Bouncing Light

When a ray of light hits a surface it can bounce off. Scientists call this reflection. Reflection is best seen in mirrors because they have smooth, shiny surfaces. When a light ray hits a smooth surface it bounces off in a predictable direction.

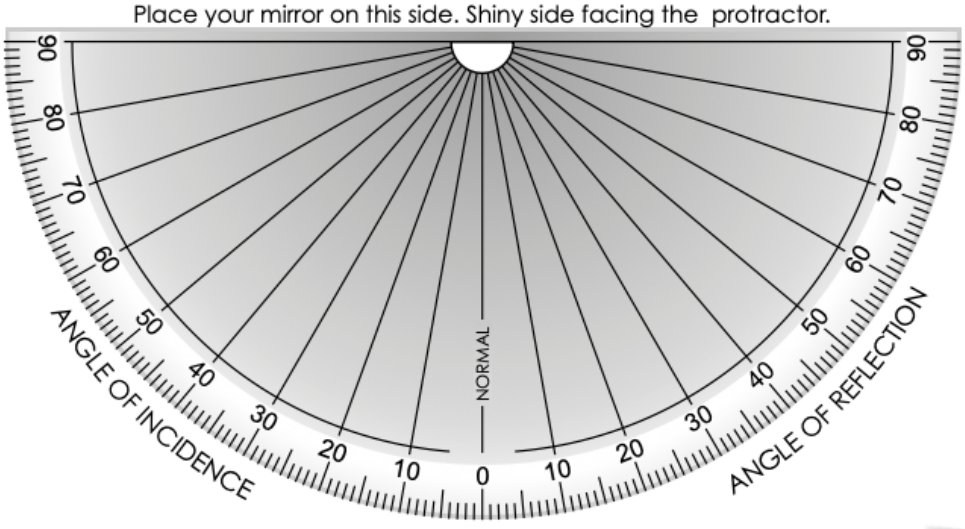
A ray of light striking a surface is called the *incident ray*. The ray of light that reflects off a surface is called the *reflected ray*. To measure the angle of incidence (the angle that light is hitting a surface) a line is drawn at 90° to the surface. This line is called the *normal* line.

Investigating the Laws of Reflection

Aim: To investigate how light behaves when it hits a plane (flat) mirror.

Method:

1. Collect a ray box, power supply and single-slit ray slide from your teacher, and set them up to produce a single beam of light.
2. Place a plane mirror on the diagram of the protractor as described below.
3. Vary the angle of incidence and record the angle of reflection in the results table.



Results:

Angle of Incidence	Angle of Reflection
0°	
10°	
20°	
30°	
40°	
50°	
60°	
70°	
80°	

Quick Note

In science the symbol for a mirror is shown like this

1. Complete the following sentences using the word list below.

reflection **light** **reflected** **normal** **same** **incidence**

When _____ hits a mirror, the angle at which it hits is the _____ as the angle at which it is _____.

Scientists called this the Reflection Law. In correct scientific terms, the Reflection Law states that the angle of _____ is equal to the angle of _____ when measured from _____.

Using Reflection - Periscopes

The periscope is a useful tool. It allows the user to see around corners, over obstacles, or under things without having to put their head in danger.

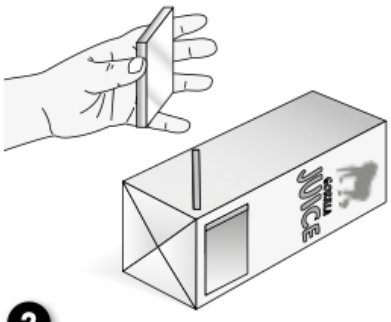
They are commonly used on submarines to see what is above the water while remaining submerged, and were also used by soldiers in World War I and II to look out of the trenches without getting their heads shot off!

Aim: To make a periscope and explain how it works.

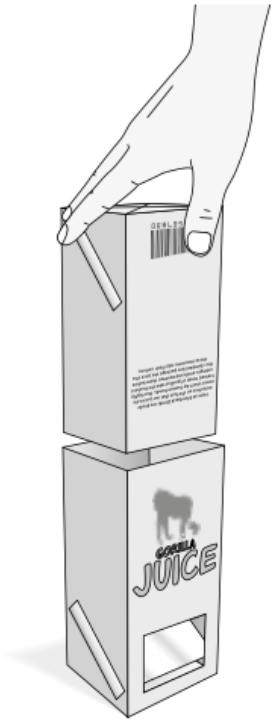
Equipment: Two Tetra Pak® cartons (juice, yogurt, milk cartons, etc.), scissors, a scalpel or craft knife, two plane (flat) mirrors.

Method:

1 Using the craft knife, carefully cut out a viewing hole in both cartons. You should make your hole at the bottom of each carton. Then, using the scissors, cut the tops off both cartons.

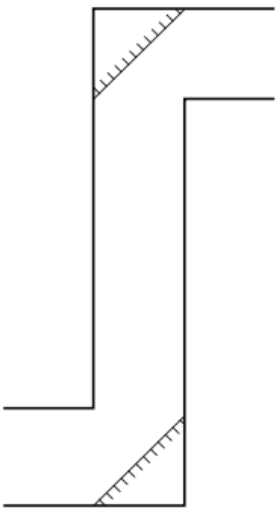


2 From the bottom of each carton, measure a 45° angle and cut a slot on both sides of the carton. The slot should be big enough to fit a mirror into the slot.



3 With the mirrors inserted into the slots, turn one carton upside down and fit it over the other carton. You will need to push in the sides of the bottom carton in order for the top carton to fit over it.

1. Use the simplified diagram of a periscope on the right to help you explain why the mirrors inside a periscope should be placed on 45° angles. You should try and use the Reflection Law in your answer.



2. Use your imagination to describe a new, modern use for periscopes.