

Refraction and Sight:

5. Where is the only place where refraction occurs?

6. Watch the animation. When a pencil is placed in a glass of water, the portion submerged seems to be broken from the portion of the pencil in the air. Using a diagram, describe this phenomenon. [This is a great test question]

The Cause of Refraction:

7. When is it possible for a light wave to cross a boundary and change speed but not experience refraction?

8. What are the two requirements necessary for refraction to occur?

Optical Density and Light Speed:

9. What is refraction and what causes it?

10. Define "c" and give its value in both scientific notation and expanded form. Don't forget units!!!

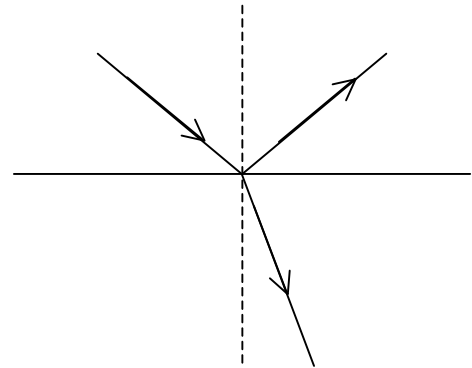
11. What is optical density? How does optical density affect the speed of a light wave?

12. What is "n"? What happens to the speed of light as the value of n increases?

The Direction of Bending:

13. Label the following terms on the diagram at the right:

- incidence ray
- refracted ray
- boundary
- normal line
- angle of incidence
- angle of refraction
- reflected ray



14. If a ray of light passes across the boundary from a material in which it travels fast into a material in which travels slower, then the light ray will bend _____ the normal line.

If a ray of light passes across the boundary from a material in which it travels slow into a material in which travels faster, then the light ray will bend _____ the normal line.

15. If light travels into and out of a medium, it is possible that the final direction of the light waves is the same as the initial direction of the light waves. What are the two conditions necessary for this to occur? Include a labeled diagram to illustrate this occurrence.

16. Do the practice problem. Show your work here.

17. Explain the mnemonics FST and SFA.

18. Do the "Check Your Understanding" questions and check your answers.

The next web page will mention a formula called Snell's Law. Don't worry, you didn't miss anything, we haven't discussed it yet. Just focus on the theory, not the exact numbers. But do pay attention to the relative values of refractive indices and speeds.

Total Internal Reflection:

19. Total internal reflection occurs when all the light is _____ and none of the light is _____.

20. What are the two conditions necessary for total internal reflection to occur?

21. Draw a labeled diagram illustrating the direction of a light ray traveling from water to air for different angles of incidence.

22. Define critical angle.