Refraction – Review

1. Match each term on the left with the best descriptor on the right. Each descriptor may be used only once.

Term	Descriptor
1. _____ angle of refraction 2. _____ medium 3. _____ total internal reflection 4. _____ refracted ray 5. _____ refraction 6. _____ critical angle	A. The substance through which light travels. B. The change in direction light takes when it crosses a boundary between two media. C. The angle of incidence for which the angle of refraction is 90°. D. The ray that has crossed the boundary between two media. E. The angle between the refracted ray and the normal at which the ray crossed the boundary. F. Occurs when light can't escape a medium because the angle of incidence is larger than the critical angle. All light is reflected back into the original medium.

2. a) Label the incident ray, refracted ray, reflected ray, angle of incidence (i), angle of reflection (r) and angle of refraction (R) in this diagram.

A

B
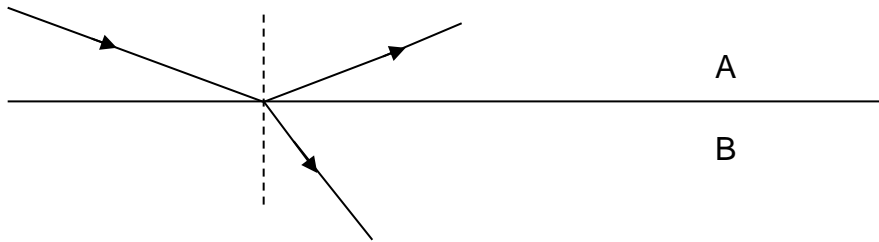
   b) Based on this diagram, does light travel faster in substance A (top substance) or in substance B? Explain how do you know? _____

   _____

   c) One of the substances is air and one is glass. Which one is substance A? _____
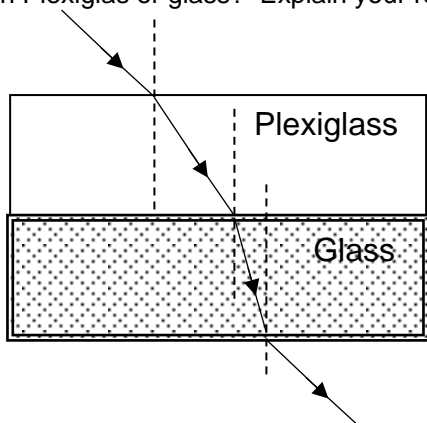
   d) Measure the angle of incidence, the angle of reflection, and the angle of refraction.

   Angle of incidence = _____ Angle of reflection = _____

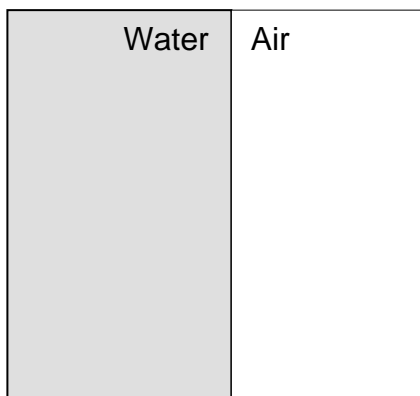   Angle of refraction = _____

3. Light travels more quickly in ice than in water. Draw a ray diagram of a light ray traveling through ice into water. Label the two different media, the boundary between them, an incident ray, a refracted ray, the normal, the angle of incidence (i), and the angle of refraction (R).

4. In this diagram, a ray of light travels through air, Plexiglas, glass, and air again. Does light travel more quickly in Plexiglas or glass? Explain your reasoning.

Plexiglass

Glass

5. Draw an incident ray traveling through water at an angle of incidence of 63°.
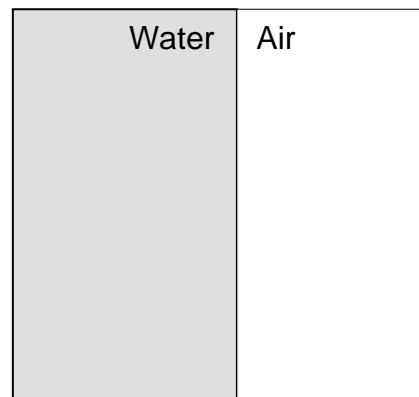
6.

Water | Air

a) Assume that the critical angle for water is 63°.
   i. What will the angle of refraction be? _____
   ii. Draw the refracted ray.
b) Based on the information above, what would happen if the angle of incidence was 20°? 80°? Draw the incident ray, refracted ray (if any) and reflected ray (if any).

Angle of incidence = 20°

Water | Air
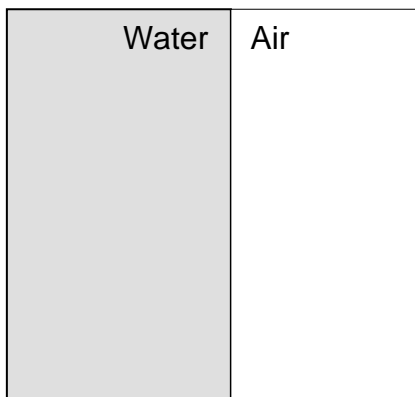
Angle of incidence = 80°

Water | Air

7. You are given two blocks of glass that look just alike. A classmate tells you that they are really two different types of glass. Describe an experiment that you could carry out that would determine whether the blocks of glass were identical or different types of glass.

8. Textbook questions:
   a) Page 444 – Q # 1-8, 13, 14, 24 – a, c;
   b) Page 482 – Q # 1,3, 6, 12, 17;
   c) Page 518 – Q # 8, 10, 13, 18;
   d) Page 524 – Q # 1, 2, 7, 11, 12, 16, 17, 18, 21, 23, 28