

Name: _____ Class: _____ Date: _____

Light Up Your Life!

Learner Outcomes:

- Investigate how light is reflected, transmitted and absorbed by different materials; and describe differences in the optical properties of various materials.

Key Terms:

Concave

Absorption

Luminous

Convex

Transparent

Non-luminous

Reflection

Translucent

Diffuse

Refraction

Opaque

Focused

Background Information:

Research question: What are some of the properties of light? How does light behave in different situations?

Materials:

Flashlights or ray
boxes

Convex lens

Cornstarch

Colored filters (blue
red green)

Concave lens

Water

Flat mirror

Large beaker
(1000mL)

Tissue paper

Solar calculator

White paper

Colored paper

This investigation / activity has been adapted from:

Mah K, Martha J, McClelland L, et al. *Science in Action 9*. Toronto, ON: Addison Wesley.

Procedure:

Station A:

1. Shine a light source at a blank white screen.
2. Cover the light source with a colored filter and shine at the screen.
3. Overlap two different color filters and shine at the screen. Do this in all possible combinations (there are 3).
4. Overlap all three color filters and shine at the screen.
5. Record your observations for parts 1-4.

Station B:

1. Look at your image in a mirror.
2. Step back from the mirror and record how your view changes.
3. Can you see more or less of your self?

Station C:

1. Describe the lines on a piece of paper without looking through a lens.
2. Look at a sheet of lined paper using a **convex lens** (thicker in the middle than the edges). Record your observations.
3. Look at a sheet of lined paper using a **concave lens** (thinner in the middle). Record your observations.
4. Look through the convex lens and move it farther away from the paper. Record your observations.
5. Look through the concave lens and move it farther away from the paper. Record your observations.
6. Move each lens closer to the paper and record your observations.

Station D:

1. Shine a light source through a glass, tissue paper and a book.
2. Describe what happens to the light in each case.
3. Name another material that would have the same properties of a glass, tissue paper and a book when light is shone through it.

Stations E: Teacher Demonstration

This investigation / activity has been adapted from:

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1. As your teacher holds the lasers below the waterline, and shines the laser through the water at different angles, observe the laser and the light beam in the water. Record your observations.
2. If the laser is held above the waterline, and shone at different angles, describe and record what you notice.

Observations:

Station A

	Blue	Red	Yellow	Green
Blue				
Red				
Yellow				
Green				

What do you notice when you overlap all four colours?

Station B

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How does your view change? (Can you see more of yourself?) _____

Station C

Convex Lens: What happens to the distance between the lines as you move further away?

Concave Lens: What happens to the distance between the lines as you move further away?

Station D

What do you notice when the laser is below the water level and is placed at different angles?

What do you notice when the laser is above the water level and is placed at different angles?

Station E

What happens to the light when it is shone through each object? Also give the scientific word after the explanation.

Glass: _____

Tissue Paper: _____

Book: _____

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Station F

Explain a simple experiment to demonstrate that light is an energy source.
(1 - 2 sentences)

How does varying the amount of light affect the amount of power?

What is the manipulated variable in the above experiment?

What is the responding variable in the above experiment?

What is the controlled variable in the above experiment?

Conclusion: Using appropriate terminology, describe all the ways we saw light interact with matter in this investigation.

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Extension:

1. Research and describe one everyday practical application for each of the ways we saw that light interacts with matter in this investigation. Be specific and describe how our interactions with light are useful.

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