

Half a Lens

Apparatus

lens, light source, piece of paper

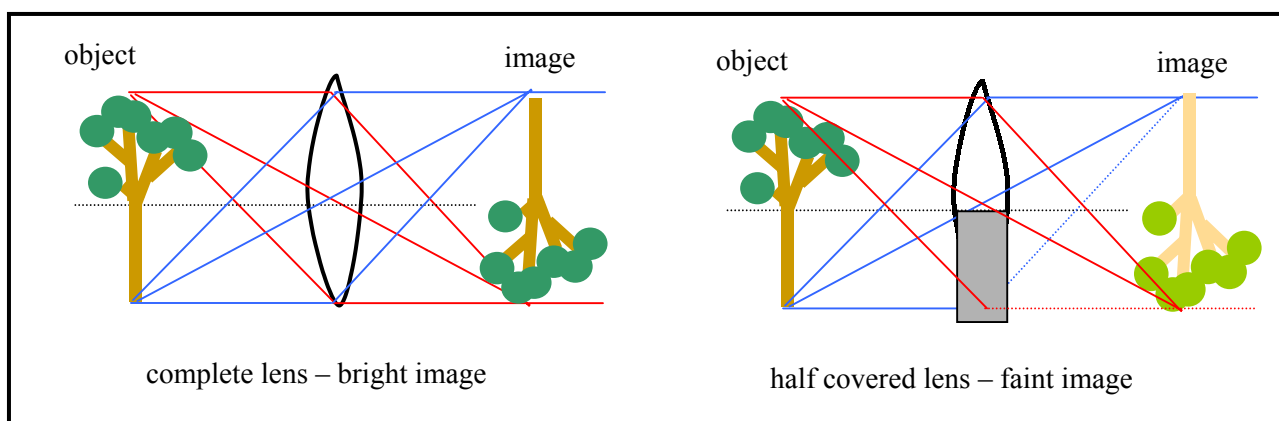
Action

The students use the lens to observe an image. They then predict what will happen to the image if the lens is partly covered by a piece of paper, giving only half a lens. *After* agreeing amongst themselves on their prediction, one student covers half the lens. They should compare their prediction to their observe, and attempt to explain any differences.

The Physics

When you cover half the lens you get a fainter image. Effectively you are cutting out half the light rays, but they still produce an entire image. In the diagram below you can see that rays from the top and bottom of the tree still pass through the top half of the lens to form. However half of the rays from all parts of the image are blocked, so that only half reach the image point, giving only half the intensity of the complete lens.

Note: it is particularly valuable to get students to predict what will happen in advance of doing the activity, as it is not an intuitive result for many people.



Accompanying sheet

Half a Lens

Hold up the lens so that you create an image with it.

What do you think will happen to the image if you cover half the lens?
Discuss this in your group, and agree on your prediction.

Now cover half the lens.

What happens to the image?

Was your prediction right? Explain what has happened.