

GETTING STARTED

AN INTRODUCTION TO LIGHT AND OPTICS

Science Alberta Foundation is pleased to make *Get Focused on Light and Optics*, one of our Science-In-A-Crate programs, available in your community!

Inside the light and optics crate students will encounter activities that introduce them to the wide world of optometry. They will learn about the unique characteristics of light and image formation in the human eye. Using ray diagrams and mirrors they will learn how to use reflection to design an optometry office where patients can have vision tests. And of course, they will be their own first patient - experiencing the effects of a vision impairment and working towards a correct diagnosis and solution.

Other activities will explore the process of refraction and investigate how to change the direction of light rays. Students will apply the process of refraction in an effort to understand the nature and cause of visual problems including near sightedness and farsightedness. By simulating and exploring these visual problems they will gain an even deeper understanding and appreciation of visual impairments.

The *Get Focused* crate meets the grade 8 science curriculum. This activity guide provides the background information necessary for teaching about light and optics at the Division III level as well as detailed instructions and answers for each activity. The activity topics are as follows:

Pupils and Pinholes

Explaining image formation in a pinhole camera and comparing it to image formation in the human eye.

Dr. Dan's Digs

Use the law of reflection to determine the best physical layout of an optometry office.

Looking at Lenses	Use laser ray diagrams to compare the refraction in concave and convex lenses.
Can't Judge a Lens by its Looks	Use laser ray diagrams to compare the refractive power of two different lens materials.
Through the Looking Glass	Use laser ray diagrams to understand the cause of normal, near and far sightedness.
Eye Spy	Use a dissectible eye model to identify all the major anatomical parts of the human eye. Also perform a colorblindness test and "see" your blind spot.
Have a Look-See	Perform a standard vision test with and without simulated near sighted goggles. Discover how lenses are used to correct near sightedness.
Optional: Light Pipes and Mirages	Use a java applet to construct a ray diagram demonstrating total internal reflection in a light pipe and the formation of a mirage.