

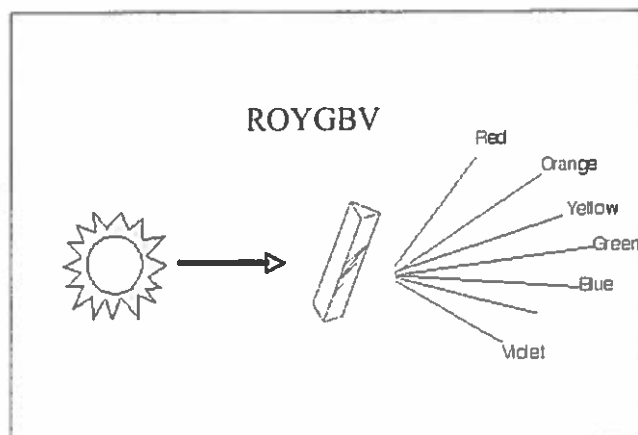
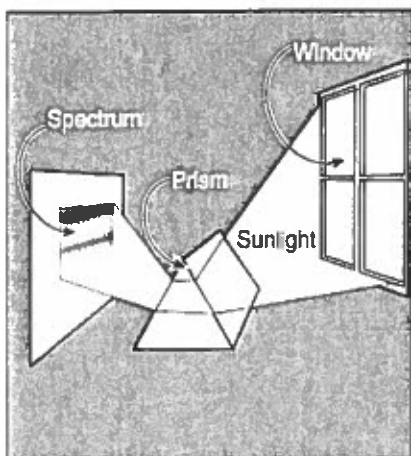
# Key Concepts

## Force, Motion, Energy, and Matter (SOL 5.3)

### Light

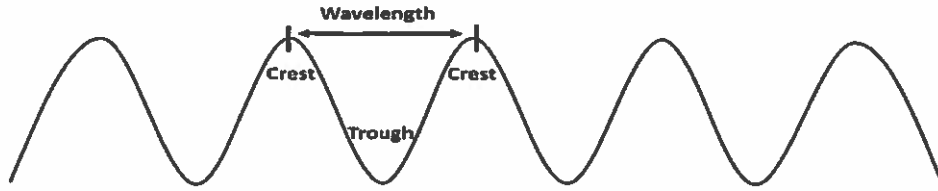
- **Visible light** is a combination of several different wavelengths of light traveling together. These wavelengths are represented by the colors red, orange, yellow, green, blue, indigo, and violet (ROYGBV).
- **Transverse waves** (light waves) are characterized by their **wavelengths**. In the **visible spectrum**, red has the *longest* wavelength, and violet has the *shortest*. Wavelengths get progressively shorter from red to violet.
- Light travels in **waves**. Compared to sound, light travels extremely fast. It takes light from the sun less than 8½ minutes to travel 150 million kilometers to reach the Earth.
- Unlike sound, light waves travel in straight paths called **rays** and do not need a medium through which to move.
- Light travels in **straight** paths until it hits an object, where it bounces off (is **reflected**), is bent (is **refracted**), passes through the object (is **transmitted**), or is absorbed as heat.
- The relative terms **transparent (all light)**, **translucent (some light)**, and **opaque (no light)** indicate the amount of light that passes through an object.
- A **prism** can be used to refract visible light. When the different wavelengths of light in visible light pass through a prism, they are bent at different angles. The colors of light we see are red, orange, yellow, green, blue, indigo, and violet.

### How a Prism Works



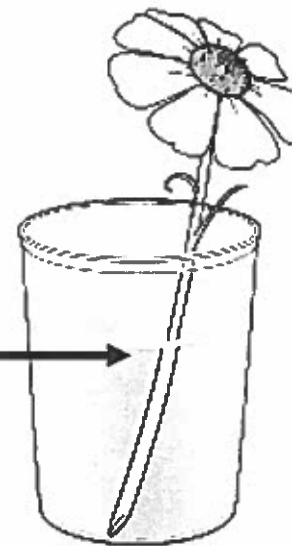
Violet light has the shortest wavelength (and the highest frequency and energy) of visible light. Light passing through a prism can be broken down into its individual wavelengths and frequencies.

### Transverse Wave



### Refraction

Light is bent as its path is changed (such as when light passes through different objects like a lens or water). This straw looks bigger in the glass of water.



## Opaque, Translucent, and Transparent

Directions: Draw a line from the vocabulary word to the correct definition.

Transparent

Some of the light passes through an object, but it is scattered. Objects cannot be seen clearly.

Translucent

None of the light passes through an object.

Opaque

Most of the light passes through an object. Objects can be clearly seen.



**Directions:** Label the pictures below: transparent, translucent, or opaque



Thin curtains

1. \_\_\_\_\_



Books

2. \_\_\_\_\_



Magnifier

3. \_\_\_\_\_



Clear glass window

4. \_\_\_\_\_



**Directions:** Indicate whether the following statements are true (T) or false (F).  
If the statement is false, change the underlined word(s) to make it true.

- \_\_\_\_\_ 1. Light waves travel slower than sound waves. \_\_\_\_\_
- \_\_\_\_\_ 2. Light waves refract as they pass through a prism. \_\_\_\_\_
- \_\_\_\_\_ 3. Light waves travel in curved paths, or rays. \_\_\_\_\_
- \_\_\_\_\_ 4. In the visible spectrum, violet has the longest wavelength. \_\_\_\_\_
- \_\_\_\_\_ 5. When light bounces off a mirror, it is reflected. \_\_\_\_\_
- \_\_\_\_\_ 6. An opaque object allows some of the light to pass through it. \_\_\_\_\_
- \_\_\_\_\_ 7. Clear glass is a transparent substance. \_\_\_\_\_
- \_\_\_\_\_ 8. ROY G BV refers to the colors of the visible spectrum. \_\_\_\_\_
- \_\_\_\_\_ 9. It takes light from the sun less than 8 ½ minutes to travel about 150 million miles to the earth.