



PHOTOGRAPHY -101

By Shiva Chiluveru

How digital cameras work

- At the most basic level, a digital camera works much the same as a film-camera
 - The camera captures images through a series of lenses that bounce light off a subject.
- Where digital cameras differ is in the image processing
 - Film cameras process images chemically... you don't even need electricity to operate a camera!
 - Digital cameras convert images into a series of 0's and 1's that represent the tiny colored dots, or *pixels*, that make up the image.
 - The number of pixels a digital camera can copy makes up the camera's *resolution*.

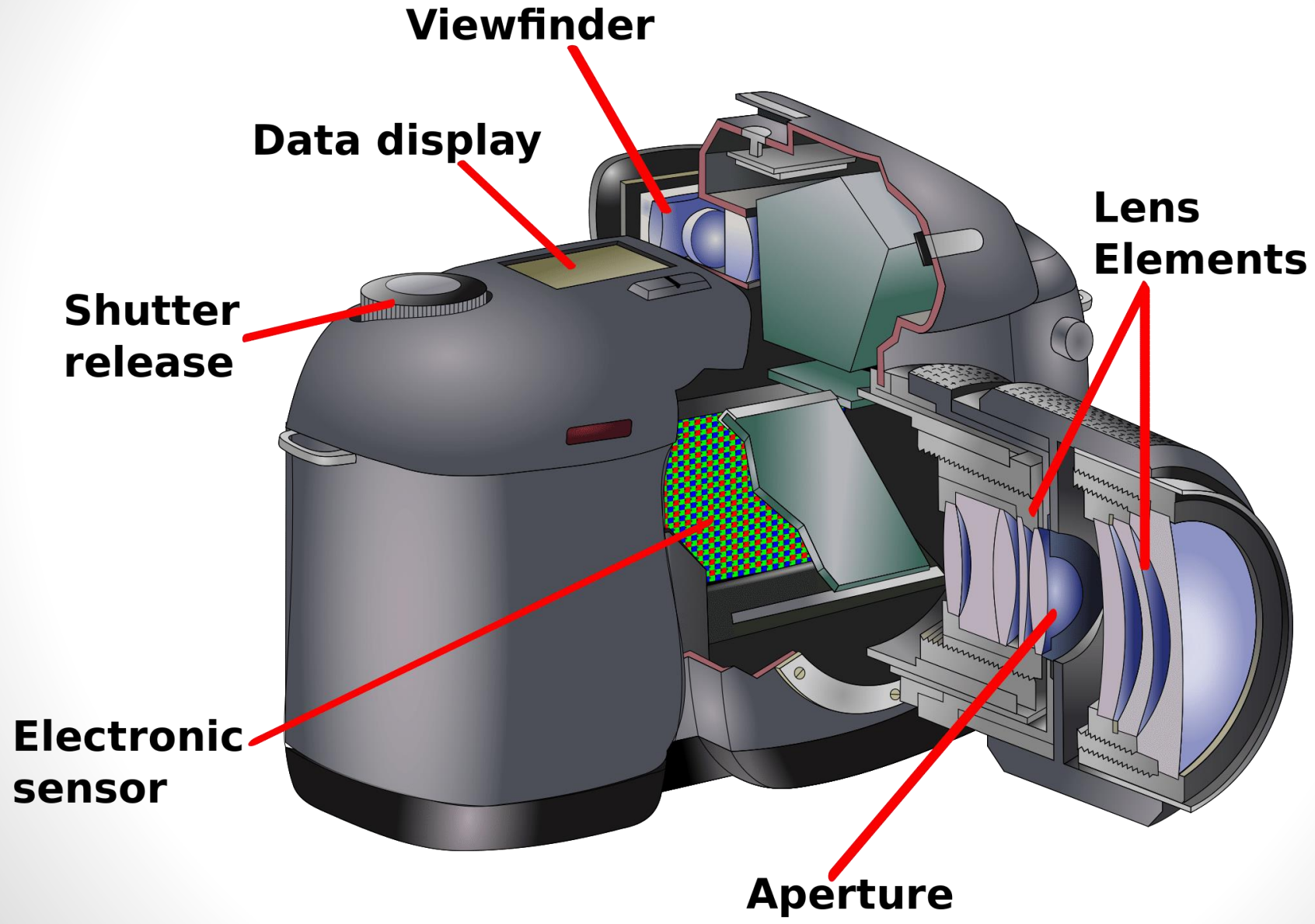
Parts of the camera



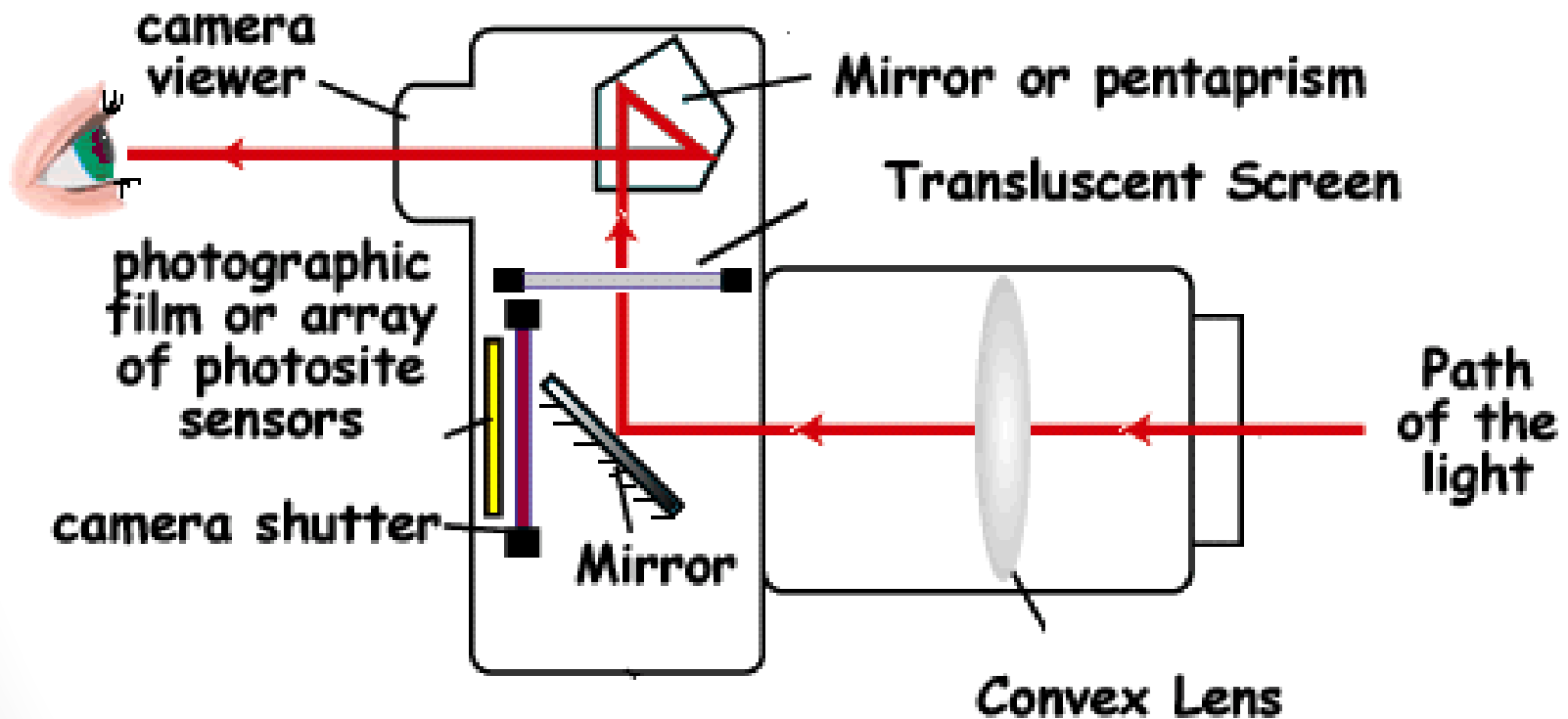
Parts of the camera



Parts of the camera



Parts of the camera



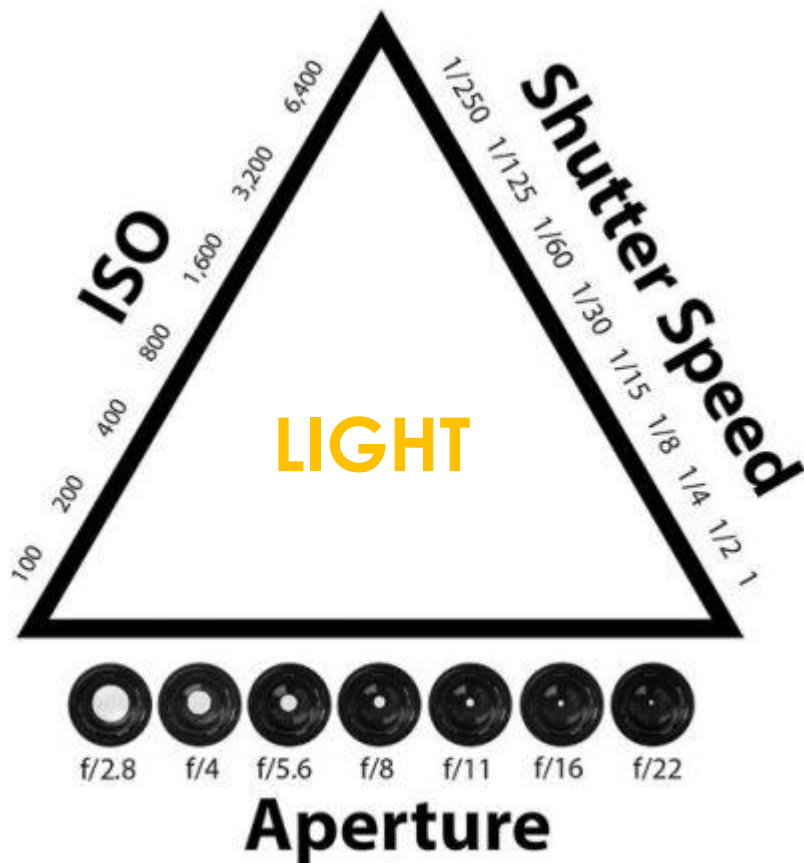
Some Photography BASICS

Camera Controls and How They Affect Your Image

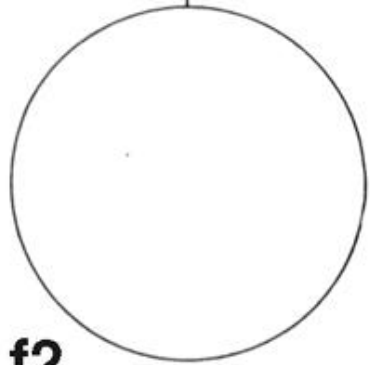
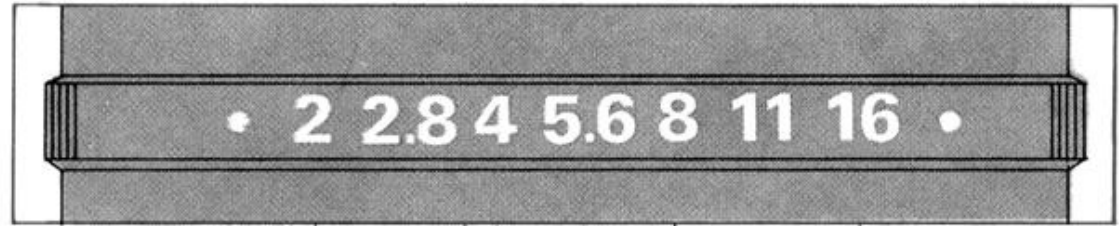
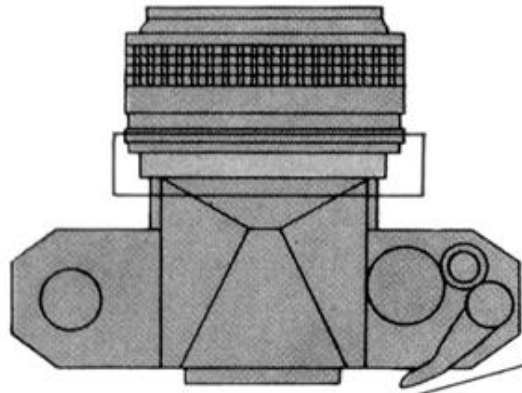
- 1. Aperture/ F-Stop** - how much light is seen,
how much the aperture is open
- 2. Shutter Speed** - how long the light is seen in the aperture
- 3. ISO Sensitivity / FILM SPEED** - how fast the film itself responds
to this light

Some Photography BASICS

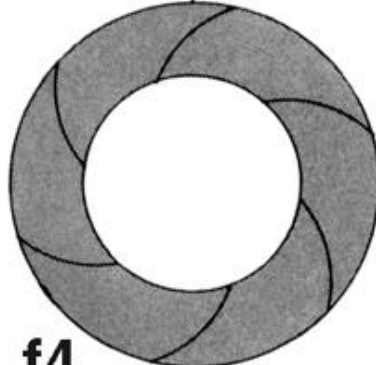
Camera Controls and How They Affect Your Image



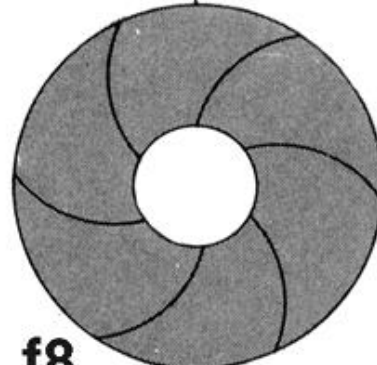
Aperture



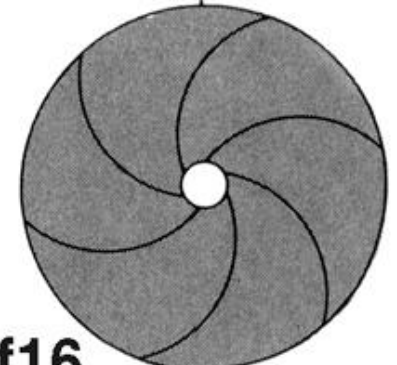
f2



f4

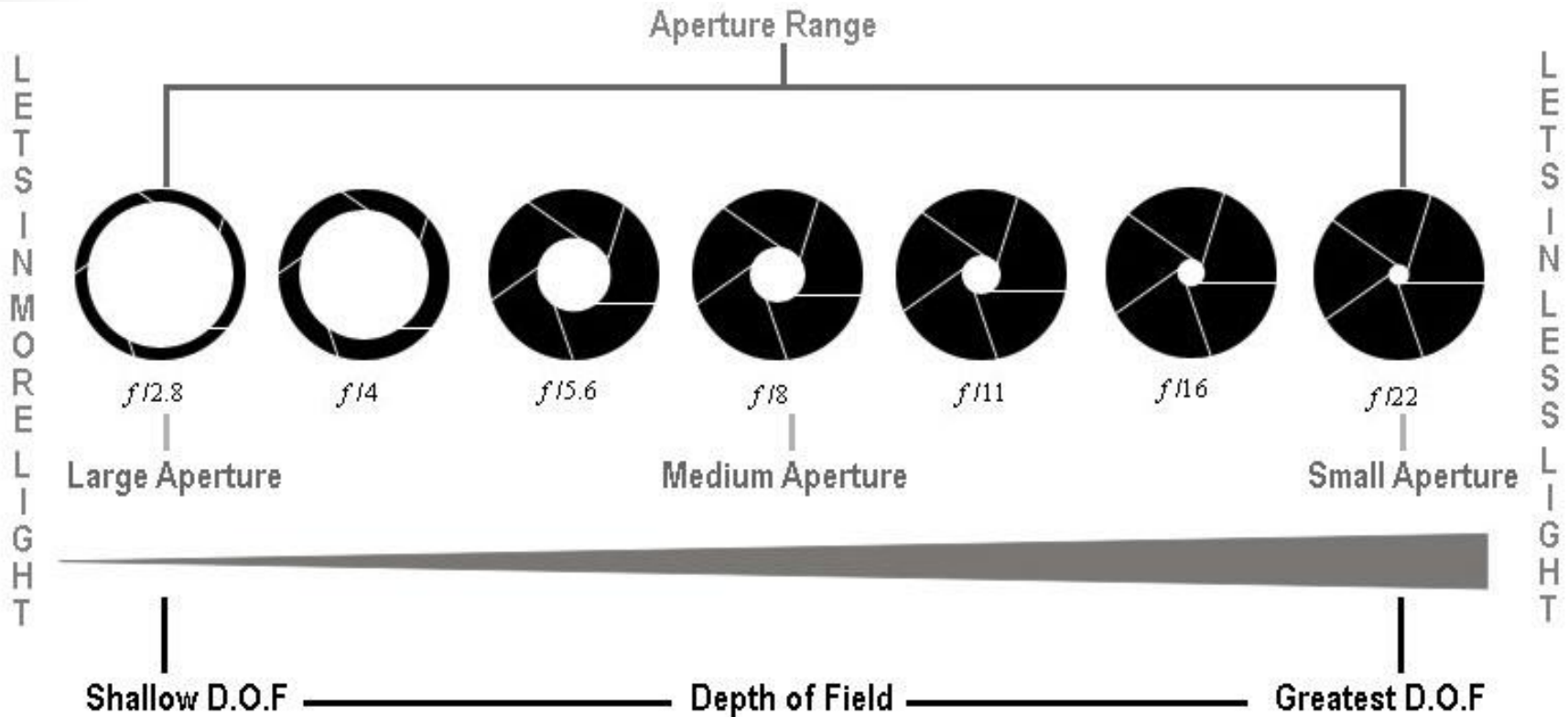


f8



f16

A Tiny aperture like $f/22$ doesn't let in much light, but it does give you sharp focus over a wide range of distances: wide "Depth of Field"



Aperture / F-STOP IMPACT

Low F-stop say **f2.8**



High F-stop say **f8**



ISO Setting

- This number quantifies how sensitive is the film or chip to recording light.
- Low ISO setting means it'll take more time to record a given amount of light, but it'll do so with less digital noise
- ISO=6400 records lots and lots of stars, but the pixel-to-pixel noise will be higher. It'll look much more “grainy”
- For situations where there's plenty of light, use low ISO to get better pictures

ISO Setting



ISO 80

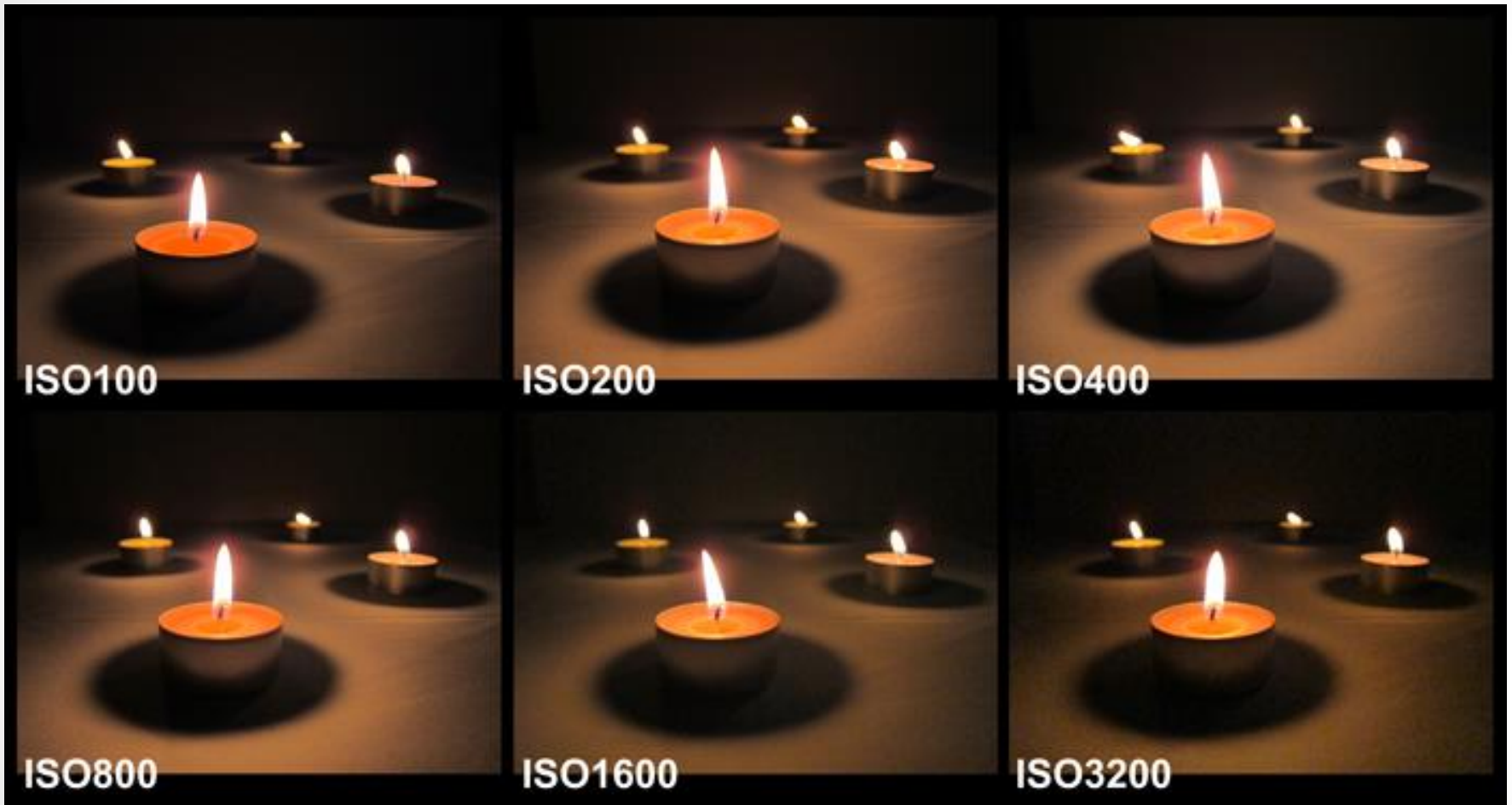


ISO 800



ISO 1600

ISO Setting



SHUTTER SPEED

MEASURES HOW LONG LIGHT IS LET INTO THE FILM/CAMERA

- Common values include $\frac{1}{2}$ sec, $\frac{1}{8}$ second, $\frac{1}{1000}$ second etc
- Shorter time means less time for light to get into the camera
- Shorter time reduces blurriness

SHUTTER SPEED

FASTER SPEED

ADVANTAGES

- Reduces blurriness as image is 'seen' only briefly – great for sports events.

DISADVANTAGES

- Less time for light to enter camera
- Requires bright conditions

SHUTTER SPEED

SLOWER SPEED

ADVANTAGES

- Great for darker conditions (more time for light to enter the camera)

DISADVANTAGES

- Increased chance of blurriness
- Often requires a tripod be used for steadiness.

Shutter Speed=1/15 of a Second



Shutter Speed=1/150 of a second



Modes of camera



Auto Mode

The camera will automatically try and choose the best possible settings. In auto mode, there's no need to mess with any of the settings. Just point and shoot.



Portrait Mode

Keeps your subject sharp while creating a beautifully blurred background



Landscape Mode

Designed for capturing sweeping vistas or huge crowds. In this mode, your camera increases the Aperture f-stop number in order to maximize depth of field. Objects both near and far will be in sharp focus



Child Mode

In this mode, clothing and backgrounds are colorful while keeping skin tones soft and natural looking. Shutter speed is also increased to capture kids who are a bit more wiggly



Aperture Priority

This is a semi-automatic mode that allows you to choose the aperture yourself. The camera will automatically set the shutter speed that will produce the proper exposure. The semi-automatic modes are a great place to start when you're first venturing out from full automatic



Shutter Priority

Allows you to choose the shutter speed yourself. The camera will automatically select the aperture (f-stop) that will produce a proper exposure



Program AE Mode

The camera sets the shutter speed and aperture but you control flash, white balance, ISO, etc...

Modes of camera



Sports Mode

The camera uses a faster shutter speed to capture fast-moving objects. Essentially allowing you to "freeze" action scenes.



Close Up Mode

The camera uses a smaller aperture to improve depth of field. Perfect for macro shots, close-ups of flowers, insects, and other objects



Night Portrait Mode

The camera uses a slower shutter speed and flash to capture more light. Useful in low light situations. But use a tripod to avoid camera shake



Manual Mode

This is designed for experts who want complete control over their camera settings. In this mode, you choose the shutter speed, aperture, and ISO



No Flash

Same as full auto mode, but with flash disabled



Creative Auto

Same as full auto mode, but with a little more control over focus, exposure and color



Movie

Allows you to record video



Learning the lingo

Here are some of the basic digital camera terms we'll be using throughout the presentation:

Resolution: Refers to the number of pixels a digital camera can capture. Can be stated as either *3 mega pixel*, *3 MP*, or *2048 x 1536*. Resolution is the most common term used to differentiate digital cameras.

Aperture: Refers to the size of the opening of the lens and how much light gets to the digital camera sensor.

Shutterspeed: Refers to how long the sensor is exposed to light.



Learning the lingo

ISO stands for **International Standards Organization**, and it is a standardized industry scale for measuring sensitivity to light. This can be used in relation to how sensitive camera film is to light, but more commonly today, it pertains to the sensitivity of a digital image sensor

Memory: How a camera stores images. Can be internal and external. Also referred to as *storage*.

Zoom: How the camera “zooms” in on an object. Can be either *digital* or *optical*.

White balance: Tells the camera what elements of a photo should look white, and, in turn, what should look black and all colors in between. Can be automatic or manual.

Learning the lingo

LCD: Short for Liquid Crystal Display. It is the screen on the back of most digital cameras that allows you to preview photos.

File format (type): Refers to the type of digital file the camera will save images as. Most common are .jpeg, .tiff and RAW.

File size: Refers to the size of each photo taken. This will vary based on *resolution* and *file format*.

Learning the lingo

Bracketing – taking a series of images at different exposures or EV. You may see a setting on your camera that says AEB (auto exposure bracketing).

This is often used when creating HDR images or in difficult lighting situations where you may want to have a range of exposures from light to dark.

Bulb – the “B” setting on your camera where the shutter remains opened as long as the button or cable release (remote trigger) is pressed.

On a Canon it may be on your mode dial on top of the camera, or at the low end of the shutter speed settings (also where it is on a Nikon)

Learning the lingo

DSLR – digital single lens reflex camera. Any digital camera with interchangeable lenses where the image is viewed using a mirror and prism, and the image is taken directly through that lens. What you see in your viewfinder is what the lens sees.

Exposure compensation – modifying the shutter speed or aperture from the camera's recommended exposure to create a certain effect (over or under exposing) – usually used in the Shutter Priority or Aperture Priority modes.

Represented by a little +/- button on your camera. Your camera reads light bouncing off your subject and is designed to expose for medium grey.

Learning the lingo

Exposure – the total amount of light reaching the digital sensor. It is controlled by setting the aperture, shutter speed and ISO.

F-stop – is a measure of the aperture opening in the lens 1, 1.4, 2, 2.8, 4, 5.6, 8, 11, 16, 22, etc. just remember that each step is double the amount of light.

Depth of Field - is a photography term that refers to how much of the image is in focus. The camera will focus on one distance, but there's a range of distance in front and behind that point that stays sharp—that's depth of field. Portraits often have a soft, unfocused background—this is a shallow depth of field. Landscapes, on the other hand, often have more of the image in focus—this is a large depth of field, with a big range of distance that stays sharp.

Learning the lingo

Zoom lens – any lens that has variable focal lengths such as a 24-70mm or 18-55mm. You zoom in or out by rotating the barrel of the lens.

Prime or fixed lens – any lens that does not zoom and is a set focal length such as a 50mm lens

Remote trigger or digital cable release – a device that allows the camera to be fired without pressing the button or touching the camera. Helps eliminate movement of the camera during long exposures.

Macro lens – one that focuses very close to the subject allowing for 1:1 reproduction size of the object or larger.

Learning the lingo

“Normal” lens – generally a 50mm lens (on a full frame sensor camera) is considered to be a “normal” lens because it is closest to what the human eye sees. If you have a cropped sensor that will be closer to 35mm.

Telephoto lens – simply stated a telephoto lens is one that is longer than a normal lens, eg., 70-300mm. A lens with a longer focal length than standard, giving a narrow field of view and a magnified image. Super telephoto is usually 300mm and longer lenses.

Wide angle lens – again simple answer is a lens that shows a wider field of view than a normal lens, which allows more to be fit into the frame. Depending on the degree of wide angle there may also be edge distortion (super wide angle), and if you get wide enough the image will become a circle (fish-eye).

Learning the lingo

File format jpg versus RAW – most DSLR's have the ability to shoot both formats. If you choose JPG, the camera will shoot a RAW file, process it using the picture style you've selected in your menu, save it as a JPG and discard the RAW version. If shot in RAW the resulting file will be larger, carry more information and require software to process. It gives you the photographer more control over the final look of your image.

Full frame vs cropped sensor –A full frame sensor is roughly the size as the “old” 35mm frame of film. Lenses are made to create a circle of light just large enough to cover that area. In a cropped sensor camera the physical size of the sensor is smaller so it only captures a portion of the entire image the lens is projecting, effectively cropping part of the image out.

Learning the lingo

Camera modes –

Manual: full manual the user is setting the ISO, shutter speed and aperture.

Shutter priority (Tv on a Canon or S on a Nikon) the user is selecting ISO and shutter speed, the camera is then choosing the aperture to make a correct exposure.

Aperture priority (Av for Canon users, A for Nikon) the photographer selects the ISO and aperture and the camera picks the shutter speed.

Lighting and Portrait Photography Terms

Ambient light – also referred to as available light, is the light that is occurring in the scene without adding any flash or light modifiers. This could be daylight, or man made light such as tungsten or fluorescent bulbs.

Main light or key light: is the main light source for a photograph. It could be the sun, a studio strobe, a flash, a reflector or something else. But it is the source of light that is producing the pattern of light on the subject with the most intensity.

Fill light: is the light source that is secondary to the main light. It is used to “fill” in the shadows to a desired degree. It can be produced by using a flash, a reflector, or a studio strobe.

Lighting and Portrait Photography Terms

Lighting pattern: this is the way the light falls on the subjects face. A particular pattern of light and shadow that is created.

Lighting ratio: is a comparison between the intensity (brightness) of the main light and the fill light and thus the difference of the lit and shadow sides of the subject's face.

Incident light meter: is a handheld device separate from your camera that measures the amount of light falling on a subject (as opposed to the reflective reading your camera takes which is light bouncing off the subject back to the camera). The incident meter is not fooled by the brightness range of the subject, where as in camera reflective meters can be fooled.

Lighting and Portrait Photography Terms

Speedlight (speedlite for Canon users): small portable flash which can attach to your camera's hot shoe, or stand alone if activated remotely.

Reflector – a device that is used to reflect light, generally back towards the subject. It can be a specialized factory made reflector (I recommend getting a 5-in-1 if you get one) or as simple as a piece of white cardboard.

Light meter – a device that measures the amount of light in a scene. Your DSLR has one built in, it uses reflective readings (light bouncing off the subject coming back through the lens [TTL])

Lighting and Portrait Photography Terms

Remote flash trigger – a device used to fire Speedlight's off camera. Pocket Wizard is a popular brand.

Subtractive lighting – as the name implies it is the taking away of light to create a desired affect. Commonly it involves holding a reflector or opaque panel over the subject's head to block light from above and open up deep eye shadows cause by overhead lighting. It can also mean holding a black reflector opposite your main light to create a deeper shadow, in essence reflecting black onto the subject instead of light.

Hard light – harsh or undiffused light such as produced by bright sunlight, a small Speedlight, or an on-camera flash. It produces harsh shadows with well defined edges (edge transfer), contrast, and texture (if used at an angle to the subject). Emphasizes texture, lines and wrinkles, and used to create a more dramatic type of portrait (character study).

Lighting and Portrait Photography Terms

Soft light – diffused light such as from an overcast sky, north facing window with no direct light, or a large studio soft box. This type of light produces soft shadows with soft edges, lower contrast, and less texture. Generally preferred by most wedding and portrait photographers as it flatter the subject more.

Edge transfer – where the light turns into the shadow, the edge transfer is how quickly it goes from dark to light. If using harsh light the edge transfer is very defined and sudden, almost a clear line. When using soft lighting the edge transfer will be much more subtle, almost imperceptible as it gradually changes from light to dark.

Flash sync – simply put is the synchronization of the firing of an electronic flash and the shutter speed. You need to know what shutter speed your camera syncs at, otherwise if you shoot too fast a shutter speed you may get a partially illuminated image. For most cameras that is around 1/200th of a second, but it can be adjusted if you have a flash that can be set for fast speeds.

THANK YOU

