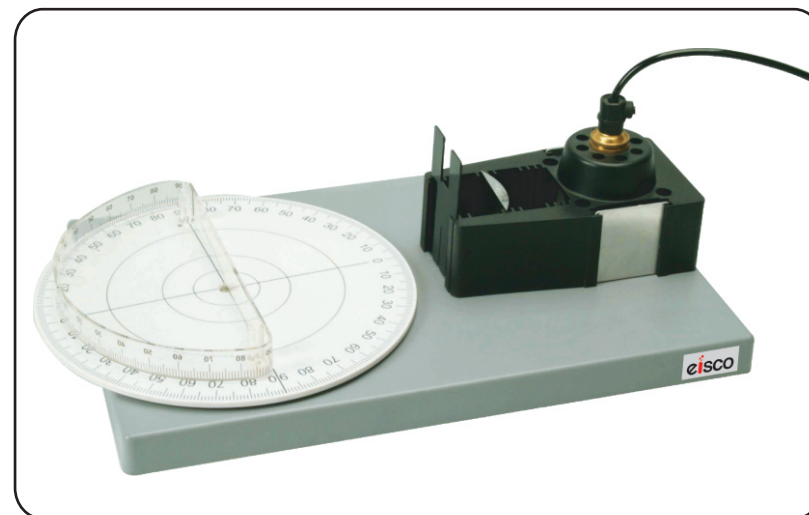




REFRACTION & REFLECTION APPARATUS CAT NO. PH0614A



Manufactured by :



U.S. Distributor :

Eisco Scientific

850 St Paul St, Suite 15, Rochester, NY 14605

Website : www.eiscolabs.com

Instruction Manual

REFLECTION & REFRACTION APPTS.

CAUTION: WHEN LAMP IS LEFT ON FOR EXTENDED PERIODS OF TIME, THE METAL WILL HEAT UP AND MAY CAUSE BURNS IF TOUCHED. WARN STUDENTS OF THIS HAZARD AND LET APPARATUS COOL BEFORE STORING OR TOUCHING

EISCO's reflection refraction apparatus helps students easily study these two important wave properties. The rotating base provides a high degree of accuracy when making measurements as well as provides an easy way to change angles with out disturbing your light source or the object the light is being shone upon.

List of what comes with the apparatus:

- * Grey base support stand with rotating protractor
- * Mountable lighting apparatus
- * Two 12 V 24 W light bulbs
- * Two metal shields for blocking light
- * Acrylic lens for focusing beam of light
- * Single/double slit slide
- * Triple slit/wide slit slide
- * Acrylic semi-circle block
- * Acrylic semi-circle dish with angle measures

Additional materials needed:

- * 12 volt DC power supply or batteries
- * Plane mirror
- * Clay for fixing apparatus in place
- * Water
- * Corn oil
- * Glycerol
- * Ethyl alcohol

Instructions to use as a Reflection Demonstration:

Materials Needed:

- * Reflection and Refraction apparatus
- * Small mirror
- * Clay or tape to hold mirror in place
- * 12 Volt power supply

1. Insert side shields, acrylic lens and single slit shield into the light box as shown in diagram below.

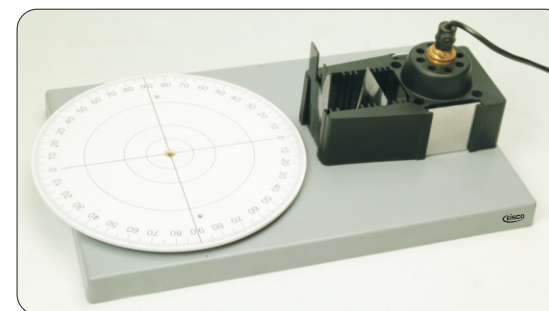
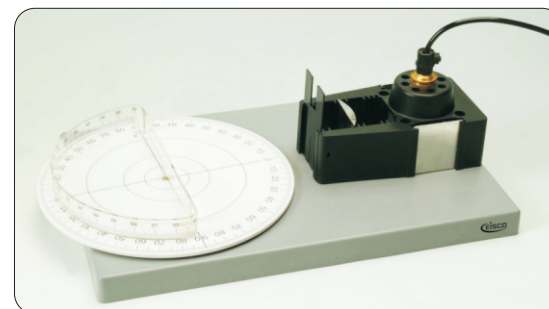


Diagram: Picture of single slit, acrylic lens and shields in place

2. Attach mirror to the acrylic block as shown in diagram and line the surface of the mirror up with the 90° line on the rotating protractor as shown in diagram.



Diagram, showing directions written above

3. Insert leads from the light bulb into a 12 Volt power supply and switch on, turn off or block all other lights in the room.
4. If properly aligned the incident ray should measure zero as well as the reflected ray.
5. Carefully rotate the protractor base. The incident ray should always equal the reflected ray.

Instructions to use as Refraction Demonstration:

Materials Needed:

- * Reflection and refraction apparatus
 - * 12 Volt power supply
 - * Acrylic semi-circle block
 - * Acrylic semi-circle dish with angle measures
 - * Various mediums such as water, corn oil, glycerol, ethyl alcohol
 - * Sheet of white paper
1. Set up apparatus as shown in “Instructions to use as a reflection demonstration” steps 1-3. Start with placing the acrylic semi-circle in place.
 2. The beam of light should pass straight through the acrylic block at angle zero. Rotate the protractor to the right 40°, and the angle of refraction should measure about 25°, Rotate the protractor to the left 40° and the angle of refraction should measure the same. This should hold true for every angle and is a good test of proper alignment.
 3. Increase the angle of incidence by increments of 15° until you reach about 70° and have students record their data.
 4. Students can then calculate the index of refraction of the acrylic block by using Snell's law.

Sample Data:

Angle of Incidence for air (°)	Index of refraction for air	Angle of Reflection in acrylic semi-circle (°)	Index of refraction for acrylic
10	1.00	6.5	1.5
25	1.00	16	1.5
40	1.00	25	1.5
55	1.00	33	1.5
70	1.00	39	1.5

Sample calculation using Snell's Law:

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$