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Inquiry Lens Simulation

Introduction:  Lenses are important for things like glasses, telescopes, microscopes, movie projectors, and other devices.  In this activity, we will be looking at how a convex lens affects the image of an object.

Directions:

1. Search for pHet simulations.  Go to “Lens Optics” and open the program.
2. Change “marginal rays” to “principal rays.”  Increase the diameter to the maximum of 1.3 m.
3. Move the pencil up so that the eraser is on the line.  It should be twice the distance from the x.  The “x” represents the focal point of the lens.
4. Draw the image below.

1. How do the rays go through the focal points?
2. Is the image upright or flipped?
3. Is the image real or virtual?
4. Now move the pencil slightly farther away from the lens.  How did the image change?  Draw this image below.

1. Now move the pencil closer to the lens, closer than the first situation but not quite to the focal point. How did the image change? Draw this image below

1. Now move the pencil directly on top of the focal point or x.
2. How do the rays appear?

1. Since they are parallel they will never converge or come together.  What type of image would this produce?
2. Move the pencil back to twice the focal length.  It should be the exact same size on the other side.
3. The refractive index of this glass is shown at the top of the page and should be 1.53.
4. Try changing the index to a higher number than 1.53.  What happens?

1. Try changing the index to a lower number than 1.53.  What happens?

1. The refractive index of air is 1.00 because it is less dense than the glass lens.  What type of substance might have an index of less than 1.53?

1. The refractive index of air is 1.00 because it is less dense than the glass lens.  What type of substance might have an index greater than 1.53?