

III. Light and matter

Key Question: How much light passes through?



Student name:

Class:



Activity 1 – Sunglasses contest

In the summer the sun can be very bright.

Sunglasses help protect you from bright sunlight.

But some sunglasses are better than others.

- Collect different sunglasses.
- Try every pair of sunglasses. Which pair of sunglasses appears to be most effective?

Describe its properties.



Now you are going to use a light sensor to find out how much light reaches your eyes through different sunglasses and to decide which sunglasses are the most efficient.

Conducting a fair test is very important in science investigations. To ensure that your test is a fair test, you must change only one factor at a time while keeping all other conditions the same.

- Use a torch as a source of light. Design and describe below an experiment to find out which sunglasses stop the most light. Think about how you will make your experiment fair and safe.

1. What will you measure in your test?

2. What will you change in your test?

3. What will you keep the same?

● Ask your teacher to approve your plan.

● Now test your sunglasses. Record your results in the table below.

SUNGLASSES (OWNER)	INTENSITY OF LIGHT PASSING THROUGH (LUX)	RANK (1 MEANS BLOCKING THE MOST LIGHT)

4. Which of the tested sunglasses is the best at blocking light?

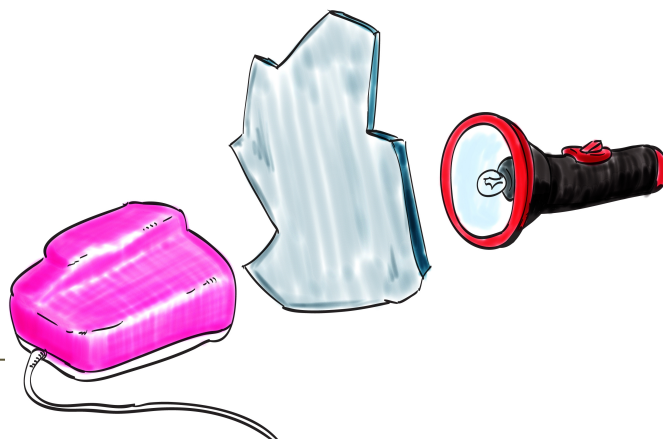
5. What do you think is the reason for this?

Activity 2 - Does light travel through every material?

By using sunglasses you can block some of the light getting into your eyes. Also with some other materials you can do this. In this activity you will use a light sensor to measure how much light can pass through different materials and to find the material, which is the best at blocking light.

6. How would you modify your previous experiment?

Discuss your idea with the teacher and describe it below.



7. In the table below list the materials, which you will test.

This can be for example glass, wood, cardboard, foil, cellophane, different fabrics, tissue, different papers, plastic bags, etc.

MATERIAL	INTENSITY OF LIGHT PASSING THROUGH (LUX)	RANK (1 MEANS BLOCKING THE MOST LIGHT)

8. Which of the tested materials is the best at blocking light?

9. Why is that? Explain in your own words.

10. Which of the tested materials is the worst at blocking light?

11. Why is that? Explain in your own words.

Activity 3 – What is the difference between translucent and transparent?

As you have observed in your previous activity, materials sometimes let the light through and sometimes not. When light strikes an object, the light can be reflected, absorbed or transmitted.



A material that reflects or absorbs all light that strikes it is called **opaque** (for example wood or metal).

A material that allows almost all light to pass through is called **transparent**. You can look through such material and see things clearly.

A material that allows only some light to pass through is called **translucent**. You can look through such material but you cannot see things clearly.

- 12.** Based on your results from the previous investigation and this information place each of tested material in one of the columns.

OPAQUE MATERIALS	TRANSPARENT MATERIALS	TRANSLUCENT MATERIALS

13. Make a list of objects or materials in your house for each category.

OPAQUE MATERIALS	TRANSPARENT MATERIALS	TRANSLUCENT MATERIALS

14. Which material would be the best for a window blind?

☐ Opaque ☐ Transparent ☐ Translucent

15. Which material would you use for a bathroom window?

☐ Opaque ☐ Transparent ☐ Translucent

16. Which material would be the best for a parasol?

☐ Opaque ☐ Transparent ☐ Translucent

Activity 4 – Coloured filters

- 17.** Imagine you are a shop manager. There is a lot of sunlight coming to your shop causing the clothes to fade. You would like to stop this process. You have different coloured filter foils that can be placed on shop windows. Investigate which colour filter would be the most effective for this job. Describe below your experiment design.



- 18.** Perform the experiment and write the results below.

My conclusion:

The best colour to stop light is _____.

- 19.** When you look through a coloured foil in which colour you see objects around?
Explain.

- 20.** Which colour of the light pass through:

a red coloured filter? _____

a green coloured filter? _____

a blue coloured filter? _____

Questions

- A.** Would thicker material let through more or less light? Explain.

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- B.** Make a list of objects or materials in your school for each category.

OPAQUE MATERIALS	TRANSPARENT MATERIALS	TRANSLUCENT MATERIALS