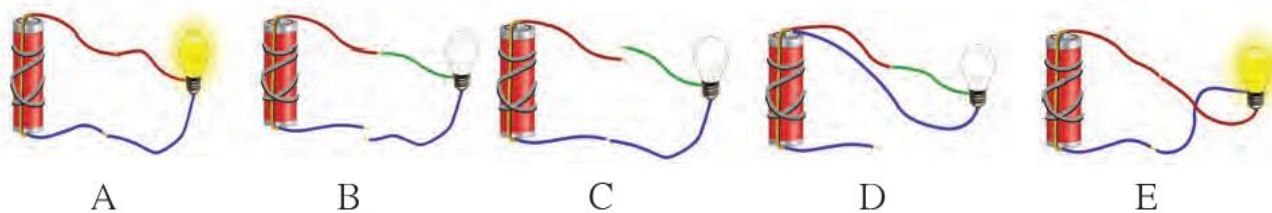
Resistors in series	Resistors in parallel
	
1) The same current flows through each resistor.	The potential difference across the end of all resistors is the same.
2) The effective resistance of the resistors is equal to the sum of their individual resistances.	The inverse of the effective resistance is equal to the sum of the inverses of individual resistances.
3) The effective resistance is larger than each of the individual resistances.	The effective resistance of resistors connected in parallel is less than the least resistance of individual resistors
4) This arrangement is used to increase the resistance in a circuit.	This arrangement is used to reduce the resistance in a circuit.
5) $R_s = R_1 + R_2 + R_3 + \dots$	$1/R_p = 1/R_1 + 1/R_2 + 1/R_3$

Let's Practice :

Q.1) Point out the mistakes in the figure given below.



Q.2) Why are the bulbs in Figures B, C and D below not lighting up ?



Q.3) The accompanying figure of the house shows some electrical appliances connected in a circuit. Answer the following questions related to figure.

a) By which method are the appliances connected?



b) What must be the potential difference across individual appliances?

c) Will the current passing through each appliance be the same? Justify your answer.

d) Why are domestic appliances connected in this way?

Links for more study:

Current electricity 1

https://diksha.gov.in/play/collection/do_312528046877925376147723?contentId=do_31251815662698496019264

Simple circuit

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Activity Sheet : 06

Let's understand : Work, Energy, Mechanical energy, Law of conservation of energy and Free fall.

Reference : Std. IX, Chapter 02 Work and Energy

Competency Statements :

- 1) To explain the interrelationship between work and energy and to identify the type of work done in everyday instances.
- 2) To explain the logic involved in examples of work, energy and power from everyday life and to solve numerical problems.

Let's' take a look :

1) Work :



In which of the pictures above has work been done?

Work is said to be done when a force applied on an object causes displacement of the object.

$$\text{Work} = \text{Force} \times \text{Displacement}$$

SI unit of work, $W = \text{Newton-meter (Nm)}$, This is called Joule.

1 Joule : If a force of 1 Newton displaces an object through 1 meter in the direction of the force, the amount of work done on the object is 1 Joule.

SI unit of work, $W = \text{Dyne-centimeter}$, This is called erg.

1 erg : If a force of 1 dyne displaces an object through 1 centimeter in the direction of the force, the amount of the work done on the object is 1 erg.

Relationship between Joule and erg: $1 \text{ Joule} = 10^7 \text{ erg}$

- 1) Positive work : When the force and displacement are in the same direction , the work done by the force is positive.

eg. pushing a stalled vehicle.

Negative work : When the force and displacement are in the opposite direction , the work done by the force is negative.

eg. Stopping a moving cycle by applying brakes.

Zero work : When the applied force does not cause any displacement or when the force and the displacement are perpendicular to each other , the work done by the force is zero.

eg. Tying a stone to one end of the string and swinging it round and round by the other end of the string.

- 2) Energy : The capacity of a body to perform work is called its energy.

SI unit : Joule, CGS unit : erg

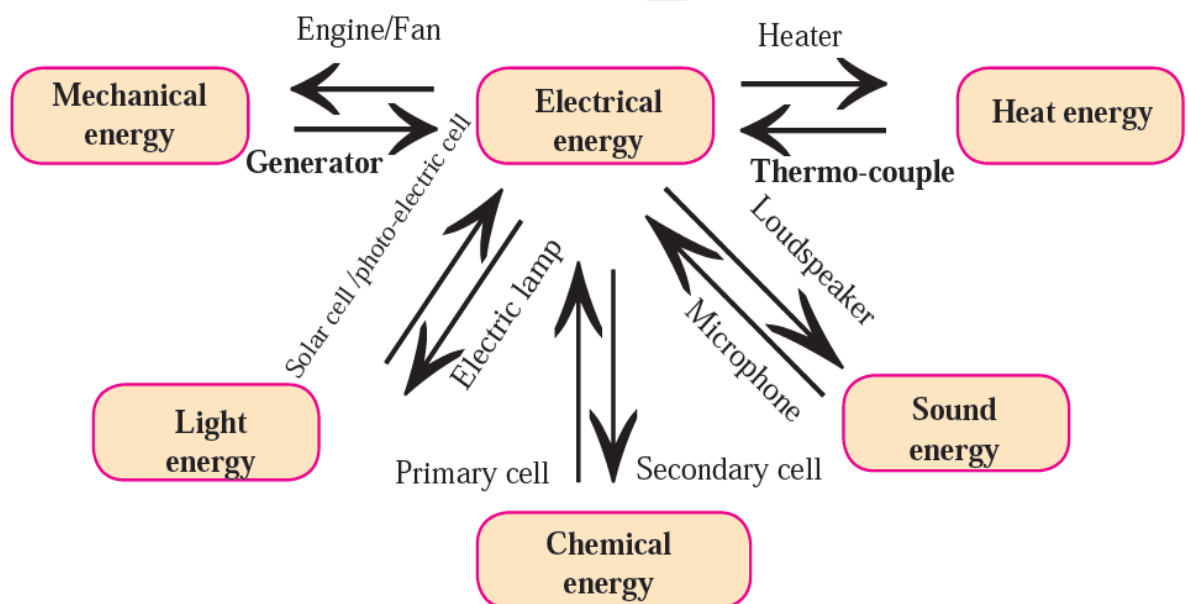
Kinetic energy : The energy which an object has because of its motion is called kinetic energy. Examples : Energy in flowing water, Energy in fast ball.

Equation of kinetic energy (K.E.) = mv^2 (Here m = mass and v = velocity)

Potential energy : The energy stored in an object because of its specific state or position is called its potential energy. Examples : Energy in stretched bow, Energy in compressed spring, Energy in stored water kept at height.

Equation of potential energy (P.E.) = mgh (Here m = mass, g = acceleration and h = height)

- 3) Transformation of energy : Energy can be transformed from one type to another.



- 4) Law of conservation of energy : Energy can neither be created nor destroyed. It can be converted from one form into another. Thus, the total amount of energy in the universe remains constant.

- 5) Free fall : An object falling solely under the influence of gravitational force is said to be in free fall or to be falling freely.

Every object has potential energy when it is at height above the ground and it keeps getting converted into kinetic energy as the object falls towards the ground.

- 6) Power : Power is the rate at which work is done.

If W amount of work done in time t then, Power = Work/time i.e. $P = W/t$

The SI unit of power is J/s. This is called watt. ($1W = J/s$)

In the industrial sector the unit used to measure the power is called 'horsepower'.

1 horsepower = 746 watt

The unit of energy for commercial use is kilowatt hour. ($1 kWh = 3.6 \times 10^6 J$).

Electricity used for domestic purposes is measured in units of kilowatt hour. (1 kWh = 1 unit)

Let's Practice:

Q.1) Write down any four forms of energy found in your home.

Q. 2) Name a household appliance that converts electrical energy into light and heat.

Q. 3) Make a list of electrical appliances in your home. Write how energy is transformed in those devices.

Q. 4) Write two examples each of potential and kinetic energy.

Links for more study:

Work: <https://bit.ly/3xdecdr>

Displacement of object: <https://bit.ly/3qOgfT2>

Potential energy: <https://bit.ly/3dII6iO>

Kinetic energy: <https://bit.ly/3xiHfMN>

Law of conservation of energy: <https://bit.ly/3ykEcDO>

Numerical problems on power: <https://bit.ly/3jJhvFq>

Activity Sheet: 07

Let's Understand : Mirrors and types of mirrors, Spherical mirrors and images formed by them, Magnification due to spherical mirrors.

Reference : Std. IX Chapter 12 Study of sound

Competency statement :

1. To identify the different types of mirrors, to give a scientific explanation of the images formed by them and to draw the related ray diagrams.
2. To find the number of multiple images by experiment.
3. To find out the scientific reasons for the use of the different types of mirrors in our daily life.

Let's took a look :

Observe the mirror used at your home, at the side of the bike and in headlights.

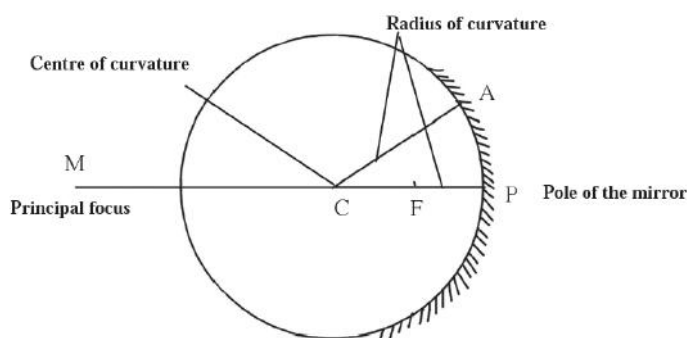
1. Are these three mirrors the same?
2. What is the difference between these three mirrors?
3. Have you noticed any difference between plane and spherical mirrors?
4. Are the side mirrors of the bike and the mirror in the headlight used the same?

Spherical mirrors

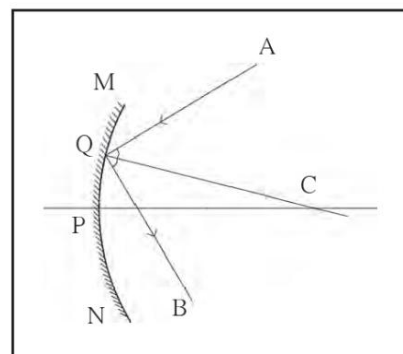
A. Concave mirror and B. Convex mirror

Terms related to spherical mirrors

The light gets dispersed by a convex mirror and focused by a concave mirror.

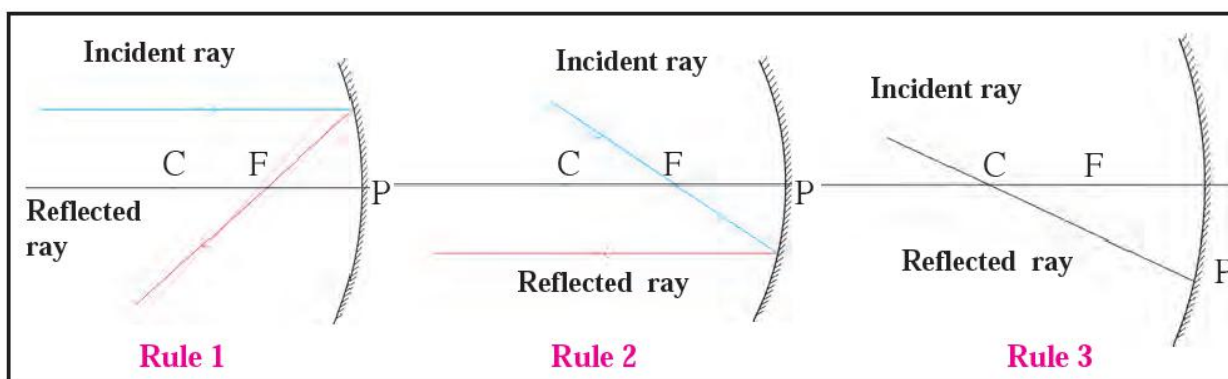


11.7 Terms related to spherical mirrors



11.8 Drawing the reflected rays.

Rules for drawing ray diagrams:



<p>Uses of concave mirrors</p> <ol style="list-style-type: none"> 1. Barber shop, dental hospital – If the object is placed between the pole and focus of the mirror, an erect, virtual and magnified image is obtained 2. Torch and head lamps of vehicles- The source of light is kept at the focus of the mirror. Thus, a parallel beam of light is obtained. 3. Flood lights- The source of light is placed a little beyond the centre of curvature of the mirror. This gives a bright beam of light. 4. Various equipment using solar energy – Sun rays reflected by a concave mirror come together in the focal plane. 	<p>Uses of convex mirrors</p> <ol style="list-style-type: none"> 1. Mirrors on the sides of cars are convex mirrors 2. Big convex mirrors are fitted at the gate and in the square.
--	---

Mirror formula:

We get the correct values of distances by using the Cartesian sign convention. The object distance (u) is the distance of the object from the pole, while the image distance (v) is the distance of the image from the pole. The relationship between the object distance, image distance and the focal length (f) is called the mirror formula. This formula is valid for all spherical mirrors, for all positions of objects, under all circumstances.

Magnification due to spherical mirrors

As the object is always kept above the principal axis, its height is always taken to be positive. For virtual images, the height is positive while for real images, it is negative. As the object is kept on the left of the mirror, its distance (u) is always negative.

Images formed by concave mirrors

No.	Position of the object	Position of the image	Nature of image	Size of the image
1	Between pole and focus	Behind the mirror	Erect, virtual	Magnified
2	At the focus	At infinity	Inverted, real	Very large
3	Between focus and centre of curvature	Beyond the centre of curvature	Inverted, real	Magnified
4	At the centre of curvature	At the centre of curvature	Inverted, real	Same as the object
5	Beyond the centre of curvature	Between the centre of curvature and focus	Inverted, real	Diminished
6	At a very large (infinite) distance	At focus	Inverted, real	Point image

Let's Practice :

1) Name the devices made by using the concave mirrors.

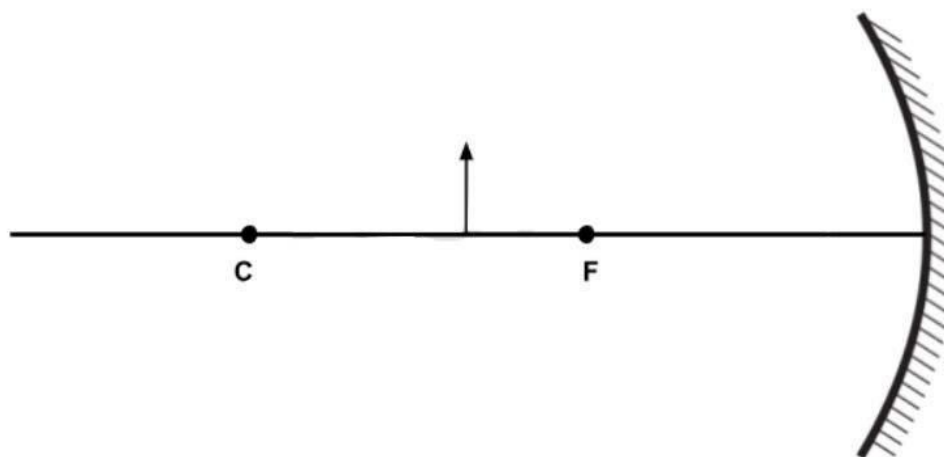
2) How to make a water heater with the help of a concave mirror?

3) Which type of mirrors are used in the following equipment?

Periscope: _____ Shaving mirror: _____

Street light: _____. Head lamps of a car: _____

4) If the object in front of the concave mirror is kept in between the center of curvature and principal focus then, explain the position, nature and size of the image by completing the following figure.



5) Create a kaleidoscope using three plane mirrors, card sheets and colored pieces of bangles etc.

Link for more study :

Reflection of light

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Understanding equation of mirror

https://diksha.gov.in/play/collection/do_312528046877925376147723?contentId=do_31271153942186393617348

Application of mirror

https://diksha.gov.in/play/collection/do_312528046877925376147723?contentId=do_31271152520455782416902

Image formation with plane mirror

https://diksha.gov.in/play/collection/do_312528046877925376147723?contentId=do_31271153477975244816636

How images are formed

https://diksha.gov.in/play/collection/do_312528046877925376147723?contentId=do_31271152934304153617344

Image formation by concave mirror

https://diksha.gov.in/play/collection/do_312528046877925376147723?contentId=do_31271153122630860817347

Image formed by convex mirror

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Activity Sheet : 08

Let's Understand : Carbon, Allotropes of carbon

Reference : Std. IX Chapter 13 Carbon: An important element

Competency Statements :

- 1) To learn the properties of Carbon
- 2) To classify carbon
- 3) To verify the properties experimentally

Let's take a look :

Try this :

- 1) Take some milk in one spoon and in another spoon take a small sample of sugar. Heat the spoons individually on a gas flame. What does the black substance remaining in each spoon indicate?
- 2) Observe the following pictures and find the common factor in them.



Wood



Coke



Natural gas

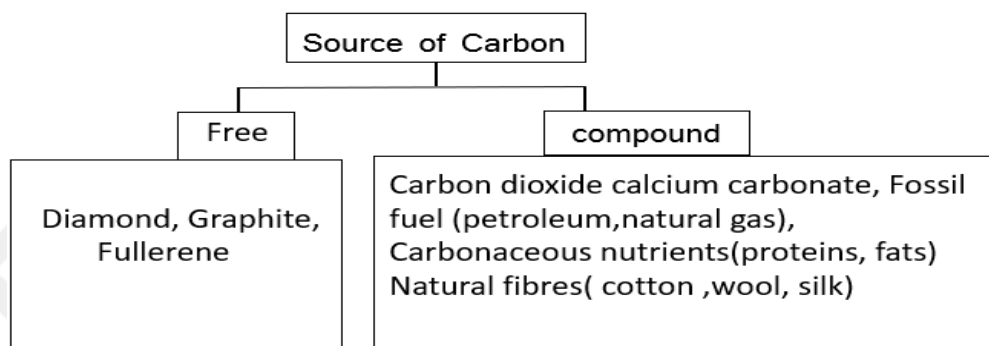


Petroleum



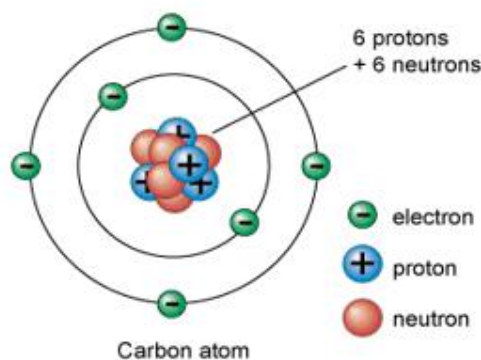
Biogas

Carbon is found in nature in free as well as compound state.



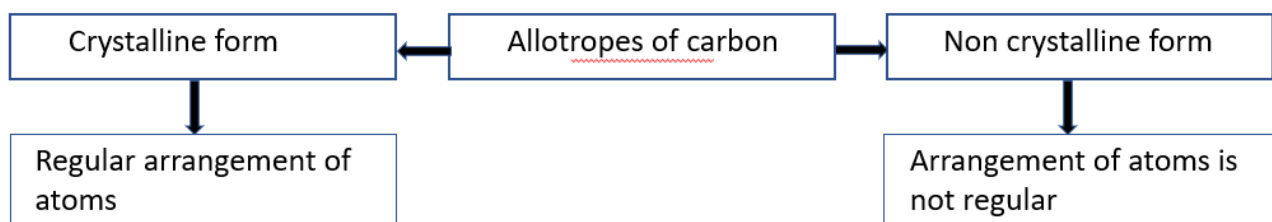
On heating dry leaves, hair, seeds, split pulses, paper and plastic the left over substance is carbon.

1. Symbol of carbon – C
2. Atomic number – 6
3. Atomic mass – 12
4. Electron configuration – 2,4
5. Valency – 4
6. Non-metallic element

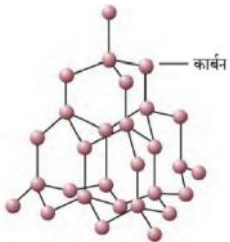
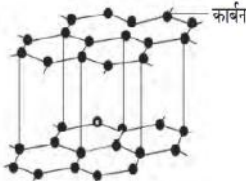
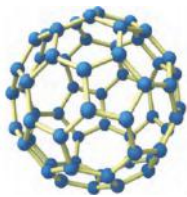


In table, cotton, vegetables, petrol, medicines, paper, oil, foodstuffs, fuels, clothes etc. carbon is a common and important constituent.

Allotropes of carbon—some elements occur in nature in more than one form. The chemical properties of these different forms are the same but their physical properties are different. This property of elements is called allotropy. Like carbon, sulphur and phosphorus also exhibit allotropy.



Three crystalline forms of carbon are given in the table below.

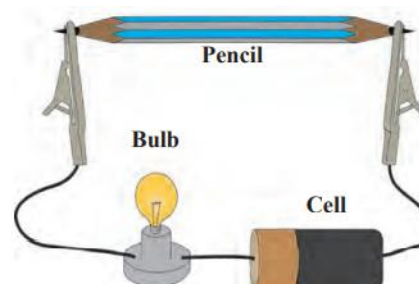
Crystalline form	Properties	Uses	Structure
Diamond	1.Hardest and bad conductor of electricity. 2. Insoluble in any solvent. 3.Acids/Bases have no effects.	1.Cutting glass 2.Drilling machines 3. In ornaments	
Graphite	1.Black, soft, brittle, slippery 2.Good conductor of electricity	1.For making lubricants 2.For making carbon electrodes 3.In pencils 4.In arc lamps	
Fullerene	1.Molecules are found in the form of buckyballs and buckytubes. 2.30 to 900 carbon atoms in one molecule.	1.Used as insulator 2.Catalyst in water purification 3 At certain temperature exhibit superconductivity	

Try this: Apparatus- Pencil, electrical wire battery/cell, small bulb Arrange the above materials as shown in the picture and verify the electrical conductivity property of graphite.

Non crystalline form of carbon: Arrangement of carbon atoms in this form is not regular.

1 Coal: Coal is a fossil fuel. It occurs in the form of Peat,Lignite, Bituminous, Anthracite.

2 Charcoal: The charcoal that is made from animals is made from their bones and horns etc.The charcoal made from the plants is formed by combustion of wood in an insufficient supply of air.



3 Coke: The pure coal that remains when coal gas has been taken away from coal is called coke.

Uses of coke:

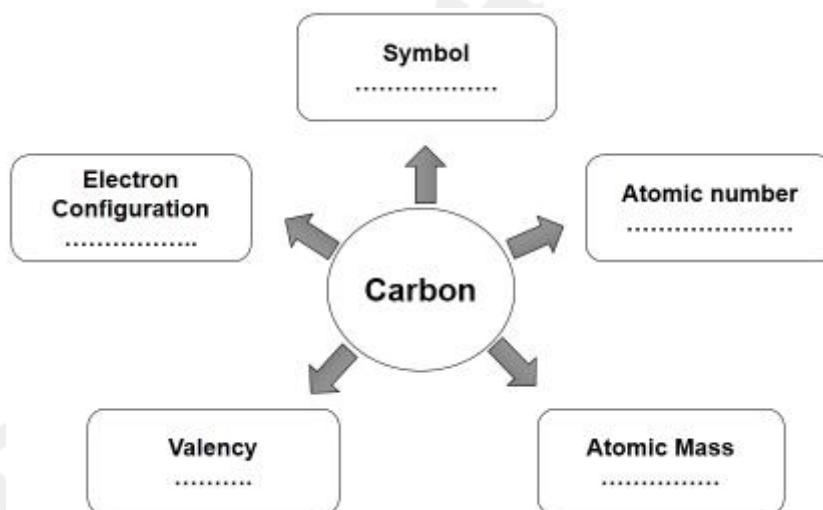
- 1) Domestic fuel
- 2) Reducing agent
- 3) In the production of water gas ($\text{CO} + \text{H}_2$), producer gas ($\text{CO} + \text{H}_2 + \text{CO}_2 + \text{N}_2$)

Let's Practice.:

Q 1) Name the following.

- a) The hardest allotrope of carbon _____
- b) Allotrope found in the form of Bucky ball _____
- c) Non crystalline allotrope that is made from the bones and horns of animals _____

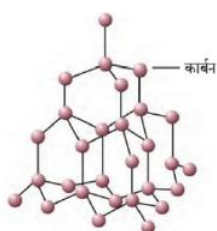
Q 2) Fill in the blanks in the box below.



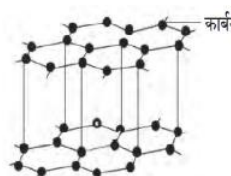
Q. 3) Write any two uses of graphite.

Q. 4) Write the flow chart showing classification of carbon.

Q. 5) Identify the allotropes of carbon from the atomic structure given below and write their two properties .



i) _____



ii) _____

Links for more study :

Carbon Introduction

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Carbon an important element

<https://youtu.be/4E8ShsaWssA>

Allotropy

https://diksha.gov.in/play/collection/do_312528046877925376147723?contentId=do_31275606612578304019269

Note:1) All questions are compulsory.

2) The number to the right of the questions indicate full marks.

3) Scientifically correct, labelled diagrams should be drawn wherever necessary.

Q.1) Solve the following questions.(Any Five)

05 Marks

1) a) 'Graphite is used to make carbon electrodes'. Explain.

OR

b) Why are concave mirrors used in solar equipment?

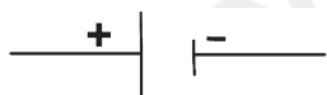
2) Write definition (Any 1)

a) Work b) Potential difference c) Power.

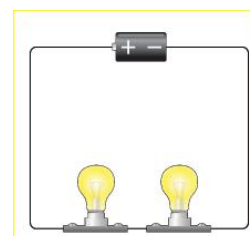
3) Write the mirror formula.

4) Which type of bonds is present in saturated hydrocarbons? Which is the smallest hydrocarbon?

5) Which component of the electrical circuit this symbol denotes?



6) Identify the type of bulb connection in the figure.

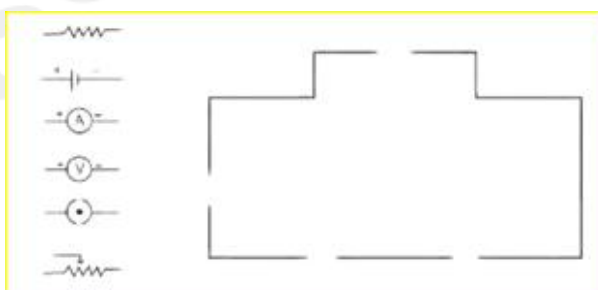


7) If the angle between two plane mirrors is 120° , then calculate the number of images formed.

8) Carbon compounds are found in which two forms?

Q. 2) Solve the following. (Any Five)

10 Marks

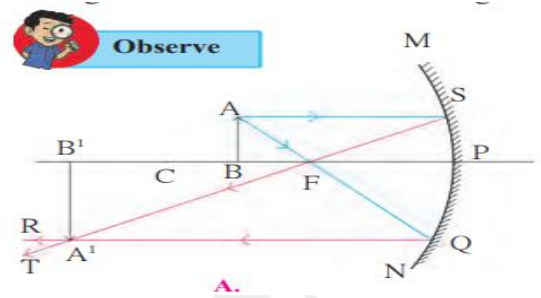


1) The symbols for the components used in electric circuits are given in the chart. Complete the circuit by connecting them at proper positions in the diagram. Which rule can be proved with the help of this circuit ?

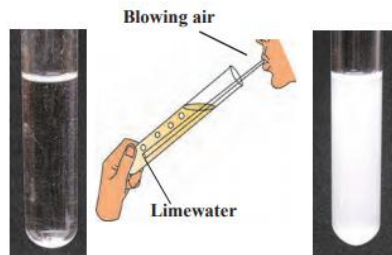
2) Observe the diagram and answer the questions.

1) What is the position of the object?

2) Write the position and nature of the image.



3) What is seen in the given experiment? State the reason behind that.



4) Which gas is released in the fire extinguisher? Write a property and a use of these types of extinguishers.

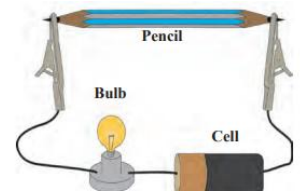


5) Distinguish between. (Any 1)

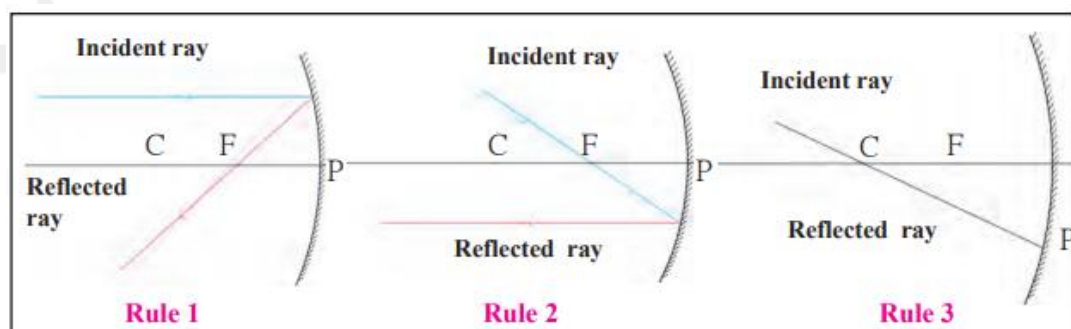
a) Kinetic energy and potential energy.

b) Conductors and insulators.

6) What will happen if an electric current is flown in the circuit in the figure? Which material is present in the pencil? Which property of that material is found in this experiment?



7) Write the rules for drawing a ray diagram by observing the given figures.



8) Resistors having resistances of $15\ \Omega$, $20\ \Omega$ and $10\ \Omega$ are connected in parallel. What is the effective resistance in the circuit?



Activity Sheet : 09

Let's Understand : Organic and Inorganic compound, Hydrocarbon, Covalent compounds, Properties of covalent compound, Saturated and Unsaturated hydrocarbon.

Reference: Std. IX, Chapter 13 Carbon An important element

Competency Statements:

- 1) To identify organic and inorganic compounds in our daily use.
- 2) To draw the structural diagram of a covalent compound in the form of an electron dot model.
- 3) To classify the saturated and unsaturated hydrocarbon

Let's take a look:

Compounds obtained directly or indirectly from plants and animals are called organic compounds and compounds obtained from minerals are called inorganic compounds.

Organic compounds	Inorganic compounds
Paper	Salt
Petrol	Iron
Wax	Water
Natural gas	Hydrochloric acid
Sugar	Carbon dioxide
Protein	Glass

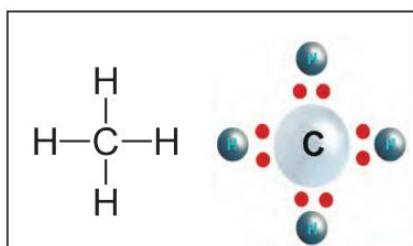
Hydrocarbon : Basic organic compounds

Along with carbon, the element hydrogen is also included in most organic compounds. The compounds formed from only carbon and hydrogen are called basic organic compounds. These are also called hydrocarbons.

The electronic configuration of carbon is 2, 4. If four electrons are added to the second orbit of carbon, its octet becomes complete and its electronic configuration becomes stable like that of the nearest inert gas neon (2,8). Therefore the valency of carbon is 4. This occurs by sharing of electron rather than a give and take of electrons. The chemical bond forms such a way is called as covalent bond.

When a carbon atom shares one electron each with four hydrogen atoms and forms four C-H bonds, a methane CH_4 molecule is formed. The molecule formed by sharing electrons is called a covalent compound.

Structural formula and electron dot model of methane.



Properties of covalent compound:

- 1) Covalent compounds have low melting point and boiling point.
- 2) Generally they are insoluble in water and soluble in organic solvents.
- 3) They are poor conductors of heat and electricity.

Saturated and unsaturated hydrocarbon

The hydrocarbons having only single bonds between carbon atoms are called saturated hydrocarbons. The hydrocarbon having double or triple bonds between carbon atoms called unsaturated hydrocarbons.

Let's Practice :

- 1) Classify the following substances into organic and inorganic substances.

Spoon, Kerosene, earthen pot, wood, bell, carbonates , LPG, DNA

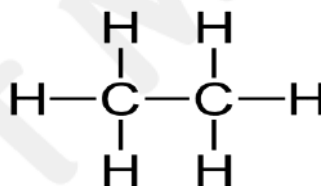
- 2) Find an odd one out.

Sugar, cotton, salt, paper_____

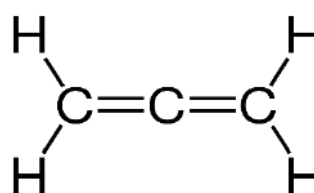
Ethene, Ethane, Ethyne , Propene_____

Methane, Ethane, Ethene, Propane_____

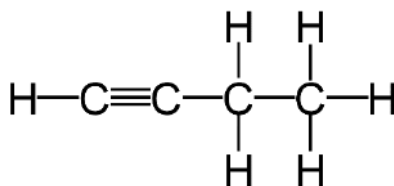
- 3) Observe the following structural formula and identify the type of hydrocarbon.



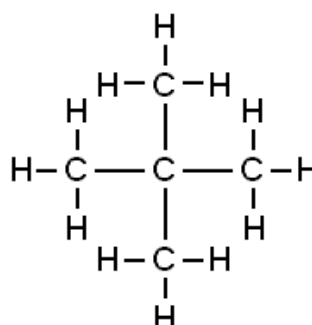
(i)



(ii)



(iii)



(iv)

- 4) The chemical formula of ethane is C_2H_6 . Draw its structural formula.

5) Write the properties of covalent compounds.

Links for more study :

Saturated and unsaturated hydrocarbons

https://youtu.be/x_urclNMoPs

Activity Sheet : 10

Let's Understand :

- 1) Importance of substance and classification in day to day life.
- 2) Radioactive Substances and radiation.
- 3) Some chemical Substances in day to day life.

Reference : Std. IX Chapter 14 Substances in common use.

Competency Statements :

- 1) To explain the concept of salt.
- 2) To explain the important uses and properties of – Sodium chloride (NaCl), Sodium bicarbonate (Baking Soda–NaHCO₃), Sodium carbonate (Washing Soda – Na₂CO₃·10H₂O)
- 3) To explain the uses of radioactive isotopes and its radiation.
- 4) To explain some chemical Substances in day to day life.

Let's take a look :

Salt – The ionic compounds which do not contain H⁺ and OH⁻ ions and contain only one kind of cation and anion are called simple salts. For example– Na₂SO₄, K₃PO₄, CaCl₂ Salts found in Sea water – Sodium chloride (NaCl), Magnesium chloride (MgCl₂), magnesium Sulphate (MgSO₄), Calcium Carbonate (CaCO₃), magnesium bromide (MgBr₂)

Activity – (1) Complete the table.

Sr.No.	Substance	Formula	Property	Uses
1	Sodium Chloride			
2	Sodium Carbonate			
3	Sodium bicarbonate			
4	Bleaching powder			

Radioactive Substance–

Elements with a high atomic number have a property of spontaneously emitting invisible highly penetrating and high energy radiation. This property is called radioactivity. A Substance having this property is called a radioactive Substance.

Three types of radiation are given out by radioactive substances: alpha, beta and gamma rays.

Characteristics – 1) alpha (α) rays

- 1) Alpha (α) ray is the nucleus of helium.
- 2) Alpha rays are positively charged.
- 3) Their penetrating power is very less.
- 4) Their ionization power is very high.
- 5) Mass: 4.0028 u

- 2) Beta (β) rays –
- 1) Beta (β) rays are electrons.
 - 2) Beta rays are negatively charged.
 - 3) Their penetrating power is much greater than that of α -rays.
 - 4) Their ionization power is much less than that of α -rays.

3) gamma (γ) rays –

- 1) Gamma (γ) rays are electromagnetic waves of very short wavelength.
- 2) They are electrically neutral and they have no mass.
- 3) Their penetrating power is very high compared to that of beta rays.
- 4) Thus ionization power is very low compared to that of α -rays and β . rays.

Uses of radioactive isotopes–

1. Industrial field – Isotopes like cobalt 60, iridium –192 are used in radiography cameras.
2. Field of agriculture –, The genes and chromosomes that give seed properties like fast growth, higher productivity etc. can be modified by means of radiation.
3. Field of Medical Science :
 1. Polycythemia – Phosphorus 32 is used in the treatment of polycythemia. The disease in which the count of red blood cells increases.
 2. Bone cancer : Strontium 89, strontium–90, samarium–153 and radium–223 are used in the treatment of bone cancer.
 3. Hyperthyroidism – Iodine – 123 is used in the treatment of hyperthyroidism.
 4. Brain tumour – Boron – 10, Iodine –131, cobalt 60 are used in the treatment of brain tumour.

Hazards of radioactive substance and radiation

1. Radioactive radiation affects the central nervous system.
2. Bombardment of radiation on DNA in the body causes hereditary defects.
3. Diseases like skin cancer, leukemia are caused.

Some Chemical Substances in day to day life:

- | | |
|----------------------------|-------------------|
| 1) Food colors and essence | 2) Dye |
| 3) Artificial colors | 4) Deodorant |
| 5) Teflon | 6) Powder Coating |
| 7) Anodizing | 8) Ceramic |
| 9) Porcelain | 10) Bone China |
| 11) Advanced Ceramics | |

Activity : Complete the table

Substances	Uses	Effects
Food colours and essence		
Dye		
Deodorant		

Let's Practice :

1) Name the water of crystallization used in the blood test to diagnose anemia

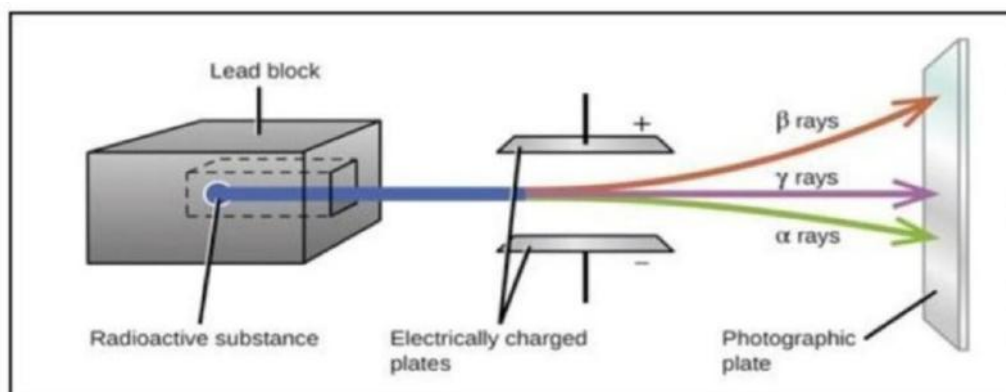
2) Classify –

No.	Substance	Acidic	Basic	Salt	Neutral
1	Curds				
2	Baking soda				
3	Salt				
4	Water				
5	Toothpaste				
6	Soap				
7	Milk				
8	Alum				

3) When is the nucleus said to be unstable?

4) Write the name of the compound used for disinfecting drinking water.

5) Complete the table with the help of a given diagram.



Rays	Nature	Mass	Charge	Velocity	Deviation in the electric field
Alpha Rays (α)					
Beta rays (β)					
Gamma rays (γ)					

6) State the uses of radioactive elements in the field of medical science.

7) Write any two uses.

1) Ceramic

2) Bone China

Links for more study:

- 1) <http://youtu.be/pOeoXS9cZzc>
- 2) https://youtu.be/G6_qwIDZ5GA
- 3) <https://youtu.be/MOgl1OCGxF8>

Activity Sheet : 11

Let's Understand : Different forms of light, different types according to wavelengths, Telescopes and different types of telescopes, Telescopes in space, Indian Space research Organization (ISRO)

Reference : Std. IX Chapter 18 Observing Space: Telescopes

Competency Statement :

- 1) To identify the types of radiation according to wavelength.
- 2) To explain different types of telescopes.
- 3) To understand information about ISRO

Let's take a look :

Different Forms of light

Light: meaning: Light is an electromagnetic wave.

Characteristic: Light waves have the characteristic of wavelength.

Human eye can see the light of wavelengths between 400nm- 800nm – Visible light rays

Type of Radiation	Wavelength
Radio waves	Longer than about 20 cm
Microwaves	0.3mm - 20cm
Infrared waves	800nm -0.3 mm
Ultraviolet rays	300nm -400nm
X-rays	3nm -300nm
Gamma rays	shorter than 3nm

1nm = 10^{-9} m and 1pm = 10^{-12} m

Heavenly bodies emit radiation other than visible light, so we need different types of telescopes to receive different types of radiation like X-rays radio waves and to study their resources.

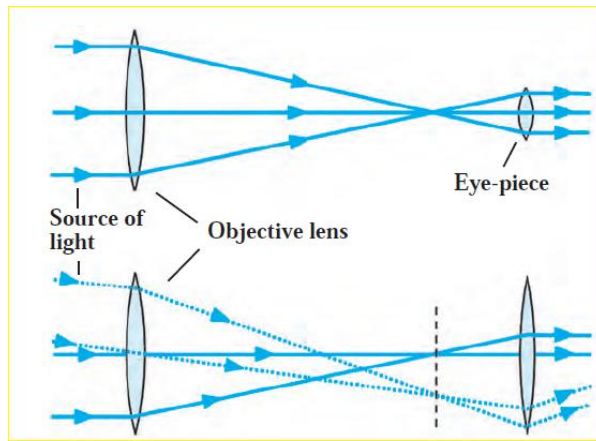
Telescope: Used To see distant objects

Hans Lippershey: In 1608 he made first Telescope keeping two lenses one behind each other

Galileo: He made Telescope in 1609 and used to for space observation



Optical Telescope: They are made with one or two lenses



Use of two or more lenses: These are called as refracting telescope also, as light rays change their direction as they enter a lens from atmosphere and again passing through lens.

Objective lens is large: To collect maximum amount of light coming from heavenly bodies.

Eye piece is smaller: Produces large image of source.

Useful for space observation: but there are some difficulties or errors.

Difficulties:

1. To get a brighter image requires large lenses which are heavy.
2. Size and length of the telescope increases.
3. The images formed by lenses have errors in colors called chromatic aberration.

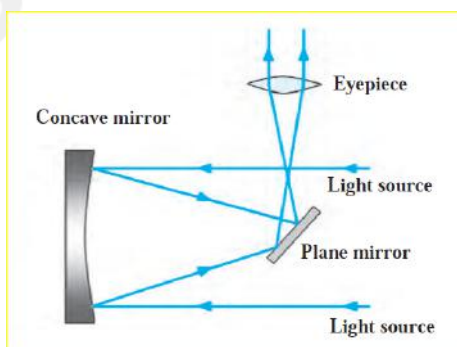
To overcome these difficulties telescopes are made using concave mirrors called Reflecting Telescopes :

Advantages:

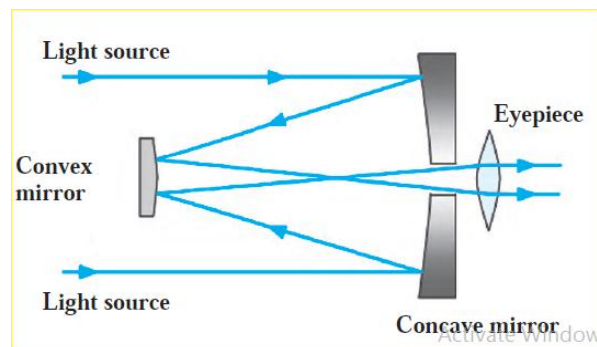
- 1) Easier to make large mirrors as compared to lenses, weight and size is less than that of lenses
- 2) Can see far away stars and galaxies

Types of reflecting telescopes

1. The Newtonian Telescope

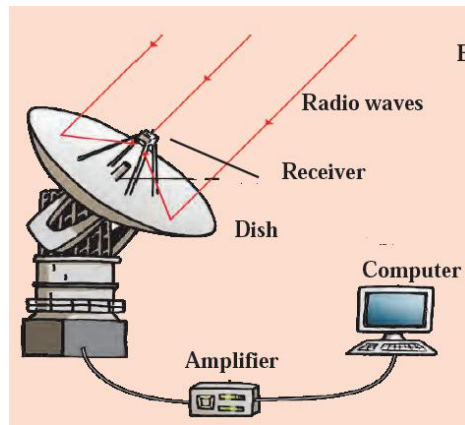


2. Cassegrain Telescope



Radio

Telescope: Heavenly bodies emit radio waves in addition to visible radiations. A special type of telescope is use to receive these rays called Radio Telescope .It is made up of one or more dishes particular parabolic shape .incident radio waves are reflected by these dishes and converge at focus.



Giant Metrewave Radio Telescope (GMRT): Erected at Narayangaon, Near Pune.

Telescopes in Space:

Earth based telescopes present some problems in making good quality observations such as absorption of light rays in the atmosphere, decreasing intensity of light while reaching up to earth's surface, atmospheric pressure and temperature. Because of sunlight or during night city lights or cloudy weather can cause difficulties.

To reduce these problems telescopes are situated at the top of the mountain. To get rid of all above problems completely, they should be placed above the earth's atmosphere, in space itself.



Hubble Telescope: Launched by NASA in 1990. Diameter: 94 inches and orbiting at height 589 km. Has helped to make important discoveries.

Chandra X-ray Telescope: Launched by NASA in 1999 – used special mirrors which can reflect X-rays. It is named after Indian scientist Subramanian Chandrashekar. Chandra has given useful information about stars and galaxies.



Indian Space Research Organization (ISRO): Established in 1969 with the aim of developing technology for making and launching artificial satellites

Different satellite series and their roles:

INSAT / GSAT	Telecommunication, Television broadcasting, meteorological services
EDUSAT	Exclusively for education
IRS	Monitoring and management of natural resources, Disaster Management



Astrosat: Unique Artificial satellite launched by ISRO in 2015
It has ultraviolet and X-Ray telescopes and detectors unique system having different kinds of telescopes on single satellite

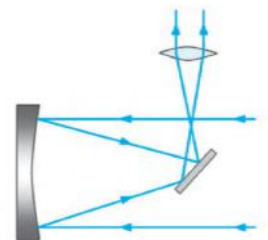
Lets Practice :

Q.1) What are difficulties in using ground based optical telescopes? How are they overcome?

Q.2) Which is the only Indian institute to launch an artificial satellite? Name the different satellite series launched by it?

Q.3) Which is the largest diameter telescope in Asia? Where is it situated? What is its diameter?

- Q.4) a) What type of telescope is shown in the figure?
b) Label the main parts of the telescope?
c) What type of mirror is this telescope based on?



Q.5) Watch the video at the link below and try to make a telescope and observe.

<https://www.youtube.com/watch?v=KnGXZ20V0fE>

Links for more study :

https://diksha.gov.in/play/content/do_31270153211230617617457?referrer=utm_source%3Dmobile%26utm_campaign%3Dshare_content

Note : 1) All questions are compulsory.

2) The number to the right of the questions indicates marks.

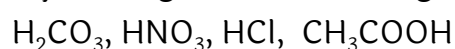
3) Draw the exact, well labeled diagrams wherever necessary.

4) For each multiple choice question, only the correct option number should be written.

Q. 1) Solve the following questions.

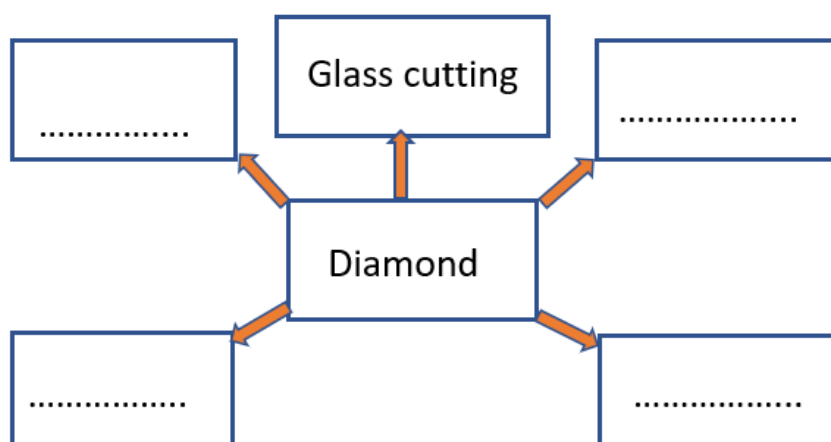
2 Marks each

1. Classify the following acids into strong and weak acids.



2. Give scientific reason: When a moving bus suddenly turns to the right, its passengers leans to the left.

3. Complete the following boxes.

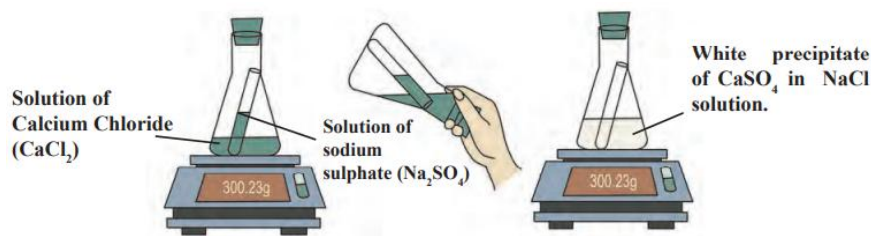


4. Distinguish between saturated and unsaturated hydrocarbons.

5. Complete the following chart.

substance	Litmus		Methyl orange	Phenolphthalein
	Blue	Red		
Acid	_____	Red	pink	colorless
Base	Blue	_____	_____	_____

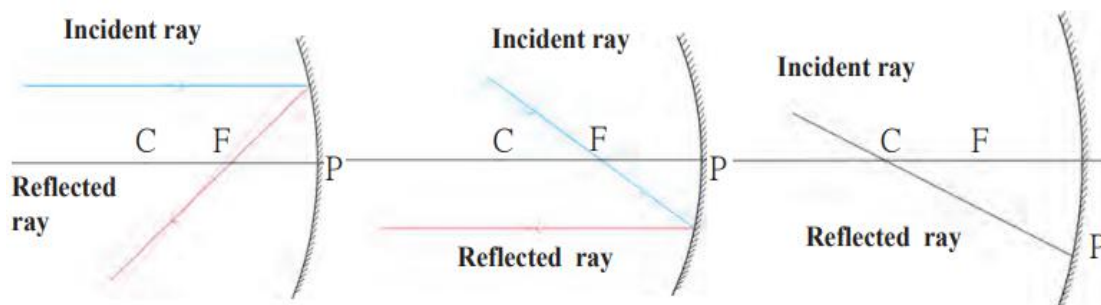
6. Identify which rule is understood by observing the following diagram and write the rule in your own words.



Q. 2) Answer the following questions

3 Marks each

- 1) In the following example determine the direction of force and of displacement. Identify positive, negative or zero work done by applying the force.
 - i) Pushing a stalled vehicle.
 - ii) Tying a stone to one end of a string and swinging it round and round by the other end of the string.
 - iii) Catching a ball thrown by a friend.
- 2) Observe the diagram and write the rules used for drawing ray diagrams.



- 3) Choose the correct word from the bracket and fill in the blanks given in a paragraph.

(20 Hz, infrasound, audible, 20,000 Hz, ultrasound, lower)

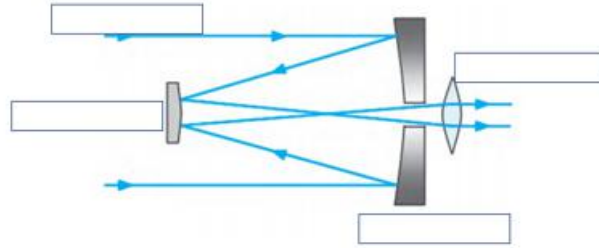
The limits of hearing of the human ear are to 20,000 Hz. That is, the human ear can hear sounds of frequencies in this range. These sounds are called..... sounds. Our ears cannot hear frequencies than 20 Hz and higher than 20 kHz. Sound with a frequency smaller than 20 Hz is called The sound produced by a pendulum and the sound generated by the vibrations of the earth's crust just before an earthquake are examples of such sounds. Sound waves with frequency greater than 20 kHz are called

- 4) Observe the picture given below and answer the questions.

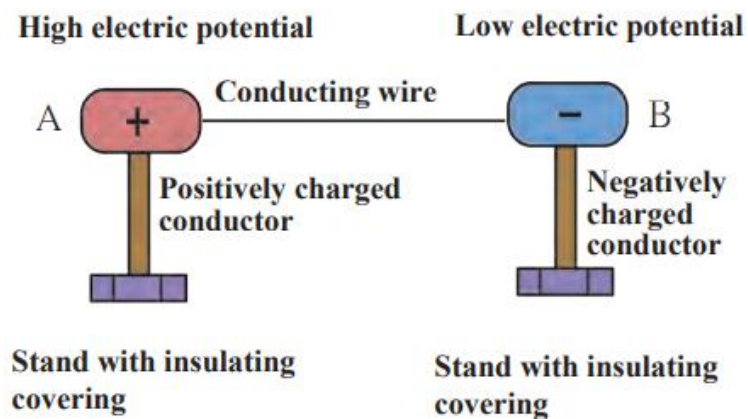


- i. What is the name of the strip in the picture? What is it used for?
- ii. How is it determined whether the substance is acidic, basic or neutral?
- iii. What is the pH value of neutral salts?

5) Observe the diagram given below and answer the questions.



- What type of telescope is shown in a diagram?
 - Label the main parts of the telescope.
- 6) Observe the diagram and answer the questions given below.



- Which conductor is at higher potential?
- What is the direction of flow of electrons through the wire?
- When will the electrons flow through the wire stop?

* * *