Name:_____Date:_____Class:_____

Teacher Guide with answers

Refraction Tank: Independent Inquiry

This activity provides an alternative to the guided inquiry version to allow independent investigation.

Safety
Never shine a laser into anyone's eyes. It can cause permanent blindness.

Materials
- refraction tank
- water
- laser pointer

Before you begin:

Make sure the water level reaches horizontal line (90°) on the refraction tank and turn on the laser.

Procedure

Explore the different ways the laser beam can bend using the refraction laser tank. Find out all you can about the relationship between the entering laser beam going in and the exiting laser beam. Prepare to share at least one insight with the rest of the class.
Students may notice that the ray bends and goes through at angles up to 40^o. At greater angles, students may notice that the laser beam bends and reflects back into the water.

Challenge #1

Find the relationship between the incoming light beam *(angle of incidence)* and the outgoing light beam *(angle of refraction)* as light travels <u>from water into air.</u>

Students may notice that the angle of incidence is smaller than the angle of refraction when the laser beam leaves the water. Once internal reflection occurs, the angles of incidence and the angles of reflection are the same.

Challenge #2

Find the relationship between the incoming light beam *(angle of incidence)* and the outgoing light beam *(angle of refraction)* as light travels <u>from air into water.</u>

Students may notice that the angle of incidence is larger than the angle of refraction when the beam travels into the water. The students will also notice that total internal reflection is never reached.