

Ray Optics Module – Equipment List and Setup

What	Qty	Activities
Mirror which can be balanced vertically, perhaps 10 cm by 20 cm	1	2
Small sign on thin paper with the bold word “ Charles Dodgson ” printed on it	1	2
Basic Optics Light Source, Pasco OS-8470	1	3, 6, 7, 10
Glass Rhombus [Hubbard 7-909-60]	1	3
Small semi-circular protractor, 10 cm in diameter	1	3, 6
Ruler	1	3, 6, 7, 10
Transparent container such as a small bottle	2	5
Pyrex test tube	2	5
Canola oil	? ml	5
Small dishpan or tray	1	5
Box of Kleenex	1	5
Papers towels	A few	5
Flat Convex Lens [Hubbard 7-909-60]	1	6
Flat Concave Lens [Hubbard 7-909-60]	1	6
2.2 meter Track, Pasco ME-9452	1	7, 10
Basic Optics Viewing Screen, Pasco OS-8460	1	7, 8, 10
Dynamics Optics Carriage, Pasco OS-8472	3	7, 10
board with 5 mm diameter hole in it, homemade	1	7
Lens Holder, Pasco OS-8474 with 50 mm Diameter, 100 mm Focal Length convex lens “A”, PASCO SE-7582	1	8, 10
Lens Holder, Pasco OS-8474 with 50 mm Diameter, convex lens “B”, PASCO SE-7583. The focal length seems to be either 200 mm or 250 mm.	1	8, 10

Setup Notes:

Activities 3, 6, 7, 8 and 10: The lights in the room need to be dimmed and the blinds lowered for these activities to be effective.

Activity 5: The bottles must have a height somewhat less than the length of the test tubes, and the mouth needs to be somewhat bigger than the diameter of the test tube. One of the bottles should be about two-thirds filled with canola oil, the other about two-thirds filled with water. One of the test tubes should have about 1 cm of canola oil in it, and is placed in the bottle with canola oil in it. The other test tube should have about 1 cm of

water in it, and is placed in the bottle with the water in it. Both bottles should be placed in the tray. For the water test tube and “bottle” a beaker or wide-mouth bottle will be nice so the students can see that the test tube appears bent in the water.

Activity 7: The board with the 5 mm diameter hole in it should be mountable on the track, held vertically, similar to the Viewing Screen. The hole should be at the same height as the light-hole in the Light Source, or about 13.4 cm above the top surface of the aluminum track.

Activity 8: There needs to be a distant light source in the room, for example, a bare light bulb at both the front and back of the room. Every table should be able to get a line of sight to the bulb from near their table which is at least 4 m away. Note that for this activity they hold the lens and screen so the 2.2 m track does *not* have to be pointed at the distant light source!

Activities 8 and 10: The feet on the tracks should be set to 5 cm and 150 cm.

JJBH – Dec/08

Updated Dec. 10, 2009 by Jason Harlow based on suggestions from Lilian Leung

Revised February 4, 2011 by David M. Harrison