Wednesday, September 27, 2023   2:23 PM

Today: Focus, aperture, shutters

Critique feedback. 21+, 2 -, One suggestion: smaller pods, yes.

Pods for Team First critiques:
1) Kohlrabi and Snap Peas
2) Pattypan and Shishito
3) Chard and Purslane
4) Sungold and Basil
5) Kuri and Moskovich

Should be able to do one team on Friday and the other on Monday.
Attendance required both days.
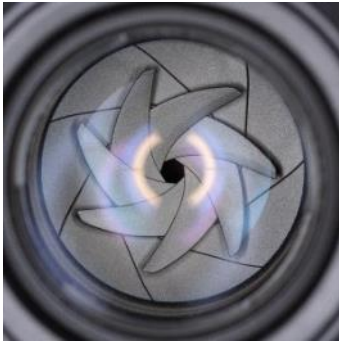Volunteers for Pod Facilitator (to figure out which team for which day)
And Critique Facilitator (one for Friday, one for Monday, 4 questions)?

PHOTOGRAPHY FUNDAMENTALS

1) Framing/workflow
2) Camera
3) Lenses
   ○ Typical lenses
   ○ Focal lengths
   ○ Focus and Lens laws
   ○ Aperture, depth of field

4) Exposure Control
5) Resolution

Focus, Aperture and DOF

Overlapping leaflets form an iris with a variable diameter opening, here from a Canon EF-M 32mm F1.4 STM lens. D-Kuru, CC BY-SA 4.0 via Wikimedia Common

From <https://www.flowvis.org/Flow%20Vis%20Guide/overview-4-photography-c-lenses-aperture-and-dof/>

Aperture spec = F number, F#, f/, f-stop = f/D = focal length/ optical hole diameter
Inverse of hole diameter
The larger the hole, the smaller the f/
Range is usually f/1.4 to f/22
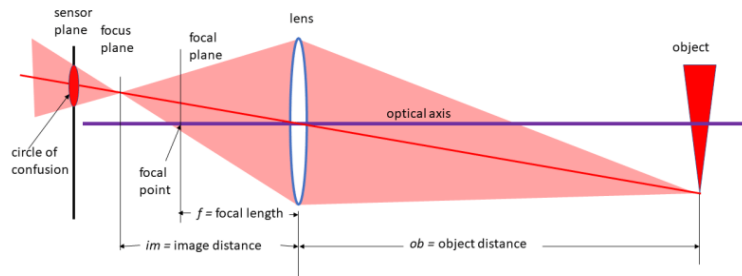 What is yours? How does it change with zoom?
  On consumer cameras, f/ will change with zoom.
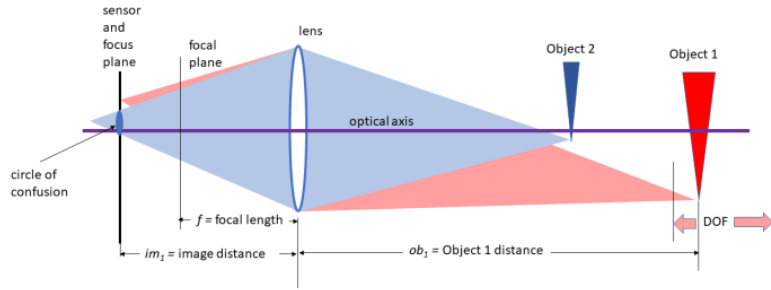 Not so for professional lenses.

2 main effects: on depth of field, and exposure

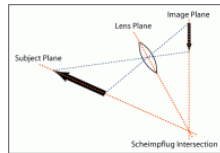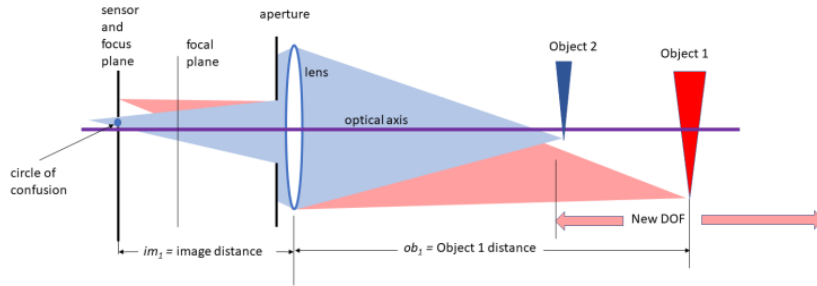DOF = depth of field = range of object distances with 'acceptable' focus.

In focus: Sensor plane is at focus plane. What if that is *not* true? Maybe the object is not the perfect distance away?
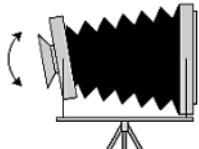

Now put Object 1 in focus, and Object 2 too close to the camera

Now **stop down** the aperture. What happens to the circle of confusion?

Tilting a lens tilts the object plane. Fil Hunter, Public domain, via Wikimedia Commons.

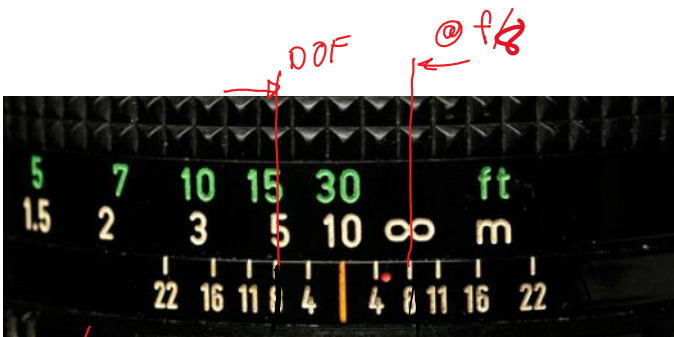View camera with tilt
. Cdheald, CC BY-SA 3.0 via Wikimedia Commons.

Scheimpflug principle

A LensBaby does this for DSLRs, but are $$.

Sometimes out-of-focus areas are desirable.
Bokeh = the aesthetic quality of blur in an image

Droplets of oil on the surface of water reflect a glittery backdrop. Kelsey DeGeorge, Get Wet, Spring 2014.

http://jimdoty.com/learn/exp101/exp_big3/exp_big3.html
Only old manual lenses have this guide now.

More DOF behind best focus because of nonlinear lens equation.
Focusing is done with aperture wide open. Some cameras allow a preview with lens stopped down for DOF preview.

Detailed article on DOF: http://www.largeformatphotography.info/articles/DoFinDepth.pdf

4. EXPOSURE

For a given light intensity, exposure = Total photons hitting the sensor: (**aperture area**) X (**time shutter is open**)
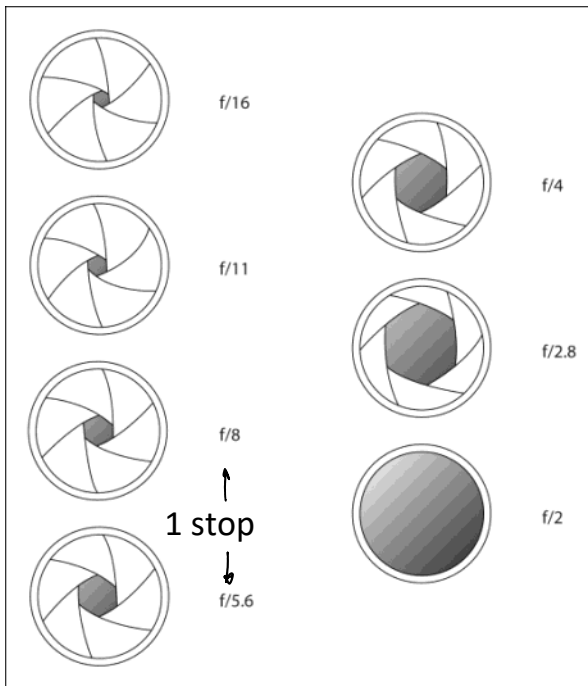
Aperture

$$f/ \; = f/D \; = \frac{\text{focal length}}{\text{aperture diameter}}$$

Aperture has impact on exposure too, how much light total hits the sensor.

- Exposure units: **1 stop = 1 EV Exposure Value = factor of 2 in area, or total light**.
Camera adjustments in 1/3 or 1/2 stop steps

Stop used to be a metal plate with hole punched in it. It stopped light.

Aperture (iris) mechanism made from overlapping pivoting leaves.

http://media.wiley.com/assets/1007/41/0-7645-9802-3_0213.jpg

F-stop series, 1 stop increments: 1.4, 2, 2.8, 4, 5.6, 8, 11, 16, 22, 32, 45, 64
WRITE THIS DOWN, we'll use in in a few minutes

Shutter Speed

Shutter speeds: 30 = 1/30th of a second etc.
5 = 1/5th of a second
30" = 30 seconds
T = time, click to open shutter and again to close
B = bulb, shutter stays open as long as button is pressed (or bulb is squeezed)

Make a looong time exposure

In groups:
Check your camera shutter speed options. What is the range?

Check your camera shutter speed options. What is the range?

Shutter Speed

Longest
1"
|
30"

Proper exposure = middle value on an average pixel

Same image brightness
f/5.6, 1/100 sec, ISO 200
f/8, 1/100 sec, ISO 400
f/4, 1/200 sec, ISO 400

OK, many combinations lead to the same overall brightness. How to choose?

In groups, what are the side effects of each choice?

Next class we'll fill these out

Side Effects	If you want your photo Darker Brighter	Side Effects
DOF ↑	**Aperture** f/8 f/5.6 f/4 f/2.8 f/2.0 f/1.4	*DOF* ↓ *Bokeh*
	Shutter Speed Fast Medium Slow 1/1000 sec 1/250 sec 1/30 sec	*motion blur*
	ISO Sensitivity Low gain High gain ISO 100 ISO 6400	*noise*