Intermediate-Light & Optics

The activities chosen for intermediate students introduce them to concepts involving optics. What is optics? Optics is one branch of science which deals with how we control light. Why would we want to control light? Because light is a form of energy, and we use light energy every day – to brighten our homes, to entertain us, to help keep us healthy, to learn about the world around us… Whether we know it or not, light is a very, very important part of our daily lives. And that’s what optics is all about – using special types of materials or devices to make light do what we want it to do, so our lives will be better in some way.

Some of devices we use to control light are called lenses. Lenses are used to bend light. They come in many shapes and sizes. Some are large, and some are very very small. Some are round and some have other shapes. Many are made of clear glass, but some are made of plastic, and some are made of other materials. They all have special shapes which make the light behave exactly the way we want it to behave. We use lenses every day. People who wear glasses use lenses to help them see more clearly. There are lenses in cameras, CD and DVD players, your TV remote control, your car… they’re everywhere!
Some of the devices we use to control light are called mirrors. You’re probably very familiar with mirrors… most people have one in their bathroom or bedroom. Mirrors are used to bounce light from one place to another. Most of the mirrors you see are flat. But mirrors can be many different shapes. The headlights in your car used curved mirrors to bounce all the light from the bulb out in front of the car. The mirrors in flashlights are curved too. Can you think of any other curved mirrors?

Another kind of device that controls light is called a filter. Filters are special materials that let some light, but not all light, pass through. Sometimes filters are colored – these filters only let one color of light through, but not the others. The tail lights on your car look red because of a red filter. Some filters let all colors through, but less brightly than normal. Sunglasses are an example of this kind of filter. Can you think of any other filters that you’ve seen?

The exercises in the “Optics Discovery Kit” were designed to give you a chance to learn more about lenses, mirrors, filters, and more. As you go through the demonstrations, try to answer the questions on the back of each card. They’ll help you understand more about how this important technology is used in imaging science.
If you want to learn more about optics, you should visit the web site http://www.opticsforkids.com. It was designed by the Optical Society of America, a group of scientists and engineers who work with optics in their jobs every day. They’re the same group who made your Optics Discovery Kit.