

Light sources and straight-line rays

Grade 6 science (Year 7 · Class 6) · Lab

Name: _____ Date: _____ Class: _____

Which materials let the most light through, and does light really travel in straight lines? In this lab you use a torch and a light meter to measure transmission through five samples, then test the straight-line idea with three punched cards.

Level: Grade 6 science (Year 7 · Class 6) · **Curriculum:** MS-PS4-2

Aim

To measure how much light different materials let through, to classify them as transparent, translucent or opaque, and to test that light travels in straight lines.

Equipment

- Torch with a fresh battery
- Light meter (or a light sensor with a display)
- Metre ruler and sticky tack
- Samples: clear plastic, tracing paper, bubble wrap, cardboard, aluminium foil
- Three index cards with a hole punched in each

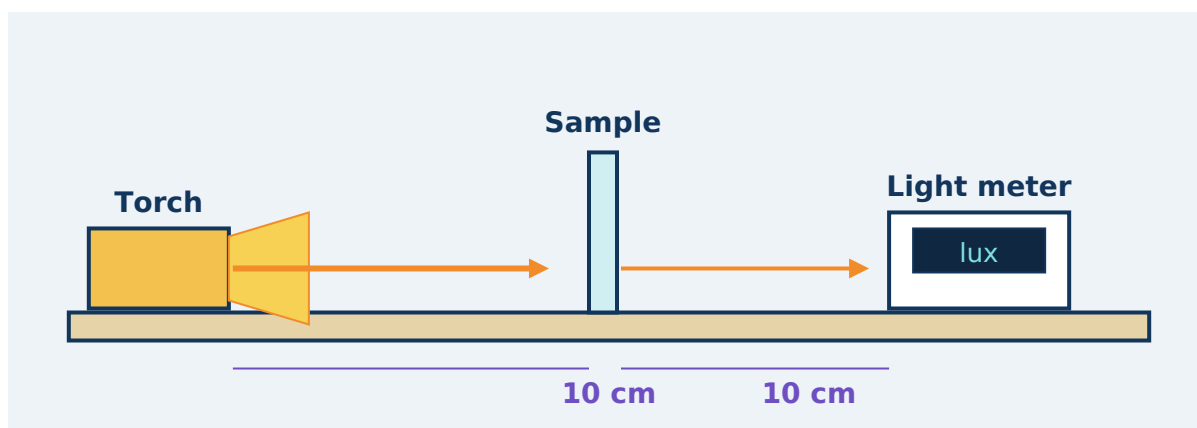
Safety

Safety

Never shine a torch or any bright light into someone's eyes. Handle the foil and punched cards carefully because their edges can be sharp.

Method

1. Fix the torch, the sample holder and the light meter on the ruler, 10 cm apart, in a dim room.
2. With no sample in the holder, switch on the torch and record the reading three times.
3. Put in each sample in turn. Record three readings each time.
4. Calculate the mean and the percentage of light passing through.
5. Finally stand the three punched cards on the ruler in a line, 10 cm apart, and look through the holes towards the torch. Then move the middle card sideways.



Keep every distance the same for every material.

Results

Sample	Trial 1 (lux)	Trial 2 (lux)	Trial 3 (lux)	Mean (lux)
No sample	120	121	119	to calculate
Clear plastic	112	110	114	to calculate
Bubble wrap	90	92	88	to calculate
Tracing paper	66	64	65	to calculate
Cardboard	0	0	0	to calculate
Aluminium foil	0	0	0	to calculate

Analysis questions

Question 1 Mean readings

Calculate the mean reading for no sample, clear plastic, bubble wrap and tracing paper.

Question 2 Percentage transmitted

Calculate the percentage of light that passes through clear plastic, bubble wrap and tracing paper, to the nearest per cent.

Question 3 Classify the samples

Classify all five samples as transparent, translucent or opaque, using your results and how clearly you could see through them.

Question 4 Ranking

Rank the samples from the one that lets most light through to the one that lets least.

Question 5 Fair test

State three variables that you kept the same and explain why.

Question 6 Straight line test

Explain what you saw with the three cards and what this shows about light.

Question 7 Improving accuracy

Suggest two ways to improve the accuracy of the readings.