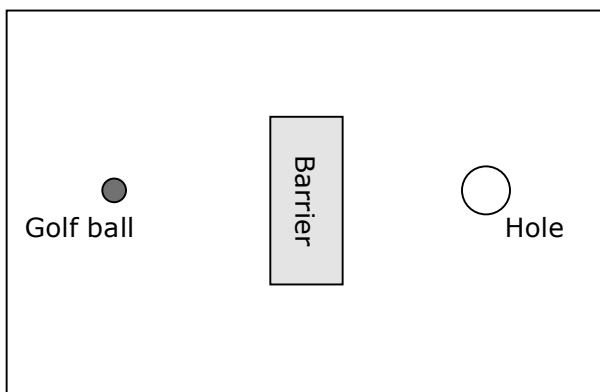


Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## REFLECTION AND REFRACTION EXERCISES

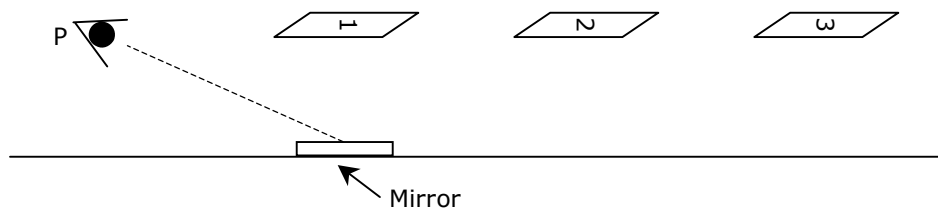
Use your class notes to answer the following questions. Write the answers directly on this page and tape this page into your science notebook.

1. In a given medium, if the frequency increases the wavelength \_\_\_\_\_ and the speed \_\_\_\_\_.
2. The bending of waves due to a change in speed is called \_\_\_\_\_.
3. In a transverse wave, the particles of the medium move \_\_\_\_\_ to the direction of the wave.
4. Drawn below is a putting green at a miniature golf course. Using the Law of Reflection, explain how you can hit the golf ball into the hole in one shot. Label the drawing to show the incident ray, reflected ray, incident angle, reflected angle, and normal.



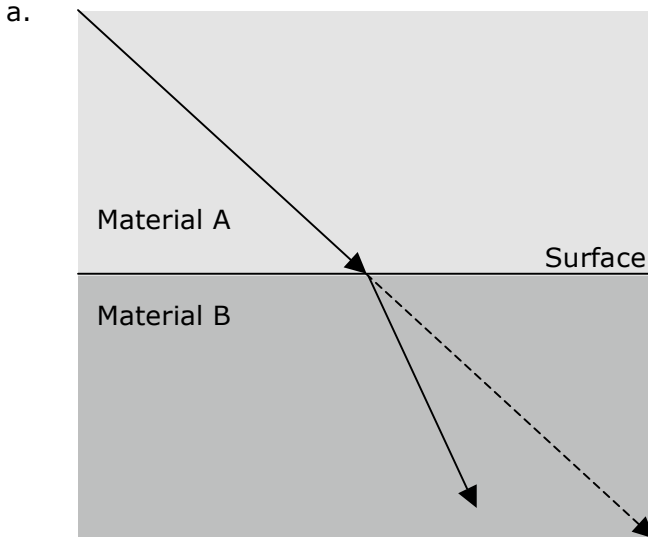
Wall all of the way around.

5. An eye at point P looks into the mirror. Which of the numbered cards is seen reflected in the mirror?



6. If you were in a boat and spearing a fish you see in the water, would you aim above, below, or directly at the fish to make a direct hit? (Assume the fish is stationary in the water.) If you instead used light from a laser as your "spear," would you aim above, below, or directly at the observed fish? Defend your answers.

7. Light waves tend to slow down in a denser medium. As light waves slow down they refract toward normal. The picture below shows a light wave traveling from one medium to another. Label the parts of the picture listed and answer the questions.

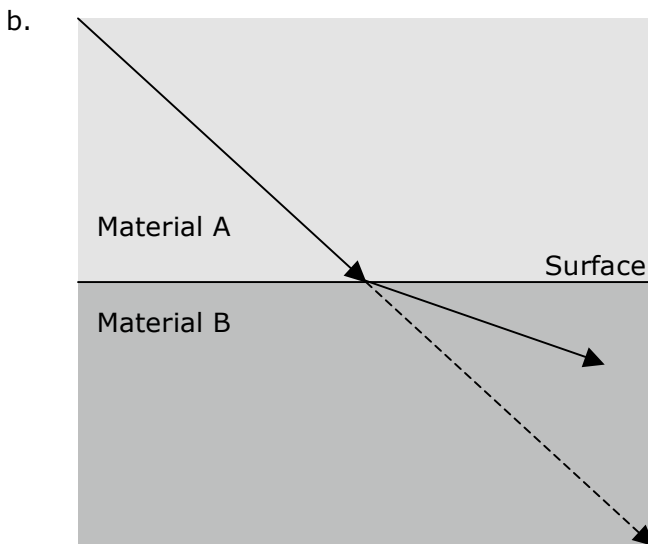


Label the following parts in this drawing:

- Incident ray
- Refracted ray
- Normal (draw and label)
- Incident angle (draw and label)
- Refracted angle (draw and label)

Does the light wave speed up or slow down?  
How do you know?

Which material is denser, A or B? How do you know?



Label the following parts in this drawing:

- Incident ray
- Refracted ray
- Normal (draw and label)
- Incident angle (draw and label)
- Refracted angle (draw and label)

Does the light wave speed up or slow down?  
How do you know?

Which material is denser, A or B? How do you know?

8. A pair of toy cart wheels are rolled obliquely from a smooth surface onto two plots of grass, a rectangular plot and a triangular plot as shown below. The ground is on a slight incline so that after slowing down in the grass, the wheels speed up again when they emerge on the smooth surface, Finish each sketch by showing some positions of the wheels inside the plots and on the other sides, thereby indicating the direction of travel.

