

D. What's Blocking the Light?

Purpose: You will classify objects based on how they permit light to pass through them.

Introduction: Objects are either transparent, translucent, or opaque depending on the amount of light that is able to pass through them. Transparent objects allow light to travel through them. Materials like air, water, and clear glass are called transparent. When light encounters transparent materials, almost all of it passes directly through them. Glass, for example, is transparent to all visible light.

Translucent objects allow some light to travel through them. Materials like frosted glass and some plastics are called translucent. When light strikes translucent materials, only some of the light passes through them. The light does not pass directly through the materials. It changes direction many times and is scattered as it passes through. Therefore, we cannot see clearly through them; and objects on the other side of a translucent object appear fuzzy and unclear.

Opaque objects block light from traveling through them. Most of the light is either reflected by the object or absorbed and converted to thermal energy. Materials such as wood, stone, and metals are opaque to visible light.

The amount of light that shines through an object effects shadows too. An object that is transparent has a shadow that is barely visible. You may even have to squint to see the shadow. Objects that are translucent have shadows that are darker. An object that is opaque has a very dark shadow. Shadows are visible to us because they are darker than the light around them. When an object is translucent, it allows a lot of light to pass through. This amount of light makes the shadow very light and similar in color to the original light source.

Materials: flashlight; variety of transparent, translucent, and opaque objects

Procedure:

Part A: Hypothesis

A hypothesis is an educated guess about how things work; a statement that can be used to predict outcome of future observations. The hypothesis should be something we can test. In this experiment, we are testing how light interacts with an object.

1. Write your hypothesis on how light interacts with an object on the data sheet.

Part B: Test Your Hypothesis by Classifying Objects

1. Shine a flashlight directly on each object listed below.

Objects: Object 1 is transparency film, Object 2 is wax paper, and Object 3 is black construction paper.

Caution: Handle the glass mirror and glass square carefully when you are holding them.

2. Observe how each object permits light to pass through it.

Did light pass through the material totally, partially, or not at all?

3. Classify each object as transparent, translucent, or opaque based on your observations. Write the name of each object under the appropriate column on the data sheet.

4. Using the flashlight, test and classify other objects that might be around the classroom. to see how the light interacts with the object.

Part C: Conclusion

1. Based on your experiment, write a statement expressing whether your hypothesis is correct or incorrect.

Data and Results (Light)

Name(s) _____

Part A: Hypothesis

If light shines on an object, then I will observe:

1. _____
2. _____
3. _____

Part B: Test Your Hypothesis by Classifying Objects

Classifications	transparent	translucent	opaque
Write the objects in the column according to how they interact with the light			

Part C: Conclusion

The hypothesis is correct/incorrect because in the experiment.....

Multiple Choice Questions:

1. Which of the following is **not** a transparent object?
 - A. window
 - B. plastic wrap
 - C. water bottle
 - D. aluminum foil

2. How are the hypothesis and the conclusion related?
 - A. The hypothesis asks a question that the conclusion answers.
 - B. The conclusion states if the hypothesis is correct or incorrect.
 - C. The hypothesis leads step-by-step to the conclusion.
 - D. The conclusion refers to the observations, not the hypothesis.

3. Objects that make the best shadows are:
 - A. opaque
 - B. materials
 - C. translucent
 - D. transparent

4. In this experiment, the variable being tested is the:
 - A. graphic organizer
 - B. procedure
 - C. object
 - D. light

5. Which snack would probably be translucent?
 - A. banana
 - B. granola bar
 - C. cheese stick
 - D. fruit roll-up

Instructor's Guide

(Light)

Time: 30 min.

Equipment and Materials: per group:

Items	Number	Comment
Flashlight	1	Make sure batteries are included
Transparent objects	2-3 each per lab	glass square, Saran wrap
Translucent objects	2-3 each per lab	plastic beaker, wax paper
Opaque objects	2-3 each per lab	mirror, wooden stand, plastic square, aluminum foil

Many of the materials listed above, including opaque objects, can be found in the Economy Optics Kit (Item No. OPTKIT) by United Scientific Supplies, Inc.

Why is it important to know what materials allow light to pass through them and some materials do not?

One example would be the type of glass or plastic used for bottles. Some medicines can be affected by light. Medicine bottles are often made from material that block light. For foods that aren't affected by exposure to light, containers are often designed to allow you to see what's in the jar.

Part A: Hypothesis

If light shines on an object, then I will observe:

1. light will easily pass through
2. light will be filtered
3. light will be blocked

Part B: Test Your Hypothesis by Classifying Objects

Classifications	transparent	translucent	opaque
Write the objects in the column according to how they interact with the light	glass square Saran wrap	plastic beaker wax paper	mirror wooden stand plastic square aluminum foil

Multiple Choice Questions:

1. D. aluminum foil
2. B. The conclusion states if the hypothesis is correct or incorrect.
3. A. opaque
4. C. object
5. D. fruit roll-up