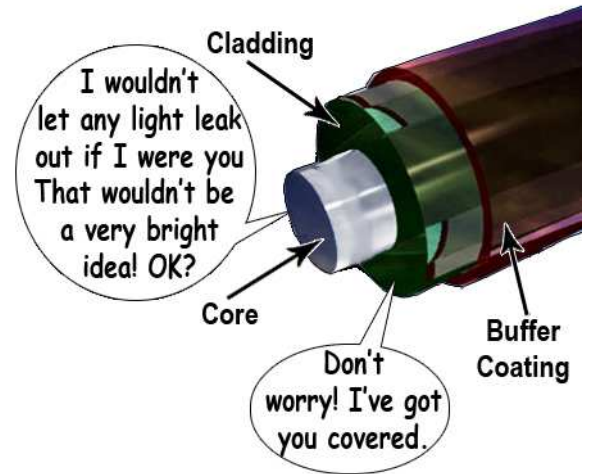


Fiber Optics

As light passes from one medium to another, some is refracted, but some is also reflected. For example, you see your faint reflection in the glass when you look through a window. The amount refracted and the amount reflected depends upon the angle of incidence. As light passes from a medium through which it travels slower to a medium through which it travels faster (from water to air, for example), the refracted beam is bent away from the normal. As the angle of incidence increases, the refracted beam bends further from the normal, and closer to the boundary between the media, while the amount refracted decreases and the amount reflected increases. If the light beam strikes the boundary at an angle to the normal greater than the critical angle, it is all reflected as if the boundary were a mirror. This is called **total internal reflection**. The size of the critical angle depends on the materials involved. Optical fibers are thin transparent fibers of glass or plastic covered with another material called cladding. Cladding is a material through which light can travel faster than through the fiber. When light strikes the boundary between the fiber and the cladding, total internal reflection can occur. As a result, light travels through the fiber. Because of total internal reflection, light can't leak from one fiber to another. Optical fibers can carry information coded into light signals. That is the science of **fiber optics**.



Division of labor in a fiber-optic cable

Answer the questions below based on the reading above and on your knowledge of physics.

1. What is total internal reflection? _____

2. What do optical fibers do? _____

3. If light is shined at one end of an optical fiber, where does it go? _____

4. Why doesn't light leak from one optical fiber to another? _____

5. What is cladding? What does it do? _____

6. What is the advantage of fiber optic cable over copper wire? _____
