Complete the 'inference statements,' based on your interpretation of the data collecter by you, for a concave lens

a. the image is always ..... in nature.

b. The image moves .....(nearer/away)..... to /from the focus as the object is moved progressively closer to the optical centre.

c. The image size keeps on progressively .....(decreasing/increasing) ..... as the object is moved progressively away from the focus.

d. For all object distances less than the focal length, the image is .....(diminished/magnified) ..... with respect to the object.

Suggested Remediation :

The teacher may guide students about

- Choosing an 'appropriate scale' in each situation
- Drawing 'to the scale' ray diagrams
- Observing any regularity/pattern present is a (given) data
- Drawing conclusions on the basis of the observed regularity/pattern in the (given) data.

[**Note:** The 'focal length magnitude', 'object size' and 'object distances' values given are only Suggested in nature and the teacher can make appropriate changes is them for assigning work to different students.]

Human Eye and Colourful World Chapter 11

Assessment Technique: Application based work sheet.

Objective : To enable the student to learn about the

- approximate size (say, r,) of the (normal) eye-ball
- that, in case of human eye, the distance between the screen (the retina) and the eye-lens remains (nearly) fixed irrespective of the distance of the object
- That during normal relaxed vision, $u = -\infty$ and $v = r$.
- That for $u \approx -25$cm, and $v = r$, the eye is looking at an object kept at the least distance of distinct vision.
- That the amazing 'power of accommodation' of the human eye does not really involve a very large percentage change in the focal length of the eye-lens.

Task : Individual numerical problem

Assesment time: 20 Minutes

Procedure Task : The teacher may explain to the students that:

- size of the normal eye-ball may be taken as close to 2.0cm.
- object distance, during normal relaxed vision, of very far off objects, is infinite.
- minimum object distance, during the seeing of nearby objects, has to be (nearly) 25cm for the normal eye.
- Lens formula can be used to calculate the focal length of the eye-lens both for 'far-off' and for 'near' viewing.
- Power of a lens (in diopters) equals the reciprocal of the focal length (in meters).

Assessment Parameters : 1 mark for each correct answer.

Student Worksheet

Instructions : You are given that the size of the normal eyeball is nearly 2cm and the normal eye can adjust the focal length of its eye-lens to see objects situated anywhere from 25cm to an infinite distance away from it

Now answer the following questions:

1. What is the focal length (in metres) of the (normal) eye-lens when it is viewing a very far off object ?
2. What is the power of the eye-lens in this case ?
3. A normal eye is viewing an object kept 25cm away from it. What is the focal length of the eye-lens in this case ?
4. What is the power of the eye-lens for this (normal) near-viewing?

5. How much is the percentage change, in the focal length of the eye-lens, when it adjusts itself, from its normal relaxed position, to the position where the eye can see the 'near-by object' clearly?

Suggested Remediation: Some of the students may not understand that the size of the eye-ball is equal to the image distance irrespective of the position of the object.

The teacher may help the students

- realize that in the case of the human eye, the distance between the lens and the screen (the retina) remains fixed and that this distance is (nearly) equal to the size of the eye-ball.
- use lens formula $\left(\frac{1}{v}-\frac{1}{u}=\frac{1}{f}\right)$ to calculate the focal length of the eye-lens for both (i) very far–off (ii) normal near–viewing.
- calculate the percentage change in the focal length of the eye-lens and appreciate that it is not a very large change.
- appreciate the wonderful capacity of the human eye—its amazing 'power of accommodation'

Human Eye and Colourful World Chapter 11

Assessent Technique: Individual Worksheet

Objective : To enable the learner to get familiar with

- some natural phenomenon based on the dispersion of light.
- places, time and situations under which these phenomenon are best observed
- The ways and means of presenting these observed phenomenon through suitable drawings/paintings/photographs

Assessment Task: Listing, Recapitulation, Drawing

Procedure : The teacher may discuss with the students

- about some natural phenomenon like the rainbow, the red colour of sky at sunset and sunrise times, the blue of sky - based on the multicolored nature of sun light.
- about cause/s – reflection, refraction, total internal reflection, scattering etc.- that are associated with these different phenomenon.
- to look for other interesting natural phenomenon through surfing the net, talking with seniors, reading from books etc.- that are associated with the multicoloured nature of white light.
- record their interesting observations through suitable (coloured) drawings/paintings/ photographs etc.

- to try and visit places, far from the haze and dust of crowded cities, for a clearer and better observation of these natural phenomenon.

Assessment Parameters : Two marks for listing of natural phenomenon

One mark for the recapitulation of the place or (approximate) time of their observations

Two marks for (at least one) drawing/painting/photograph of the natural phenomenon observed.

Student Worksheet

Instructions: Do as directed:

1. Make a list of the natural phenomenon associated with the multicoloured nature of white light.
2. When and where did you observe/last observe (any one/some of) the phenomenon listed above?
3. Draw a drawing or make/collect a painting or give your own/otherwise available photograph of the natural phenomenon that you liked and appreciated the most.

Suggested Remediation :

- Some of the students may not be keen to study the phenomenon and collect relevant information/pictures of the same. The teacher may aruse their curiosity by explosive them to the wonderful world of natural phenomenon like the rainbow, the 'red-colour' of the sky at sun-rise and sun-set, the blue of the sky and so on.
- The teacher may also collect information- to the extent possible – from the net, books, newspaper and magazine reports – about some not so common phenomenon, based on the multicoloured nature of sunlight.
- The teacher may encourage and motivate her/his students to appreciate the boundless beauties and wonders of nature and to do their best to cause least damage to nature and natural surroundings.

The Human Eye and Colourful World Chapter 11

Assessment Technique: Matching Type Worksheet

Objectives : To enable the learner to

- Understand the structure of the human eye.
- Correlate the parts of the human eye to their practical function.

- Study the types of defects in the human eye and their correction.
- Differentiate between the main defects of the eye and to investigate their cause/s.
- Appreciate the role of ciliary muscles and correcting lenses (when needed) to get a clear vision of the objects situated anywhere between 25 cm to infinity.

Assessment Time : 15 minutes

Procedure : The teacher may

- Describe the structure of the eye using a labeled diagram
- Discuss the function of different parts of the eye
- Explain the types of defects of vision and their cause/s.
- Discuss the location of near point/far point of defective eye and compare the same with those of a normal eye.
- Describe how the use of lenses helps in correction of eye defects.

Assessment parameters : Half mark for each correct answer.

Student Worksheet

Instructions :

The following table lists a few functions/phrases/statements in column A. Match these items in column A to the corresponding terms in column B. Note that more than one item in column A may match with the same item in column B.

The matching for A_1 and A_2 is given as an illustration.

Column A	Column B
A_1 Light-sensitive screen	B_1 Hypermetropia
A_2 Cells on this part generate electrical signals upon illumination	B_2 Retina
A_3 Near-sightedness	B_3 Deviation
A_4 Corrected by using bifocal lenses	B4 Myopia
A_5 Inability to see nearby objects clearly	B_5 Ciliary muscels
A_6 With objects at 25cm, the image is formed behind the retina	B_6 Increased focal length of the eye-lens
A_7 Modify the curvature of the eye-lens	B_7 Presbyopia
A_8 Milky and cloudy eye-lens	B_8 Cataract

Column A	Column B
A_9 Near point of the eye moves away	B_9 Reddish colour of the sky
A_{10} Distance of the far point decreases	B_{10} Scattering of light
A_{11} Corrected by a converging lens	B_{11} Refraction
A_{12} Corrected by a concave lens	B_{12} Scattering of light
A_{13} Relaxed ciliary muscles	B_{13} Twinkling of stars
A_{14} Difficulty in reading blackboard while sitting in the last row.	B_{14} Spectrum.
A_{15} Caused by excessive curvature of the eye lens	B_{15} Increase in size of the eye-ball
A_{16} Caused by increased focal length of the eye lens	B_{16} decrease in size of the eye-ball.
A_{17} Caused by light passing through thinner layers of air	
A_{18} Makes the sky appear bluish	
A_{19} The band of coloured components of white light	
A_{20} The phenomenon causing advanced sunrise and delayed sunset.	
A_{21} Caused by changing physical conditions of the atmosphere	
A_{22} Angle formed between the incident ray and the emergent ray in a prism.	

Illustrative answers.

1. $[A_1, B_2]$
2. $[A_2, B_2]$

$\Rightarrow \begin{bmatrix} A_1 \\ A_2 \end{bmatrix} > B_2$

Suggested Remediation:

- Some of the students tend to omit the detailed functioning of some parts of the human eye. The detailed functions of each part e.g. how a ciliary muscle controllers the focal length/curvature of he eye in relaxed/compressed position, should be highlighted.
- The correction of eye defects, requires the detailed study of each of the defects of the human eye. Their causes, their effect on near point/far point and role of the correcting lenses should be discussed in detail and supported with relevant ray diagrams.

Human Eye and Colourful World Chapter 11

Assessment Technique **Diagram based worksheet**

Objectives: To enable the students to

- Learn the function of the lens in a human eye.
- Differentiate between the defects myopia and hypermetropia in terms of the image formed by the eye lens.
- Study the use of spectacle lenses in correction of the Defects of vision.

Assessment Task: Individual worksheet

Approximate Time: 15 minutes.

Procedure: The teacher may

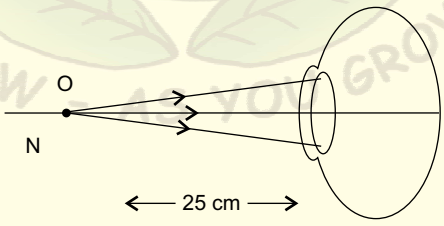
- Discuss the meaning of the power of accommodation of the normal eye.
- Explain the defects myopia and hypermetropia using diagrams.
- Describe the change in the far point/near point a defective eye.
- Explain using diagrams how appropriate lenses are used to correct the (relevant) defect of vision.

Assessment parameters: One mark for each correct answer.

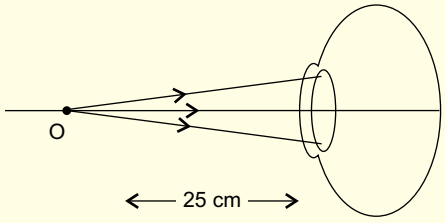
Student Worksheet

Instructions : Complete each of the following diagrams to show the image formation. The nature of the eye, normal/myopic / hypermetropic is indicated with each diagram.

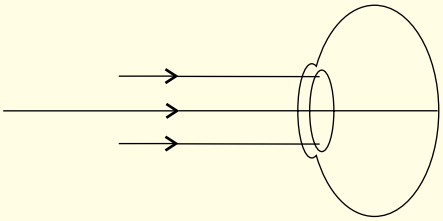
A. Normal eye, object at 25 cm from the eye lens.



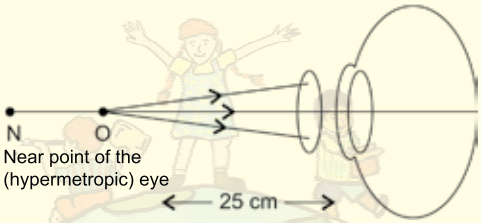
B. Hypermetropic eye, object at 25 cm from the eye lens.



C. Myopic eye, object at infinity.



D. Hypermetropic eye



E. Myopic eye

Suggested Remediation:

1. Analyse the response of the students carefully to identify the type of errors committed by them.
2. Some of the students may fail to draw the (correct ray) diagrams. They may not be aware of the fact that a myopic eye produces image (of a distant object) in front of the retina whereas a hypermetropic eye produces the image (of a nearby object) behind the retina. These points may be highlighted.
3. Generally, the students fail to comprehend the role of a convex correcting lens as a converging lens and that of a concave lens as a diverging lens. These facts should be clearly explained, with appropriate ray diagrams and enough practice should be given to the students to develop the skill of drawing the correct ray diagrams.

The Human Eye and Colourful World Chapter 11

Diagram based worksheet

Objective: To enable the learner to

- Discover that white light is a mixture of colours
- Appreciate that the dispersion is caused by the difference in angles of deviation caused by a prism for different colours
- Correlate dispersion to certain observations in daily life and in nature

Assessment Task: Individual student worksheet

Assessment Times: 10 minutes

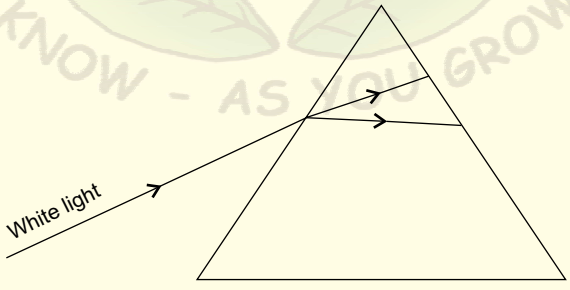
Procedure: The teacher may

- Explain the phenomenon of dispersion of light by means of a diagram and discuss the cause thereof.
- Correlate the phenomenon with observations in daily life, e.g. colours seen in a fountain/waterfall on a sunny day.
- Discuss Newton's double prism experiment, where a recombination of colours by the second prism gives back white light.

Assessment Parameter: One mark may be allotted for each correct answer.

Student Worksheet

Instructions: Study the diagram given below carefully and answer the questions that follow.



1. Complete the above diagram indicating the names of the emerging colours in correct sequences. (1)
2. Name the phenomenon involved. (1)
3. Give an example of the phenomenon occurring in (i) daily life (ii) nature (1)

4. Name the colour which deviates the (i) most (ii) least (1)

5. Explain a method to recombine the separated colours to get back white light. (1)

Suggested Remediation: Some of the students fail to understand the cause of dispersion. The fact that the refractive index of the material of a prism and hence the deviation caused depends on the colour of light may be highlighted.

- The fact that the refractive index increases from red to violet may be emphasized.

The Human Eye and Colourful World Chapter 11

Assessment Technique: Matching Type worksheet

Objectives: To enable the learner to

- Appreciate the role of human eye as the most sensitive and wonderful sense organ.
- Understand the similarity of the human eye with a camera.
- Identify the role/function of different parts of the human eye.
- Differentiate between a normal eye and a defective eye.
- Differentiate between myopia and hypermetropia
- The role and use of lenses in correcting the defects of eye.

Assessment Task: Individual worksheet.

Approximate Time: 20 minutes.

Procedure: The teacher may

- Describe the construction of human eye by mean of a neat and labeled diagram/a3-D model.
- Explain the function of each part of the human eye
- Describe the defects of human eye
- Explain the causes of these defects.
- Illustrate diagrammatically the role and use of lenses to correct these defects.

Assessment Time: 15 minutes.

Assessment parameters: Half mark for each correct answer.

Student Worksheet

Instructions: A few defects of the human eye and the functions/relevant definition, information about different parts of the-human eye are listed in columns A and B below. Select the pairs, in the two column, that match each other.

One Illustrative answer is given in the end.

Column A	Column B
A_1 The human eye	B_1 regulates and controls the amount of light entering the eye
A_2 Automatic accommodation of the eye	B_2 delicate membrane with very large number of light sensitive cells
A_3 Retina	B_3 behaves like a photographic camera
A_4 Ciliary muscles	B_4 Inability to see nearby objects clearly.
A_5 Myopia	B_5 carry electrical signal, generated by the image to the brain
A_6 Cataract.	B_6 Dark muscular diaphragm which controls the size of the pupil
A_7 Presbyopia	B_7 milky and cloudy crystalline lens of the eye
A_8 Iris	B_8 ability of eye to see objects, between 25cm to infinity, clearly
A_9 Pupil	B_9 increase or decrease in the curvature of the eye lens
A_{10} Optic nerves	B_{10} for object at infinity, the image is formed in front of the retina
A_{11} far sightedness	B_{11} decreased power of accommodation due to old age.

Illustrative Answer

$[A_1 ; B_3]$

Suggested Remediation:

- The questions in the worksheet are simple knowledge based questions. A poor response, in the above worksheet, indicates lack of proper understanding of the structure of the human eye and function of its different parts. The structure of eye and the function of each parts of he eye may be highlighted.

Electricity Chapter 12

Assessment Technique: Symbol based worksheet

Objectives: To enable the students to

- Get familiarised with the symbols of different circuits elements.
- Appreciate the significance and advantages of using symbols for drawing circuit diagrams.
- Learn to draw simple circuits diagrams by using symbols.

Procedure: The teacher may explain to the students

- The need for using symbols for drawing circuit diagrams.
- The common symbols used for different circuit elements.
- The method used for drawing circuit diagrams in terms of symbols and give them sufficient practice in drawing simple circuit diagrams.

Assessment Time: 10 minutes.

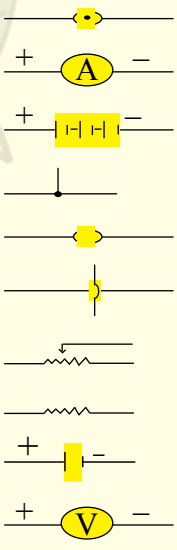
Assessment Parameters: (½) mark for each correct matching and 1 mark for drawing the given circuit diagram in terms of symbols.

Student Worksheet

Instructions: In the following two columns, the names of some common circuit elements and their symbols are given but not in the correct sequence.

Match the given symbols with their corresponding circuit elements.

Column A		Column B
1.	Open plug key	
2.	A wire joint	
3.	A resistor	
4.	Wires crossing without joining	
5.	Variable resistance/rheostat	
6.	A closed plug key	
7.	A battery	
8.	An ammeter.	
9.	A voltmeter	
10.	A Cell	



Suggested Remediation:

- Some students may not be familiar with the various symbols commonly used for drawing electrical circuit diagrams.

- The teacher may familiarize them with these symbols.
- The advantage and significance of using symbols, in drawing circuit diagrams needs to be well explained and strongly emphasized.
- The students may be given sufficient practice in drawing circuit diagrams using appropriate symbols.

Electricity Chapter 12

Assessment Technique: Numerical based worksheet

Objectives: To enable the students to

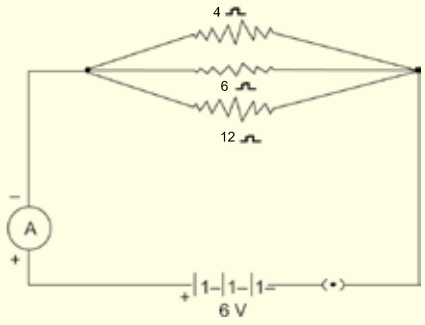
- Understand the meaning of parallel combination of resistors.
- Learn the way of connecting a given number of resistors in parallel.
- Realize that the p.d. across each of the resistors, connected in parallel is equal.
- Understand that the currents flowing, through each of the resistors connected in parallel are different.
- Understand that in a parallel combination more current flows through the lower resistance than in a higher resistance.
- Learn that the total current, drawn from the given battery, by a parallel combination of resistors, is more than that drawn individually, even by the least of the individual resistances.

Procedure: The teacher may

- Describe the meaning of parallel combination of resistors.
- Emphasize that the potential difference, across each of the resistors, connected in parallel, is equal.
- Discuss that the current drawn by each of the resistors, connected in parallel, is different and varies inversely as the resistance.
- Derive the relation $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

Assessment parameter: 1 mark for each correct answer.

Instructions: Observe the given circuit diagram carefully and answer the questions that follow:



1. What are the currents drawn by the least and the highest of the three resistors?
2. What is the current drawn by the 6 Ω resistor?
3. What would be the reading of the ammeter?
4. How much current does the least of the three resistors, draw from the given battery?
5. Is the equivalent resistance of the parallel combination shown, more or less than the least (= 4 – 2) Ω, of the individual resistances?

Suggested Remediation: Some of the students may fail to understand the characteristic features of the parallel combination of resistors.

The teacher may explain that

1. The voltage across each of the three resistors, connected in parallel is the voltage of the battery, i.v., 6V.
2. The current through each of the three resistors can be calculated by using Ohm's law. It varies inversely with the value of the resistance
3. The ammeter reading is the sum of the three currents, flowing through each of the three resistors.
4. The equivalent resistance, of the parallel combination, is less than the least of the individual resistances because it draws more (total) current than the least $(=4\Omega)$ of the individual resistances.

Electricity Chapter 12

Assessment Technique: Concept based worksheet

Objectives: To enable the students to learn that the formula = $R = s\frac{l}{A}$

(i) Implies that the resistance of a wire is directly proportional to its length provided s and A are kept constant.

- That the area of cross section, of a cylindrical wire, varies as the square of its radius (or diameter)

(ii) That the resistance of a wire is inversely proportional to its area of cross section (or diameter squared) provided r and l remain constant.

(iii) That for wires of same length (l) and same area of cross section (A), the resistance is directly proportional is s, the resistively of the material of the wire.

Assessment Task: Individual worksheet

Assessment Time: 15 minutes

Procedure: (1) The teacher may explain to the students how the formula

$$R = s\frac{l}{A}$$

leads to the conclusions:

(i) $R \propto l$ for constant values of L and A

(ii) $R \propto l \frac{1}{A}$ or $R \propto l \frac{1}{(\text{diameter})^2}$ for constant values of l and s

(iii) For different wires of equal length and radius/diameter, the resistance is more for a wire of material of larger resistivity.

2. The students will also be made to realize that the graph between two quantities (R and l) (for constant s and A)) and (R and $\frac{1}{A}$ (or R and $\frac{1}{d^2}$), for constant l and r) and (R and r (for constant l and A (or d)) would be a straight line.

Assessment Time: 15 minutes.

Assessment Task: Individual worksheet

Assessment Parameter: 1 mark for each correct answer.

Instructions: Read the given information carefully and answer the questions that follow:

(1) The resistivity of copper is less than that of aluminum which, in turn is less than that of constantan.

(2) There are nine wires, labeled as A, B, C, D, E, F, G, H, I, that have been designed as per the tabular details given below:

Wire	Length	Diameter	Material	Resistance
A	l	d	Constantan	R_1
B	2l	d	Constantan	R_2
C	3l	d	Constantan	R_3
D	l	d	Copper	R_4
E	l	2d	Copper	R_5
F	l	3d	Copper	R_6
G	l	d/2	Copper	R_7
H	l	d/2	Constantan	R_8
I	L	d/2	Aluminium	R_9

Answer the following questions:

1. Arrange the three values R_1, R_2, R_3 in increasing order.
2. Arrange the three values R_7, R_8, R_9 in decreasing order.
3. Which of the two

   (i) R_4 and R_6

   (ii) R_1 and R_8

   has a lower value?

4. Will the graph between R_1, R_2, R_3 (on the y-axis) and their corresponding length values (on the x-axis) be a straight line?

5. What is the likely value of the ratio R_4/R_6?

Suggested Remediation: Some of the students may fail to appreciate the relation between resistance and the diameter.

The teacher may clearly explain to the students that

(1) The area of cross section changes as the square of the diameter

(2) That the resistance of a wire is directly proportional to its length provided s and A are kept constant.

- That the area of cross section, of a cylindrical wire, varies as the square of its radius (or diameter)

(3) That the resistance of a wire is inversely proportional to its area of cross section (or diameter squared) provided r and l remain constant.

(4) That for wires of same length (l) and same area of cross section (A), the resistance is directly proportional is s, the resistively of the material of the wire.

Electricity Chapter 12

Assessment Technique: Concept based worksheet

Objectives: To enable the students to learn that

- Commercial unit of electrical energy is kwh and it equals 3.6×10^6 J
- Rate of electrical energy consumption per hour by a device equals its power in kW.
- Resistance of a device, operated at a given (standard) voltage (V), equals V^2/P where P is its power in watts.
- For all devices, working on a standard (mains) voltage, the resistance of a device is lower when the power of the device is larger.

Assessment Time: 20 minutes.

Assessment Task: Individual work sheet

Procedure: The following information may be given to the students:

- The commercial unit of electrical energy is kWh.
- The rate of electrical energy consumption (in kWh) per hour by a device equals its power in kW.
- The resistance of a device, operating on the mains voltage (say V volt) equals – V^2/P.

Assessment Parameters: One mark for each correct answer.

Student Worksheet

An electric geyser is known to consume 2.2 'units' of electrical energy per hour of its use. It is designed to work on the mains voltage of 220V.

1) What is the 'power-rating' of this device?

2) What is the current flowing through this device when it is connected across the 'mains'?

3) What is the 'resistance' of this device?

4) Does the resistance of this device remain constant during its operation/working?

5) Which of the two- a 100W, 220V lamp, or a 10W, 220V night lamp – has a higher resistance?

Suggested Remediation: Correlating energy consumption in kWh, with power rating of a device, will be clearly understood if the teacher clearly explains 'definition' of the commercial unit of electrical energy and its relation with the joule. (1kWh = 3.6×10^6 J)

- The students should be made to appreciate that the numerical value of the power rating (is kW) of a device equals the numerical value of the commercial units of electrical energy conserved by it is one hour.
- Some of the students may not be able to directly relate resistance to the power of a device.
- The teacher may explain how a combination of the formula : (power = voltage × current), with Ohm's law; (Resistance = $\frac{\text{voltage}}{\text{current}}$) leads to the formula : resistance = $\frac{(\text{voltage})^2}{\text{power}}$
- The students may be made to realize that for the same value of their operating voltage (the mains voltage), the device, with a higher power rating, will have a lower resistance than that a device with a lower power rating.

Electricity Chapter 12

Assessment-Technique: Picture-based worksheet

Objectives: To enable the students to

- Identity different components/devices used in domestic electric circuits
- Understand the practical use of each of these components
- Learn the advantages/ safety features of the different electric components/ devices

Assessment Time: 10 minutes.

Assessment Technique: Individual Worksheet

Procedure: The teacher may

- Show different components commonly used in domestic electric circuits using a chart
- Explain the use and role of each of there components
- Point out the advantages/safety features of these different components.
- The pictures/programs of the devices/components mentioned in the worksheet may be used

Assessment Parameters: ½ mark for each correct identification.

Student Worksheet

Instructions:

- Look at the pictures/photographs of some of the commonly used components/devices used in domestic electric circuits as given below. Identify each one of these and write their name against the picture/photograph.

Note:(In the actual worksheet, pictures of the following devices are to be drawn. Name have not to be written)

Picture/photograph. Of	**Name of the component/device**
Cartridge fuse	.....
Three pin socket (light)	.....
C F L (compact fluorescent lamp)	.....
Kit-kat fuse	.....
Domestic electricity meter	.....
The mains switch	.....
Three pin plug (light)	.....
Three wire cable	.....
Three pin plug (power)	.....
Three pin socket (power)	.....

Suggested Remediation : Most of the students generally fail to identify the components commonly used in household electrical circuits. They also do not know about the advantages of using low power devices (like the CFL) for lighting over the conventional electric lamps.

The teacher may

1. tell the students the names of the components/devices they are not familiar with.
2. highlight the safety features (child safety lock etc.) of the sockets now being used.

3. point out the difference between the 'LIGHT' and 'POWER' circuit plugs and sockets.
4. make her/his students aware of the advantages of using CFLs in place of conventional electric bulbs.

Electricity Chapter 12

Assessment Technique: Diagram Based Worksheet

Objectives: To enable the students to know the

- Basic lay-out design of domestic electric wiring.
- Role of each of the three wires used in domestic electric wiring.
- Correct position of the electricity meter,
- Correct position of the fuse and the switches in the domestic circuit.
- Importance of using the ;earth-wire' while working with metallic body appliances.
- Reasons for arrangement of devices, 'in parallel' with each other, in domestic circuits.

Assessment Time: 15 minutes.

Assessment Task: Individual Worksheet.

Procedure: The teacher may explain to the students.

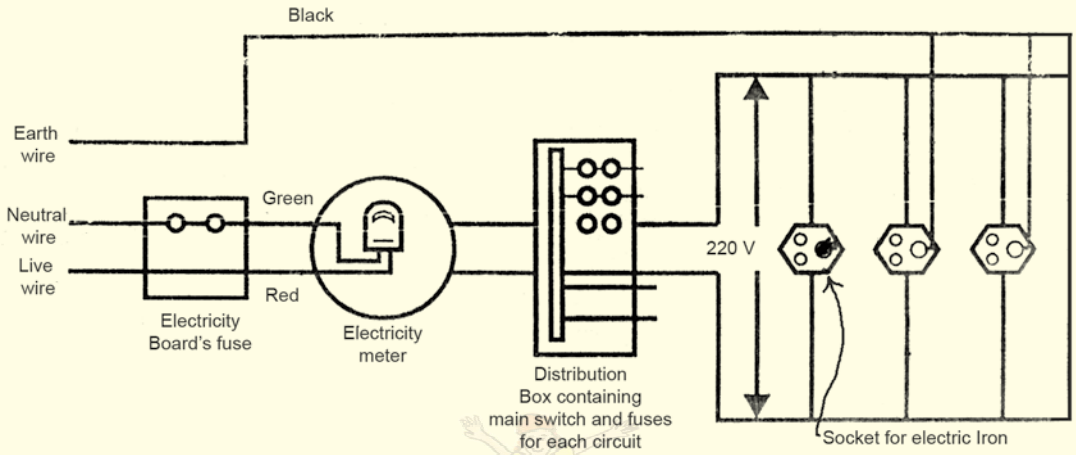
- The basic design of the electric wiring in household circuits clearly underlying the role of the neutral, the live and the earth wires.
- The role of the safety devices like the fuse wire and the earth wire.
- The correct position of the fuse, the main switch and the switches in the circuit.
- The fact that the appliances in the household circuit are connected in parallel so as to provide them the necessary voltage for their proper operation and the facility of switching these on or off independently.

Assessment parameter:

- 1 mark each for finding out each fault in the domestic wiring circuit shown
- 1 mark each for suggesting the correction needed in each of the fault found above.

Student Worksheet

Instructions: A novice electrician designed the following circuit for the 'electric wiring' in a certain household. His senior, however, told him to make five important changes/corrections in this circuit.



Identify five faults in the above circuit and suggest and write the five corrections needed, in brief, that you think the senior electrician must have suggested to this novice.

Suggested Remediation: Some of the students may not be able to understand the use of wire of different colours associated with the live, the neutral and the earth wire. The same should be clearly explained. The facts that electric sockets should always have proper earthing, as also the necessity of fixing the fuse and the switch in live wire, should be clearly explained to the students.

Electricity Chapter 12

Assessment Technique: Numerical based worksheet

Objectives: To enable the student to

- Understand the meaning of 'series combination' of resistors.
- Learn the way of connecting a given number of resistors in series.
- Realize that the currents flowing through all the resistors connected in series is equal.
- Understand that the potential drop across a number of resistors connected in series are different.
- Understand that in a series combination the p.d. across the higher resistance is more than that across a lower resistance.
- Learn that the total current drawn from the given battery, by the series combination is less than that drawn individually by the highest of the individual resistors.

Assessment Time: 15 minutes.

Assessment Task: Numerical Based Worksheet.

Procedure: The teacher may

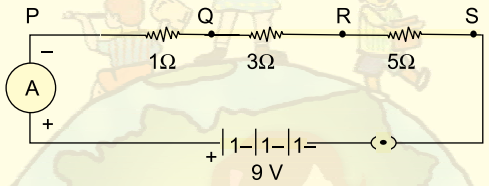
- Describe meaning of the series combination of resistors.

- Emphasise that there is only a single path (in a series combination) for flow of current and hence the same current ----- pass through each of the resistors.
- Discuss that the potential difference gets divided, across the resistances, in direct proportion to the value of the resistances.
- Derive the relation $R = R_1 + R_2 + R_3$, for the series combination and explain that the total equivalent resistance, of a series combination of resistors is more than the highest of the individual resistances.

Assessment Parameters: 1 mark for each correct answer.

Student Worksheet

Instructions: Observe the given circuit carefully and answer the questions that follow:



1. What is the total equivalent resistance of the circuit?
2. What would be the reading of the ammeter?
3. What would be the reading of a voltmeter connected between the points Q and R?
4. What would be the reading of the ammeter if only the highest of the three resistors (= 5Ω) were present alone in the circuit?
5. What would be the reading of a voltmeter connected between the points P and S?

Suggested Remediation: Some of the students may fail to understand the characteristic features of the series combination of resistors. The teacher may explain that in a series combination

1. The current flowing through all the resistors (in the series combination) is same.
2. The voltage drops, across different resistors, in a series combination, are different.
3. The equivalent resistance, of the series combination of a number of resistors, is more than the highest of the individual resistances.

Electricity Chapter 12

Assessment Technique: (True/False) statements based worksheet

Objectives: To enable the students to

1. be aware of the safety precautions needed in the use of electricity
2. appreciate the necessity and importance of putting these precautions in use in day-to-day life.

3. understand the significance of the statement that 'Electricity is a good servant but a bad master'.

Assessment Time: 10 minutes.

Assessment Task: Individual Worksheet.

Procedure: The teacher may

(i) Apprise the students with 'the do's and don'ts' related to the use of electricity in our day-to-day life.

(ii) describe the very important need of following safety precautions while using electrical application

(iii) ask the students to write 'Yes' or 'No' against each statement.

(iv) assess the 'awareness level' of his/her students with respect to the important safety precautions and make them realize the importance and significance of the same.

Assessment Parameters: One mark for each correct answer.

Student Worksheet

Instructions: Read the following statements carefully and select 'Yes' or 'No' against each in terms of its correctness, or otherwise, vis-à-vis safe use of electricity in our day to day life.

1.	It is the standard practice to connect a fuse wire in the neutral wire of the household wiring.	Yes/No
2.	We can use either a two pin (plug and socket), or a three pin (plug and socket), while working with an electric iron.	Yes/No
3.	It is always a good habit not to touch an electric switch with wet hands.	Yes/No
4.	Every household circuit should have a proper 'earth wire' installed in it.	Yes/No
5.	While replacing a 'fuse wire', the electrician must use a fuse wire of the correct rating.	Yes/No
6.	The electrician must always follow the correct colour code while 'wiring' the household circuits.	Yes/No
7.	The electrician can carry out the 'repairs' of an electric toaster while it is connected to the mains.	Yes/No
8.	We must always stay away from the 'high tension wires', it any, in our neighborhood.	Yes/No

9. If does not really matter if the string, attached to a flying kite, momentarily comes in contact with a live wire. Yes/No
10. At the 'very start', the household wiring should have a 'main switch' and a 'main fuse', poth but in the Live wire. Yes/No

(*Note*: The teacher can add to/readjust the statements given here in the context of any special safety precautions needed in her/his area)

Suggested Remediation: Some students may not be aware of the basic safety precautions needed for a proper and safe use of electricity. The teacher should .

1. make them aware of the basic safety precautions.
2. make them aware of the importance of 'earthing' the metallic bodies of electrical appliances.
3. make them aware of using 'fuse wires'/MCB's of the correct rating.
4. make them realize that we should use 'electricity as a good servant' and not let it become 'a bad master'.

Magnetic Effect of Current Chapter 13

Assessment Technique: Matching scientific terms/features to their correct meaning

Objectives: To enable the students to get familiar with

- The basic details of the A.C. supply used in domestic electric circuits in India.
- Some of the basic features of the design of domestic electric circuits.
- Some features/anomalies that get associated with the domestic electric supply.

Procedure Task: The teacher may explain to the students:

1. The A.C. supply to Indian household circuits has a frequency of 50Hz.
2. The A.C. supply reaches its peak value twice in each cycle and therefore, 100 times in one second.
3. The potential difference between the live and the neutral wire in an Indian domestic electric circuit, has an (average, rms) value of (nearly) 220V.
4. The colours of the three wires, used in Indian domestic electric circuits are as follows:

LIVE wire	:	Red (or Brown)
NEUTRAL wire	:	Black (or Blue)
EARTH wire	:	Green (or Yellow)

5. The neutral and the earth wires, in a domestic household circuit are at the same potential, i.e., the p.d. between these is zero.
6. The A.C. supply makes use of Transformers, both at the generating stations and at local substations.
7. The 'distribution box' is an important component of the domestic electric circuit.
8. The ratings of the fuse wires (always put in the LIVE wire) for the domestic 'power and light' circuits are 15 A and 5 A respectively.

Assessment Parameters: One mark for each correct matching.

Instructions: The following columns give some features of the A.C. supply in India and their relevant values/details.

Match the items in these two columns:

	Column A		Column B
a	(Average, rms) Potential difference (in volts) between the live and the neutral wires in a household in India	(i)	Short circuit
b.	Value of the frequency of the A.C. supply, in India	(ii)	Green (Yellow)
c.	No of times the household supply voltage attains its peak value in one second	(iii)	Transformer
d.	Colour of the 'Earth wire' in household wiring	(iv)	Distribution Book
e.	(Average rms) potential difference (in volts) between the neutral and the ground wires in a domestic electric circuit.	(v)	50
f.	Colour of the wire in which the 'switch' needs to be put in a domestic electric circuit.	(vi)	00
g.	Rating of the fuse wire (in A) used in domestic 'Power circuits'.	(vii)	15
h.	An important device present in the 'local sub-station' of a locality.	(viii)	220
i.	An important device present in the domestic electric circuit.	(ix)	Red (Brown)
j.	An abrupt increase in the current flowing in a domestic electric circuit.	(x)	100

Suggested Remediation: Based on the evaluation of the worksheet, you may identify the facts not clearly understood by the students and reinforce the same.

Magnetic Effect of Current — Chapter 13

Assessment Technique: (True/False) statements based Worksheet.

Objectives: To enable the students to understand

- The basic features of magnetic field lines.
- The basic rules for finding the direction of the magnetic field in different cases.
- The similarity between the magnetic field of a bar magnet with that due to a long current carrying solenoid.
- The fact that the force due to a magnetic field is not along its own direction but along a direction perpendicular to its own direction.
- That a current carrying wire experiences the maximum force when it is oriented perpendicular to the direction of the magnetic field.
- That we use Fleming's left hand rule for finding the direction of force experienced by a current carrying wire (or a moving charge) in a perpendicular magnetic field whereas the right rand rule is used for finding the direction of induced current.

Assessment Time: 15 minutes

Assessment Time: Individual Worksheet

Procedure: The teacher may explain to the students the

i. right hand thumb rule for the magnetic field due to a straight wire

ii. Fleming's left hand rule.

iii. Fleming's right hand rule.

iv. condition under which a current carrying wire experiences the maximum force in a magnetic field.

v. basic properties of magnetic field lines.

Assessment Parameters: ½ mark for each correct labeling.

1 mark for each 'corrected version' of the statements labeled as 'false'.

Student Worksheet

Instructions: The following statements are associated with the characteristic features/ properties of the magnetic field. You have to label these statements as 'True or False'. Also write the corrected (or True) version of the statements labeled as 'false' by you.

1. We use the 'right hand thumb rule' for finding the direction of the magnetic field due to both a (current carrying) straight wire as well as a circular coil.
2. Fleming's left hand rule helps us to find the direction of the induced current.
3. The magnetic field, due to a bar magnet, is quite similar to that due to a long current carrying solenoid.
4. We can use Fleming's right hand rule to find the direction of the force experienced by a current carrying wire in a magnetic field.
5. A current carrying wire experiences the maximum force due to a given magnetic field when it is aligned parallel to the direction of the magnetic field.
6. The pattern of the magnetic field lines, due to a long straight current carrying wire, is that of circles, centered on a point on the wire.
7. A small compass needle can be used to plot the pattern of magnetic field lines.
8. We can also observe the pattern of magnetic field lines by using iron-filings.
9. We can 'separate-out' the north and south poles of a magnet.
10. The magnetic field near the centre and close to the axis of a long solenoid is quite uniform.

Suggested Remediation: Based on the performance/evaluation of the worksheet, the teacher will identify the scientific facts/rules not clearly understood by the students.

- the basic details of Fleming's left hand and the right hand rule.
- the 'facts' from the above questions about which the students have some difficulty.

Magnetic Effect of Current Chapter 13

Assessment Technique: Application based worksheet

Objectives: To enable the students to

- Learn that the force, due to a magnetic field on a moving charge is not along the direction of the magnetic field itself.
- Get familiar with Fleming's left hand rule for finding the direction of the force due to a magnetic field.
- Learn to apply the rule for finding the direction of force in different situations.
- Realize that electrons move in a direction opposite to that of current.

Assessment Time: 15 minutes

Assessment Task: Individual Worksheet

Procedure: The teacher may

- Discuss the statement of Fleming's left hand rule.
- Tell the students about an 'easy way' to remember this rule.
- Illustrate the use of this rule in some simple situations.
- Ask the students to use this rule for finding the direction of force, due to a given magnetic field, in different given situations.
- Help the students to know about the care needed in using this rule in case of moving negative charges.
- Emphasize that a magnetic field does not exert any force on a charge moving paralled, or antiparallel to the field direction.

Assessment Parameters: One mark for each correct answer.

Instructions: Answer the questions given below:

1. An electron is moving

   (a) from west to east in the plane of the paper in a region where there is a uniform magnetic field, directed inwards and perpendicular to the plane of the paper

   (b) from south to north, in the plane of the paper in a region where there is a uniform magnetic field directed from west to east, in the plane of the paper itself.

   (c) from south to north, in the plane of the paper, in a region where there is a uniform magnetic field directed from north to south, in the plane of the paper itself.

   State the direction of the force, experienced by the electron, in each case.

2. A proton is moving in a region where there is a uniform magnetic field directed outwards and perpendicular to the plane of the page. It experiences a force directed from west to east in the plane of the page itself. What is the direction of motion of this proton?

3. An electron, moving from south to north in the plane of the page in a region where there is a uniform magnetic field, experiences a force that is directed from west to east in the plane of the page itself. What is the direction of this uniform magnetic field?

Suggested Remediation: Some students may fail to apply the rule learnt correctly in a given situation. The students may also erroneously take the electron motion as the direction of current.

You may help the students to:

- Correctly apply Fleming' left hand rule.
- Take due care, about the direction of current, while dealing with the motion of negatively charged particles is a magnetic field.
- Realize that this rule can be used to find the direction of any of the three vectors if the direction of the other two are known/given.
- Given extensive practice of application of the rule offering different situations.

Magnetic Effect of Current Chapter 13

Assessment Technique: Demonstration based worksheet

Objectives: To enable the students to

- Learn that current carrying conductor, in a uniform magnetic field, experiences a force.
- Study the effect of change in current on the force
- Observe a physical phenomenon and to make careful observation/deductions and to draw inferences.

Assessment Time: 15 minutes

Assessment Task: Individual Worksheet

Procedure:

The teacher may 'set-up' the apparatus shown in the Figure 13.12 in NCERT Text Book Page 230. She/he may demonstrate that the rod gets deflected when a current flows through it. She/he may also demonstrate the effect of (i) increasing the current through the rod (ii) taking the rod (slightly) nearer or farther from the horse shoe magnet.

Assessment parameters: One mark for each correct answer.

Student Worksheet

Instructions:

You have observed the demonstrations shown carefully. Please answer the following questions:

1. Did the wire experience a force when no current was flowing through it?
2. Which way did the rod get displaced when the current was first 'switched-on'?
3. What was the effect of reversing the terminals of the battery?
4. What was the effect, if any, of taking the rod nearer to the magnet?
5. When the number of cells in the battery was increased what change did you observe in the extent of displacement of the rod?

Suggested Remediation: Some of the students may not be able to draw the desired inference

The teacher may explain to the students.

- That a current carrying rod/wire can experience a force in a magnetic field.
- She/he may tell them that this force increases with an increase in the current flowing through the rod or with a decrease in the distance between the magnet and the rod.
- She/he will also explain how the direction of the force experienced can be found by using Fleming's left hand rule.

Magnetic Effect of Current Chapter 13

Assessment Technique: Diagram based worksheet

Objectives: To enable the students to

- Familiarize themselves with the role of the 'compass needle' in drawing magnetic field lines.
- Familiarize themselves with the pattern of magnetic field lines of some simple current carrying conductors/coils/devices.
- To understand the basic properties of magnetic field lines.
- To appreciate the need and significance of using the term 'Magnetic field lines' rather than 'Magnetic lines of force'.

Assessment Time: 15 minutes

Assessment Task: Individual Worksheet

Procedure: The teacher may

- Draw the pattern of the magnetic field lines due to a bar magnet along straight current carrying wire, a circular coil and a solenoid, without naming any of them.

- tell the students about each field line pattern and write the appropriate name under it.
- explain to the students about the 'need' and 'way of use' of a compass needle for drawing magnetic field lines.
- make them understand the basic properties of magnetic field lines.

Assessment Parameters: One mark for each correct answer.

Student Worksheet

Instructions: Student worksheet

Note **:** The Worksheet may include Fig. 13.4 (page 225), Fig. 13.6 (page 227), Fig. 13.8 (page 228) and Fig. 13.10 (page 229) of NCERT Science Text Book for Class X.

Carefully observe the magnetic field lines patterns drawn here and answer the questions that follow:

1. Write the 'correct name' of the device/coil/conductor that corresponds to each of the magnetic field line pattern shown above.
2. A point is marked on one of the field lines and the south pole of a (small) compass needle made coincident with it. Along which direction will the compass align itself?
3. Is there any similarity between any two of the field line patterns shown above? Identify the patterns.
4. Do you observe any of the two field lines in any pattern crossing each other?
5. Do the field lines shown here have a 'starting' and a and an 'end' point?
6. What do the arrows on the field lines shown here signify?
7. The magnetic field lines are closer to each other in some regions and farther apart in other regions. What does this relative packing of lines indicate?

Suggested Remediation: Some of the students may fail to associate a given pattern of magnetic field lines with the device causing it. The teacher may help the students to

- Know about the magnetic field lines patterns of the bar magnet, straight wire, circular coil and the solenoid.
- Understand the basic properties of the magnetic field lines.
- Understand that the force due to a magnetic field on a moving charge is not along the field lines themselves, and hence the name 'lines of force' is not appropriate for them.
- Know how a small compass needle helps to draw the magnetic field line patterns.