

PRACTICAL EXPERIMENT

- LIGHT WAVES: REFLECTION AND REFRACTION.

Background information.

As we know, light travels from one place to another as waves. We can use equipment such as a light box kit to investigate how light waves interact when reflecting and refracting. Light box kits contain concave (curved inwards) objects, convex (curved outwards) objects, prisms and planes that can be used to demonstrate how light is reflected or refracted.

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Aim:

The aim of this experiment is to identify how light waves reflect or refract off different surfaces such as concave, convex, plane and prisms by using the light box kit provided.

Hypothesis:

It is hypothesised that the experiment will demonstrate how the light wave energy is being reflected or refracted off different surfaces which include concave, convex, plane and prisms by using the beam of light from the light box kit.

Materials:

- Light box kit
- Convex and concave lenses
- Prisms and planes
- Battery pack
- White A4 paper

Method:

Set up of light box kit.

1. Connect your light box to your battery pack as shown by your teacher
2. Place the black plastic light distributor down with the single open shaft facing downwards.
3. Place a sheet of white paper down in front of the light box.
4. Choose a coloured square of your choice.
5. Close the sides of the box making sure no light escapes.

Experiment 1.

6. Place a concave mirror in front of the light box and fill in the table below.
7. Flip over the concave mirror so it faces backwards and fill in the table below.
8. Place down the plane mirror so that it faces the light box and fill in the table below.

Experiment 2.

9. Place the concave lense in front of the light box (on the horizontal) and fill in the table below.
10. Place the convex lense in front of the light box (on the horizontal) and fill in the table below.

11. Place down the rectangular plane in front of the light box (on the diagonal) and fill in the table below.

12. Place the prism in front of the light box and fill in the table below.

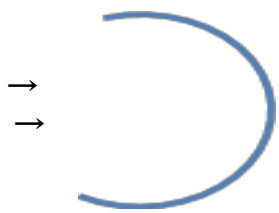
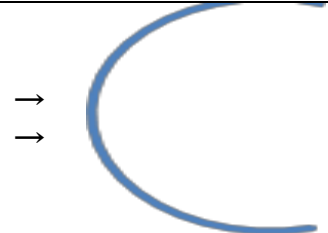

Experiment 3.

13. Start with a convex lens and hold it close to your eye. Slowly move the lense away from your face until your arm is completed outstretched. Record what you see in the space below.

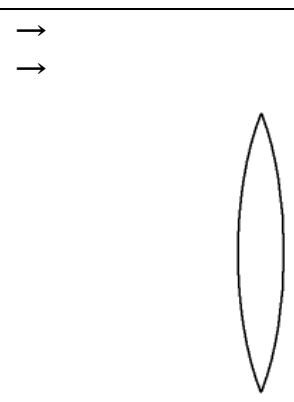
14. Repeat the action for concave lenses and describe the difference between the two lenses.


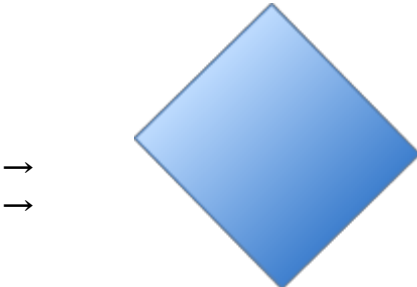

Results: Reflection And Refraction using Different Surfaces

Experiment 1.

Top view	What happened to the rays? Reflection or refraction?	Plane, convex or concave surface?
	The light ray gets reflected off the concave mirror in an outwards direction	Concave Surface
	The ray gets reflected outwards off the concave surface	Concave surface
	The ray is refracted upwards off the plane surface. It has changed direction	Plane Surface

Experiment 2.

Top view	What happens to the rays? Reflection or refraction?	Lens or prism? Convex or concave?
	The ray went straight through the convex lens and it refracted.	convex lense.

	<p>The ray went straight through the concave lens so then means it means it refracted</p>	<p>convex lense</p>
	<p>The light reflected off the plane rectangular surface but also refracted through it.</p>	<p>rectangular plane</p>
	<p>The light refracted through the triangular prism then broke into two different directions looking like a Y chart this is called scattering.</p>	<p>Triangular prism</p>

Experiment 3:

The convex lense made everything look much smaller than its actual size. The concave lense flipped the area upside down and enlarged the area.

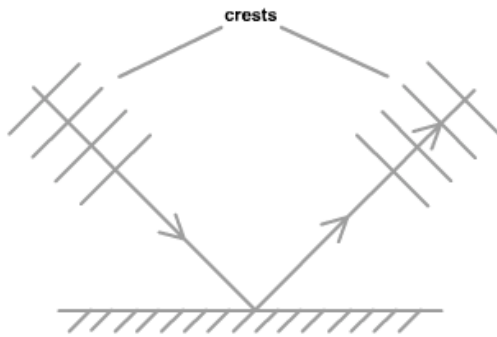
Discussion:

Question 1: Describe the difference between reflection and refraction based on what you saw in your results. The difference between reflection and refraction is reflection bounces off the surface that is front of the light and refraction is when the beam of light went straight through the object.

Question 2: Describe the effect concave and convex lenses have on the light that passes through them. The effect concave and convex lenses had were both the same, they both demonstrated refraction because the beam of light went straight through the lenses.

Question 3. Does the distance from the object alter the way the light bends? Explain your response. Altering the distance of the object from the light makes the bend more sharper and starts to move more inwards.

Question 4. The following image demonstrates what feature of light waves and why?



This image demonstrates the reflection of light and also scattering of light

Conclusion: (Summarise the experiment, refer to and describe results, state if the hypothesis was support or not and why and acknowledge any errors made and how they could have impacted results).

In conclusion the aim of the experiment was to identify how light waves reflect or refract off different surfaces such as concave, convex, plane and prisms by using the light box kit provided.

It was hypothesized that this experiment will demonstrate how the light wave energy is being reflected or refracted off different surfaces which include concave, convex, plane and prisms by using the beam of light from the light box kit. . The results of the experiment have shown shown that the hypothesis was correct because it clearly identifies that different surfaces can reflect and refract depending if the surfaces were plane, prism, convex or concave. The concave surfaces reflected off the surface because the light wave bounced back. The beam of light refracted off the convex surface by bending in a different direction when hitting the surface. While observing the light being either reflected or refracted some errors were made. One error that was made was placing the concave or convex lense the wrong way or in the wrong direction another error that was made was being confused as to whether the light was reflecting or refracting off the surfaces. This impacted the results by the light showing up differently. This prac was able to identify how light waves can either reflect or refract by shining onto different surfaces directly. The experiment was able to present how light travels from one place to another as waves and can be seen differently.