Light

Light is a form of energy. It travels in straight lines.

 Light waves travel in straight lines away from the light source until the waves hit something. This is why we can see straight "beams" of light coming from flashlights, car headlights, and the lamps of the lighthouse in the picture.

Unlike some other kinds of energy, light can travel through the vacuum of space. If it could not, the Earth would not receive light from the Sun.

Objects and materials interact with light. When light shines on an object, the object may absorb, reflect, or refract the light. The object's properties determine which of these events takes place.

Light

*When light interacts with matter it can be **refracted**, **reflected**, or **absorbed**. Objects can be classified as **opaque**, **transparent**, or **translucent** based on how they transmit light.*

Reflection

Reflection occurs when the light waves *bounce off* an object. In reflection, the light waves will bounce off a flat surface at the same angle as they struck. A mirror is an example of a surface that reflects light.

Refraction

Refraction is often referred to as the *bending of light* where two different materials touch. We most often see this property as light moves between air and water. The light is traveling at a certain speed, but when it makes contact with the water, the light waves are forced to slow down. This causes the object that the light is hitting, like a flower stem in water, to appear to be bent or broken.

Absorption

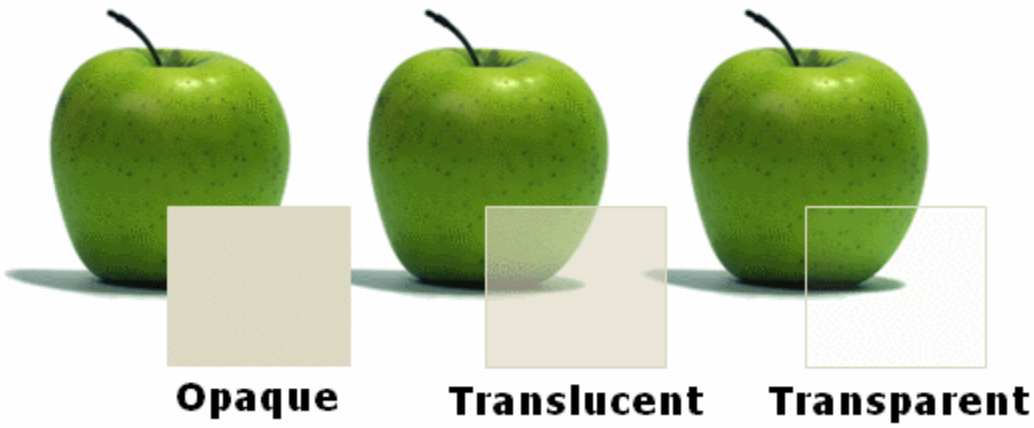
Absorption occurs when the light is not reflected or transmitted. The color black is a great example of something that absorbs light. Black does not reflect any colors of light; it absorbs them all. The colors that our eyes are able to see result from objects' reflection and absorption of light.

The color that we see is the color that the object reflects; all of the other colors are absorbed by the object. For example, the yellow apple in the picture appears yellow because it is reflecting yellow light. The red apples appear red because they are reflecting red light. They are absorbing the other colors of light.

Material Properties

Different materials can have different interactions with light energy. Some materials reflect light. Some change the direction of light through refraction or diffusion. Other materials allow light to pass through. It is even possible for a material to do two or more of these things.

Materials have the quality of being opaque, translucent, or transparent, depending on how the materials interact with light.



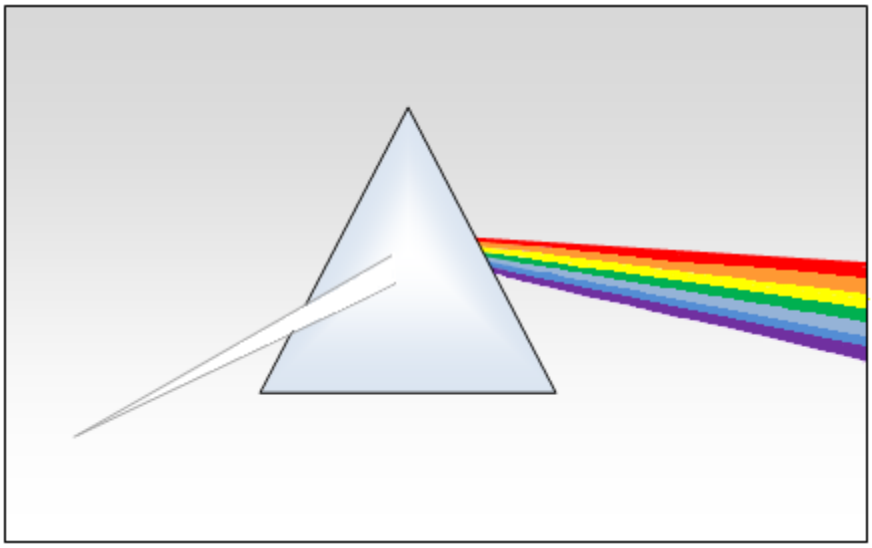
- **Opaque** objects, like a wood door, absorb or reflect all light, so you cannot see through them.
- **Translucent** materials, like a frosted glass window, *diffuse* light, allowing only some light to pass through (be transmitted), making image details unclear.
- **Transparent** objects, including car windshields, allow light to clearly pass through (be transmitted), so you can see the details of objects on the other side.

Prisms

*A **prism** is a tool that is used to bend light different amounts.*

Prisms bend different types of light different amounts. Light coming from the Sun or from light bulbs carries many different colors of light. All of these colors together are known as the light *spectrum*. However, these colors can only be seen individually when they are separated from each other. Prisms separate the colors by bending them differently.

When sunlight enters a prism, the entire spectrum of light is spread out in a rainbow-like pattern because some colors are bent more than others.



White light is made up of many different colors of light, and a prism allows us to see this. Prisms are usually made of glass or crystal but can also be made of clear plastic.