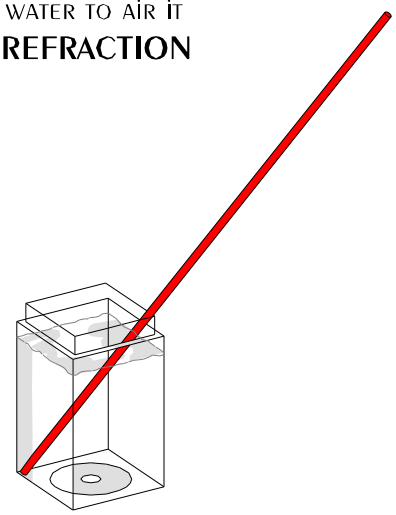
The Mysterious LIGHT-BENDING BOX

Usually, light moves in straight lines. But when light moves from water to air it can change direction, bending the light's path. This is known as **REFRACTION** and can result in some interesting effects! Let's see for ourselves.



What You Need: A thin straw and a clear plastic box

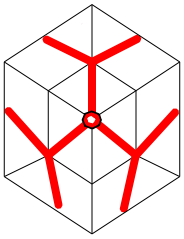
What To Do: Remove the box lid. You don't need it today. Fill the box with water. Drop in the straw as in this picture.

As you look at the straw in the water, slowly rotate the box. Notice anything unusual about the way the straw looks under water?

HOW MANY STRAWS DO YOU SEE UNDER THE WATER?

DOES THE STRAW SEEM TO BEND?

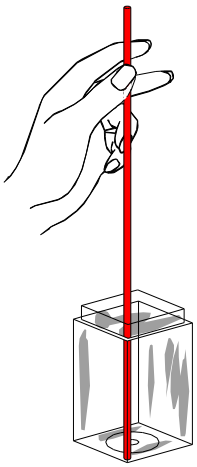
Look down along the straw the long way. Can you find a pattern that looks like this?



A CLOSER LOOK:

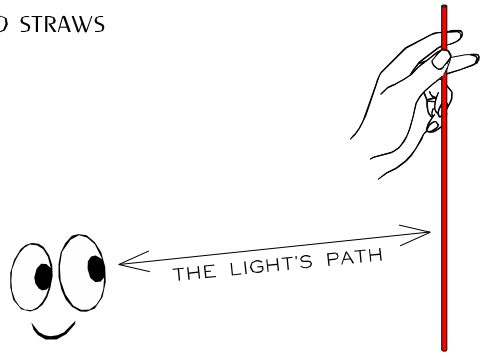
To see how refraction is working, stand the straw straight up in the corner of the box closest to you.

With your eyes at the level of the box and looking through the corner, slowly move the straw toward the center of the box. Watch the straw under the water.



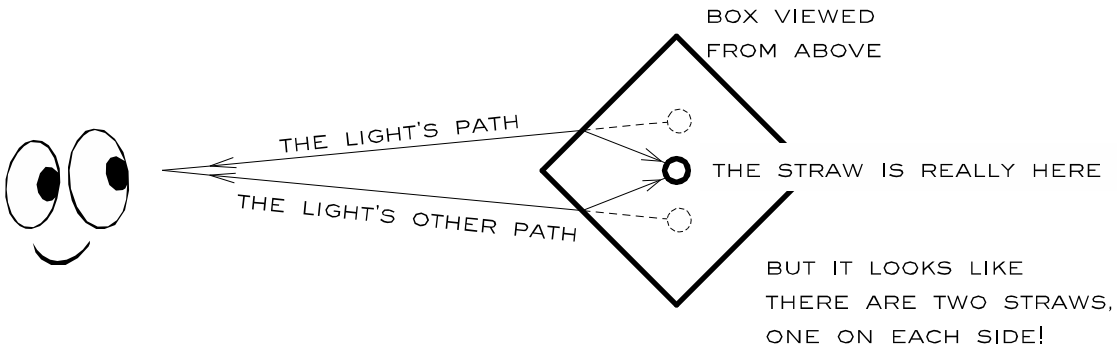
Record Your Observations:

As soon as you moved the straw, I'll bet you saw *two* straws under the water instead of one. Let me explain why!



In the air, light travels from the straw to your eye along one straight path. You look back along that path and see ONE straw.

Light traveling from the straw to your eye through the water can take TWO paths, because the light's path bends between water and air. You look back along the paths and see TWO straws!



TRY THIS EXPERIMENT AGAIN, but this time move the straw from the close corner, all the way to the far corner. Watch carefully, and think about what you see.

How many total straw images appeared under water? _____

How many of the underwater straws were created by refraction? _____

How many of the underwater straws were created by reflection? _____

VOCABULARY

REFLECTION : when light bounces off a surface.

REFRACTION : when light goes through a surface and changes its direction.