

ASTR 1230: Astrophotography Lab Orientation Session

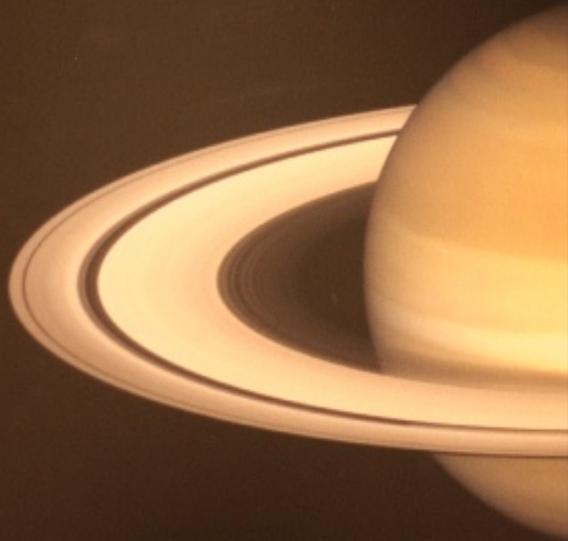
Terms to Know

- **ISO** = Light Sensitivity
- **Aperture** = Opening Diameter of Camera
 - f/stops: Ratio of the focal length to the lens diameter.
 - Focal length is fixed, alter the diameter of the lens.
 - F/2.8: Wide Aperture; F/22: Narrow Aperture.
- **Exposure Time** = Shutter Speed
 - Length of time the shutter is open
 - Displayed in seconds
- **White Balance**
 - How colors are displayed which is dependent on lighting.

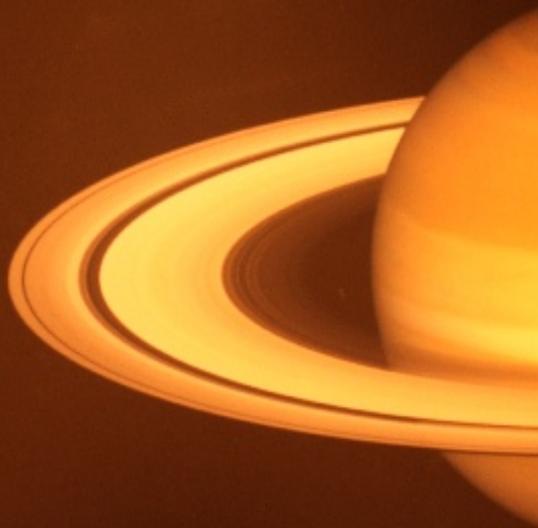
Camera Use: White Balance

This sets what is “true white” in an image.

You will need to experiment and determine what is best for your imaging needs.



Automatic



“Shade” - More Red



“Flash” - More Blue

Set the White Balance

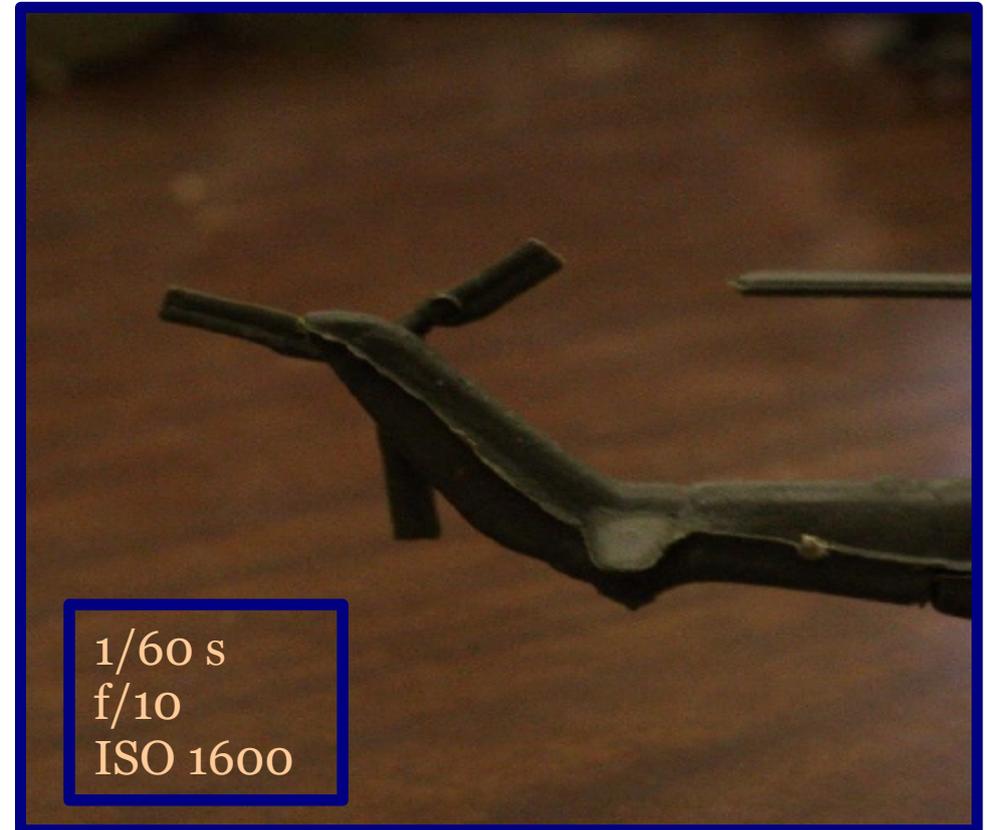
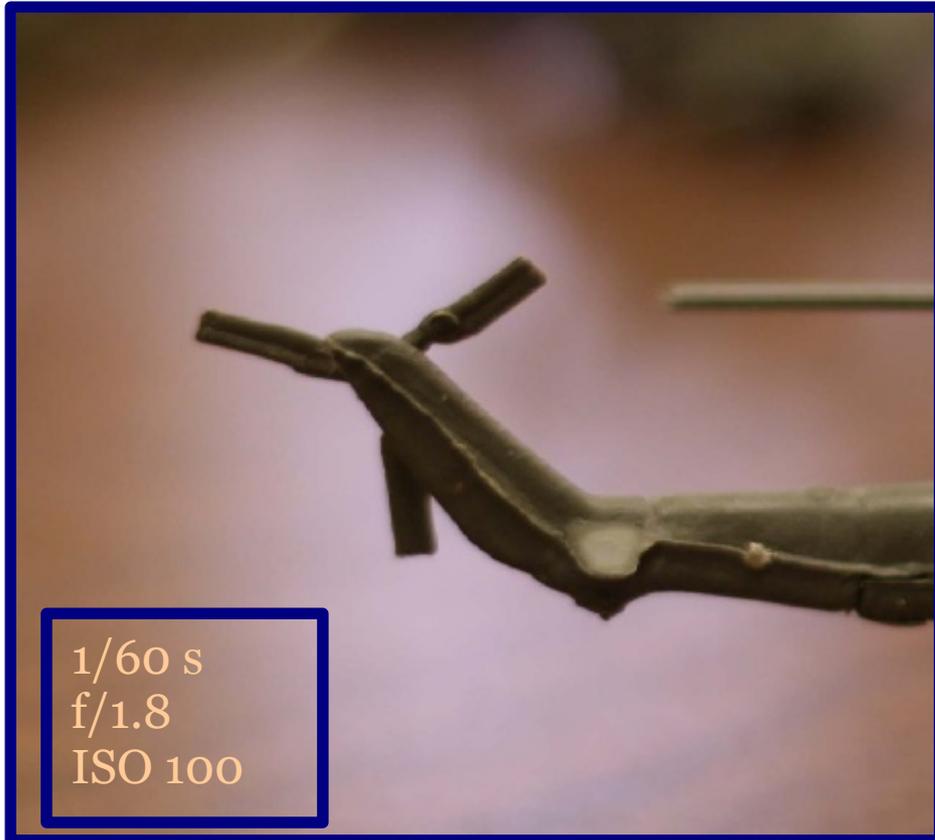


Adjust the White Balance.

1: Press the White Balance Button on the back of the camera

2: Use the scroll wheel to select wireless the desired White Balance from the screen.

Camera Use: ISO



Low ISO:

- lower light sensitivity
- lower noise
- better resolution

High ISO:

- more light sensitivity
- more noise
- lower resolution (grainy)

Set the Light Sensitivity



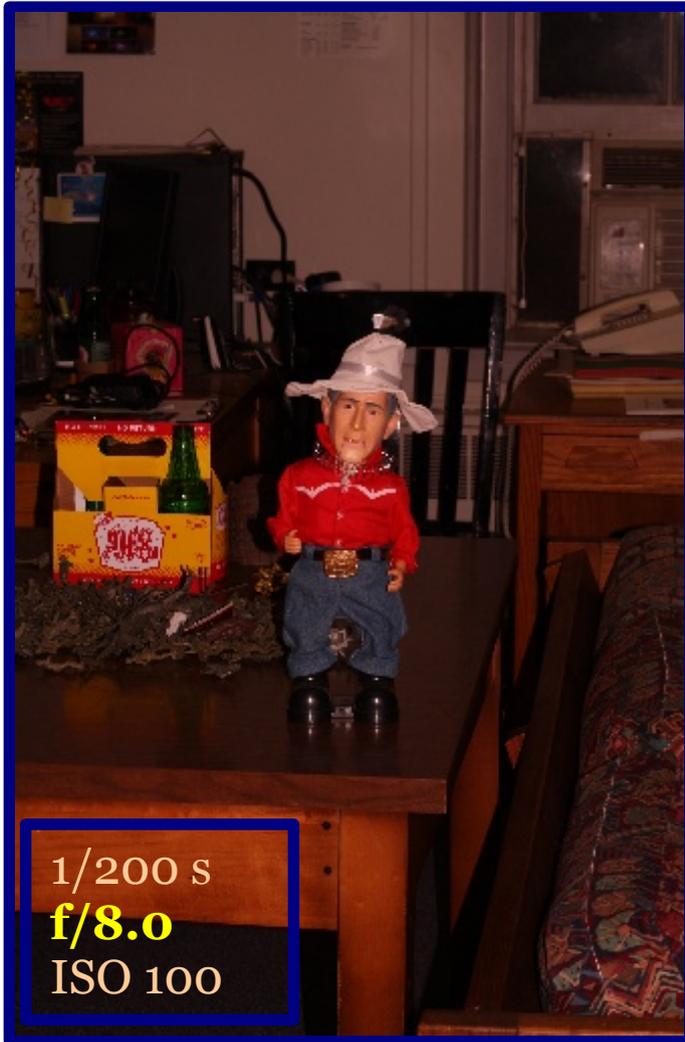
Change the ISO.

1: Press the ISO button on the top of the camera.

2: Use the scroll wheel to select the desired ISO for your subject from the display.

3: Your settings will be displayed here in the general menu.

Camera Use: Aperture (f/ stop)



High f/# = slow
- less light per time



Low f/# = fast
- more light per time

Camera Use: Aperture (f/ stop)



Low f/# = Shallow Depth of Field
← *only a small region of the image is actually in focus*



High f/# = Deep Depth of Field
← *more of the image is actually in focus*

By stopping down the aperture, we cut back on the off-axis rays and more of the image is brought into focus.
We also let in **less** light and so need to take longer exposures or up the ISO

Set the Aperture



Set the diameter of the lens aperture.

1: Press the Button on the back of the camera

2: Hold the Av button to toggle from shutter speed to the aperture on the display.

3: Use the scroll wheel to adjust the aperture settings.

4: Your settings will be displayed here in the general menu.

Example: Night Scene



National Solar Observatory

Focal Length: 18 mm

Aperture: f/5.6

Exposure Time: 415 seconds

White Balance: Incandescent

Film Speed: ISO 200

Here the Moon is behind the photographer and casts a shadow of the tree across the observatory. The clouds also create the colors near the horizon due to reflections.

Example: Night Scene



Fan Mountain Observatory

Focal Length: 18 mm

Aperture: f/3.5

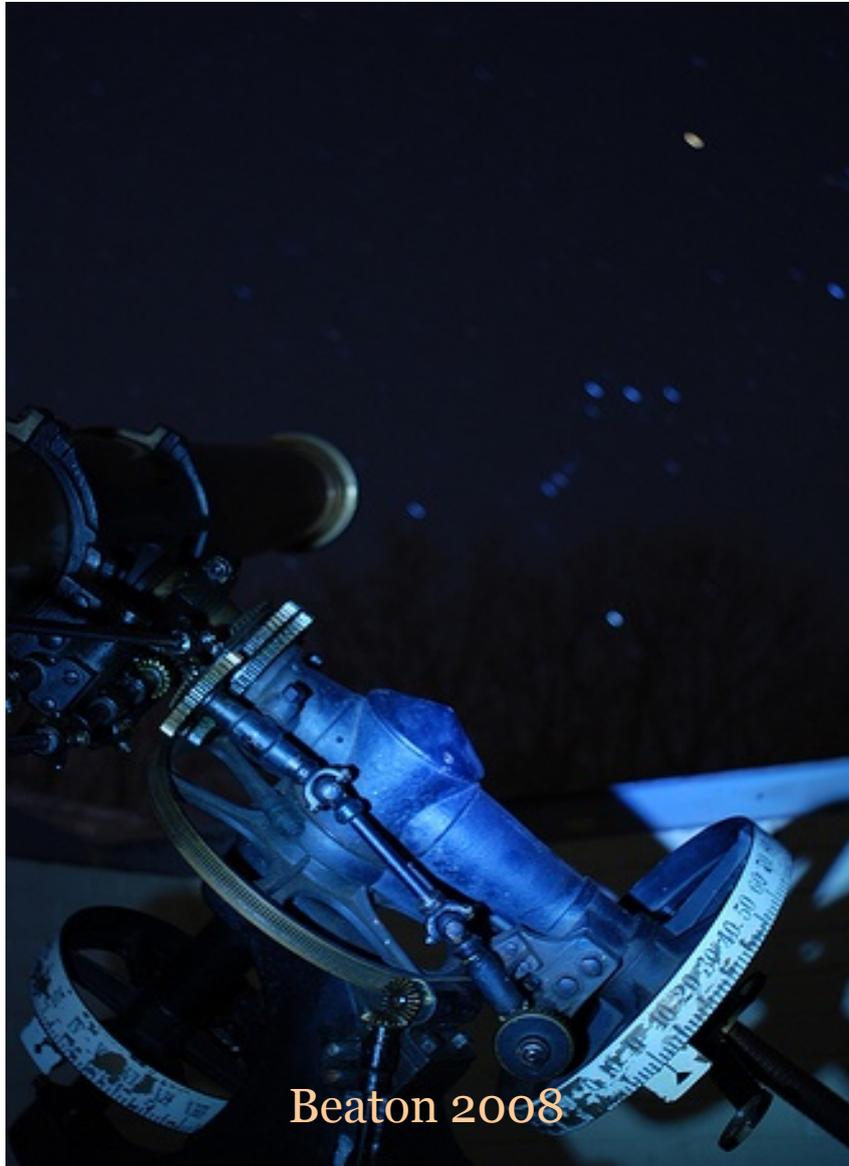
Exposure Time: 40 seconds

White Balance: Manual

Film Speed: ISO 400

Here we can see the light trails caused by people moving in front of the observatory with their flashlights!

Examples: Constellation



Clarke 6" & Orion

Focal Length: 20 mm

Aperture: f/5.6

Exposure Time: 90 seconds

White Balance: Incandescent

Film Speed: ISO 200

Here the camera is focused on the Clarke Telescope but the constellation, Orion, is clearly visible in the background, although not in focus.

Example: Constellation



Lake Scene with Big Dipper

Focal Length: 18 mm

Aperture: f/4.0

Exposure Time: 308 seconds

White Balance: Manual

Film Speed: ISO 200

Here you can see the light pollution from houses and on the horizon from a nearby city. These are things to try and avoid for some images, but add aesthetic quality for other images.

Set Manual Shooting Mode



Change the Shooting Mode of the Camera to have full control over settings.

1: Turn the shooting mode nob to M for Manual Mode.

2: Your settings will be displayed here in the general menu.

Set Manual Focus



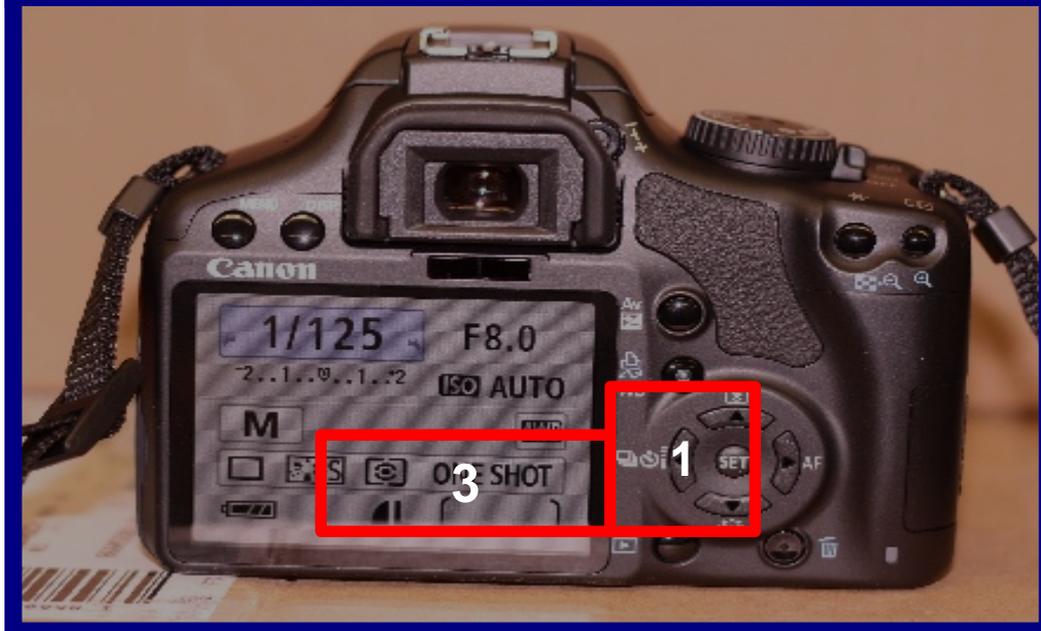
Change the Focus Mode of the lens.

1: Toggle the MF/AF button on the side of the lens.

2: Look through the view finder at your subject.

3: The focus can be adjusted with the focus wheel at the edge of the lens.

Set the Shutter Release Mode



Change the Shutter Release mode to respond to the wireless remote.

1: Press the Button on the back of the camera

2: Use the scroll wheel to select wireless remote.

3: Your settings will be displayed here in the general menu.

Set the Shutter Speed



Change the exposure time appropriate for your image.

1: Press the ok Button on the back of the camera to bring up the settings menu

2: Use the scroll wheel to adjust the shutter speed.

3: Your settings will be displayed here in seconds on the general menu.

Setting the Bulb Shutter Speed

- For indefinitely long exposures, it is useful to use the 'bulb' mode. This opens the shutter and it remains open until the user closes the shutter.
 - Wireless Remote:
 - The first click will open the shutter (often after a 2 second delay).
 - The second click will close the shutter. The remote must be pointed at the front face of the camera to be intercepted.
 - Normal Shutter Release Button:
 - The user must hold down the shutter release button for the desired exposure length.

Rules of Thumb

Astrophotography is a game of trial and error depending on the specific details of the shooting conditions and the subject.

You will learn the most by experimenting with settings to learn how to create the image you desire.