

When light meets materials



SmartSteps
FOR PRIMARY SCHOOLS

AusVELS: Level 5

Science Understanding – Physical sciences (ACSSU080)

Science Inquiry Skills – Planning and conducting (ACSIS086)



Key learning outcomes

Students will be able to:

- recognise that light travels in a straight line
- identify and name the different characteristics of opaque, transparent and translucent materials
- create practical uses for opaque, transparent and translucent materials in a model



Suggested time

Before we go: 60 minutes

Walk: 45–60 minutes

When we get back: 90 minutes

Lesson

Before we go

- Students work in small groups with a torch or other light source and a variety of opaque, transparent and translucent materials (see Resources). Groups shine the light source on the back of each material sample, recording what they see from the front of the material on the [Material data chart \(p.3\)](#).
- Explain the meaning of opaque, transparent and translucent and have the students record the correct terminology against each observation.
- Students experiment using the light source to find out how light travels. They place two sheets of cardboard (see Resources) so that the holes are approximately five centimetres apart and with the third sheet approximately five centimetres in front of the other two. Students move the sheets around until the light source shines off the third piece of cardboard.
- The class discusses what happened, drawing conclusions about how light rays travel and relating it to their previous observations. Discuss that opaque material absorbs some light and reflects the rest, transparent material allows light to travel through it, and translucent material allows some light through and some to be reflected.
- Explain to the students that they will be going for a walk around the local area to look for examples of opaque, translucent and transparent materials in use.
- On the walk, students will observe how the different materials are used and record their observations on the [Material uses chart \(p.4\)](#).

Out and about

- Using the *Material uses chart*, students record how they have seen the three types of materials (opaque, transparent and translucent) used in their local area.
- Encourage groups to carefully observe how and why each type of material has been used.
- During the walk, periodically stop students and prompt their observations with questions such as:
 - » Have you found any interesting uses for the materials?
 - » Why do you think a particular material is used in a particular situation?
- » Would you have used a different material for a particular situation?
- Encourage students to record anything interesting on their chart.

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When we get back

- Students discuss in their groups the number of instances of each type of material usage and the reasons they were used in each case (e.g. glass in shop windows to display merchandise, translucent windows for some privacy at a day spa or opaque doors for security).
- Have the students tally the number of times they saw each material used and create graphs using a spreadsheet program.
- In groups, have students design and build models, using the three different types of materials appropriately.

Resources

- torch or light source (one per group)
- opaque, transparent and translucent materials, such as paper, cardboard, wood, fabric, glass, clear plastic or Perspex sheets (one set per group)
- three sheets of A4 cardboard per group, two of which have identical holes in them (to allow light to shine through both holes onto the third piece of cardboard)
- [Material data chart \(p.3\)](#) (one per group)
- [Material uses chart \(p.4\)](#) (one per student)
- local builder or hardware merchant – invite them to talk to the class about how materials can be used to manage the level of light for a specific purpose (e.g. sun protection, energy savings) (optional)

Useful links

Light characteristics
science.howstuffworks.com/light2.htm
www.learner.org/teacherslab/science/light
www.teachingideas.co.uk/science/contents_light.htm

Suggested assessment

Assess student's ability to:

- identify and classify materials that are opaque, transparent and translucent
- recognise that light travels in a straight line
- represent practical uses of opaque, transparent and translucent materials in a model

Further connections

Students and their families could:

- identify opaque, transparent and translucent materials in their neighbourhood or in another area they visit, such as streets around their grandparent's home
- talk about why certain materials have been used for a particular purpose
- create or collect photos showing practical uses for opaque, transparent and translucent materials to share with the class
- complete a [Smart Steps: for Families – Activity Sheet](#) at home

AusVELS Level 5

Strand	Sub-strand	Elaboration
Science Understanding	Physical sciences Light from a source forms shadows and can be absorbed, reflected and refracted (ACSSU080)	<ul style="list-style-type: none"> • drawing simple labelled ray diagrams to show the paths of light from a source to our eyes • classifying materials as transparent, opaque or translucent based on whether light passes through them or is absorbed
Science Inquiry Skills	Planning and conducting With guidance, plan appropriate investigation methods to answer questions or solve problems (ACSIS086)	<ul style="list-style-type: none"> • experiencing a range of ways of investigating questions, including experimental testing, internet research, field observations and exploring simulations

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Material uses chart

Name:

Material used	Where material is used	Opaque, transparent or translucent?	Reason material is used here
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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Other interesting observations:
