



Master Lesson Plan

For

Light

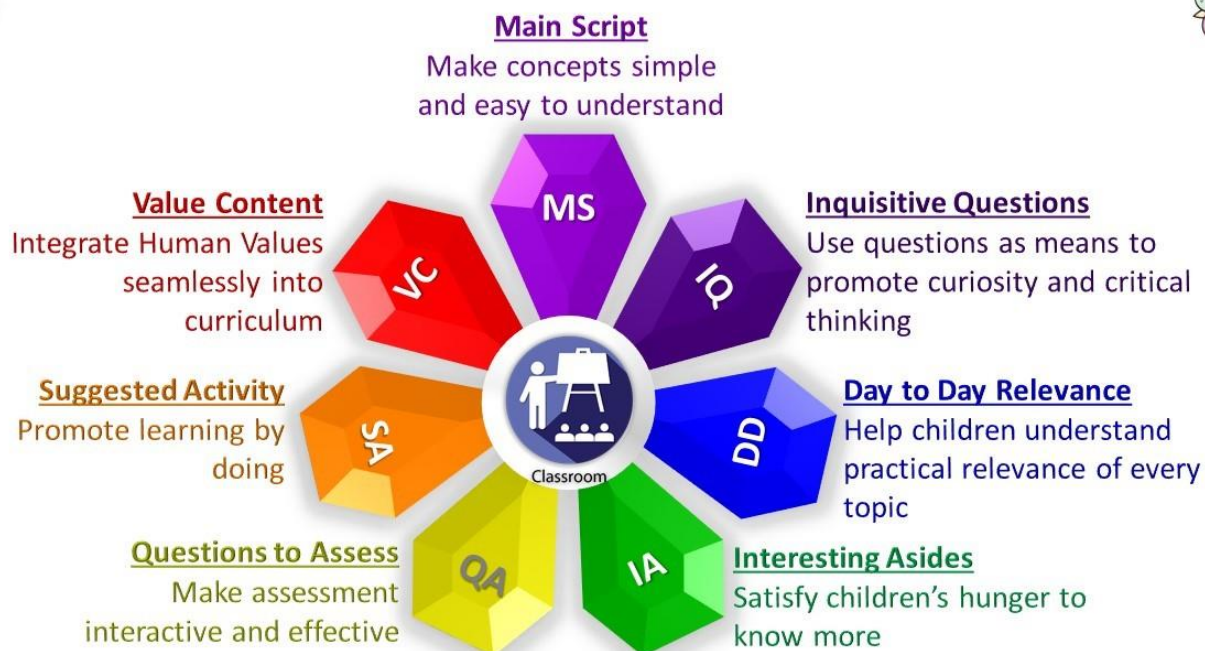
Board	Standard	Subject	Chapter	Language	Reference Link	Creation
CBSE	STD VIII	Science	Light	English	Light	2020-12

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Master Lesson Plan (MLP) - Covers the entire chapter with the help of these 7 asset types



For more information on how to use the lesson plan effectively, please scroll to the guidelines at the end of this document.

Light

1. MS_ Objectives_ Light

Notes to the teacher: This asset lays down the proposed plan for transacting this chapter. It states the asset objectives of the MLP. This asset is for teacher's reference and need not be taught to the students:

Students will be able to...

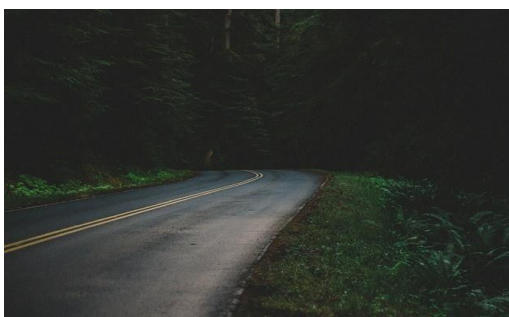
- discover how we are able to see the objects
- explain the laws of reflection
- identify the types of reflections
- demonstrate the laws of reflection using a plane mirror
- describe the different features of an image formed by a plane mirror
- relate to the concept of self-reflection
- design a kaleidoscope
- describe the phenomenon of multiple reflections
- illustrate the functionality of different parts of the human eye
- take delight in learning more about the general defects of a human eye and also how to rectify these
- defects list the steps to be taken to safeguard our eyes
- discuss the Braille system
- create a simple rainbow
- deduce the reason for the formation of a rainbow and appearance of the word AMBULANCE in reverse order on hospital vans
- enjoy the beauty of nature
- assess themselves on the different concepts of light such as reflection, multiple images, and dispersion

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Main Script	Light	

2. IQ_ What makes us see objects?

[Notes to the teacher - Teacher may enable the students to think and come out with as many answers as possible before giving out the right answer/ answers]

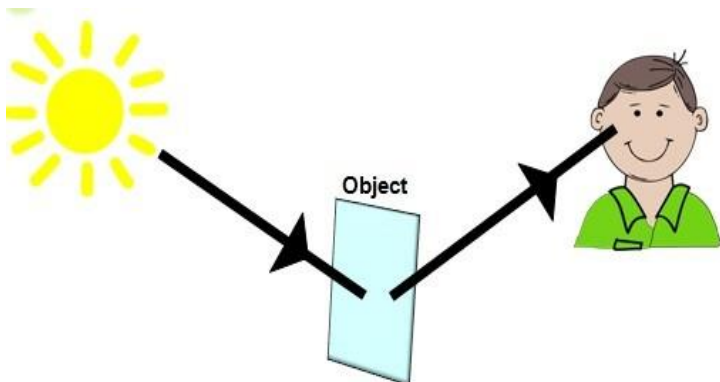
1. On the way to our school in the morning, we see things like buses and trees. Are we able to see the same things at night when it is completely dark?



Answer: No, light helps us to see things. Without light we cannot see objects at night.

2. How does light make us see an object?

Answer: When light falls on an object, it reflects the light and when the reflected light reaches our eyes, we see the object.



3. Can we see a glowing bulb through a bent pipe?

Answer: No. Light travels only in a straight line. So, a glowing bulb cannot be seen through a bent pipe. This property of light is called rectilinear propagation of light.

4. We are able to see through a glass door but why are we not able to see through a wooden door?



Answer:

- Light can pass through only transparent and translucent objects. It cannot pass through opaque objects.
- The Glass door is transparent and the wooden door is opaque. Therefore, we can see through a glass door but not through a wooden door.

Image source:

Morning-road:SA: <https://pixabay.com/en/road-highway-bridge-bus-243234/>

Dark-road:SA: <https://pixabay.com/en/street-road-night-dark-asphalt-918882/>

Sun:SA: <http://www.clker.com/clipart-yellow-sunshine.html>

Boy:SA: <https://pixabay.com/en/boy-happy-child-childhood-kid-310729/>

Glass-door:SA: <https://pixabay.com/en/japan-home-front-door-sunshine-2170046/>

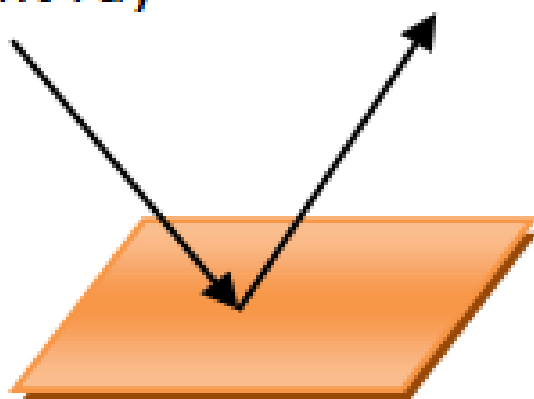
Wood-door:SA: <https://pixabay.com/en/door-wooden-door-wood-closed-2982587/>

Time to teach	Asset Type	Theme	Sub Theme
6 Minutes	Inquisitive Questions	Light	Image formation

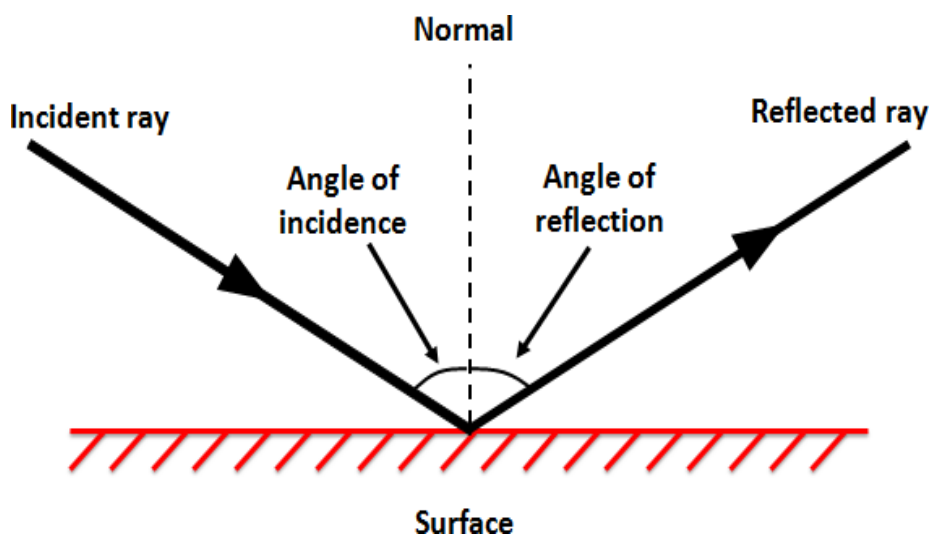
3. MS_ Laws of Reflection

Reflection: The process of bouncing back of light from any surface either smooth or rough is called reflection.

Light ray



- The light ray that strikes the surface is known as the incident ray.
- The ray that bounces back from the surface after reflection is known as the reflected ray.
- The perpendicular drawn to the surface at the point of incidence is called the normal ray.
- The angle between the normal and the incident ray is the angle of incidence.
- The angle between the normal and the reflected ray is the angle of reflection.



Laws of Reflection:

There are two laws of reflection.

1. First law of reflection: The incident ray, the normal ray at the point of incidence and the reflected ray, all lie in the same plane.
2. Second law of reflection: The angle of incidence is equal to the angle of reflection.

Angle of Incidence = Angle of Reflection

Image source:

Reflection: OC: pavani.sathyasai@gmail.com

Ray-diagram: OC: pavani.sathyasai@gmail.com

Time to teach	Asset Type	Theme	Sub Theme
10 Minutes	Main Script	Light	Laws of reflection

4. SA_ Laws of Reflection

Aim: To demonstrate the laws of reflection using a plane mirror.

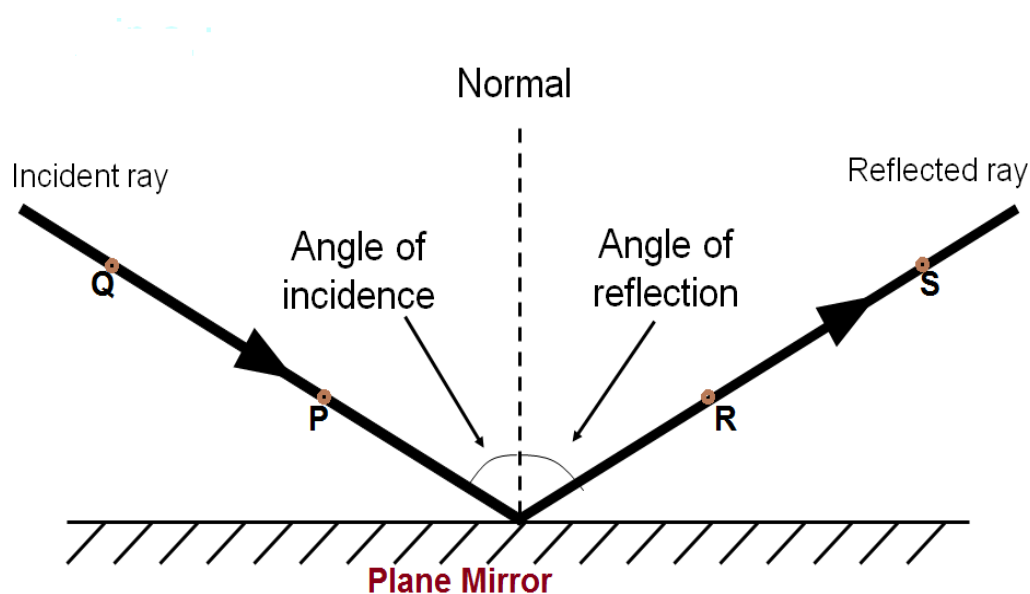
Resources Required: A thermocol sheet/drawing board, a plane mirror, a white sheet of paper, 4 pins, a protractor and a scale.

Setting for the Activity: Indoor

Type of Activity: Demonstration/Experiment

Procedure:

1. Fix the white paper on the thermocol sheet/drawing board.
2. Place the plane mirror on one edge of the thermocol sheet/drawing board and mark its position using a pencil.
3. Draw a line that is normal (or at right angles) to the edge of the mirror using a protractor.
4. Place two pins P and Q in a straight line on one side of the normal line in a way that the line joining the two pins makes an angle of 30° with the normal line.
5. Place two pins R and S on the other side of the normal line in a way that they coincide with the images of P and Q.
6. Remove the pins and join the pin marks to the normal line and measure the angle made using a protractor. This gives the angle of reflection.



7. Repeat the steps 4, 5 and 6 for angles 35° , 40° , 45° and 50° and record the results in a table as follows

S. No	Angle of Incidence	Angle of Reflection
1		
2		
3		
4		
5		

Observation: The angle of incidence is equal to the angle of reflection in all the five cases.

Conclusion:

1. The incident ray, the normal at the point of incidence and the reflected ray are all represented on the same thermocol sheet. Therefore, the incident ray, the normal at the point of incidence and the reflected ray, all lie in the same plane.

2. The angle of incidence is equal to the angle of reflection.

Thus, the two laws of reflection have been proved.

Time to teach	Asset Type	Theme	Sub Theme
20 Minutes	Suggested Activity	Light	Laws of reflection

5. MS_ Types of reflection

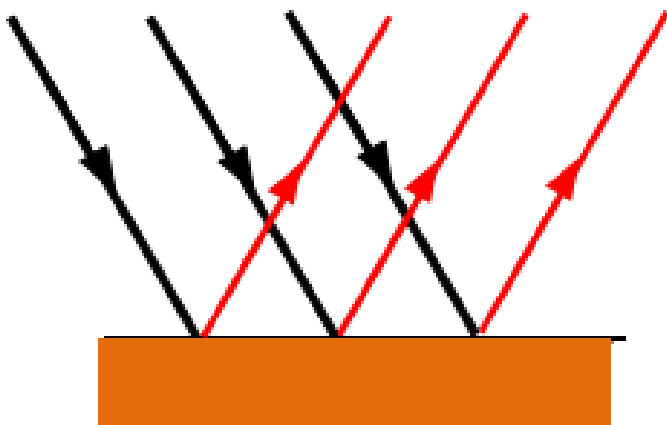
Based on the surface on which light is reflected, there are two types of reflections.

1. Regular reflection

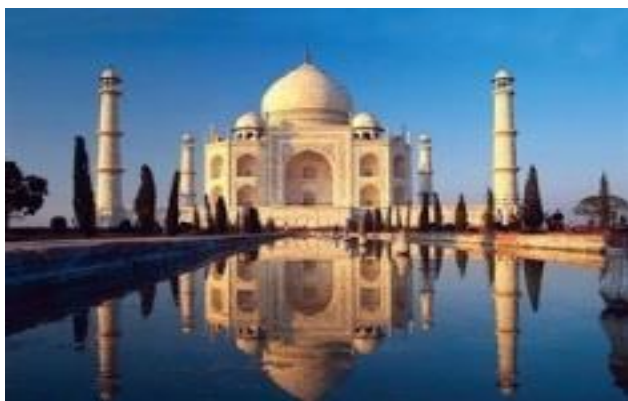
2. Irregular /Diffused reflection

1. Regular reflection:

- Reflection of light from a smooth surface is called regular reflection.
- When light rays fall on a smooth surface, they all reflect in the same direction, and they are parallel to each other.

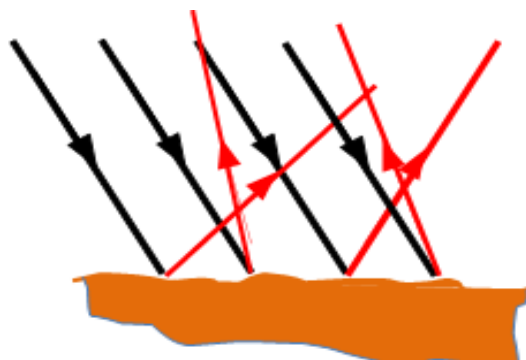


Example: Reflection from plane mirror or still water.



2. Irregular or diffused reflection:

- Reflection of light from an irregular or rough surface is called diffused or irregular reflection.
- When light rays fall on a the rough surface, they scatter in different directions.



Example: Reflection from a rough wall or disturbed water.



Image source:

Regular-reflection:OC: pavani.sathyasai@gmail.com

Tajmahal: SA: <http://www.clker.com/clipart-163427.html>

Diffuse-reflection:OC: pavani.sathyasai@gmail.com

Mountain-reflection: SA: <https://www.publicdomainpictures.net/en/view-image.php?image=32609&picture=mountain-meet-the-sea>

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Main Script	Light	Regular and diffused reflection

6. VC_ Self Reflection

Learning Domain- Classroom

Reflection occurs when light bounces off an object. If the surface is smooth and shiny, like glass, water or polished metal, the light will reflect at the same angle as it hits the surface.

Anything that reflects comes back to you. If you look into a mirror, you will see your reflected image. When we reflect on our past experiences, we tend to look at them once again thoughtfully. You reflect so that you can learn.

Self-reflection helps to build emotional self-awareness. By taking the time to ask yourself important questions, you gain a better understanding of your emotions, strengths, weaknesses and driving factors.

Quote:

Be quick to self-reflect and slow to judgement.

Story – Self-Reflection

Once a king wanted answers to three of his questions. He read many books, conducted sessions with many learned people, but could not come to a conclusion.



Therefore, he sent out a message throughout his kingdom, announcing a job in his ministry to anyone who would answer them. Many wise people tried, but their answers were not satisfactory. Hence, the king decided to visit a sage in the nearby forest. Disguised as an ordinary man, the king went to the sage, bowed down before him and asked him the following three questions.

1. How can I know which is the right time?
2. Who are the necessary persons I need the most?
3. What is the most important thing to do in life?

The sage smilingly replied, “Dear Son, there is only one time that is right and that time is ‘Now’. Understand the ‘Power of Now’ because it is the only time we have with any power to act.

The most necessary person you need is the person you are with, at any particular moment. Be aware of your thoughts and actions with that person.

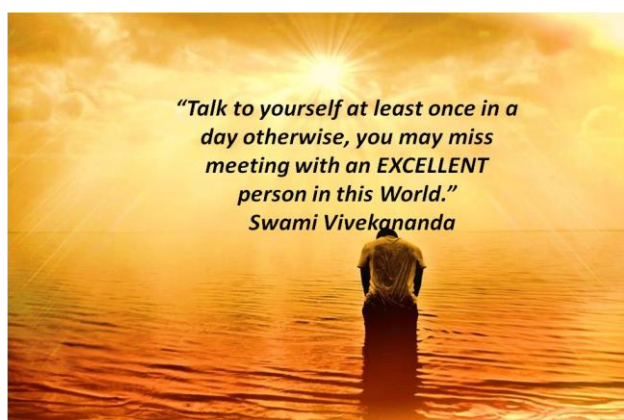


The most important thing to do in life is, to do good to that person. Because that is the only purpose we are sent to this world."

The king calmed down, for those answers taught him to always self-introspect, without being carried away by the external distractions around him.

Take home message

- Whenever we get caught in a go-go race, it is helpful to stop and reflect on our thought process: What am I thinking? What am I doing? What is really important to me in this place? etc
- The mistakes and failures we encounter are valuable learning tools, because we can use them as stepping stones to improve, instead of something to feel worried/embarrassed/upset about.



Talk to yourself at least once in a day, otherwise you may miss a meeting with an EXCELLENT person in this World." Swami Vivekananda

Image Source:

King: https://www.youtube.com/watch?v=CbNW_S03KJU

Sage: https://www.youtube.com/watch?v=CbNW_S03KJU

Man: <https://pixabay.com/photos/man-human-person-sea-ocean-sun-888591/>

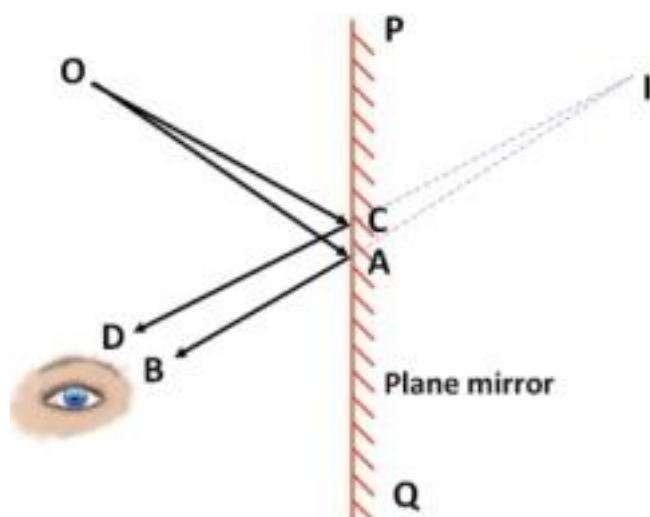
Time to teach	Value Type	Value Sub Type	Value Attribute
5 Minutes	Peace		Stories

7. MS_ Image formation by plane mirror

When light falls on a plane mirror, a perfect regular reflection takes place and an image is formed.



Image formation by plane mirror:



- O is the source of the light and PQ is a plane mirror.
- OA and OC are the light rays that are incident on the mirror PQ and are reflected as rays AB and CD.
- When AB and CD are extended backwards, they appear to meet (even though they do not meet) at the end point, and at this point I, an image of the object is formed.
- Both image distance and the object distance are equal for a plane mirror.

The characteristics of an image formed by a plane mirror are the following

1. The image is erect.
2. The image is of the same size as that of the object.
3. The distance between the image and mirror is equal to the distance between the object and mirror.
4. The image is virtual, that is it cannot be caught on a screen.
5. Left of the object becomes right in the image and the right of the object becomes left in the image on a plane mirror. This is known as lateral inversion.

Lateral Inversion



Here, the tooth brush is actually in the left hand of the boy but in the image it appears as if the brush is in the right hand of the boy.

Image source:

Boy-mirror: SA: <https://pixabay.com/en/child-boy-mirror-reflection-856132/>

Boy-brushing: SA: <http://www.clker.com/clipart-520063.html>

Eye: SA: Eye: <https://openclipart.org/detail/87955/eye>

Ray-diagram: OC: pavani.sathyasai@gmail.com

Time to teach	Asset Type	Theme	Sub Theme
7 Minutes	Main Script	Light	Image formation

8. SA_ Kaleidoscope

Aim: To design a kaleidoscope using mirror strips.

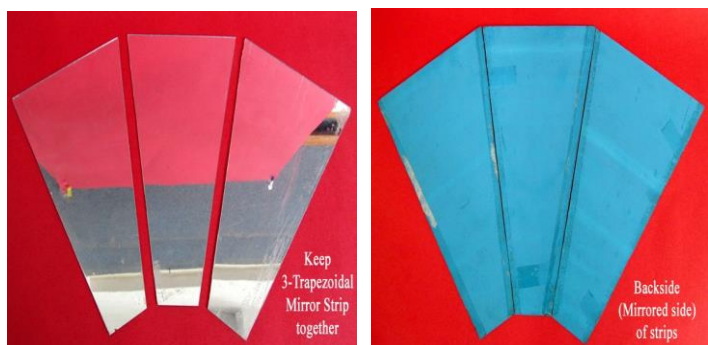
Resources Required: Three trapezoidal shaped mirror strips, a sticky tape, 10 beads and buttons of different colours.

Setting for the Activity: Indoor

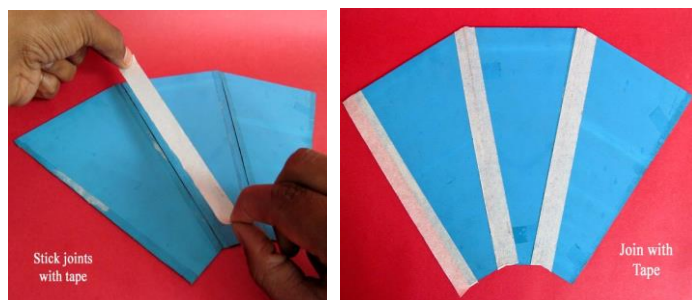
Type of Activity: Demonstration

Procedure:

1. Keep the three trapezoidal shaped mirror strips together as shown below



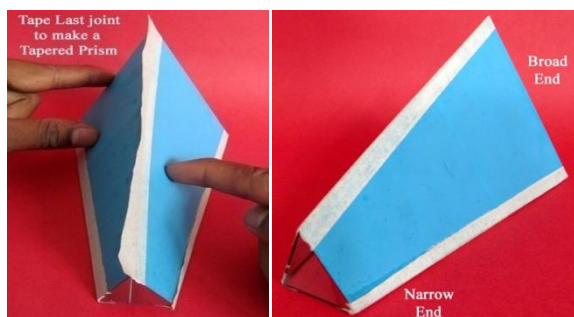
2. Stick the joints of these mirrors using tape.



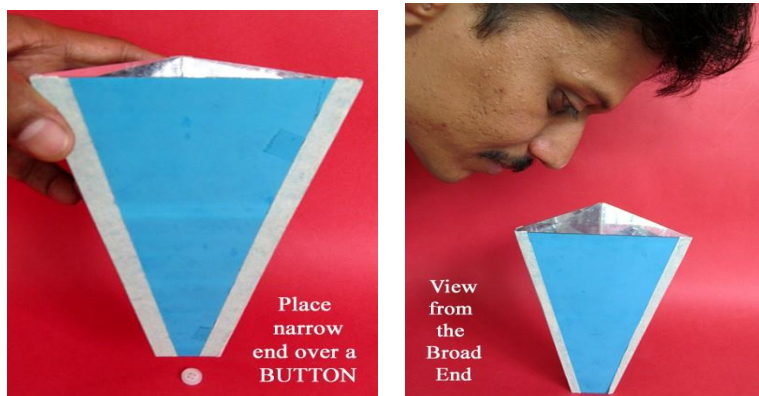
3. Fold and join the mirrors to form a tapered prism.



4. Tape the last joint to make a tapered prism. Now the tapered prism is ready.



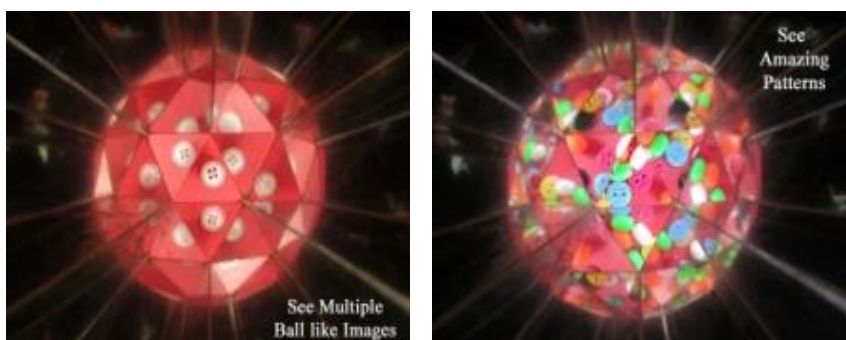
5. Place the narrow end of the kaleidoscope on a button and view from the broad end.



6. Similarly place the narrow end over the beads and buttons and view from the broad end.



Observation: When we place the narrow end over beads and buttons, we observe amazing patterns of beads and buttons.



Conclusion: Students will be able to design a kaleidoscope.

Precautions:

1. Students should be careful while working with mirror strips. They should handle the mirrors carefully as they may cause injury or cut their fingers.
2. Students should hold this kaleidoscope carefully while viewing the designs otherwise it may fall down and break.

Discussion Questions:

1. How are we able to observe amazing patterns of beads and buttons?

Answer: The amazing patterns of beads and buttons are formed by the images reflected by the three mirror strips of the tapered prism.

2. What is the principle that is applied in the kaleidoscope?

Answer: Multiple reflections

Image source:

step1:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic03.jpg>

step1a: SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic04.jpg>

Step2:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic05.jpg>

Step2a:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic06.jpg>

Step3:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic08.jpg>

Step4:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic09.jpg>

Step4a:SA <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic11.jpg>

Step5 :SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic13.jpg>

Step5a :SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic14.jpg>

Step6:SA <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic16.jpg>

Pattern: SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic15.jpg>

Pattern2:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/Kaleidoscopemagic17.jpg>

Time to teach	Asset Type	Theme	Sub Theme
15 Minutes	Suggested Activity	Light	Kaleidoscope

9. MS_ Multiple Reflections

- A single plane mirror forms only a single image of an object.



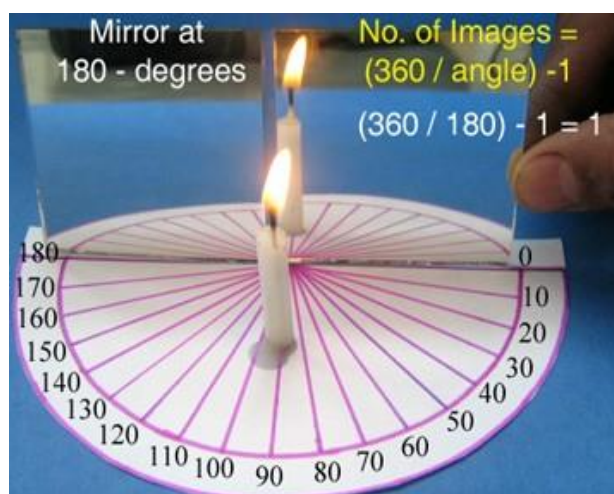
- If two plane mirrors are placed at an angle to each other, the image in one mirror acts as an object for another mirror. Thus, multiple images are formed.
- The number of images formed depends on the angle between the two mirrors.

This can be calculated by using the following formula:

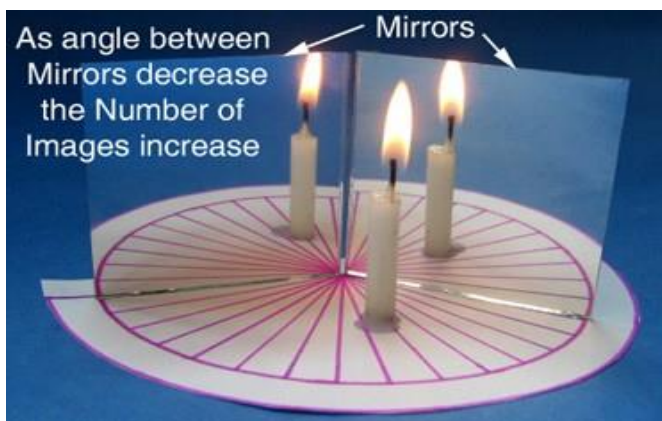
$$\text{Number of Images} = \frac{360^\circ}{\text{Angle}} - 1$$

Number of Images =

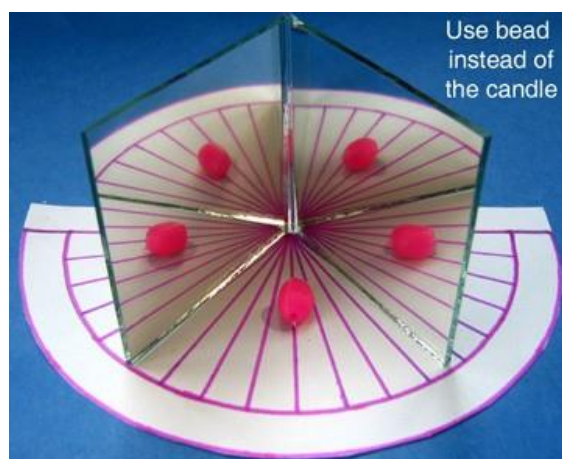
- If two plane mirrors are placed at 180° to each other, one image is formed.



- If two plane mirrors are placed at 120° to each other, two images are formed.



- If two mirrors are kept at an angle of 72° to each other, four images are formed.



- When two mirrors are kept parallel to each other, an infinite number of images are formed.
Example:-In a jewellery shop two plane mirrors are placed on opposite walls.

Image source:

Mirror-image: SA: <https://www.publicdomainpictures.net/en/view-image.php?image=21358&picture=mirror-effect>

Multiple-image1:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/multipleimages04.jpg>

Multiple-images2:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/multipleimages05.jpg>

Multiple-images2: SA: <http://www.arvindguptatoys.com/arvindgupta/toys/multipleimages07.jpg>

Time to teach	Asset Type	Theme	Sub Theme
8 Minutes	Main Script	Light	Multiple reflection, Meaning reflection of light, Laws of reflection formation

10. IA_ General Defects of Eye

The three general defects of human eye are the following:

1. **Myopia or Nearsightedness:** Persons with Myopia cannot see distant objects clearly but can see nearby objects clearly. This defect can be rectified by using a concave lens of suitable power in the spectacles.



2. **Hypermetropia or Far sightedness:** Persons with Hypermetropia cannot see nearer objects clearly, but can see distant objects clearly. This defect can be rectified by using a convex lens of suitable power in the spectacles.



3. **Cataract:** It is a common defect that occurs mainly in old age, when eye sight becomes foggy. This defect can be rectified by replacing the opaque lens with a new artificial lens through a minor surgery.

Image source:

Myopia: SA: <https://www.publicdomainpictures.net/en/view-image.php?image=115804&picture=new-leaves>

Concave lens : OC: Original Contribution(pavani.sathyasai@gmail.com)

Car: SA: <http://www.publicdomainpictures.net/view-image.php?image=7945&picture=&jazyk=EN>

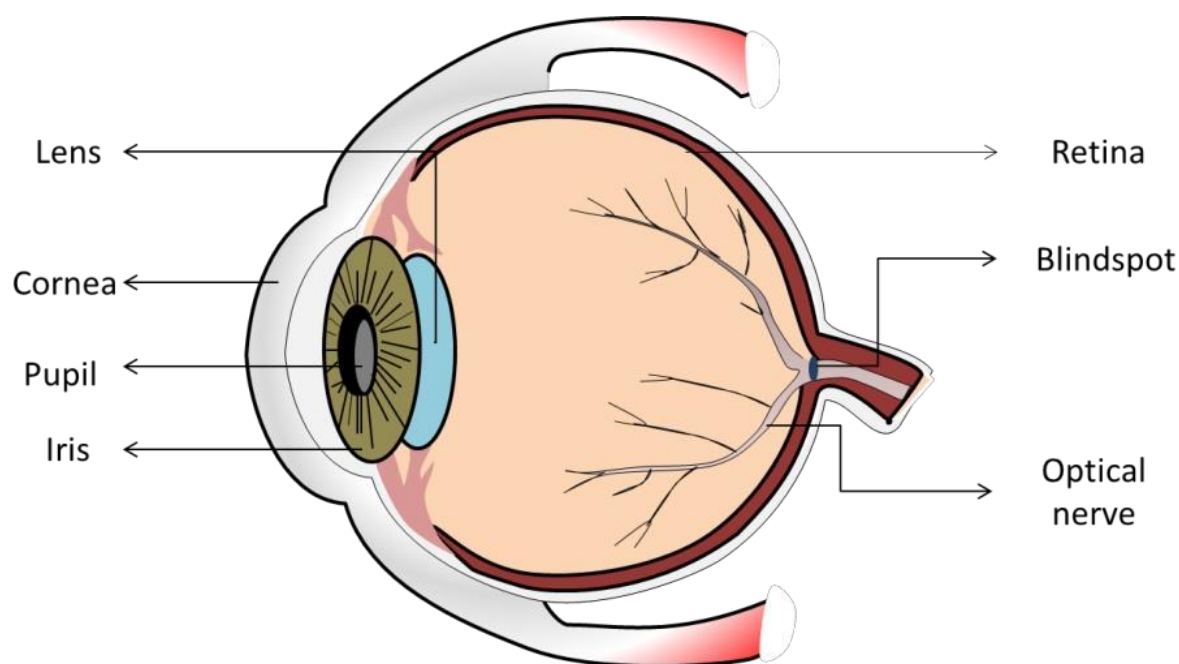
Road: SA: <https://pixabay.com/en/shimla-street-himachal-india-555885/>

Convex lens: OC: : Original Contribution(pavani.sathyasai@gmail.com)

Time to teach	Asset Type	Theme	Sub Theme
4 Minutes	Interesting Asides	Light	What makes things visible? What makes thin Image formation

11. MS_ Human Eye

- Eye is one of the most important, complex and sensitive sense organs.
- It is spherical in shape.
- It is covered with an opaque white layer/coat. This coat protects the interior part of the eye from accidents



The other main parts of the eye are:

1. **Cornea:** It is the transparent front part of the eye where refraction takes place.
2. **Iris:** It is the dark muscular structure present behind the cornea. It is the part of the eye that gives colour to the eyes. If a person has blue eyes, it means his eye iris is blue in colour. It controls the amount of light entering into the eye.
3. **Pupil:** It is the small circular opening in the centre of the iris.
4. **Lens:** A crystalline muscular convex lens (lens that is thicker at the centre) is present behind the pupil of the eye.
5. **Retina:** It is the innermost layer of the eye. It contains several cells.
6. **Optic Nerves:** Optic nerves are an onset of nearly one million nerves fibres that carry visual messages from the retina to the brain.

Types of cells: The two types of cells of retina are the following:

1. **Cones:** They are sensitive to bright light and they also sense the colours.
2. **Rods:** They are sensitive to dim light.
 - Sensations are transmitted to the brain through optic nerves.
 - The impression of an image stays on the retina for about $\frac{1}{16}$ of a second.

3. Blind spot: There are no sensory cells at the junction of the optic nerve and retina. Therefore, vision is not possible at this place and this spot is called as the blind spot.

Image source:

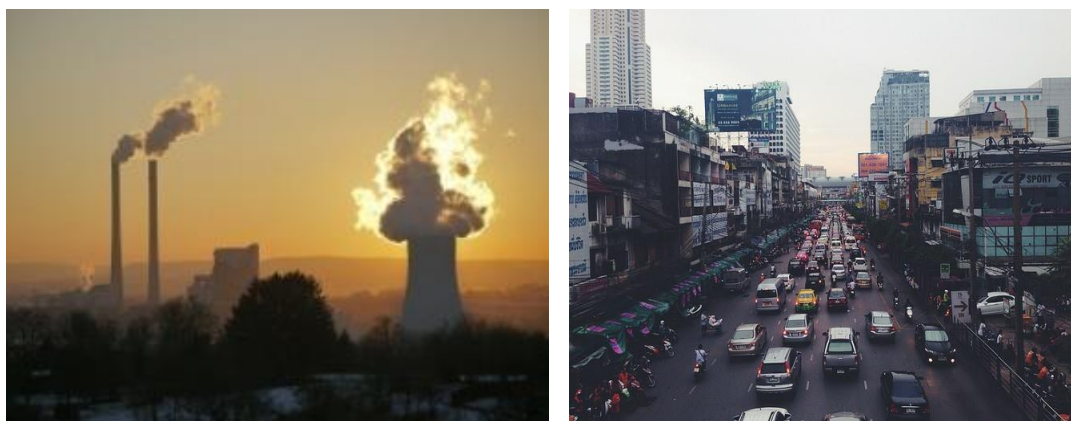
Eye: OC: rushmish@gmail.com

Time to teach	Asset Type	Theme	Sub Theme
7 Minutes	Main Script	Light	What makes things visible? What makes thin Image formation

12. DD_ Proper care of eyes

It is very essential to have healthy eyes.

We must protect them from any damage as they are very sensitive and are constantly exposed to the outside polluted world.



We must take the following steps to safeguard our eyes

1. Avoid too little or too much light. Insufficient light causes eyestrain and headaches. Too much light, like that of the sun or a powerful beam can damage the cells in the retina.

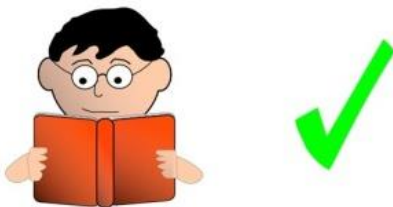


2. Avoid looking at the sun or any other bright light directly.



3. If any dust particles fall into the eye, never rub the eyes; instead wash them with clean water. You can use goggles to prevent the falling of dust particles into your eyes.

4. Never read by bringing books too close to the eyes or too distant from the eyes.



5. Avoid watching TV or computer too closely or for long hours.



6. Ensure proper diet with balanced nutrition especially with vitamin A. Examples for the fruits and vegetables that are rich in vitamin A are mango, papaya, carrot, sweet potato and dark leafy green vegetables.



Image source:

Papaya:SA: <https://pixabay.com/en/papaya-fruit-summer-juicy-3652074/>

Carrot: SA : <http://www.publicdomainpictures.net/view-image.php?image=8794>

Spinach: SA: <http://www.publicdomainpictures.net/view-image.php?image=31019&picture=healthy-spinach-plant>

Mango:SA: <https://pixabay.com/en/mangoes-fruit-mango-food-tropical-1320111/>

Factory: SA: <https://pixabay.com/en/power-plant-industry-flame-2012377/>

Traffic in India: SA: <https://pixabay.com/en/traffic-jam-traffic-india-street-388924/>

dimlight: SA: <http://www.publicdomainpictures.net/view-image.php?image=69243&picture=faint-light>

Laser: SA: <https://pixabay.com/en/laser-disco-light-show-dance-light-1752656/>

Boy: SA: <https://pixabay.com/en/boy-sit-play-shirt-striped-307703/>

Open book: SA: <https://pixabay.com/en/book-open-book-reading-2026902/>

Boy reading book:SA: <http://www.clker.com/clipart-15943.html>

Right:SA: <https://openclipart.org/detail/15814/right-or-wrong-4>

Wrong mark:SA: <http://www.clker.com/clipart-crossmark1.html>

boy-book:SA: <http://www.clker.com/clipart-boy-reading-book-1.html>

Boy-TV:SA: <https://pixabay.com/en/children-tv-child-television-home-403582/>

Bright Sun: SA: <https://pixabay.com/en/sun-shining-glowing-bright-light-18849/>

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Day-to-day Relevance	Light	Image formation

13. MS_ Braille System

- Visually challenged persons can read and write using the Braille system.
- It was developed and published by Louis Braille in the year 1821, who himself was a visually challenged person.
- Louis Braille was born in Coupvray, France on January 4, 1809.



Dot patterns of Braille System:

- The Braille system includes 63 dot patterns or characters.
- In each character, dots are arranged in cells of two vertical rows of three dots each.



- Each character represents a letter, a combination of letters, a common word or a grammatical sign.
Example: The dot pattern for letter "C", the word "And" and the grammatical sign "comma" are as follows:



- These patterns are embossed on the Braille sheet with the dots slightly raised for easier touch.



- Visually challenged persons can identify / recognize these characters by touch.
- Braille text can be either handwritten or printed by machine.
- Braille code is developed for common languages, mathematics and scientific notation.

Image source:

Braille: SA: <https://openclipart.org/detail/292159/louis-braille>

Braille-character: SA: <http://www.clker.com/clipart-map-symbols-braille-white.html>

Braille-sheet: SA: <https://pixabay.com/en/braille-font-keys-metal-plate-52554/>

Dot-pattern: OC: pavani.sathyasai@gmail.com

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Main Script	Light	What makes things visible?

14. SA_ Simple rainbow

Aim: To create a simple rainbow using a mirror strip.

Resources Required: A mirror strip, a white sheet of paper, a bowl half filled with water and a shallow container

Setting for the Activity: Outdoor

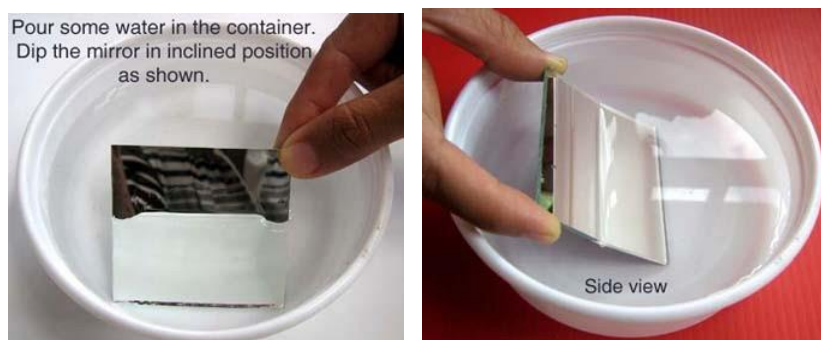
Type of Activity: Demonstration

Procedure:

1. Pour the water from the bowl into the shallow container.

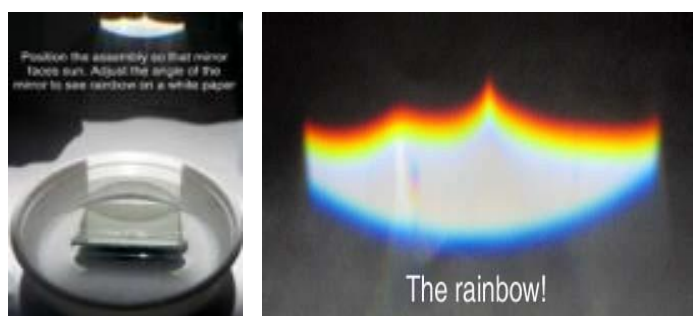


2. Place the mirror in the inclined position in the container and the mirror should face the sun.



3. Now the mirror strip and water form a prism. Then, the light splits into its seven colours. Capture the image

4. Adjust the distance and the angle of the mirror and the paper to obtain a wonderful rainbow spectrum on paper.



Observation: The mirror strip and water form a prism and this breaks the light into its seven colours (VIBGYOR).

Conclusion: A rainbow spectrum is formed on a white sheet of paper. This phenomenon of splitting light into seven colours is known as dispersion.

Image source:

Rainbow1:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/rainbow01.jpg>

Rainbow2:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/rainbow02.jpg>

Rainbow3: SA: <http://www.arvindguptatoys.com/arvindgupta/toys/rainbow03.jpg>

Rainbow4:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/rainbow04.jpg>

Rainbow5:SA: <http://www.arvindguptatoys.com/arvindgupta/toys/rainbow05.jpg>

Time to teach	Asset Type	Theme	Sub Theme
10 Minutes	Suggested Activity	Light	Dispersion of white light

15. IQ_ Ambulance and Rainbow

[Notes to the teacher - Teacher may enable the students to think and come out with as many answers as possible before giving out the right answer/ answers]

1. Why is the word "AMBULANCE" written backwards on hospital vans?



Answer:

- The image formed by a plane mirror is laterally inverted. i.e left side of the object becomes the right side in the image, and the right side of the object becomes left in the image on a plane mirror.
- The word AMBULANCE is written backwards, so that drivers of vehicles in front of the ambulance can read it easily and properly when seen through their rear-view mirrors and give them way.

2. Have you ever seen a rainbow? What colours are present in a rainbow? How does it form?



Answer:

- Yes. A rainbow contains seven colours, namely, violet, indigo, blue, green, yellow, orange, and red (VIBGYOR).
- A rainbow appears due to dispersion of white light into seven colours by tiny water drops in the atmosphere. The process of splitting of white light into seven colours is called dispersion.

Image source:

Ambulance: SG: <https://www.srisathyaasaividyaiahini.org/index.php/component/joomgallery/transportation/roads/transportation-roadways-4092.html>

Rainbow: SA: <https://pixabay.com/en/rainbow-arch-rainbow-colors-436183/>

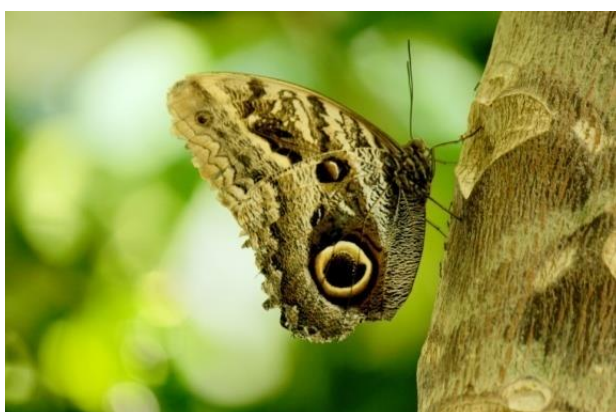
Time to teach	Asset Type	Theme	Sub Theme
3 Minutes	Inquisitive Questions	Light	Image formation, Dispersion a glass prism

16. IA_ How do animals and birds see?

1. Crabs have very small eyes, but they have all-round vision.



2. Butterflies have very large eyes. They can see in all directions-front, back and sides as well.



3. Owls have more rods than the cones. Therefore, they can see very well at night but not during the day. Similarly day light birds like eagles have more cones than rods and therefore, they can see very well during the day but not at night.



Image source:

Owl SA: <https://www.publicdomainpictures.net/en/view-image.php?image=119630&picture=owl-eyes>

Eagle: SA: <https://www.publicdomainpictures.net/en/view-image.php?image=15976&picture=eagle-landing>

Crab: SA: <https://pixabay.com/en/crab-beach-animal-sand-claw-sea-2442907/>

Butterfly: SA: <https://www.publicdomainpictures.net/en/view-image.php?image=93110&picture=butterfly-eye>

Time to teach	Asset Type	Theme	Sub Theme
3 Minutes	Interesting Asides	Light	What makes things visible? Image formation, What makes thin Image

17. QA_ How do the light rays reflect?

I. Choose the correct answer for the following:

- _____ type of reflection occurs from a smooth surface.
a) Diffused reflection b) Regular reflection c) Irregular reflection d) none
- When two plane mirrors are kept at an angle of 90° to each other, _____ number of images are formed.
a) 4 b) 5 c) 3 d) 2
- _____ is the innermost layer of the eye that contains cones and rods.
a) Iris b) Retina c) Pupil d) none
- If a ray of light is reflected at an angle of 60° , then the angle of incidence is _____.
a) 45° b) 60° c) 80° d) 90°

Answers: 1. b 2. c 3. b 4. b

II. Fill up the following blanks

1. The impression of an image stays on the retina for about _____ of a second.
2. _____ is the formula for calculating the number of images formed when two plane mirrors are kept at an angle to each other.
3. _____ type of reflection occurs when light falls on chalk powder.

Answers:

1. $1/16^{\text{th}}$

2. $\frac{360^\circ}{\text{Angle}} - 1$

3. Irregular or diffused

III. Answer the following questions:

1. Why do owls have good vision at night?



Answer: Owls have more rods than cones in their eyes. Rods are sensitive to dim light. Therefore, owls have good vision at night times.

2. What are the characteristics of an image formed by a plane mirror?

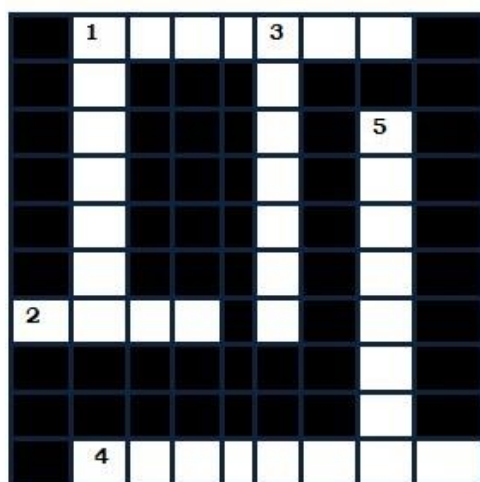
Answer: An image formed by a plane mirror is always erect, virtual and laterally inverted and it is of the same size as that of the object. Further, the image distance is equal to the object distance.

IV. Match the following:

<u>Group A</u>	<u>Group B</u>
1. Blind spot	a. Rough surface
2. Dispersion	b. Multiple images
3. Kaleidoscope	c. No vision
4. Diffused reflection	d. Splitting of light into its colours

Answer:

<u>Group A</u>	<u>Group B</u>
1. Blind spot	a. No vision
2. Dispersion	b. Splitting of light into its colours
3. Kaleidoscope	c. Multiple images
4. Diffused reflection	d. Rough surface

V. Solve the following puzzle:**Across:**

- _____ is the natural phenomenon showing dispersion(7)
- _____ is the part of the eye responsible for the colour of the eyes(4)
- _____ number of images are formed when two plane mirrors are kept parallel to each other (8)

Down:

- 1 In reflection, all reflected rays are parallel to each other.(7)
3. Visually challenged persons can read and write using _____ system(7)
5. _____ is the eye defect that occurs mainly in old age when the eyesight becomes foggy (8)

Solution:

	¹ R	A	I	N	³ B	O	W	
	E				R			
	G				A		⁵ C	
	U				I		A	
	L				L		T	
	A				L		A	
² I	R	I	S		E		R	
							A	
							C	
	⁴ I	N	F	I	N	I	T	E

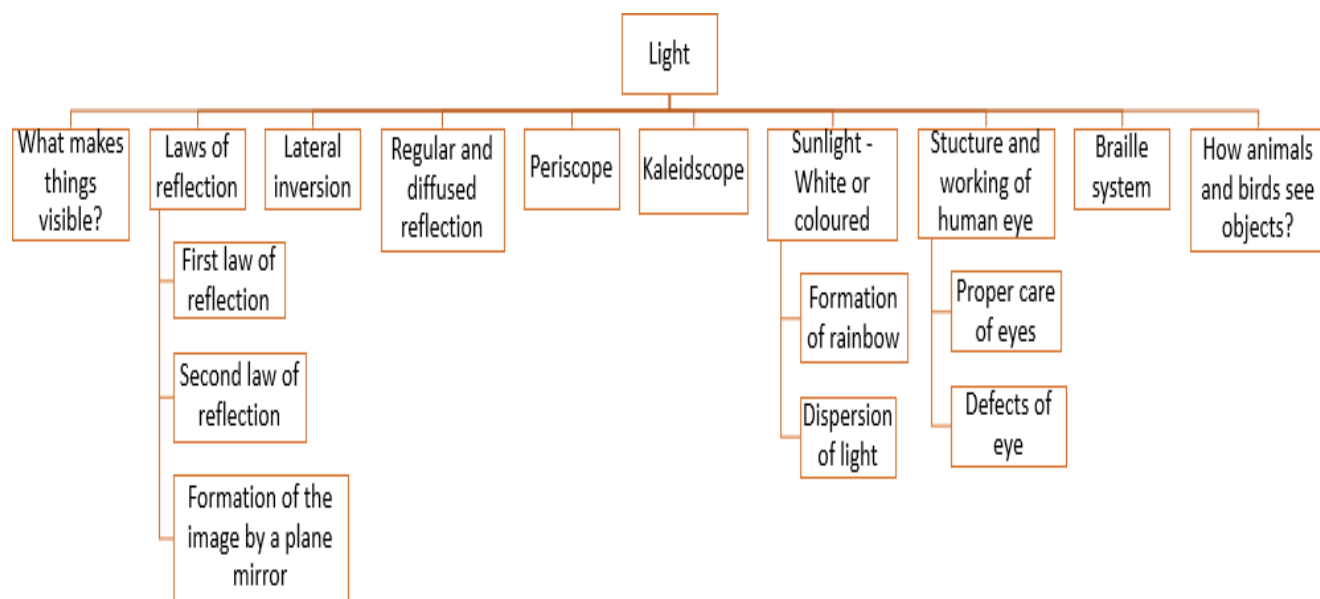
Image source:

Owl: SA: <https://www.publicdomainpictures.net/en/view-image.php?image=119630&picture=owl-eyes>

Puzzle: pavani

Time to teach	Asset Type	Theme	Sub Theme
12 Minutes	Assessments	Light	What makes things visible? Laws of reflection, Image formation, what makes things visible?,

18. MS_Summary_Light



Time to teach	Asset Type	Theme	Sub Theme
15 Minutes	Main Script	Light	What makes things visible? Laws of reflection, Image formation, what makes things visible?

Master Lesson Plan

Seven Asset Methodology for MLP	
What is the purpose of this Master lesson Plan?	This Master Lesson Plan (MLP) prepared by Sri Sathya Sai Vidya Vahini, covers the entire chapter for the given board. The chapter given in the textbook is broken down into smaller modules known as assets. One of seven teaching methods is applied to each asset. Several different assets together complete the entire chapter. Each asset is supported by a teaching aid such as animated presentation, audio, video, worksheet; that the teacher can use in the class, while teaching that module. The MLP is for the teacher's preparation and the teaching aids are for use in the classroom.
How to use it?	You can prepare for your class with this MLP by following 3 simple steps: 1. Read your textbook; 2. Go through the information given in the assets (document & multimedia); 3. Prepare your teaching notes. Great! Now you are ready to transact the chapter.
Duration	Kindly note the duration given for each asset. Due care has been taken in planning the assets, to ensure the chapter is completed within the time specified by the Board. Note: Preparation time is not included in the asset duration. The teaching time depends on the duration of the teaching aids and is not impacted by the length of the MLP.
What is a 'Main Script' (MS) Asset?	The Main Script asset is there for explaining the main concepts of the chapter clearly. The information given in the textbook is simplified, organised and structured to give more clarity. Additionally, you may find a video or mnemonics or a graphic organiser to deepen the understanding of the concept.
How to teach using the MS asset?	Please use the blackboard, slides and interaction to develop the concept.
What is an 'Inquisitive Questions' (IQ) asset?	The Inquisitive Questions asset uses questions to promote higher order thinking like the n^{th} why, what-if, new perspectives, cause-effect, and others, creating curiosity.
How to teach using the IQ asset?	You may use the questions to connect with the students, encourage exploration to engage them in the learning process. You may allow multiple responses and instead of rejecting any of the responses, ask why, before revealing the suggested answer or hints.
What is a 'Day to day Relevance' (DD) Asset?	The Day to Day Relevance asset helps students understand the practical relevance of every topic, making them eager participants in the classroom. If students connect the concepts to their environment, they would learn meaningfully without dislike or simply memorizing for exams.

How to teach using the DD asset?	You may use the asset by asking questions about their experience and use it to establish why they are learning the topic. If necessary you may substitute with a recent or local example.
What is an 'Interesting Aside' (IA) asset?	The Interesting Aside asset uses attention grabbing titbits or anecdotes to bring joy and satisfy the child's hunger to know more. This is a quick/short asset intended to bring attention back to the main concept being taught.
How to teach using the IA asset?	You may use this asset to give a piece of interesting information relevant to the topic, without prolonged explanation/discussion. You may suggest appropriate books for further reading.
What is a 'Suggested Activity' (SA) Asset?	The Suggested Activity asset provides a detailed step by step procedure for the teacher to conduct a hands-on activity. This promotes Activity Based Learning.
How to teach using the SA asset?	You may use this asset to energise your students to learn by doing simple, fun-filled activities based on the topic. The asset includes - preparation, activity, and follow-up. You may engage the students in the preparation and follow-up stages to develop collaboration and responsibility. You could try it once, yourself, before the actual delivery to be more comfortable with it. Note: The duration mentioned in the asset is usually for the activity part only.
What is a 'Value Content' (VC) Asset?	The Value Content asset integrates Universal Human Values (such as empathy, inclusivity, respect for nature that translates into responsible behaviour) seamlessly into the curriculum, as the "End of education is character".
How to teach using the VC asset?	You may use this asset to engage with the students to bring out their innate values and connect with the intrinsic values in the topic/concept. The asset includes pointers on the specific pedagogical technique followed.
What is a 'Questions to Assess' (QA) asset?	The Questions to Assess asset uses an interactive approach to check learning of different types of learners, and provides feedback to the teacher for appropriate action. The questions cater to all the levels of Bloom's Taxonomy. Questions from 'Apply' level and above enable students to reflect on their learning.
How to teach using the QA asset?	You may go through the slides to understand its flow and know when to click for the answer (slides include suggested answers). While presenting in the class, you may display the question and encourage multiple responses, before revealing the answer. In some cases, this asset may include extra questions/worksheet that can be given as homework.