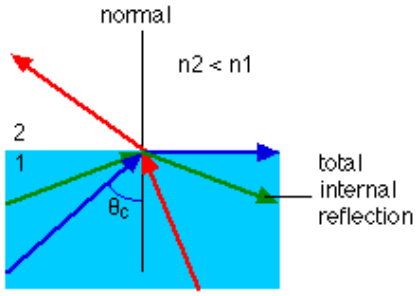
Refraction Part 2
The Critical Angle

Purpose:

To use the critical angle to calculate the refractive index of various materials.



Materials:

Semicircular plastic or glass block
Semicircular water container filled with water
Ray box with single slit aperture
Protractor
Blank Paper

Procedure:

1. On the blank paper, trace the semicircular shape of the plastic or glass block.
2. On the straight side of the semicircle, mark the centre and draw a normal at the point.
3. Darken the room. Place the semicircular plastic or glass block on the page, matching the outline of the semicircle. Shine a ray along the normal the check the position of the block.
4. Move the light source at ever increasing angles of incidence until no more refracted rays emerge. Measure and record this angle.

   θ_c = _____

5. Repeat Steps 1-4 for the semicircular water container filled with water.

   θ_c = _____

Analysis:

Use the critical angle to find the refractive index of both materials. Show your calculations.

Check these values against the values given by your teacher and calculate your percent error for each: