Important Concepts . . .

Preview Review

Science *Grade 8*

W3 - Lesson 1: Transmission and Absorption of Light

V5-07

Important Concepts of Grade 8 Science

Materials Required

Textbook:
Science in Action 8

Science Grade 8
Version 5
Preview/Review W3 - Lesson 1

Publisher: Alberta Distance Learning Centre
Author: Kevin De Clerq
In-House Teachers: Barb Philips and Norene Pinder

Project Coordinator: Dennis McCarthy
Preview/Review Publishing Coordinating Team: Nina Johnson, Laura Renkema, and Donna Silgard

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Preview/Review Concepts for Grade Eight Science

W3 - Lesson 1:
Transmission and Absorption of Light

OBJECTIVES

By the end of this lesson, you should

- name and define the different types of matter related to light transmission
- describe how colours are produced and why different materials have different colours
- name and describe various forms of artificial light
- name some natural sources of light

GLOSSARY

absorption - taking something in and keeping it there

bioluminescence - light produced by living organisms

reflect - to bounce off

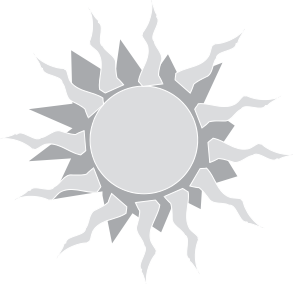
transmission - movement of light waves through something

wavelength - the distance between the tops of two waves

W3 - Lesson 1: Transmission and Absorption of Light

Welcome to W3 - Lesson 1. This lesson is designed to teach you how **light absorption** and **light transmission** affect the way we see objects. It should take about 1.5 hours to complete; there will be a small homework assignment at the end.

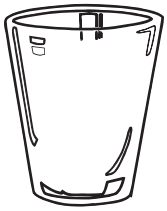
Transmission and Absorption of Light

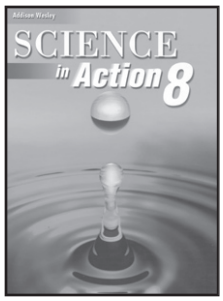


When light leaves a source of energy, its **transmission** is determined by properties of the matter it encounters. Matter can be transparent, translucent, or opaque.

- **Transparent** materials allow the light to pass through; an example is a clear glass of water.
- **Translucent** materials like sunglasses or frosted glass allow only a portion of the light to pass through.
- **Opaque** materials such as wood or metal do not allow light to pass through.

To summarize, light can pass through objects that are transparent or translucent, but not through objects that are opaque. Light travels in all directions from its source unless blocked.





Activity 1

Read and understand pages 213 to 215 in *Science in Action* 8. Then, answer the following questions.

1. Light energy travels in what form?

   _____

2. When two rainbows form, does the formation of the colors appear exactly the same? Explain your answer.

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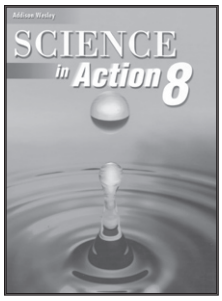
3. Draw a diagram to explain what happens to white light as it passes through a prism.

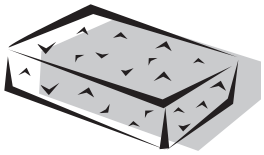


Absorption of Light

Light travels as waves of energy. Colours are a product of light. Each colour is produced by a specific **wavelength** of light.

Read pages 213 to 215 in *Science in Action* 8.

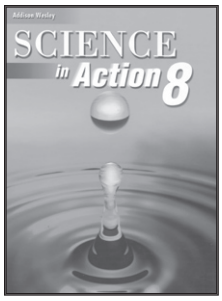
If we see a colour, the wavelengths that make them are **reflected** from the material you are looking at. All other wavelengths (colours), are absorbed by it.



If you see the colour of pink on a sweater, the sweater is absorbing all the colours of the spectrum except the colour of pink; pink is the only colour that the sweater reflects. If you see the colour of black, such as a black garbage bag, all the colours of the visible light spectrum are absorbed and none are reflected.

Darker colours tend to collect heat in the sun because they absorb most of the visible light. A dark or black-coloured car on a sunny summer day will absorb sunlight and become very warm. This is why it is not a good idea to wear dark coloured clothing on a hot summer day — you will get very warm.

White objects reflect light; they will stay relatively cool and will not be heated by the sun. If you have ever gone skiing in the wintertime, you will know that it is possible to get sunburned because the white snow reflects sunlight onto your face.



Activity 2

Read and understand pages 216 to 217 in *Science in Action 8*. Then, answer the following questions.

1. What is the electromagnetic spectrum?

_____

_____

3. Name two types of electromagnetic radiation other than light.

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_____

3. If you had a red shirt, what colour(s) of the visible light spectrum would it be reflecting and what colour(s) would it be absorbing?

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4. Why do black-coloured objects heat up when they sit outside in the sun?

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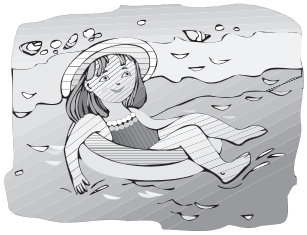

5. If you expose a white-coloured object to the sun it would stay cooler than a black object. What is the reason for this?

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Transmission of Light

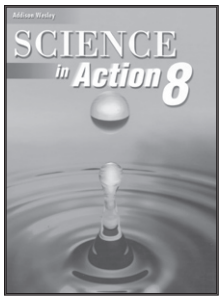
Light that is transmitted can be produced artificially. Three kinds of artificial light are used in our daily lives.

1. The first is **incandescent**. Inside a glass bulb is a thin wire filament through which electricity passes. This causes the wire to heat to a high temperature, and it gives a white-hot glow.

2. The second is **fluorescent**. When electricity flows through the fluorescent tube, it causes the mercury vapor to give off ultraviolet light. The tube is coated with a special white powder called **phosphor**. Phosphor converts ultra violet light into visible light.

3. The third is called **phosphorescent light**. When ultraviolet light hits phosphorescent materials, the materials store the energy and will glow in the dark until all the energy is released. A good example of phosphorescent light is the light given off by glow-in-the-dark toys.

The most important natural light source is the sun. Another form of natural light is **bioluminescence** where an organism, such as a firefly or a glow worm, is able to produce its own light .



Activity 3

Read and understand pages 222, 223, and 225 in *Science in Action 8*. Then, answer the following questions.

1. The textbook discusses light sources. Give an example of three natural light sources and three artificial light sources.

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2. What is a photophore and how does it produce light?

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_____

3. Give one reason people are switching from incandescent lights to fluorescent lights in their home.

_____

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You should now be able to meet all the objectives listed at the beginning of the lesson. Go through the list to see if there is anything you need to spend more time on.

Extended Activity (Homework)

Make a collage of light sources using pictures from the Internet, old catalogues, or magazines. Glue these pictures on a regular sheet of paper or cardboard (8.5 x 11 inch). Your collage must have a title such as *Light Sources* or *Environmentally Friendly Light Sources*, or a title of your choice.) These pictures could include sources related to the visible and invisible light spectrum.