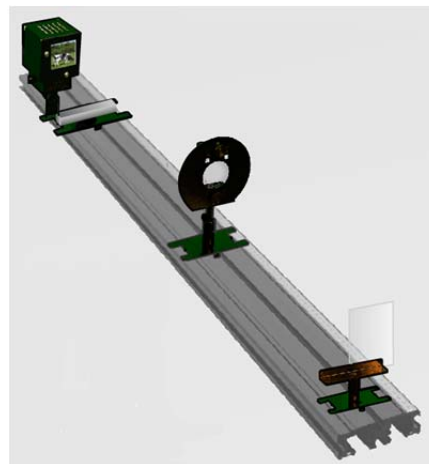**The virtual optical bench.** While it is the centerpiece of the lab, there is little interaction to be had directly with the bench. The object on the light-box is visible, and, if there is one, the image on the screen can also be seen. But to move either of these the use must use the ray diagram. The same is true for adding and changing the lenses and mirrors.


The ray diagram. The diagram found on the bottom of the screen is the real workhorse of the lab. Starting out, the screen is shown on the right in the diagram, and can be moved by clicking and dragging back and forth on the base. When it moves on the diagram it will also move on the optical bench.

Similarly, on the right of the diagram is the object arrow which represents the light-box and this, too, can be moved by clicking and dragging. To precisely place the object arrow, the numerical stepper shown above the diagram labeled "Set Object Position" can be used by clicking the up or down arrows.
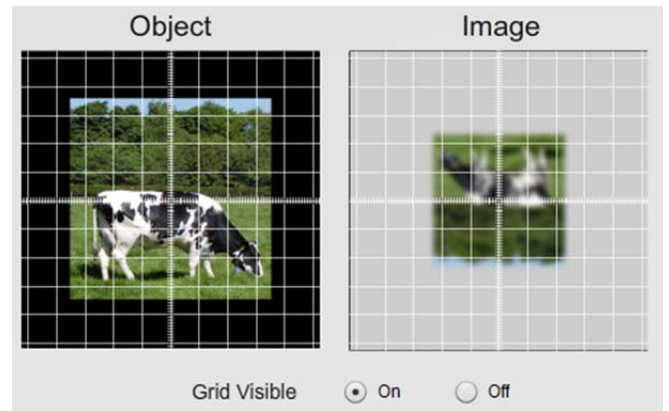
The other arrow in the diagram is the image arrow and it cannot be moved independently because its position and size is determined from the object and the lens or mirror involved. The focal length (and 2 x focal length) may be shown depending on the configuration. There is also a ruler near the ray diagram, which can be used by clicking and dragging.
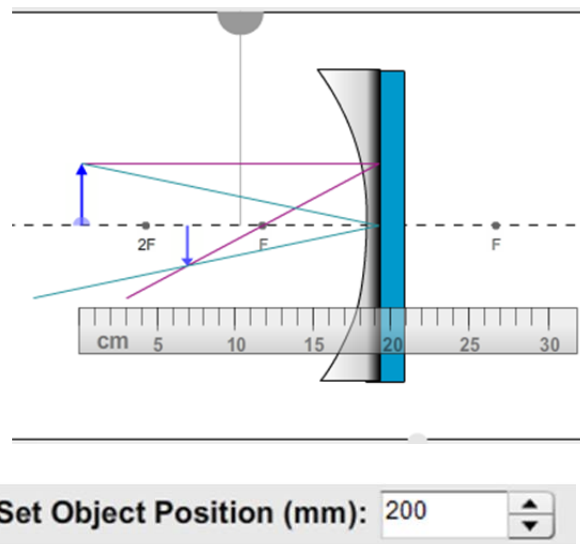
The optical apparatus. The various lenses and mirrors for the lab are shown directly above the ray diagram. To use any of these on the optical bench, click and drag to the diagram and drop on top of whichever apparatus is already in use. Be precise! If the new lens or mirror is dropped correctly, the diagram will change and the old apparatus will be removed. When a concave mirror is used a slight change in the optical bench should be noted.
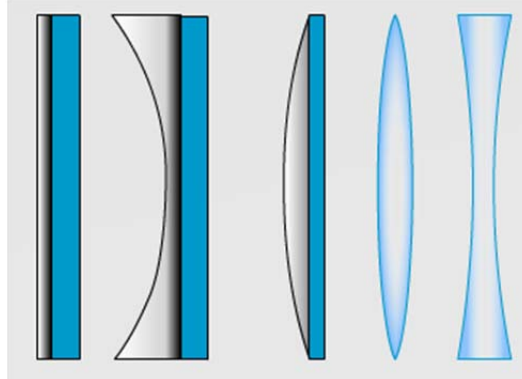
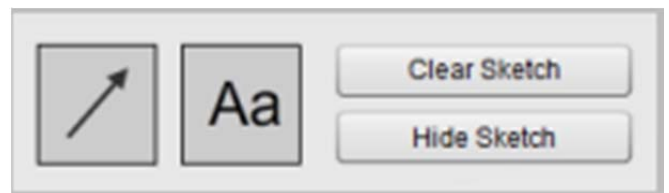|	
The close-ups. In the upper left corner of the screen sits the close-ups of the light-box and the image screen. The left close-up is of the object and it should always appear correctly. To the right is the image and depending on the location of the image screen and the lens or mirror being used, the image may appear upside down, out of focus, or not at all. A grid can be used to measure things on the photos by clicking the "On" button next to "Grid Visible." Once on, this grid is movable by clicking and dragging the grid lines or the round silver handle.	
The photos. In the upper left corner of the screen is the photo selection. The light-box object can be changed by clicking any of these photos, and the close-ups will also change accordingly. Moo.	
Various focal lengths. The lab now comes with 5 different focal lengths for each set of mirrors and lenses. For #1, the focal markers on the diagram are static and show the true focal points. For #2-5, the focal markers are movable and setting them correctly is up to the user. Once set, you can lock their position with the checkbox provided.	
The Sketch Tools. You can now add vectors and labels to the diagram to mark various locations of the object or the image. Just click and drag to add to the screen. You can hide or delete the images with the buttons provided.	
Snapshot. As with most of our labs, you can take a screenshot of any portion of the screen by clicking on the Snapshot icon and then clicking and dragging a box around what you want to capture. A dialog will then appear asking you what you want to call the image and where you want to save it. In most labs, a timestamp will be added to the image to keep track of it better.	