Intelligence plus character- that is the goal of true education

Martin luther king jr.

Science_6th_Light shadows and reflections_MSMAP_DisttPathankot and Sapna Gupta Distt_Kapurthala

Name of Distt	**Pathankot/Kapurthala**
Name of teachers	**M**anoj,**S**andeep,**M**unish,**A**jay,**P**radeep, Sapna Gupta
Class	**6th**
Subject	**Science**
Name of the Chapter	**Light shadows and reflections**
Topic	**Light shadows and reflections**
No. of periods required	**8**
Edited By	**MSMAP**

Objectives:-

B1:- Usefulness in daily life.

(a) Behavioral skills.

1. To develop critical thinking and scientific temper.
2. To develop skill of observation.
3. To condition their social behavior through group activities.
4. To develop a concept so as to overcome cramming.
5. To ignite the latent and cognitive learning.

(b) Technical skills.

1. The rectilinear propagation of light and its properties.
2. Role of light to sight.
3. Formation of shadow and its essentials.
4. Classification of objects on the basis of visibility through them

(c) **Disadvantages of not knowing the concept**.

1. Unable to understand the working of many optical instruments like camera, microscope, telescope, periscope.
2. Unable to understand the phenomenon of ray optics.
3. Unable to enjoy the gifts imparted by the nature e:g: Formation of rainbow,Looming, Mirage
4. Why we are not able to see in dark
5. Why the position and size of shadows is changed time to time
6. Why only some objects allow light to pass through
7. How we are able to see different colors
8. Why and how shadows and reflections are different
9. The concept of lateral inversion.

(d) Career options:-

1. Photography/camera men
2. Shadow artist
3. Teaching and Research

B2:- Simplifying the complex.

1. Transparent, opaque and translucent.
2. Rectilinear propagation of light
3. Shadows
4. Pinhole camera
5. Mirrors and reflections

B3:- Life skills

1. Collaborative learning
2. Research aptitude
3. Public speaking
4. Building vocabulary
5. Creative art
6. Moral valuesand transmission of culture.

B4:- Vocabulary

1. Light	ਪ੍ਰਕਾਸ਼
2. Luminous	ਦੀਪਤ
3. Non- Luminous	ਅਣ-ਦੀਪਤ
4. Transparent	ਪਾਰਦਰਸ਼ੀ
5. Opaque	ਅਪਾਰਦਰਸ਼ੀ
6. Translucent	ਅਲਪ-ਪਾਰਦਰਸ਼ੀ
7. Shadow	ਪਰਛਾਵਾਂ
8. Reflection	ਪਰਾਵਰਤਨ
9. Mirror	ਦਰਪਣ

C: - Building bridges

1. Students must be aware of the basic concepts of light like luminous, non-luminous and sources of light.

D: - Period wise break up for each chapter.

PERIOD	What to be covered
1	Introduction following P.K testing. How objects are visible to us. Classification of objects on the basis of visibility/ obstruction offered by them.
2	Concept of shadows
3	Pinhole camera.
4	Rectilinear propagation of light.

5	Mirrors & reflections
6	Creative session
7	Exercises at the end of lesson & Recap
8	Presentation
9	Evaluation

E: - Micro Planning.

E1.Students must be aware of the basic concepts of light like luminous, non-luminous and sources of light.

Entry behavior of teacher	5min	Teacher will ask the students about the sources of light (Natural & artificial).	Students will be able to answer the questions.
Introduction of the topic	10min	Teacher will ask the following questions. 1. Can you see the objects in day time? 2. What characteristics you observe of an object seen? 3. Can you see the objects in night time and its details? 4. Then what we need to see the objects in night? Then teacher will announce the topic " Light and its properties"	
Career options	5min	Then teacher will talk about the career options which may require the knowledge about the concepts of this chapter as per given in B1.	
Activity task	15 min	Teacher will ask the students to perform the activity as per Annexure GD1 and tabulate their observations	Group task.
Home task	5 min	Teacher will give Worksheet no 1as per Annexure GD 2.	

Name of the Annexure	GD 1
Name of the activity	Visibility through objects

<table>
<tr><td>Topic</td><td>Light</td></tr>
<tr><td>Type of the activity</td><td>Group</td></tr>
<tr><td>Material required</td><td>Paper, eraser, talc sheet, tracing paper, pencil, glass, thermocol etc.</td></tr>
<tr><td>Specific preparation required in the class room for performing the activity</td><td>There must be adequate light in the room.</td></tr>
<tr><td>Details of the activity and detailed instructions to carry it out.</td><td>Try to look at something far away,through each of these objects is light from a far away object able totravel to your eye, through any of theobjects?
Record your observations in the table as given below.
<table><tr><th>Object/material</th><th>View through the object possible (fully/ partially / not at all)</th><th>Object is opaque/ transparent/ translucent</th></tr><tr><td>Pencil</td><td></td><td></td></tr><tr><td>Rubber ball</td><td></td><td></td></tr><tr><td>Sheet of writing paper</td><td>Not very sure?</td><td></td></tr></table>
We see that a given object or materialcould be transparent, translucent or opaque depending on whether it allowslight to pass through it completely, partially or not at all.</td></tr>
<tr><td>Pictures describing the activity.</td><td> 
Observing objects that do or do not allow light to pass through them</td></tr>
<tr><td>Precautions</td><td>Confined to the scope</td></tr>
<tr><td>Explanation of the outcomes of the activities</td><td>Building bridge between essentials for formation of shadows.</td></tr>
<tr><td>Objective of the assessment of the learning</td><td>Able to conceptualize the classification of materials on the basis of visibility through them.</td></tr>
</table>

Name of the Annexure	GD 2
Name of the activity	Worksheet 1
Topic	LIGHT AND OBJECTS

Type of the activity	Home Assignment

Did you know that light interacts with theworld in three different ways? The way light Passes through objects can be transparent,translucent, or opaque.
Transparent means that light can passthrough an object uninterrupted, as if the Object is not even there.
Opaque means that when the light hits anobject, it will not pass through it. Another Word for opaque is obscured.
Translucent means that light can sort ofpass through. The light is somewhat clear but Hazy when it hits the object. Semi-transparentis another word for translucent.
Use a flashlight and try to shine a light through the objects listed below.
Circle if the light is transparent, translucent, or opaque.

Describe what happens when you try to shine the light through the object.
1) Cardboard : Transparent / Translucent / Opaque
Describe:

2) Plastic Wrap : Transparent / Translucent / Opaque
Describe:

3) Tissue Paper : Transparent / Translucent / Opaque
Describe:

4) Drinking Glass : Transparent / Translucent / Opaque
Describe:

5) Your Hand : Transparent / Translucent / Opaque
Describe:

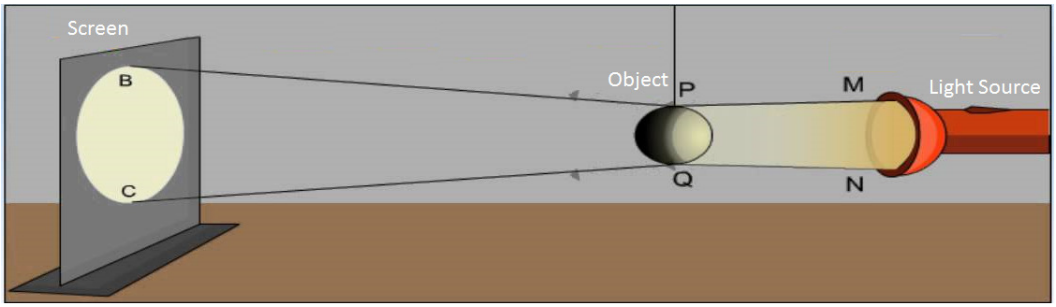
E.2

Entry Behavior of teacher	5 min	Teacher will discuss the home assignment	Student will actively participate in discussion
Activity and observation	20 min	Teacher will provide the students with necessary materials for the activity of Shadows and its dependence on the position of source as mentioned in Annexure GE 1.	Self-Expression, speaking
Discussion & A/V Presentation	12 min	Teacher will conduct a discussion on the observations made by students on performed activity and show the videoScience - Light and	Use of multimedia

Question Answer & Home Assignment	3 min	Shadow - Basic - English_low.flv to concrete the concept as per Annexure GE 2. 1. What do you think what are the basic requirements for making shadows. 2. Can we vary the size of shadows? Teacher will provide Worksheet no 2 as per Annexure GE3 and Worksheet no 3 as per Annexure GE4.	

Name of the Annexure	GE 1
Name of the activity	Shadow formation
Topic	Light
Type of the activity	Group
Material required	Source of light,screen, object.
Specific preparation required in the class room for performing the activity	Dark room or high intensity source of light.
Details of the activity and detailed instructions to carry it out.	Teacher will give proper instructions and ask the different groups to record the observations made in a given table. Data Table 1 Measuring Shadows

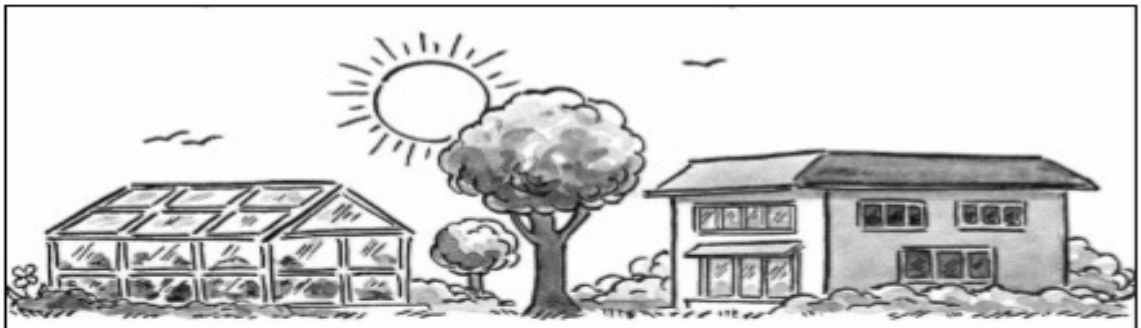
Distance From Light Source to Screen	Distance From Light Source to Object	Size of Object Constant	Size of Shadow
Trial 1			
Trial 2			
Trial 3			

	Distance From Light Source to Screen	Distance From Light Source to Object	Distance from object to screen	Size of Object	Size of Shadow	
	Constant	Constant		Constant		
	Trial 1					
	Trial 2					
	Trial 3					
Pictures describing the activity.						
Precautions	Confined to the scope					
Explanation of the outcomes of the activities	Results of the above activity are due to rectilinear propagation of light and opaqueness of the object.					
Objective of the assessment of the learning	Able to understand the shadow formation, its characteristics, and size variation of the shadow.					

Name of the Annexure	GE 3
Name of the activity	Worksheet 2
Topic	LIGHT AND SHADOW
Type of the activity	Creative art

Light and Shadows

Use a black pencil to draw in the shadows in this picture.



Background Information

Light can pass through some types of matter. Matter that allows light to pass through it so a clear image can be seen is called transparent. Glass is transparent and this property is used for windows. Matter that allows some but not all of the light to pass through it is called translucent. Wax paper is translucent. Matter that does not allow any light to pass through it is called opaque. A shadow forms when an opaque or translucent object blocks the light.

Name of the Annexure	GE 4
Name of the activity	Worksheet 3
Topic	LIGHT AND SHADOW
Type of the activity	Home assignment

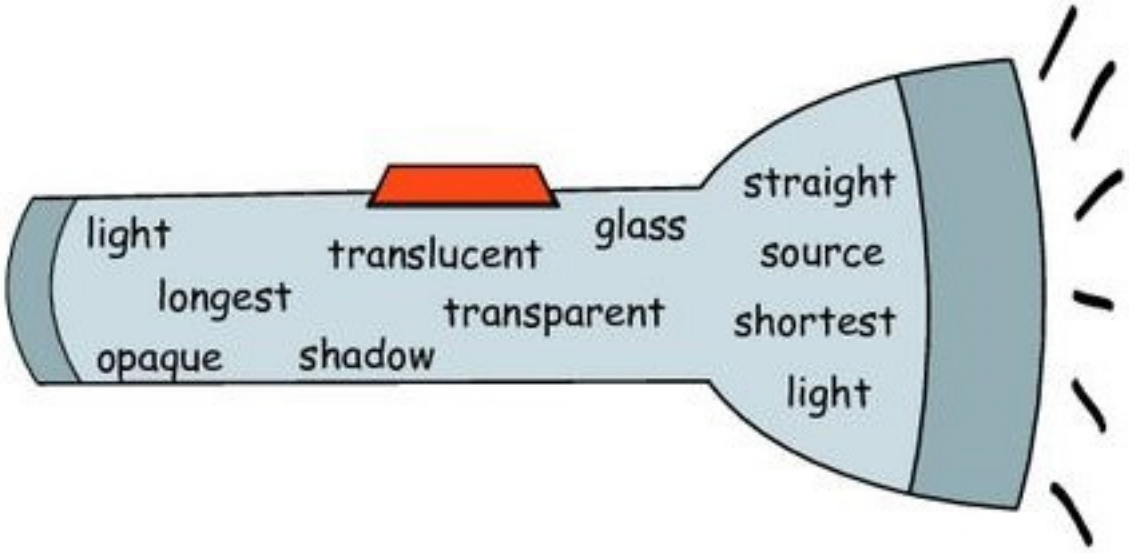
Fill in the missing words from the torch below:

Light and Shadow

Light travels in _____ lines from a _____ of light that bounces off an object. We can see the object because the _____ enters our eyes.

Wood and cardboard are _____ materials that light cannot travel through. _____ is a _____ material which allows light to pass through. Tissue paper is _____ which will let some light through.

When an object blocks out the _____, a _____ is formed. Shadows are _____ at midday and _____ at the beginning and end of the day.



E.3

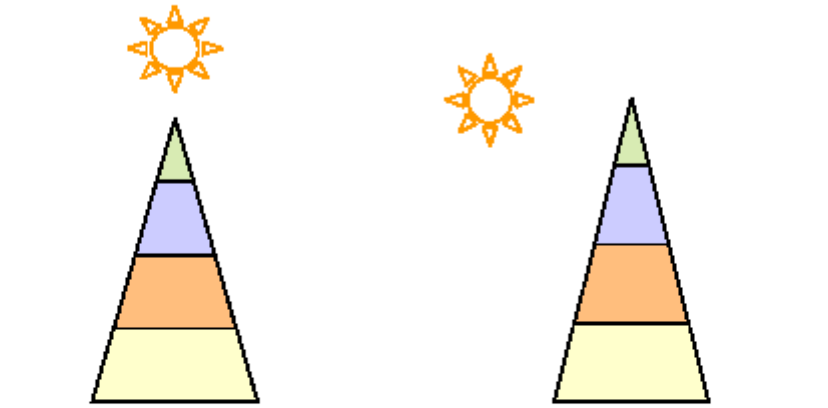
Entry Behavior of teacher	5 min	Teacher will discuss the home assignment	Student will actively participate in discussion
Discussion&A/V Presentation	25 min	Teacher will show the videoWhat is a pinhole camera & how does it work low.flvas perAnnexure GF 1 on pin hole camera by giving pauses	Use of multimedia Student will listen

		at suitable intervals and giving simultaneous explanations. Teacher will make the groups of students and ask them to submit a project on construction of pin hole camera in stipulated time.	carefully.
Instructions for project	5 min	Teacher will give the brief summary necessaryfor the construction of given project pin hole.	
Question Answer &Home Assignment	5 min	1. Why the image formed on the screen is inverted. 2. Why the size of the image is larger than the size of the hole of the camera? 3. What would happen if we move the screen near and away from the hole of the camera? Teacher will provide Worksheet no 4 as per AnnexureGF 2.	

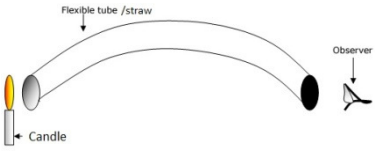
Name of the Annexure	GF 2
Name of the activity	Worksheet 4
Topic	LIGHT AND SHADOW
Type of the activity	Home assignment

Manipulation of the Angle of Light Source and Length of Shadow

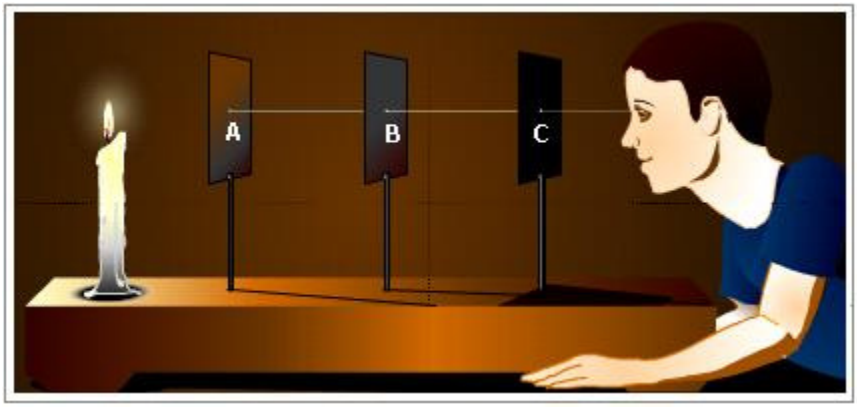
Directions: Draw the locations of the shadows.



E.4

Entry Behavior of the teacher	5 min	Teacher will discuss the home assignment. Now teacher will ask the students can they make any inference that how light propagates through the concept of shadows and pinholecamera.	Students will actively participate. To seek the attention, teacher may ask questions during activity.
Demonstration	20 min	A demonstration on rectilinear propagation of light has to be performed by the teacher as per Annexure GG 1.	
	12 min	Teacher will provide the students with the cold drink straws and ask them to see an object through it straight and then by bending the straw.	
Question Answer	3mi	1. What are the essentials for	

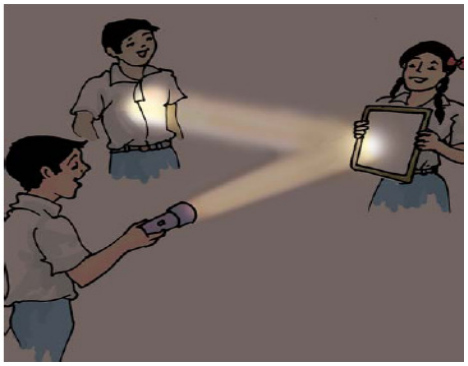
& Home Assignment	n	shadow formation? 2. What property of light is exhibited through all activities performed?	

Name of the Annexure	GG 1
Name of the activity	Rectilinear propagation of light .
Topic	Light
Type of the activity	Group
Material required	Three card-boards provided with holes , candle .
Specific preparation required in the class room for performing the activity	N.A.
Details of the activity and detailed instructions to carry it out.	Step 1 :- place two cardboards in the straight line by using thread. Step 2 :- place a source of light in front of one cardboard. Step 3 :- ask the students to see the light through the holes. Step 4 :- now place the third cardboard and try to see the source of light . Step 5 :- At last allign all the cardboards in the straight line and then ask the student to see through the holes.
Pictures describing the activity.	
Precautions	Confined to the scope
Explanation of the outcomes of the activities	Rectilinear propagation of light.
Objective of the assessment of the learning	Able to conceptualize the phenomenon related to rectilinear propagation of light such as reflection and at later stages refraction, dispersion and working of optical instruments.

E5:

Entry Behavior of the teacher	5 min	Teacher will discuss the home assignment	Students will actively participate.

Demonstration and A/V presentation	20 min	Teacher will show the videoScience - Light - Difference between shadow and reflection - English.mp4 on shadows as per Annexure GH 1 and reflections by giving pauses at suitable intervals and giving simultaneous explanations. Teacher will ask the students to pen down the differences between shadows and reflections	To seek the attention, teacher may ask questions during A/V presentation. Self expressions
Activity task	10 min	Teacher will ask the students to perform the activity as per Annexure GH 2.	Group activity
Question Answer & Home Assignment	5 min	Teacher will provide Worksheet no 5 as per Annexure GH 3.	

Name of the Annexure	GH 2
Name of the activity	Reflection of light.
Topic	Light
Type of the activity	Group
Material required	A Plane mirror, source of light.
Specific preparation required in the class room for performing the activity	Controlled light room.
Details of the activity and detailed instructions to carry it out.	Teacher will ask the students to make the formation as shown in the picture and ask them to record the observation by changing the obliquity of the source of light.
Pictures describing the activity.	
Precautions	Confined to the scope
Explanation of the outcomes of the activities	Rectilinear propagation of light.
Objective of the assessment of the learning	Able to conceptualize the phenomenon related to rectilinear propagation of light such as reflection and range of broadness of vision after reflection.

Name of the Annexure	GH3
Name of the activity	Worksheet 4
Topic	LIGHT AND SHADOW
Type of the activity	Home assignment

Q1. Rearrange the set of words given below to make a sentence that helps us understand opaque objects.

Q U E , OWS , A K E , O P A , O B J , , M , S H A D , E C T S .

Q2. Can you think of creating a shape that would give a circular shadow if held in one way and a rectangular shadow if held in another way?

Q3. In a completely dark room, if you hold up a mirror in front of you, will you see a reflection of yourself in the mirror?

Q4. Write the alphabets A to Z and their lateral inverted image forms?

Q5. Give one example of most commonly used reflector?

E6:-

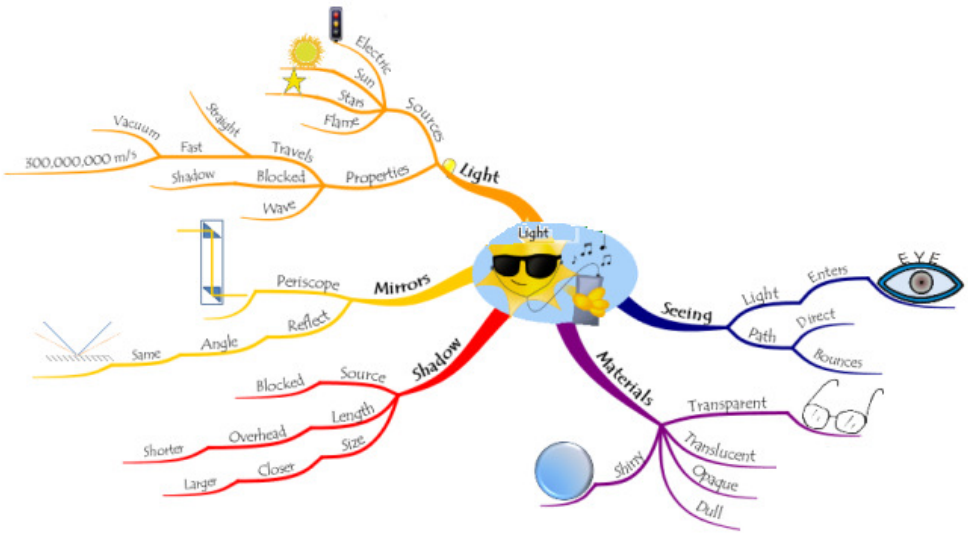
Entry Behavior of the teacher	10 min 15 min 10 min	Creative session for active learners. The teacher will discuss the applications of the concept of shadows for fun activitiesby showing video How to make Shadow Hand Puppets_low.flv as per Annexure GI 1. Construction of periscope PENCIL BOX PERISCOPE - ENGLISH - 23MB.wmv_low.flv of periscope as per Annexure GI 2.andvideosWhat is the cause of Lateral Inversion__low.mp4 related to concept of Lateral Inversion as per and Ambulances, mirrors and lateral inversion _ Light _ Physics_low.mp4Annexure GI 3. Teacher will ask the brain storming questions such as 1. Can we change the visibility through objects? 2. How can you change the range of vision (broadness) through by reflection? 3. Teacher will ask them to trace the various paths from one point to another point after reflection and ask them	

		to measure them and thus help them in building the concept that reflection of light always follows the shortest path. Teacher will motivate the students for asking the relevant questions regarding the concept.	

E.7:-

Exercise Given at the End of the Chapter	10 min 15 min 10 min	Teacher will discuss the exercise given at the end of the chapter 11 and motivate students to complete their notebooks. Teacher will ask the students to draw a mind map as home assignment as per Annexure GJ1**Teacher may evaluate the learning outcome of students by online testing on website*www.eshiksha.org.in***	Students will actively participate in learned concepts and try to answer them.

Name of the Annexure	GJ 1
Name of the activity	Mind map
Topic	LIGHT AND SHADOW
Type of the activity	Home assignment



E.8 Presentation of Project

Student presentation on pinhole camera or periscope	25 min	• 3 - 4 minutes each to a group. Teacher will randomly choose 2 students from the group to make presentation. • Teacher will note down the performance and would point out positive of each presenter and guide with regard to the deficiency. • Generally this presentation should be scheduled for a period after a weekend so that students get time on weekend to prepare for it.
	15 min	• Teacher will talk about good points of different groups and areas where improvement can be made.

E.9:-Mandatory:-

Evaluation	40 min	Teacher will use a proper evaluation tool to enhance learning outcome. Teacher will make a effective tool by taking following considerations before setting the evaluation tool. 1. Knowledge 2. Understanding 3. Applications 4. HOTS 5. Value based 6. Building vocabulary	

Section F: The Content:

F2:-A/V1.Science - Light and Shadow - Basic - English_low.flv

A/V2.What is a pinhole camera & how does it work__low.flv

A/V3.Science - Light - Difference between shadow and reflection - English.mp4

A/V4.How to make Shadow Hand Puppets_low.flv

A/V5.PENCIL BOX PERISCOPE - ENGLISH - 23MB.wmv_low.flv

A/V6.What is the cause of Lateral Inversion__low.mp4

A/V7.Ambulances, mirrors and lateral inversion _ Light _ Physics_low.mp4

G. Listing of possible activities

Name of the concept/ Skill/outcome	Name of the possible activities	Reference of the annexure where the details of the activities have been given in the already specified format of reference to the web address
A. Introduction to the chapter		
B. Sensitization about various career options		
C. Recap of the prerequisite knowledge		
D. Concept 1- Visibility through objects.	1. Activity. 2. Worksheet.	GD1 GD 2
E. Concept 2 – Shadow formation.	1. Activity. 2. Video. 3. Worksheet 2. 4. Worksheet 3.	GE1. GE 2. A/V1. Science - Light and Shadow - Basic - English_low.flv GE 3. GE 4.
F. Concept 3- Pinhole camera.	1. Video 2. Worksheet 4.	GF 1. A/V 2.What is a pinhole camera & how does it work__low.flv GF 2.
G. Concept 4- Rectilinear propagation of light	1.Activity.	GG 1.
H. Concept 5- Reflection of light.	1. Video 2. Activity. 3. Worksheet 5.	GH 1. A/V 3.Science - Light - Difference between shadow and reflection - English.mp4 GH2 GH3
I. Concept 6- Active learning session.	1. Video. 2. Video. 3. Video 4. Video	GI 1. A/V 4.How to make Shadow Hand Puppets_low.flvA/V5.PENCIL BOX PERISCOPE - ENGLISH - 23MB.wmv_low.flv A/V 6.What is the cause of Lateral Inversion__low.mp4 A/V 7.Ambulances, mirrors and lateral inversion _ Light _ Physics_low.mp4

J. Creative writing/Art skills	Mind map/memory map, Flow chart/ identify pictures.	GE 3. GF 2. GJ 1.
K. Team skills/ Drill	1. Presentation (solo/group)	PPT/ cyber surfing
L. ICT Skills	2. Presentation (solo/group)	1.PPT/ cyber surfing 2 ***www.eshiksha.org.in***
M. Presentation Skills	Presentation of project work as per Annexure GF 3 (solo/group)	PPT/ Charts (as per period E.8)
O. Project	1 Project work:- Teacher will make the groups of students and ask them to submit a project on construction of pin hole camera in stipulated time.	
P. Vocabulary	1. Worksheet.	GE 4

H:-

FORMATIVE ASSESSMENT TOOLS

S.no.	Formative assessment	Parameters used	Tools & Techniques used	Skills to be assessed	M.Marks
1	Note Book/ Work Sheet	Legible writing	Note book	Managing & handling records	1
		Interest	Drawing diagrams	creative art(Shadow shading, mind map)	1
		Regularity	Home assignment & task completion	Discipline, Obedience, Time management	2
		Activities	data collection & Tabulation	Interpretation of data & inductive reasoning, analytic skills(observation table, Inferences drawn)	1

2	Practical/Activities/Project 1. Visibility through objects. 2. Shadow formation. 3. Pinhole camera. 4. Rectilinear propagation of light. 5. Reflection of light. 6. Construction of Pinhole camera.	Practical/Activities/Project	Investigatory Project/activities	understanding concept, creativity, innovation, Application	3+2 (Activity + Project)
		Team Work	Group Activity	Group Behavior, team spirit, Art of listening	2
		Presentation	Black Board, Inter group discussion, Articulation of ideas	self-confidence, art of public speaking, self-expression	2
		Novelty	out of box thinking (Freedom to perform)	Creativity & innovation	1
3	Class room participation	Task Participation	Teachers activity/ story telling/Video/ Questioning	presence of mind, spontaneity, Knowledge	1
		Dedication	activity /Project/ Worksheet	task completion, honesty and character building.	1
		Zeal	videos/interactions during active learning session	ICT SKILLS, curiosity for further learning.	1
		Attendance	as per records	punctuality, regularity	2

Question related to Model Assessment Tool for the Students

LIGHT, SHADOWS AND REFLECTIONS

Questions based on Section B1(USEFULNESS IN DAILY LIFE) and B2 (SIMPLIFYING THE COMPLEX)

VERY SHORT QUESTIONS:

Q1. Does the flame of a gas stove emit light?
Q2. What is rectilinear propagation of light?
Q3. Write the names of 4 different sources of light?
Q4. Give one example of living thing which emits light?
Q5. Sometimes you are able to see sun or moon behind the clouds .What can you say about the ability of such clouds to transmit light?
Q6. Image formed in a pinhole camera is inverted .Why?
Q7. Can you suggest the shape of the shadows?
Q8. What can you say about the edges of shadow?
Q9. Does the length of shadow change from season to season?
Q10. What is shadow?
Q11. Coming back of light incident on a surface is called reflection.
Q12. A pinhole camera is based on rectilinear propagation of light?
Q13. Can light pass through opaque objects?
Q14. What is an artificial source of light
Q15. Classify the following into transparent, translucent, and opaque objects.
(Glass, air, oil paper, rubber sheet)
Q16. Name two sources of artificial light?
Q17. Name one transparent and one opaque body?

SHORT ANSWER TYPE QUESTIONS

Q1. Define reflection of light?
Q2. What is a reflector?
Q3. Give one example of most commonly used reflector
Q4. Does the reflection of light from the surface similar to the bouncing back of a rubber ball after it strikes from a ball? Explain.
Q5. Give the difference between virtual image and real image?
Q6. Give the properties of the image formed by the pane mirror?
Q7. Define luminous objects?
Q8. What is light?
Q9. What are non luminous objects?
Q10. Why do objects in a room become visible even if sunlight does not enter it?
Q11. How can you convert a transparent glass sheet into a translucent glass sheet?
Q12. Does the colour of the shadow depend upon the colour of the object?
Q13. In a completely dark room, if you hold up a mirror in front of you, will you see a reflection of yourself in the mirror?
Q14. Give few examples of opaque, translucent and transparent objects?
Q15. What do you understand by lateral inversion?
Q16. Give one example to show that light travels in a straight line?
Q17. Distinguish between transparent, translucent and opaque materials?
Q18. Can the opaque object cast shadow?

LONG ANSWER TYPE QUESTIONS

Q1. How are shadows formed?

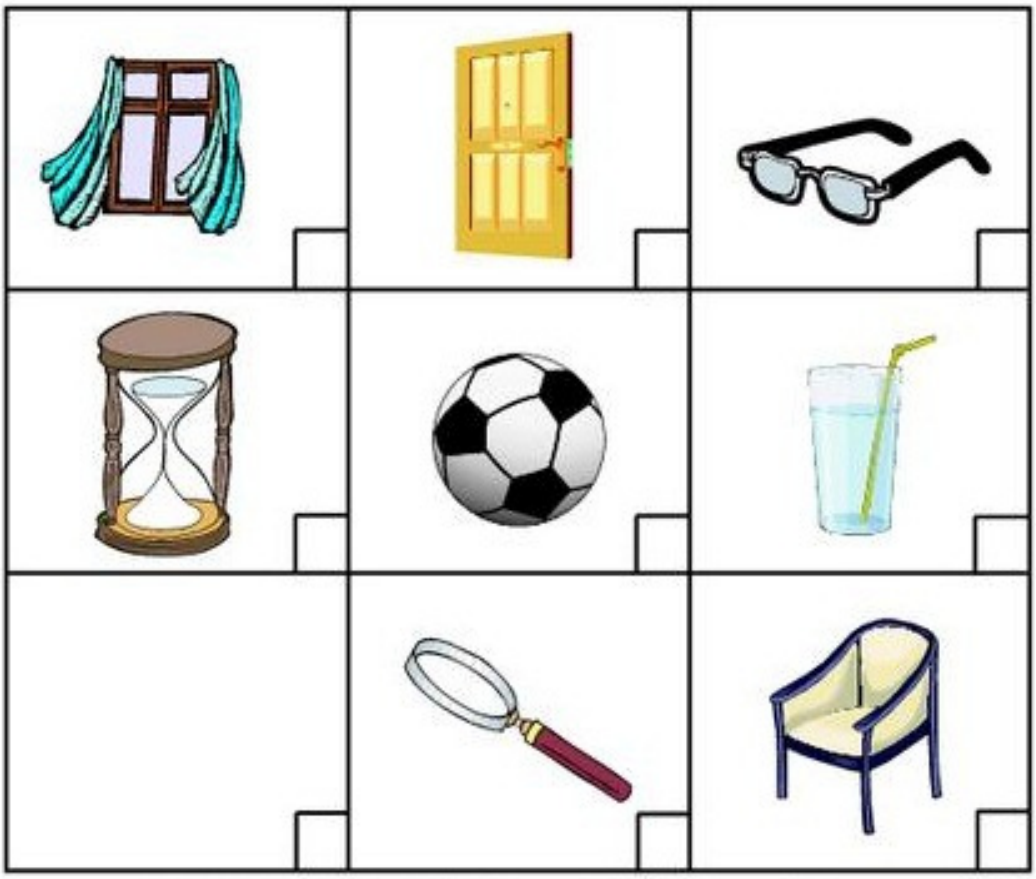
Q2. How can we protect our eyes while glaring at a strong source of light?

Q3. What happens when light falls on an object?

Questions based on Section B3 (LIFE SKILLS)

Q1Match the pictures with their shadows. Draw a line to pair them up:

Q2 What things are transparent? Transparent objects allow light to pass through them.
Look at the objects below. ✓ the objects that are transparent:



Give a reason why the following objects need to be made from a transparent material:

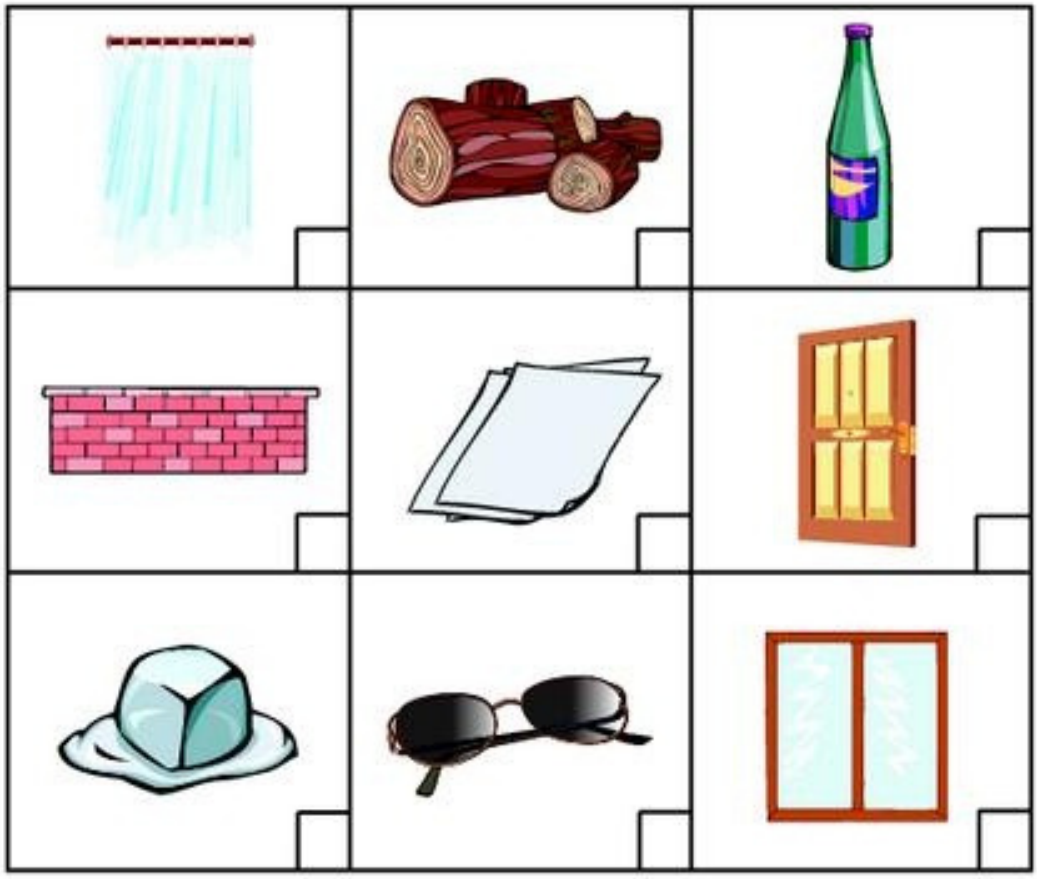
a) window _____

_____

b) glasses _____

_____

Q3 What things are translucent? Translucent objects only allow some light to pass through them.
Look at the objects below. ✓ the objects that are translucent:

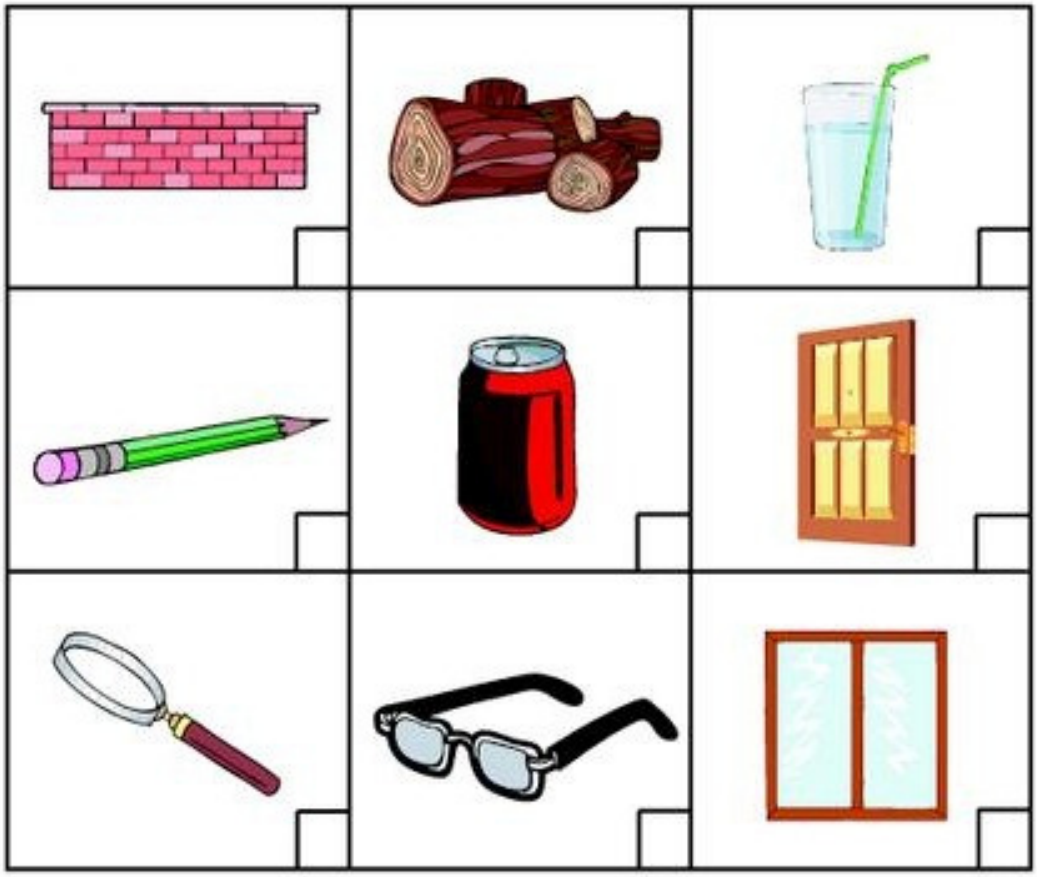


Give a reason for having a translucent window in a bathroom:

_____

_____

Q4 What things are opaque? Opaque objects do not allow any light to pass through them.
Look at the objects below. ✓ the objects that are opaque:



Give a reason for building a wall with bricks (an opaque object) instead of glass:

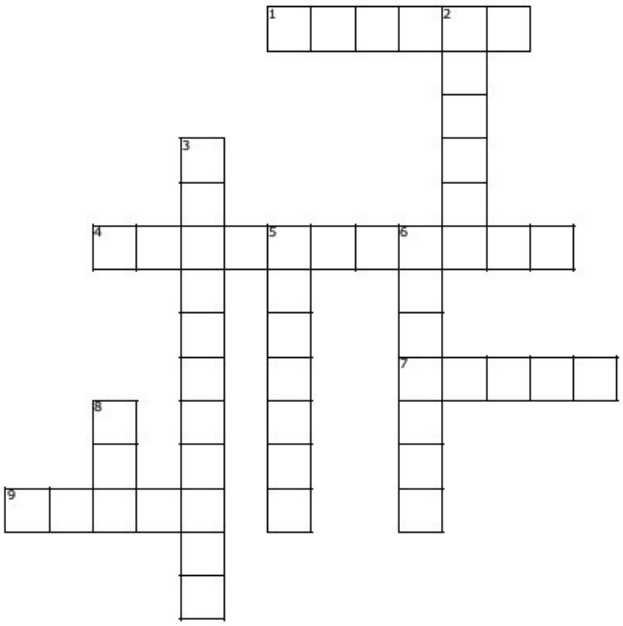
_____

_____

Q5. Consider a wooden stick about half a meter long. Fix one end of it in open ground where there are no trees and buildings near it. Look its shadow in the morning and mark its points of shadow. Note the direction of sun with respect to stick. Where is shadow of the object formed?

Questions based on Section B3 (VOCABULARY)

Q1 Light and shadows



Across

1. This is formed when a opaque object blocks light. (n)

4. An object that lets lots of light through. You can clearly see what is on the other side. (adj)

7. source These are things that give us light. (n)

9. light always reflect at the same _____ (n)

Down

2. An object that blocks all light from going through. You can not see what is on the other side. (adj)

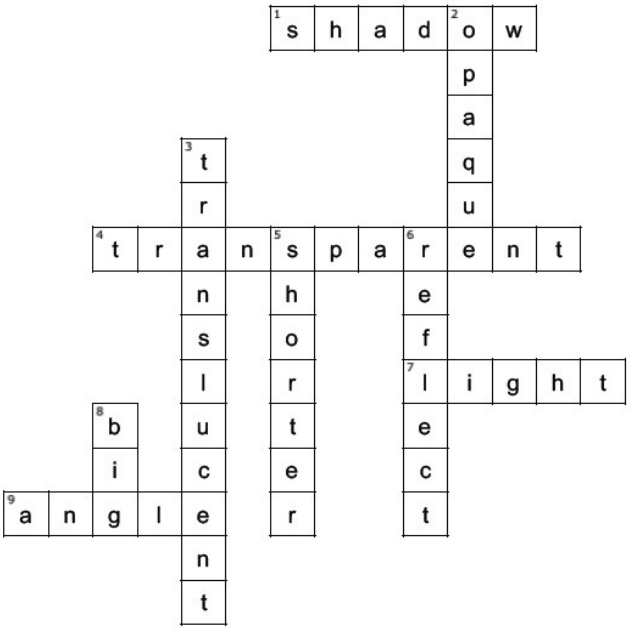
3. An object that lets some light through. You can see what is on the other side but it is not clear.

5. The higher the sun the _____ the shadow. (adj)

6. When light bounces off a surface. (v)

8. An object close to a light source will make a _____ Shadow (adj)

Light and shadows (Answers)



Q2 Wordsearch

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

SHADOW TRANSLUCENT EYE

OPAQUE TRANSPARENT LIGHT

SUN STARS TORCH

LIGHT , SHADOWS AND REFLECTIONS Hots Questions

1. In a completely dark room, can you see your face in a mirror? Why?

Ans: Due to absence of light In a dark room. Light is the source that illuminates our face by reflection.

2. Why cannot we see upside down image of the sun?

Ans: Object like sun is in infinity whose image form point sized or highly demised.

3. Why shadows are black in colour?

Ans: It is because no light reaches on screen in area where shadow form. The colour of object is colour components of light that reflect and reach our eyes.

4. Can you see an object through a "T" shaper pipe? If, no, Why?

Ans: No, it is because light always travel in straight path that is known as rectilinear properties c light.

5. Can you see a reflected light directly? If, no Why?

Ans No, the path of the ray of light is itself invisible but make the things visible only when fall c our eyes.

6. What is the reason for the formation of shadow?

Ans: The rectilinear propagation of light .Kinds of shadow depends on the source f light.

(a)Point source of light form only dark and sharp shadow called the Umbra

(b)Extended source of light (smaller than object) form two reason a dark umbra and another less dark region called penumbra.

(c)Extended source of light (larger than object) : The size of umbra decreases and penumbra increases as screen move away from object and vice versa.

7. How can you see the thing around yourself?

Ans: We see the thing around us when light from a luminous object (like the Sun, a torch or an electric light) falls on these objects and then travels towards our eye after refection.

Brain Teaser Quest Time For Class 6th Light, Shadows And Reflections

1. How can you determine the length of the shadow of an object?

Ans: We cannot correctly determine the length of the shadow of an object. The length of shadow depends on the angle at which light fall on a body and varies at different time of day. This principal helps us to make sun dial for calculating time.

2. How can you make sundial at home?

Ans: We take a pencil and place it into the whole of the empty spool of thread.This work as sundial.

Making the Sundial:

1. Using the pencil, poke a hole on the side of the paper / Styrofoam cup pproximately 2 inches below its top (rim).
2. Place the pebbles in the cup so to give it some weight and hold it upright.3. Cover the cup with the plastic lid.
4. Put the straw through the hole on the side of the cup and its lid while letting about half an inch of the straw stick out from the side.
4. Secure the straw to the cup by taping it down on the side.

4. Explain with the help of an activity that light travels in a straight line.

Ans: Place a candle at one corner of the room
Now look through the pipe, you can see the candle
Now bend the pipe and look. you cannot see the candle
This shows that light travel in straight line called rectilinear propagation of light

5. What is meant by reflection of light ?

Ans: When light fall on smooth or rough surface return back after hitting these surface this phenomenon is called reflection of light

6. What types of image form in pinhole camera?

Ans: Inverted (upside-down)

7. Why is the image formed by a pinhole camera upside down?

Ans: It is because there is no refracting or reflecting optical element to change the path of the rays of light.

8. What happens if we place an opaque object in coloured light?

The colour of light will not affect the shadow, because shadow is the dark patch formed when an object obstructs the path of light

9. On a sunny day, does a bird or an aeroplane flying high in the sky cast its shadow on the ground? Under what circumstances can we see their shadow on the ground?

Ans: when the bird is flying very low close to the ground.

10. You are given a transparent glass sheet. Suggest any two ways to make it translucent without breaking it

Ans:
(i) By applying oil, grease, butter on it or pasting a butter paper on it.
(ii) Grinding (rubbing) the surface of the glass by any abrasive material.

11. Suggest a situation where we obtain more than one shadow of an object at a time.

Ans: We can obtain more than one shadow of an object if light from more than one source falls on it. [For example during a match being played in a stadium, multiple shadows of players are seen].

12. Three identical towels of red, blue and green colour are hanging on a clothes line in the sun. What would be the colour of shadows of these towels?

Ans: The colour of shadows of all three towels will be the same

Section I

The Section

The followi
knowledg

Class – VI S

1. Which on
a. Stone

2. Light is a
a. Energy

3. Which of the following will not form circular shadow
a. A circular disk b. Shoe box c. Ice-cream cone d. A ball

4. Shadow is formed by
a. Transparent object b. Translucent object c. Opaque object d. All of these.

5. A number of rays from different direction assemble at point are called
a. Divergent rays b. Convergent rays c. Parallel rays d. Intersecting rays.

6. Shadow is formed due to
a. Rectilinear propagation of light. b. Parallel propagation of light.
c. Passing of light through object d. All of these.

7. In solar eclipse moon is between
a. Sun and Earth b. Sun and Venus c. Earth and Venus d. Earth and stars

8. If you stand before a plane mirror, your left hand appears right. This phenomenon is
a. Reflection of light b. Lateral inversion of light c. Shadow formation d. Diffusion of light.

9. Which of the following is not a luminous object
a. Sun b. Burning gas lantern c. Glow worm d. Unlit candle

10. Lunar eclipse occurs on
a. Full moon night b. New moon night c. Every night d. Half moon night

11. Which is a natural luminous body?
a. Moon b. Sun c. Burning candle d. Burning lamp

12. Which one is an opaque object?
a. Thick glass pan b. Cardboard c. Butter paper d. Thin plastic sheet.

13. If the Sun is above your head, the shadow formed would be
a. Shortest b. Longest c. Absent d. Sometimes short, some time long.

14. From a source light travels as rays which are
a. Parallel b. Convergent c. Divergent d. Diffused
15. The shape of shadow depends on
a. The size of the source of light b. The shape of the object
c. The position of the source of light d. All of the above.

16. In a plane mirror image formed is
a. Real and inverted b. Virtual and erect
c. Real and erect d. Virtual and inverted

17. Match the following columns

Column A	Column B
a. Periscope	i. To obtain image.
b. Kaleidoscope	ii. To cook food.
c. Solar cooker	iii. To see solar eclipse.
d. Dark sun glasses	iv. To obtain colured pattern and design.

e. Pin-hole camera v. To see above water form submarine.

18. Match the following

Column A	Column B
a. Solar eclipse	i. Reflection of light.
b. Lunar eclipse	ii. New moon day.
c. Sun	iii. Full moon night.
d. Bouncing back of light	iv. lateral inversion.
e. Plane mirror	v. Ultimate source of light.

19. Match the following

Column A	Column B
a. Moon	i. Translucent
b. Sun	ii. Opaque
c. Brick	iii. Reflecting surface
d. Mirror	iv. Luminous
e. Tracing paper	v. Non-luminous

20. Match the following

Column A	Column B
a. A luminous body	i. Moon
b. A transparent object	ii. Brick
c. A translucent object	iii. Star
d. An opaque object	iv. Clear water
e. A non- luminous body	v. Thick windows glass pan

21. Write T for true and F for false statements.

a. Light is a form of energy which can not be seen.

b. The image formed by pin-hole camera is inverted.

c. We see the moon because it is a luminous body.

d. Colour of shadow depends on colour of the object.

e. Plane mirror is used in periscope.

22. Write T for true and F for false statements.

a. Tube-light is a natural luminous body.

b. Stars reflect the sunlight.

c. During solar eclipse moon comes between earth and sun.

d. Rainbow is formed due to shadow formation.

e. Jugnoo (glow worm) is a luminous body.

23. Fill in the blanks with suitable word.

a. ---------- object do not caste any shadow.

b. Moon is a ---------- object.

c. Shadows give us information about the ---------- of the object.

d. Solar and Lunar eclipse are examples of ---------- formation in nature.

e. A ---------- changes the direction of light that falls on it.
f. An object which does not emit light is called ----------.
g. An object which allows all the light falling on it to pass through is called -------.
h. ---------- mirror are used in making periscope.
i. Our shadow is ---------- at noon.
j. In plane mirror image are of ---------- size.

24. Give one word/two words to replace the statement.
a. An object which allows part of light falling on it to pass through.
b. An object which gives out own light.
c. An object which does not give out own light.
d. A celestial body that reflect the light.

25. What is eclipse?
26. State two effects of rectilinear propagation of light.
27. Three identical towels of green, blue and red colour are hanged on a cloth line in thesun. What would be the colour of shadows of these towels?
28. Is air around us is always transparent? Discuss.
29. List the condition for shadow formation.
30. What is reflection of light? Write it two types?
31. Classify the following as luminous and non- luminous body.
Star, Sun, Moon, Tube-light, Mirror, Bulb, Planets, glass, Polished table top,Plastic.
32. What happen when light strikes a transparent body like glass?
33. Distinguish between regular and irregular reflection.
34. How and when does a solar eclipse occur?
35. How much distance light will cover in one minute?
36. When does a lunar eclipse occur?
37. Distinguish between real and virtual image,
38. What is lateral inversion?
39. Classify the following as transparent, translucent and opaque object.
Brick, butter paper, air, cardboard, metals, book, smoked glass, water, cellophane paper.

WORKSHEET WITH SOLUTIONS

1. Does the flame of a gas stove emit light?
Yes.
Q2. What is rectilinear propagation of light?
Light travels in a straight line.
Q3. Write the names of 4 different sources of light?
Bulb, sun, stars, firefly
Q4. Give one example of living thing which emits light?
Jugnu (firefly)
Q5. Sometimes you are able to see sun or moon behind the clouds .What can you say about the ability of such clouds to transmit light?
Yes, clouds transmit light.
Q6. Image formed in a pinhole camera is inverted .Why?
It is inverted because of the rectilinear propagation of light.
Q7. Can you suggest the shape of the shadows?
It is similar to the object.
Q8. What can you say about the edges of shadow?
They are sharp and distinct.
Q9. Does the length of shadow change from season to season?
Yes.
Q10. What is shadow?
A dark patch formed behind an opaque object when it is placed in the path of light.
Q11. Coming back of light incident on a surface is called reflection.
Q12. A pinhole camera is based on rectilinear propagation of light?
Q13. Can light pass through opaque objects?
No
Q14. What is an artificial source of light?
Man made sources of light. For example: electric bulb, candle etc.
Q15. Classify the following into transparent, translucent, and opaque objects.
(Glass, air, oil paper, rubber sheet)
Transparent: air, glass Translucent: oil paper Opaque: rubber sheet
Q16. Name two sources of artificial light?
Electric bulb, candle (wax)
Q17. Name one transparent and one opaque body?
Transparent: air Opaque: stone

SHORT ANSWER TYPE QUESTIONS

Q1. Define reflection of light?
The process of returning (Or bouncing back) the light to the same medium after Striking a surface is called reflection of light.
Q2. What is a reflector?
A surface which reflects the light is called reflector.
Q3. Give one example of most commonly used reflector?
Looking glass or plane mirror
Q4. Does the reflection of light from the surface similar to the bouncing back of arubber ball after it strikes from a ball? Explain.
Yes, because of reflection, light falling on a surface bounces back to the samemedium.

Q5. Give the difference between virtual image and real image?

Real image	Virtual image
It can be obtained on a screen	It can't be obtained on a screen.
It is always inverted.	It is always upright (i.e. erect)
Real image is formed in front of the mirror	Virtual image is formed behindthe mirror.

.

Q6. Give the properties of the image formed by the pane mirror?

1. The image formed by plane mirror is erect and virtual.
2. Size of the image formed by plane mirror is equal to the size of the object.
3. The distance of the image behind the plane mirror is equal to the distance of theobject from the mirror.

Q7. Define luminous objects?

The objects which emit light are called luminous objects.

Q8. What is light?

Light is a form of invisible energy which produces the sensation of sight.

Q9. What are non luminous objects?

Objects which do not emit their own light.

Q10. Why do objects in a room become visible even if sunlight does not enter it?

The objects in a room become visible, even if the sunlight does not enter the roombecause the air around the objects allows the scattered light to pass through it andwe can see the objects.

Q11. How can you convert a transparent glass sheet into a translucent glass sheet?

By covering one side with butter paper.

Q12. Does the colour of the shadow depend upon the colour of the object?

Yes, if we can change the colour of an opaque object, he same colour will bein the shadows.

Q13. In a completely dark room, if you hold up a mirror in front of you, will you see a reflection of yourself in the mirror?

No, because there is no source of light .We can see our image only when light isreflected from the mirror.

Q14. Give few examples of opaque, translucent and transparent objects?

Opaque: a piece of rock, a sheet of aluminium, a mirror, a wooden board, a walla sheet, a sheet of cardboard

Translucent: a sheet of polythene, a CD, smoke, fog, a sheet of carbon, a sheet ofcellophane.

Transparent: air, water, a sheet of plane glass

Q15. What do you understand by lateral inversion?

The right side of the object appears to be the left side of its image and vice-versa
This is called lateral inversion.

Q16. Give one example to show that light travels in a straight line?

When sunlight falls on a solid object like a building or a stone, a shadow is formedbehind the solid object (opaque object) .This shows that light travels in a straightline.

Q17. Distinguish between transparent, translucent and opaque materials?

Transparent materials: which allow light to pass through them and through whichwe can see clearly are known as transparent materials.

Translucent materials: substances through which light can pass partially andthrough which we can't see clearly are called translucent materials.

Opaque materials: substances which don't allow light to pass through them at allare called opaque materials.

Q18. Can the opaque object cast shadow?

In the presence of light, opaque objects act as obstacles to propagate (travel) lightand form a shadow behind them

LONG ANSWER TYPE QUESTIONS

Q1. How are shadows formed?

Light coming from the source of light falling on the objects gets obstructed by theobjects and does not go ahead. So, a shadow is formed.

Q2. How can we protect our eyes while glaring at a strong source of light?

By placing our hand in front of our eyes, light coming from the source does not fallon our eyes directly. (Since we know light travels in a straight line.)

Q3. What happens when light falls on an object?

1. It is almost completely transmitted through the object.
2. Only one part of it may be transmitted and the rest is absorbed or spread out.
3. It may not be allowed to pass through at all.

Q4. Consider a wooden stick about half a meter long. Fix one end of it in open groundwhere there are no trees and buildings near it. Look its shadow in the morning andmark its points of shadow. Note the direction of sun with respect to stick. Where isshadow of the object formed?

The shadow of the object is formed in the direction opposite to the side of the sourcelight i.e. it is formed opposite to the direction of the sun. This activity also shows that shadow moves according to the movement of the sources of light and thelength of the shadow changes with time and the shadow of an object is formed in thedirection opposite to that of the source of light.