Cameras:

By default, your scene already has one camera and that is usually all you need, but on occasion you may wish to add more cameras. You add more cameras by hitting “Shift-A”, like creating all other objects discussed up until now. To change which camera is active, you need to select that camera and press “Ctrl” and number pad “0”. This changes the active camera.

Like all other objects in Blender, you can adjust the camera settings as well. With the camera selected, click on the Camera button. Here are some of the settings options you have:

**Perspective/Orthographic** - Used to set the camera from showing a true-life perspective view to an orthographic view.

**Lens (Focal)** - Set-up a lens length much like a real camera. 35mm is a good, safe setting, but wide and tight angle setting work for different needs.

**Panorama** - Changes camera view to reflect a cylindrical camera.

**Shift** - Pushes the view left, right, up, down from actual camera view, without changing perspective.

**Clipping** - Start and End - How close and how far an object can get to the camera and still be seen. In very large scenes, this needs to be set higher or things “disappear” from view.

**DOF** (Depth-of-field) - Used with nodes to blur foreground and background objects. This will be discussed in the “Working with Nodes” chapter.

**Limits** - Draws a line in the scene to help you visualize the camera’s range.

**Size** - How big to draw the camera on the screen. You can also control size with scale.

**Show Mist** - Used to give you a visual display of how far the camera sees if using Mist (discussed in Chapter 5).

**Title Safe** - Displays the inner dashed box to help with placement of objects and text.

**Name** - With all objects, the name of the object or camera can be displayed on the screen, but this will display the name in the camera view.

**Passepartout** - Shades the area on the screen outside of the camera’s view. You can control the darkness of the shaded area with the Alpha slider.
Lighting Types and Settings

When you create a scene in Blender, you start with a few basic elements that will include a camera, but may or may not include a light. Remember that what the camera sees is what will render out as a picture or movie depending on what you tell the program you want as a final output. To get a simple rendered view, press the “F12” key. If the picture is black, you do not have a lamp or the lamp settings or placement is incorrect. To exit the render window, press the “Esc” key.

In most cases, you will need more than one lamp in order to properly illuminate your scene. Most scenes usually require 3-4 lamps. Be careful not to use too many lamps! The different types of lamps available for you to use are as follows:

- **Point**- Basic Blender Lamp- shines all directions.
- **Sun**- Provides even angle of light, regardless of placement from objects.
- **Spot**- Shines a direct angle of light.
- **Hemi**- A wider light, much like area lights.
- **Area**- Provides large area lighting (like a classroom). Can be scaled.

In traditional Blender rendering, only spotlights are able to cast shadows. However, with Ray-tracing (discussed in a later chapter) all lamps can cast shadows.

Lamp Settings:

To create a lamp, position the 3D cursor in a desired location and press “Shift-A” and select Lamp, then type. The lamp will be placed on the screen. You now have several options to select. With the lamp selected, click the Lamp button to bring up the adjusting options. Here’s what you see:

- **Preview Window**: Sample of your lamp settings.
- **Lamp Type**: Can be changed any time. You will get different options depending on the lamp selected.
- **General Settings**: This is where you select the color of the lamp, it’s energy (brightness), the distance it shines, and a few other options.
- **Shadow Options**: Shadow style, color and quality. Ray-shadow will be discussed in a later chapter.

These are your basic settings. Sun and Spot give you some different options. The Sun can actually be used to simulate sky and atmosphere variations. The spotlight will be discussed on the next page.

RoboDude Says: Instead of adding too many lights, experiment with the Energy and Distance settings first. In a large scene, the default distance setting may not light the entire scene!
Spotlight Settings:

Spotlights are unique in that you can simulate a foggy scene with them and cast shadows in the traditional Blender program. Ray-tracing (discussed in a later chapter) can cast shadows for all lamp types, but because of the more complex rendering calculations that need to be performed, renders much slower. If you watch professionally made animations on T.V., you will see that ray-tracing with reflections is not always used because of the rendering time. It is only used when needed. You can do the same thing. Again, we will focus on using the Buffer Shadow settings. Ray-trace shadows will be discussed later. Here are your spotlight settings:

Shadow Type: Buffer is the old style and fastest.
Shadow Color: Adjusts the color of the shadow.
Buffer Type: By holding your mouse over these buttons, it will tell you the benefit of each style (i.e. Deep supports transparency and better filtering, but slower).
Filter and Sample: These settings can be used to refine your results, but could add to your render times.
Clip Start and End: Gives a range for calculating shadows. Represented by a line down through lamp. Keep this line as short as possible to give the best shadowing. New to this release is the AutoClip options to set these for you.
Spot Shape: Set the Angle Size, Blend (edge softness), and Shape (round or square). You can also give it a haze with the Halo settings and intensity.

RoboDude Asks: Why can't I see my shadows or why do they look bad? If you have shadows, but look bad, try a larger Clip Start number to shorten up the area of calculation or adjust the Sample Buffers Size and Samples. If you don't see any shadows at all, you might need to go to the Render buttons and turn on Shadows under Shading.

Different lights can be used to get different effects. As mentioned before, try not to add too many lights to your scene. It is better to keep it down to 3-4 and play with their locations and setting, rather than flood the scene in light. Think of it in terms of real lighting situations.
Indirect Lighting

New to Blender 2.5/2.6 is the ability to make objects emit their own light. Indirect light is light that bounces off other objects, like real life. There has always been an Emit option in the Blender material settings so an object could glow, even when light wasn’t hitting it, but it could never light up things around it. It now can. First, let’s set up the material with the Emit feature on. For the scene below, I have removed all lamps and the default World from the scene. The only reason why the cube glows in the render is due to the Emit setting. The plane that it is resting on is not illuminated.

This is what Blender could do before this version. In order to turn on indirect lighting, I need to add a World back into the scene. I set the Horizon and Zenith colors to black for added effect. In the World settings, find the panel labeled Gather and turn on Approximate. This then open a panel called Indirect Lighting. Check and open the panel. You will see a Factor (influence) slider and Bounces, which will control how many times the light bounces. A rendered scene now shows reflection on the floor plane and a sphere sitting beside the cube, invisible before indirect lighting was applied.
What is a lighthouse scene without a light shining out through the fog? Open your “Lighthouse Scene” and place the 3D cursor directly in the middle of the lighthouse where the spotlight should shine. Use your 3 principle views (#1,3,7) to place the cursor in a good location. After the cursor is located, check to see if you are in the front view (#1) and add a Spot Lamp (Shift“A”-Add-Lamp-Spot). Rotate the lamp as necessary so it is pointed across your scene and not directly at the camera.

After the lamp is added, go to the Lamp buttons and make sure it is set to Buffer Shadow. Adjust the Energy to about 1.2. In the Spot Shape panel, adjust the Size slider to about 10. This will give you a narrow beam that is about 10 degrees wide. Also turn on the Halo button. Render an image. Fine tune the spot light with Distance and Energy setting and the Halo Intensity slider.

Your final rendering should look something like the image below. Looks good, but something is missing. There should be something in the middle of the lighthouse emitting that light. We'll do something simple, but effective for that next.
Now it’s time to add something in the middle of that lighthouse. Basically, we’re going to add a mesh with a single vertex and place a Halo Material on it.

Start by making sure the 3D cursor is still in the middle of the lighthouse top. If it isn’t, an easy way to get it there is to select the spotlight and hit “Shift-S” and select the option “Cursor to Selected”. This is a great command to use and use often. In the top view, add a plane. Enter Edit Mode (tab) and delete all but one vertex. Move that remaining vertex to the center of the lighthouse. After you move the one vertex, exit Edit Mode (tab).

Now go to the Materials buttons and Add a new material. Press the Halo button. Here, you will see some Halo settings. Adjust the Halo Size (try 1.0 or more), turn on Rings and Star, and try adding more Rings and Stars. You may want to try adjusting the Hardness and Add sliders.

Your end result should look something like this with a ring and star in the center of the lighthouse. You may need to darken your world setting a bit to get the best effect.

**Call the instructor when finished**