Camera Basics

Get to Know Your Camera

Workshop Overview

- **Main Types of Digital Cameras: DSLR vs. Mirrorless vs. Compact**
- **Parts of your camera**
- **Key buttons and features**
  - Shooting modes
  - Metering modes
  - Exposure compensation
  - Exposure/Focus Lock
  - Histogram
  - Focus modes
  - Focus points
  - FYI: Shooting JPEGs vs. RAW images
- **Sensor size matters: Full frame (FF) vs. Crop sensor (APS-C) vs. Micro 4/3 (MFT)**
- **Camera & Lens Care**
- **“Next step” photo accessories**
  - Tripod (& cable release)
  - Filters: UV, Circular Polarizer, ND filters, Graduated filters
  - Flash

Main Types of Digital Cameras

- **DSLR (Digital Single Lens Reflex)**
  - Full frame and APS-C evolved from SLR film cameras
  - ***Pros***: excellent quality
  - ***Cons***: more expensive and heavier
- **Mirrorless**
  - Full frame (ex., Sony, Leica, etc.), APS-C (most major brands) and MFT (ex., Olympus, Panasonic, etc.)
  - ***Pros***: lightweight and excellent quality, wide price range
  - ***Cons***: less choice in cameras and lenses than DSLRs (but this is changing!)
- **Compact (Point & Shoot and Smart phone cameras)**
  - Sensors smaller than MFT
  - ***Pros***: extremely portable and “culturally acceptable”
  - ***Cons***: limited “creative” options

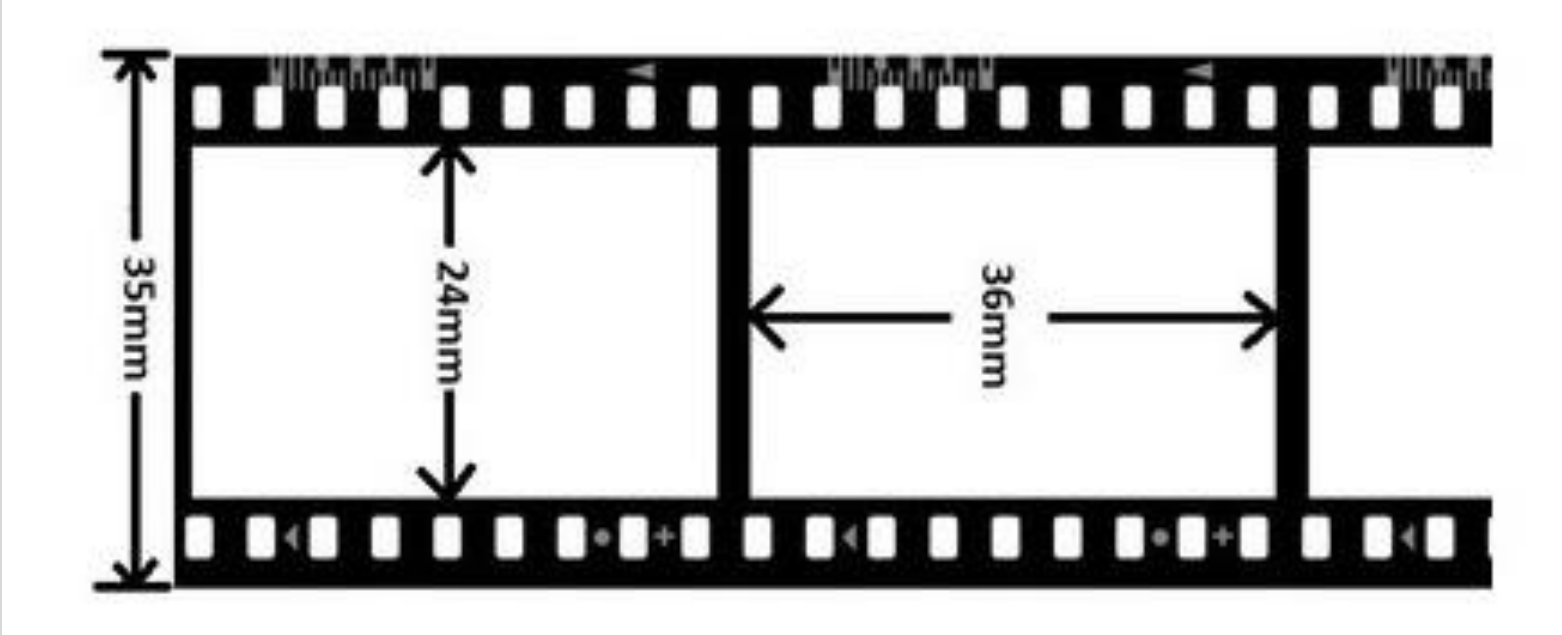
DSLR compared to Mirrorless

DSLR
(note mirror; sensor is behind the mirror)

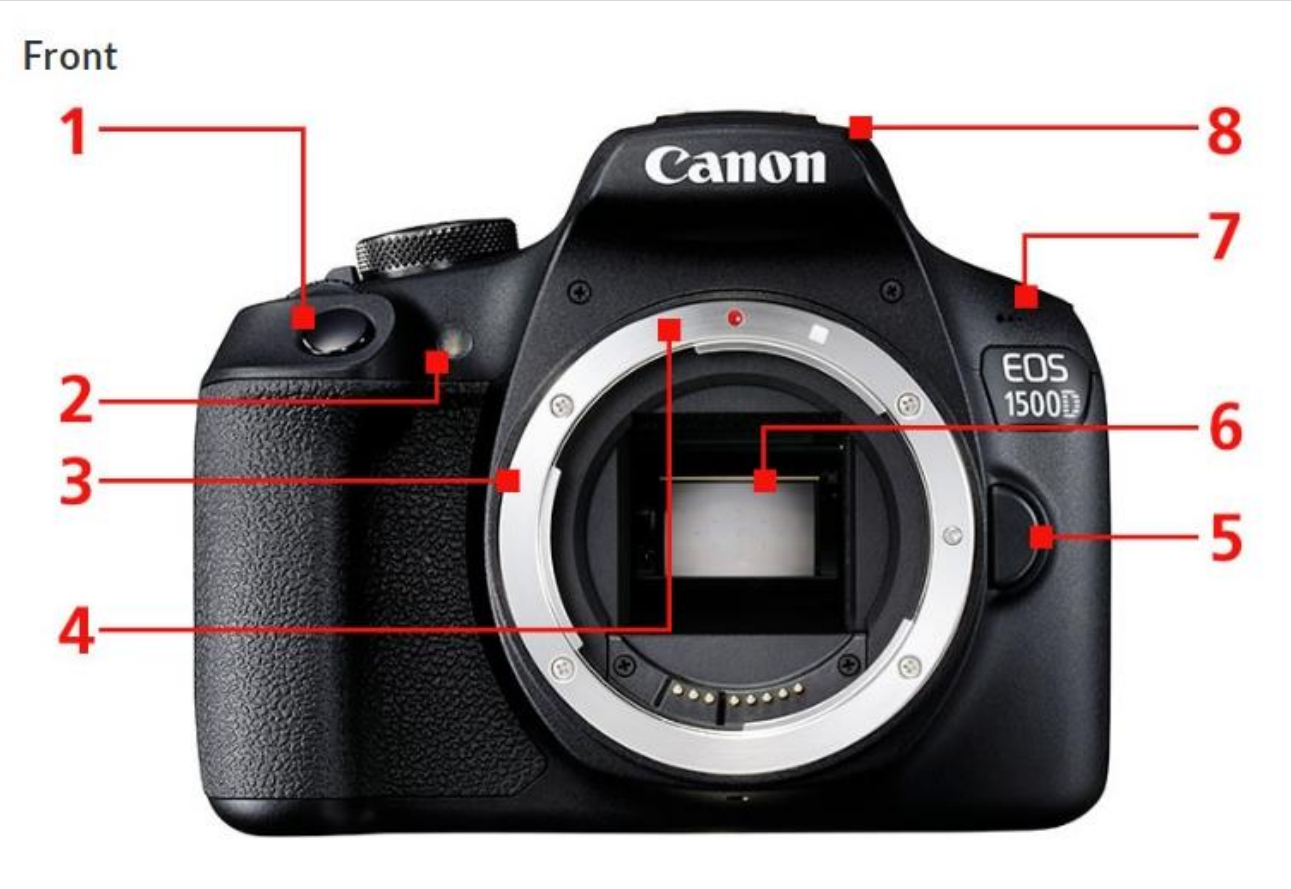
Mirrorless
(no mirror in front of sensor)

Sensor size matters: Full frame vs. Crop sensor (APS-C) vs. micro 4/3 (MFT)

- **KEY TAKEAWAY:** Because there are so many variations in camera types, the old 35mm film size has become the “standard” base for sensor size crop factor and equivalent focal length of lenses.



Parts of your Camera: Front



1: Shutter
2: Red eye reduction/self-timer indicator
3. Lens mount
4. Lens mount index
5: Lens release button
6. Mirror (DSLR only)
7. Microphone
8. Built in flash

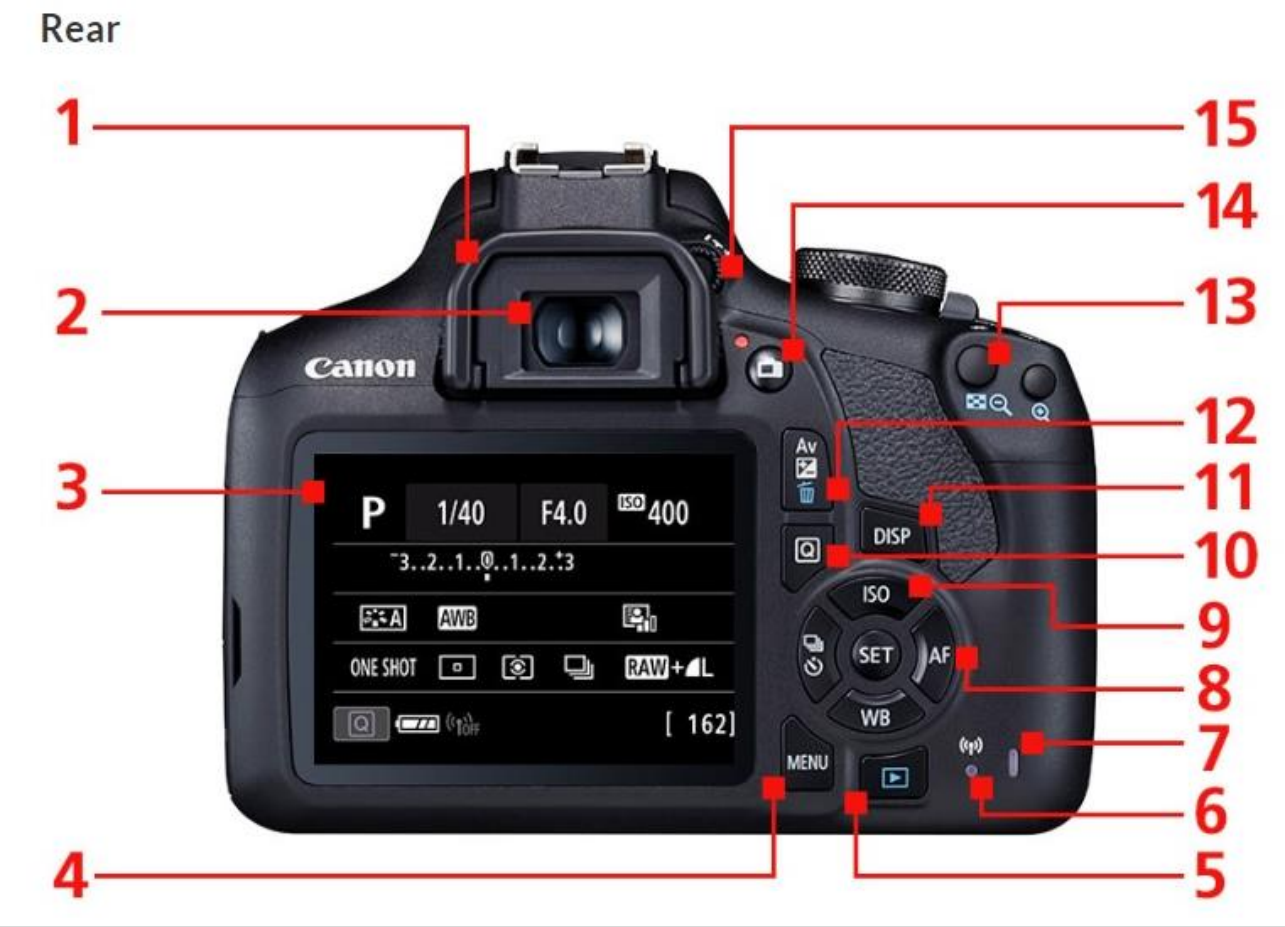
Adapted from: https://snapshot.canon-asia.com/article/en/lesson-2-knowing-the-different-parts-of-the-camera

Parts of your Camera: Top

1: Focus mode switch
2: Speaker
3: Strap mount
4: Hot shoe (for on-camera flash)
5: On/off switch
6: Mode dial
7: Flash pop-up button
8: Main multi-purpose dial
9: Lens zoom ring
10: Lens focussing ring
11: Lens focal length (crop factor!)
12: Focal plane

Adapted from: https://snapshot.canon-asia.com/article/en/lesson-2-knowing-the-different-parts-of-the-camera

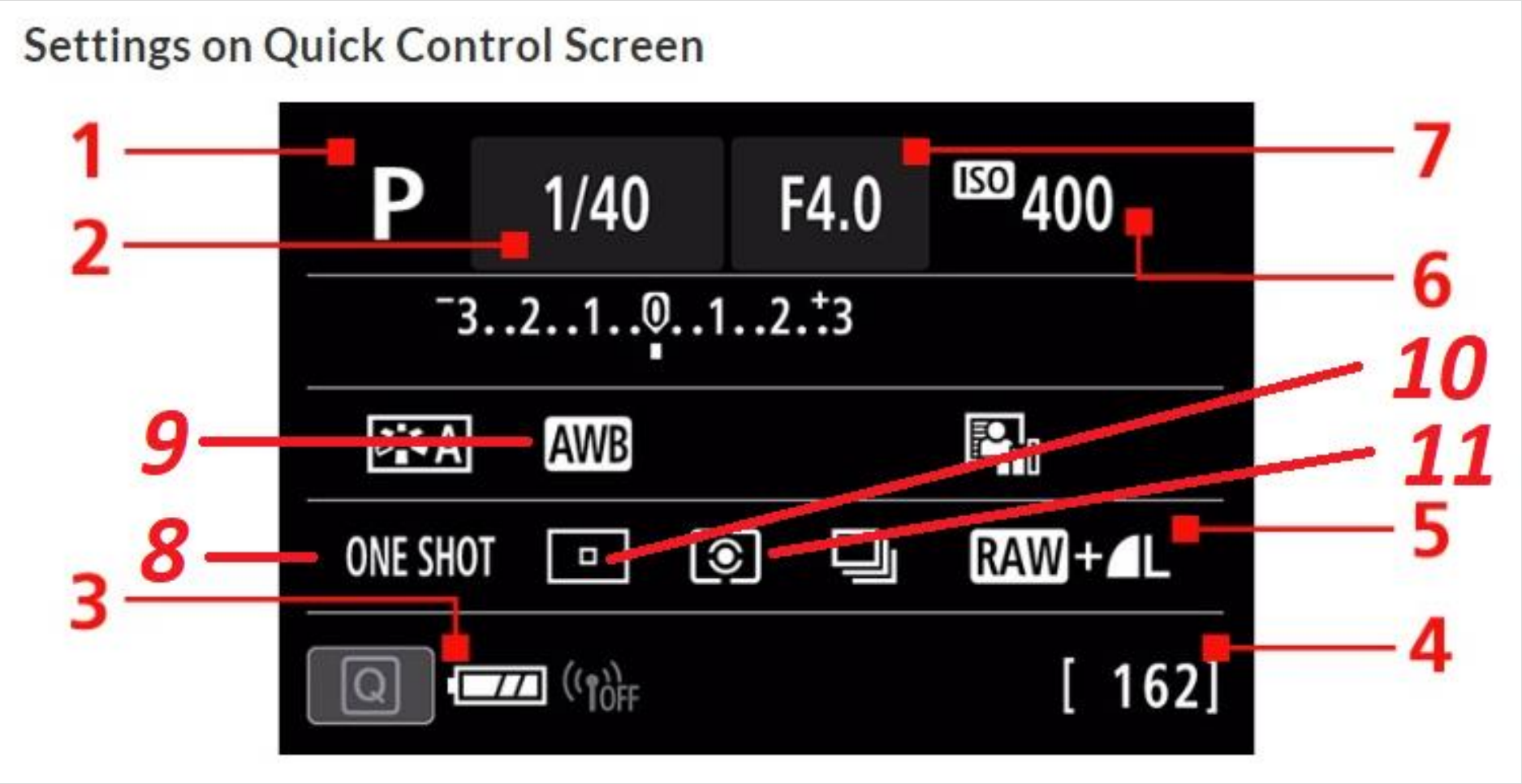
Parts of your Camera: Back



1: Eyecup
2: Viewfinder
3: LCD monitor
4: Menu button
5: Playback button
6: Wifi lamp
7: Access lamp (CAUTION! memory card transfer)
8: Multi-controller/set button
9: ISO button
10: Quick control button
11: Display button
12: Erase/delete button
13: Focus button (back button focus)
14: Live view/movie switch
15: Dioptric adjustment dial

Adapted from: https://snapshot.canon-asia.com/article/en/lesson-2-knowing-the-different-parts-of-the-camera

Parts of your Camera: LCD Control screen



1: Shooting mode
2: Shutter speed
3. Battery level
4. Shots remaining
5: Image recording format (quality level; JPEG/RAW)
6. ISO speed (sensitivity)
7. Aperture value
8. Single vs Continuous
9. White balance
10. Focus mode
11. Metering mode

Adapted from: https://snapshot.canon-asia.com/article/en/lesson-2-knowing-the-different-parts-of-the-camera

Parts of your Camera: Side

1: Remote Control Terminal, Audio/Video OUT/Digital Terminal, HDMI Mini OUT Terminal

Adapted from: https://snapshot.canon-asia.com/article/en/lesson-2-knowing-the-different-parts-of-the-camera

Parts of your Camera: Bottom

1: Battery compartment /Card slot
2: Tripod socket

Adapted from: https://snapshot.canon-asia.com/article/en/lesson-2-knowing-the-different-parts-of-the-camera

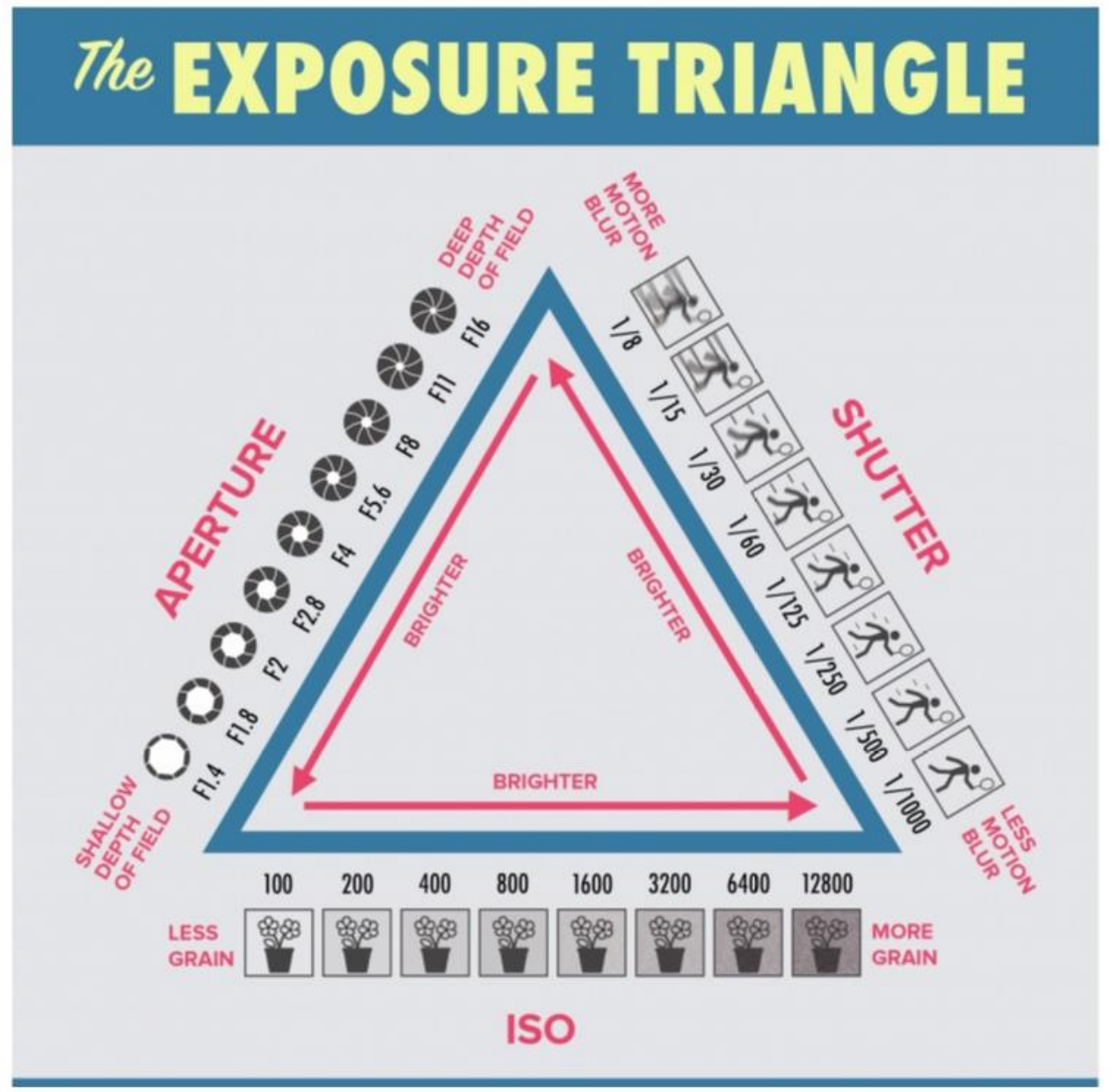
Camera & Lens Care

- Avoiding dust, sand and moisture
- Turning camera off before changing lens
- Facing camera away from “hazards” when possible (ex. shelter from windy conditions)
- Protecting the sensor
- Shooting in cold or warm (i.e., humid) temperatures and dealing with condensation
- Avoiding “bumps and bruises”
- Using a UV filter (or not!) for lenses
- Using lens caps and a camera bag always
- Having a rocket blower, Lens Pen, or microfibre cloth available
- Planning what equipment to take with you to shoot based on conditions and photo subject(s)
- Using a reliable camera strap or strap system (ex. Black Rapid, Peak Design, etc.)

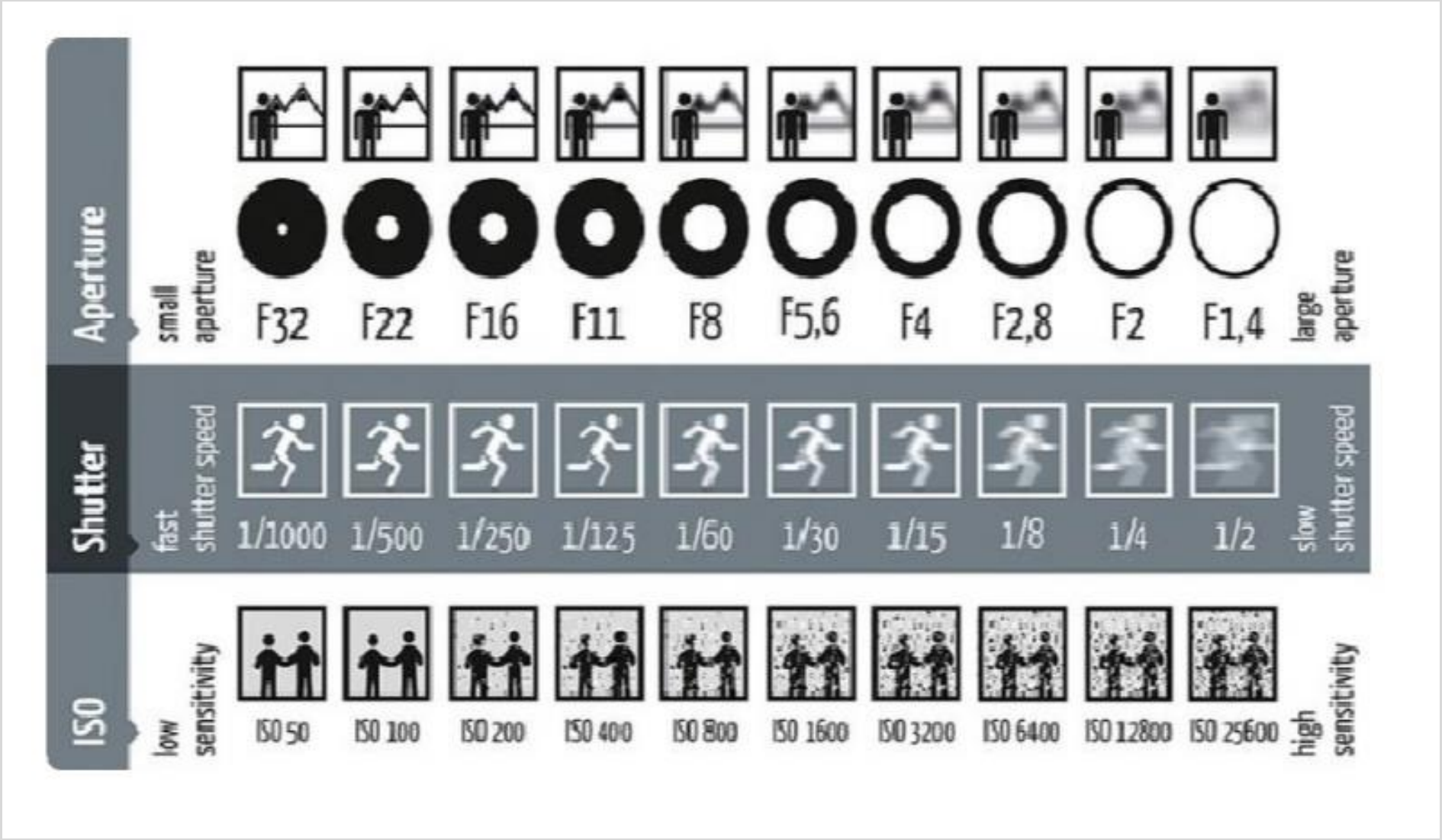
Hands-on Activity #1

- Remove your camera lens and carefully clean the lens (NOT the sensor!) with the materials provided.

The Exposure Triangle



Exposure Chart



Exposure Equivalencies

To get the same exposure, you can choose any of the following settings as all of the following are equivalent exposures to f/2.8, 1/250 sec and ISO 200. The equivalent exposures are obtained by balancing any increase or reduction in stops by making the opposite changes to keep the overall level of light the same.

Aperture	Shutter Speed	ISO
f/2.8	1/250 sec	ISO 200
f/4	1/125 sec	ISO 200
f/2.8	1/125 sec	ISO 100
f/1.4	1/250 sec	ISO 100
f/8	1/60 sec	ISO 400

Equivalent exposures for the original settings – f/2.8, 1/250 sec, ISO 200

There can be many combinations to obtain an equivalent exposure, so the above list is only representative and definitely not exhaustive.

Exposure Equivalencies

Notice the difference in the backgrounds as the aperture setting changes. The exposure is the same in all three of these photos. Which one do you like the best?

Key buttons and features: Shooting Modes

M: Manual
A: Aperture (size of lens opening)
S: Shutter speed ("T" on some other camera brands)
P: Program (camera sets "A" and "S", but photographer can choose ISO, exposure compensation, among other creative options
Auto: Camera alone determines optimal shot
Head icon: Portrait
Flower icon: Macro
Mountain icon: Landscape
Running icon: Sports

*__N.B__. Many cameras have more and other modes (ex. "**B**" = Bulb or "**X**" for flash)

Key buttons and features: Metering Modes

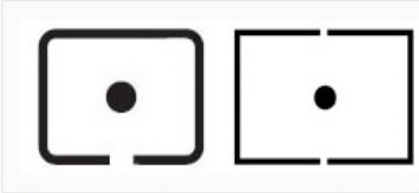
Matrix or evaluative metering: Determines exposure across the entire image

Center-weighted metering: Determines exposure weighted more towards the center of the image

Spot metering: Determines exposure based on a small area (approx. 5%) of the image

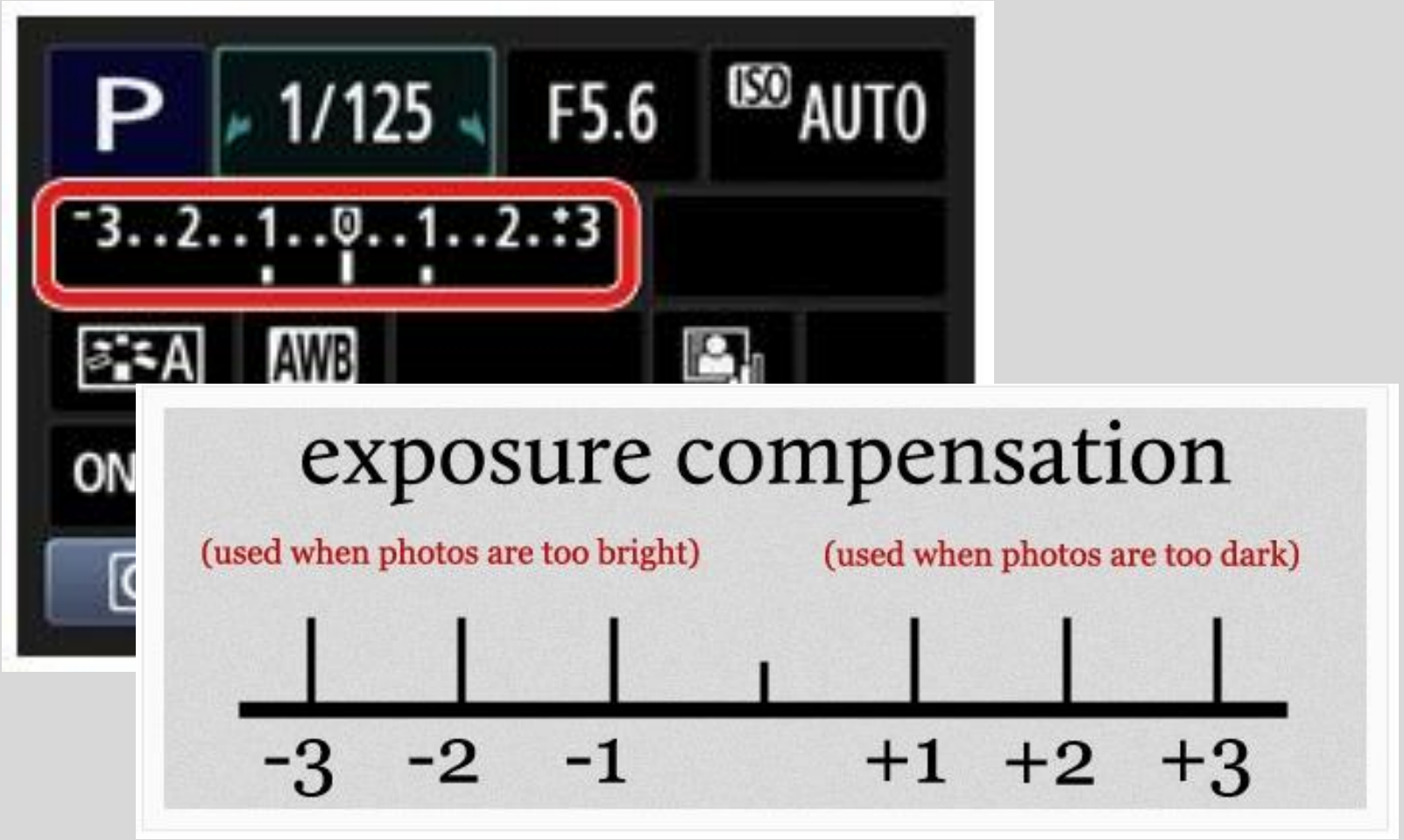
At left: Nikon's 3D Matrix metering mode symbol, with Canon's equivalent Evaluative metering symbol at right

Nikon's center-weighted metering symbol at left with Canon's at right.

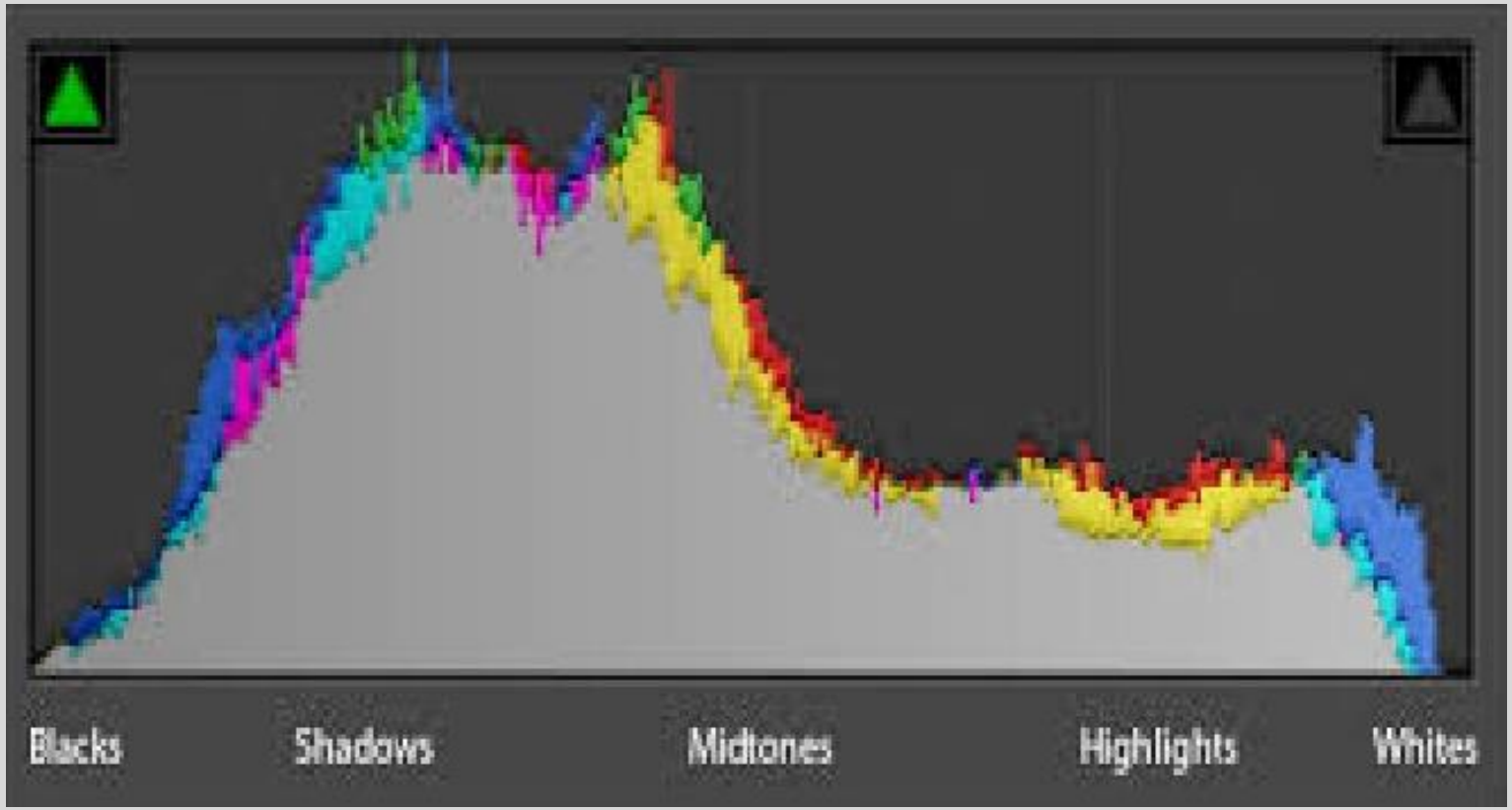


Nikon's spot metering symbol at left with Canon's at right.

Key buttons and features: Exposure Compensation



Key buttons and features:
An introduction to the Histogram



The histogram is a super tool for indicating good exposure.

With your histogram, you want to avoid having the graph touch either the left (dark) or right (light) sides of the histogram.

Key buttons and features:
Exposure/Focus Lock

Using the Exposure and Focus Lock button at the back of your camera, you can get the right exposure (especially in difficult lighting situations such as when your subject is backlit) and also focus, and by keeping the button pushed you can re-compose your shot.

Many photographers prefer to use “Back Button” focus and use the shutter release on the front solely for firing the shutter.

Key buttons and features: Focussing Modes

- **AF- S: Auto focus <u>Single Mode</u>**
  - Takes a single shot. Good for fairly stationary subjects (ex. landscapes, a model shoot)

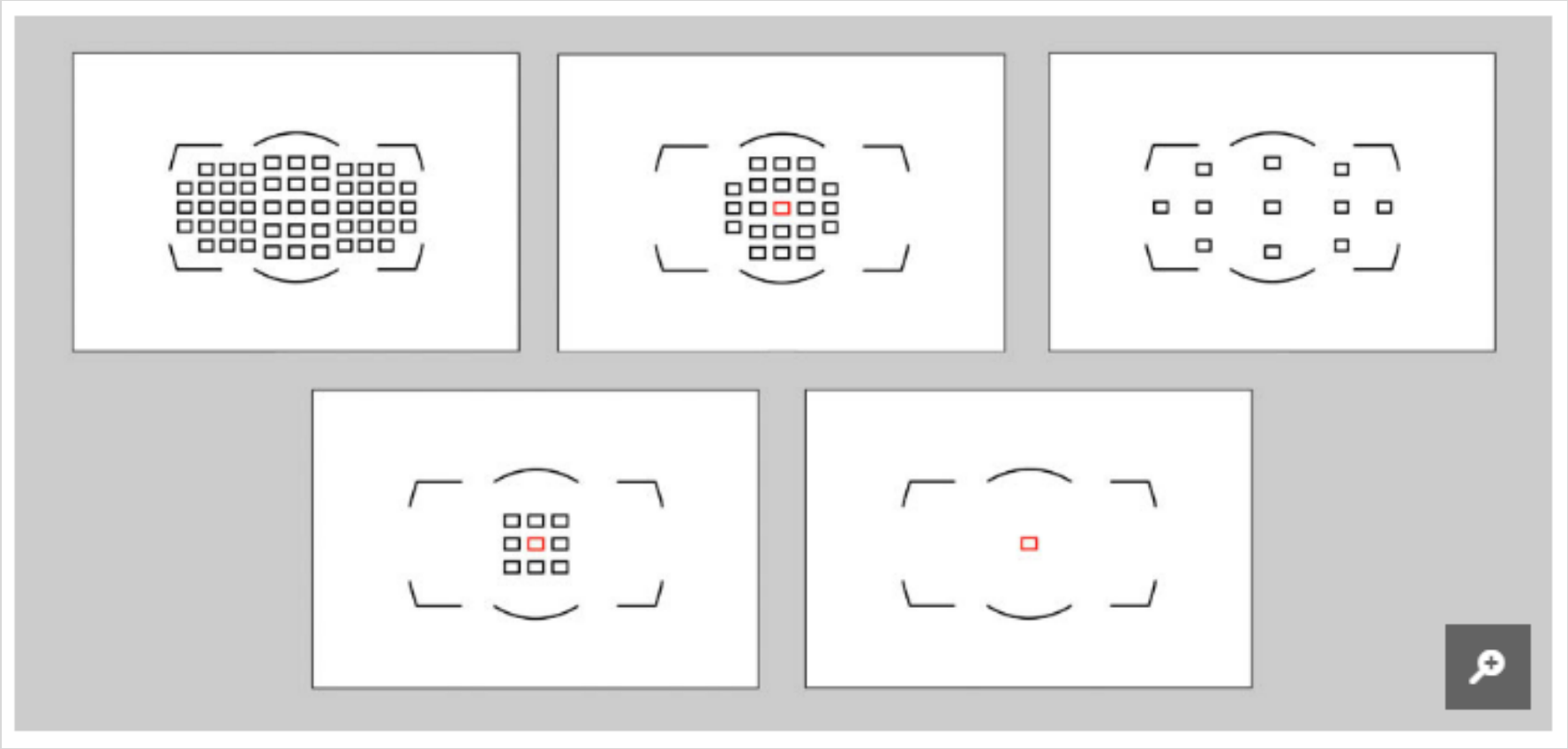
- **AF- C (Servo): Auto focus <u>Continuous Mode</u>**
  - Takes a series of shots and “tracks” the subject. Good for active children, pets and sports

- **AF- A: Auto focus <u>Auto Mode</u>** (not found on all cameras)
  - The camera decides whether singe mode or continuous mode is most appropriate. Few higher end cameras have this mode, and many photographers choose never to use this mode.

- **<u>M: Manual Mode</u>**
  - The photographer has complete control over focussing. Good for macro photography as well as still subjects, including architecture and landscapes.

Key buttons and features: Focus Points

Example of Nikon's 51 focus points on some of their higher end cameras



FYI: Some notes on JPEG vs. RAW

Most cameras allow photographers to choose to shoot JPEG only, RAW only, or both JPEG and RAW for each image. These variations can usually be set up by scrolling through the Menus on the LCD.

- JPEGs are compressed images, therefore there is a loss of some details.
- JPEGs are smaller in size so you can put more images on an SD card.
- JPEGs are easily transferred and can easily be shared with other media (ex. cell phones).
- JPEGs are more visually appealing "out of the camera".
- JPEGs do not enlarge as well as RAW files and JPEGs loose detail when "blown up big".

RAW images are like a complete digital negative.

RAW image file are much larger and eat up SD card space.

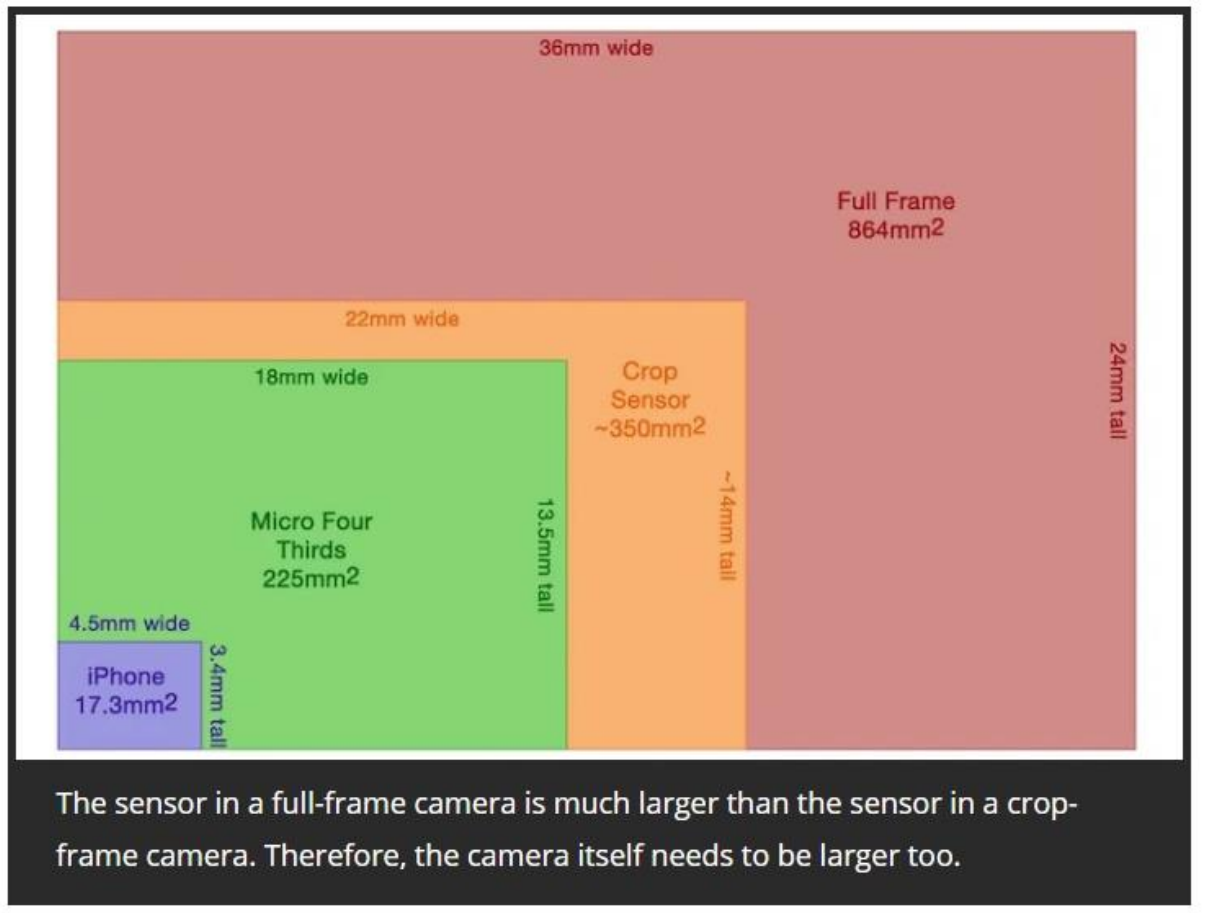
RAW images **must** be post-processed.

RAW files can more easily be "fixed" in post-processing (ex. correcting white balance, exposure, etc.)

RAW files need to be converted to JPEGs in order to share the image easily with others.

Sensor size matters: Full frame vs. Crop sensor (APS-C) vs. micro 4/3 (MFT)

- **Comparison of Sensor Sizes**



The sensor in a full-frame camera is much larger than the sensor in a crop-frame camera. Therefore, the camera itself needs to be larger too.

Sensor size matters: Full frame vs. Crop sensor (APS-C) vs. micro 4/3 (MFT)

- Example image illustrating different sensor size comparison:

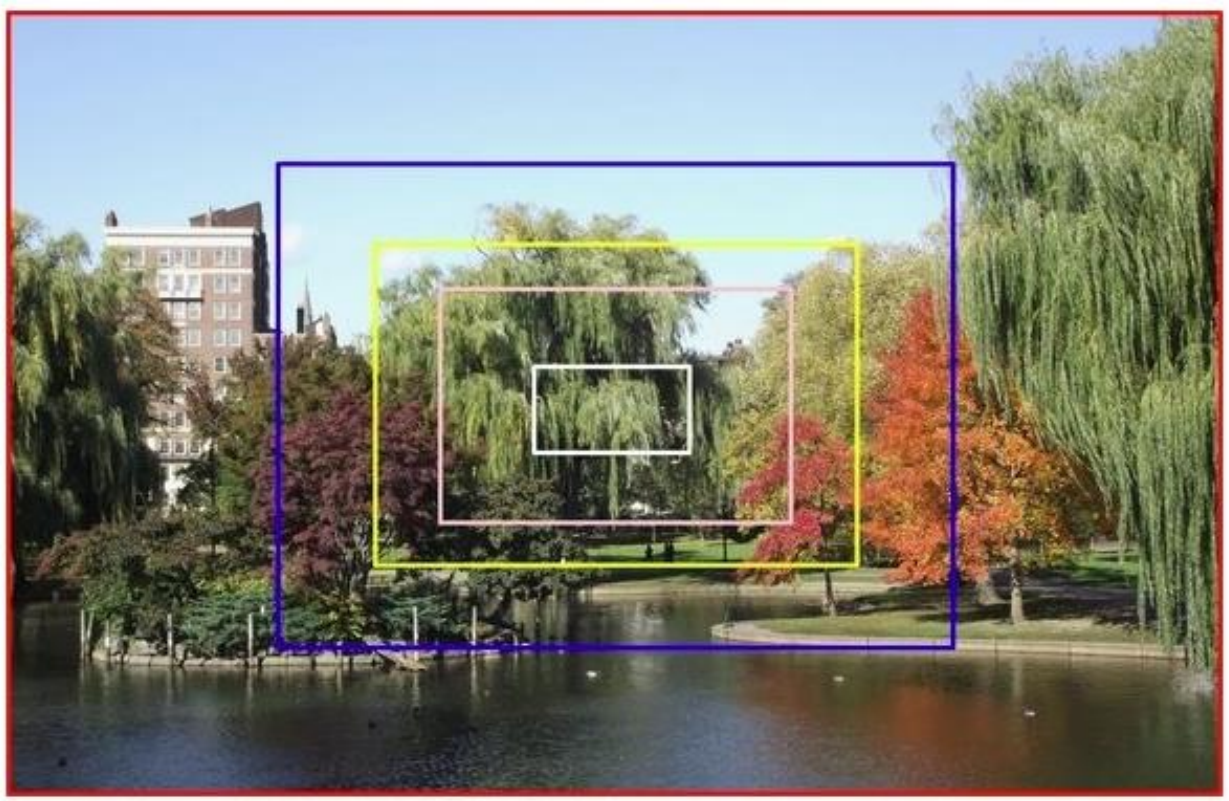
Red: Full frame

Blue: APS-C

Yellow: MFT

Pink: Superior compact (1” sensor)

White: Basic compact



This image does not show the exact ratio of one image sensor compared to another.

This depiction is for general comparison purposes only.

Crop Factor:
What size of sensor does your camera have?

Sensor	CROP FACTOR (multiplier)	Example: 50 mm lens Equivalencies
Full frame	1x	50mm
APS-C	1.5x (Canon: 1.6x)	75 mm (80mm with a Canon)
MFT	2x	100mm

Crop Sensor (APS-C) vs Full Frame

APS-C 15mm (= 22.5 mm equivalent)

Full frame 14mm

Crop Sensor (APS-C) vs Full Frame

APS-C 30mm (= 45mm equivalent)

Full Frame 30mm

Crop Sensor (APS-C) vs Full Frame

APS-C 50mm (= 75mm equivalent)

Full frame 50mm

Crop Sensor (APS-C) vs Full Frame

APS-C 100mm (= 150mm equivalent)

Full frame 100mm

Crop Sensor (APS-C) vs Full Frame

APS-C 200mm (= 300mm equivalent)

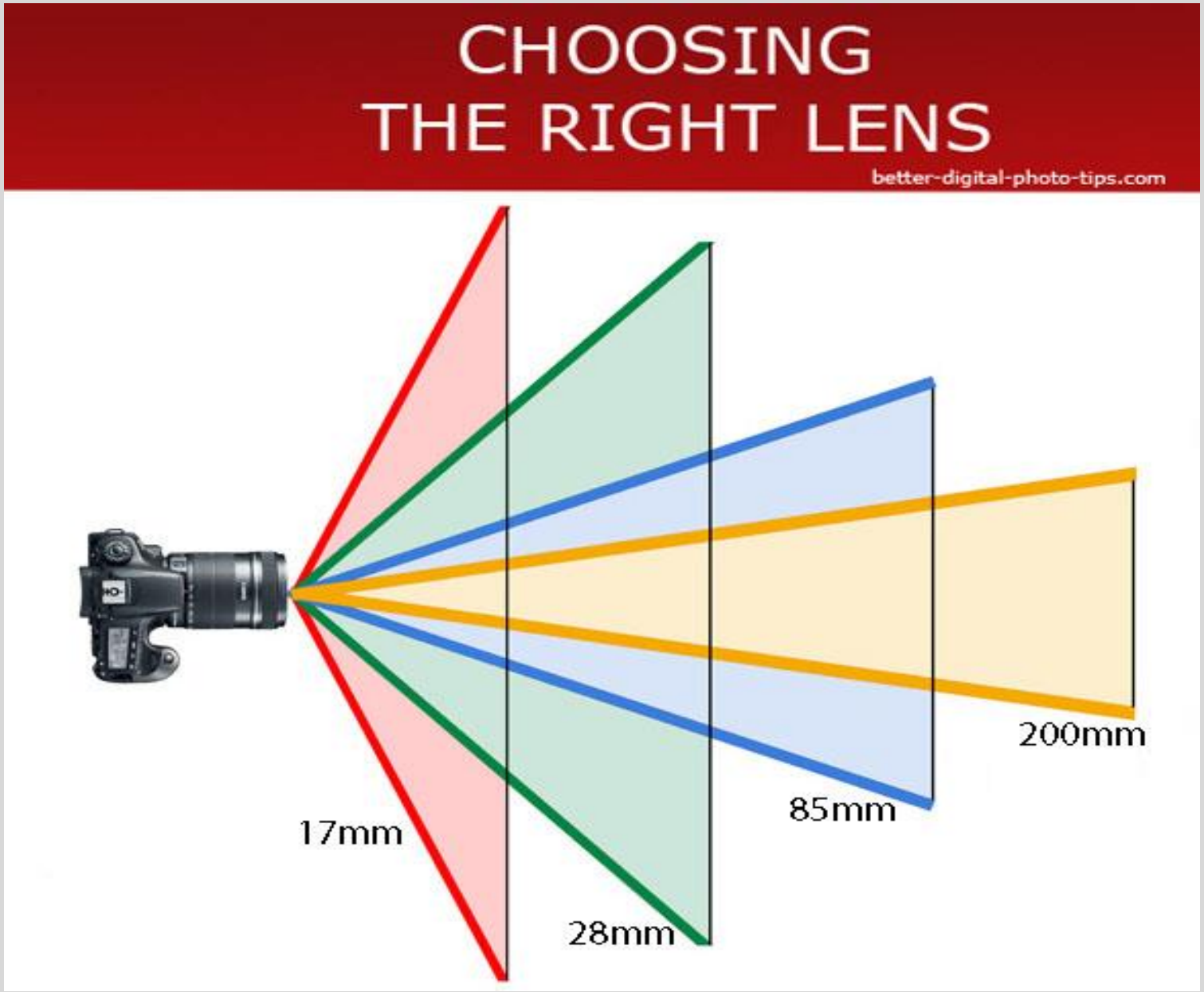
Full Frame 200mm

Crop Sensor (APS-C) vs Full Frame

APS-C 300mm (= 450mm equivalent)

Full frame 300mm

Field of View



Field of View:
Crop Sensor (APS-C) vs Full Frame

APS-C 300mm (= 450mm equivalent)

Full Frame 14mm

Hands-on Activity #2

#1: Set camera to Shooting Mode to Aperture Priority (A or Av). Set Aperture to f5.6 with ISO 400. **What is your Shutter Speed?**

#2: Set your Shooting Mode to Program. Aim at a subject and note the value (-1, 0, #1, etc.) Exposure Compensation value. Now set the Shooting mode to Manual. Set Aperture to f11, Shutter speed to 1/125 and ISO to 400. **What has happened to your Exposure Compensation indicator?**

#3: Set your Metering Mode to Matrix (or Evaluative) metering and point at a subject. Note the exposure values. Set your metering mode to Spot Metering and aim at the same subject. Note the exposure values**. Was there a difference in the exposure values between using Matrix and Spot metering?**

#4: Boost your ISO up to 1600 and use Auto focus Single (AF-S) and use the Exposure/Focus lock button to focus and recompose. Click the shutter. **Did you successfully "focus and re-compose"?**

#5: **Does your histogram from image taken the Activity #4 above touch either side of the graph?**

#6: Set camera to shoot JPEG only; then set to shoot RAW only images. **Which setting do you think you will use most often?**

“Next step” Photo Accessories

- **Tripod**
- **Cable Release or Shutter Remote**
- **Filters**
  - UV protective filter for lenses
  - Circular Polarizer
  - ND filters
  - Graduated filters
- **Flash**

Sources

- Link to Camera Parts
- https://snapshot.canon-asia.com/article/en/lesson-2-knowing-the-different-parts-of-the-camera
- Film Strip
- http://www.easybasicphotography.com/35mm-equivalent.html
- Crop sensor Comparison Diagram to Scale
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- http://www.easybasicphotography.com/35mm-equivalent.html
- JPEG vs. RAW
- https://www.slrlounge.com/workshop/dynamic-range-and-raw-vs-jpeg/
- Exposure Compensation
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- Histogram
- https://photographylife.com/understanding-histograms-in-photography
- Auto focus and Focus Points
- https://omnilargess.com/understanding-auto-focus-modes/2015