



## Basic Camera Operation

### The Exposure Triangle



Each of the three aspects of the triangle relate to light and how it enters and interacts with the camera.

The three elements are:

1. **ISO** – the measure of a digital camera sensor’s sensitivity to light
  - a. High ISO 400 records more light - **grainier**
  - b. Low ISO 100 records less light – less grain, **sharper**
2. **Aperture** – the size of the opening in the lens when a picture is taken
  - a. Large aperture = large opening = small number = more light = **smaller depth of field**
  - b. Small aperture = small opening = large number = less light = **longer depth of field**
3. **Shutter speed** – the amount of time that the shutter is open.
  - a. Fast lets in less light – **freezes action**
  - b. Slow lets in more light – **shows blur**

# ISO and Light

ISO = International Organization for Standardization

ASA = Adaptive Scheduling Algorithm

**-In digital photography:** ISO measures the sensitivity of the image sensor.  
The lower the number the less sensitive your sensor is to light and the finer the grain.

**High ISO settings:** (lets in more light)

**Use:** -in darker situations  
-to get faster shutter speeds and a smaller aperture (total scene in focus)  
-will result in **noisier** shots (more **grain**).

**Low ISO settings:** (lets in less light)

-in brighter situations  
-to use slower shutter speeds and a wider aperture (shorter depth of field to blur the background)  
-to get crisp shots (less noise or grain)

**When choosing the ISO setting, ask:**

**-Light:** Is the subject well lit?  
-Higher ISO absorbs more light  
-Lower ISO absorbs less light  
**-Grain (Noise):** Do I want a grainy shot or one without noise?  
-Higher ISO is grainier  
-Lower ISO is sharper with less grain

## **Noise Reduction Functions (Digital SLR)**

**Long exposure noise reduction**

-The camera takes a second blank frame following the actual exposure. This more or less doubles the time of the exposure. Any noise recorded on the second exposure is then automatically subtracted from the first exposure theoretically eliminating all noise.

**High ISO noise reduction**

-This function helps to reduce noise when you are shooting at ISO settings higher than 400.

**-Tripod:** Will I be using a tripod to minimize camera shake.

-Lower ISO absorbs less light requiring a slower shutter speed.

**Shake ratio = 1/aperture**

If using a 50 mm lens, shoot at 1/50 second or faster to eliminate camera shake.

**-Moving subject:** Is my subject moving or stationary?

-Fast moving subject requires a faster shutter speed (which absorbs **less** light) to freeze the action which may require a lower ISO to absorb **more** light.

## Aperture and Light

**Aperture:** the size of the opening (**hole**) in the lens when a picture is taken.

- small aperture = small hole, larger f number, and less light.
- large aperture = large hole, smaller f number, and more light.

Measured in “**f-stops.**” Approximately the sequence of the powers of  $\sqrt{2}$  (1.414):

- Large aperture** f/1.4, f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22, f/32 **Small aperture**
- moving from one f-stop to the next doubles or halves the size of the amount of opening in your lens and the amount of light entering your lens.

**Results of changing aperture:**

- Depth of field** (the amount of depth that is **in focus**)
- Large aperture** f/4 = small number = smaller depth of field = less in focus
  - flower/portrait photography
  - blurs the background and isolates the subject from the background
- Small aperture** f/22 = large number = larger depth of field = more in focus
  - landscapes
  - everything in complete focus

## Shutter Speed and Light

**Shutter Speed:** the amount of time that the shutter is open.

- the length of time that your image sensor “sees” the scene you are attempting to capture.

Measured in **seconds**, or in most cases, **fractions of seconds**.

- the larger the denominator the faster the speed (1/1000 is much faster than 1/30)
- Fast** 1/1000, 1/500, 1/250, 1/125, 1/60, 1/30, 1/15, 1/8, 1/4, 1/2, 1 **Slow**
- moving from one speed to the next doubles or halves the amount of light entering your lens.
- some cameras will give you the option for very slow shutter speeds of up to 30 seconds.
- “**B**” or **bulb** lets you keep the shutter open for as long as you hold it down.

**Results of changing shutter speed:**

- Fast shutter speed:** **freezes** the image.
- Slow shutter speed:**
  - may cause **camera shake**.
    - you can generally hand hold a camera with a shutter speed faster than **1/focal length** of your camera.
    - eg. If you shoot using a 100 mm lens then you can hand hold with minimal camera shake at a shutter speed of 1/100 second.
    - longer focal lengths will require faster shutter speeds to avoid camera shake.
  - may **blur** the image to creatively show **motion**.

## Aperture and Shutter Speed Relationship

(more light) f/1.4, f/2, f/2.8, f/4, f/5.6, **f/8**, f/11, f/16, f/22, f/32 (less light)  
(less light) 1/1000, 1/500, 1/250, 1/125, 1/60, **1/30**, 1/15, 1/8, 1/4, 1/2 (more light)

Use **shutter priority** to capture movement.

Use aperture priority to control depth of field.

To control shutter priority and/or aperture priority on an **entry level point and shoot**:

1. Upgrade your camera.
2. Trick your camera. (For full details see “**Digital Camera Modes**” below)
  - a. For a shallow depth of field use Portrait mode.
  - b. For a wider depth of field use Landscape mode.
  - c. For a fast shutter speed choose Sports mode to freeze fast moving subjects.
  - d. For a slow shutter speed choose Night mode and cover your flash.

## Metering Modes

**Evaluative or Matrix Metering**: Averages the light in the scene. Best choice for most situations.

**Center Weighted Metering**: When the main subject is in the middle of the frame.

**Spot Metering**: Use in high contrast situations.

## Exposure

**Light** is the **key** to great shots.

-Overhead mid-day light is flat.

-Early morning and before sunset (the **golden hours**) provide lovely warm colours and more cross lighting resulting in more drama and impact to the photo.

## Digital Camera Modes

### Fully Automatic Modes

#### **Automatic Mode**

Camera uses it's best judgment to select shutter speed, aperture, ISO, white balance, focus and flash to take the best shot that it can.

-Camera is “guessing.” The camera is not creative.

-You aren't giving it any extra information.

-Gives nice results much of the time.

#### **Portrait Mode**

Best for a head and shoulders shot of an individual

-Isolates the subject from the background

-By blurring the background

-Sets a narrow depth of field

-Large aperture (small number)

## **Landscape Mode**

Best for wide angle scenic shots (Exact opposite of portrait mode)

- To have as much of the scene in focus as possible
- Small aperture (large number)
- May use a slow shutter speed (consider a tripod)

## **Macro Mode**

Best for flowers and other small objects up close

- Sets a very narrow depth of field
- Large aperture (Small number)
- Use a tripod
- Keep your camera and subject as parallel as possible
- Don't use your flash. May burn out subject

## **Sports Mode**

Best for photographing any moving objects

- Attempts to freeze the action
- By increasing the shutter speed
- Pan with the fast moving subject
- Pre-focus on a spot where the subject will be

## **Night Mode**

Best for photographing in low light situations

- Uses a long shutter speed to show background detail
- Fires a flash to illuminate the foreground subject
- Use a tripod

## **Movie Mode**

Best for photographing moving images

- Quality is poorer than a video camera
- Use significantly more memory space

## **Semi-Automatic Modes**

### **Aperture Priority**

Best for you controlling the depth of field

- You choose the aperture and your camera chooses the other settings
- Small aperture (large number) lets less light in
- Gives a larger depth of field (more in focus)
- Slower shutter speed (tripod)
- Large aperture is the opposite

## **Shutter Priority**

Best for you controlling the shutter speed

- You choose the shutter speed and your camera chooses the other settings
- Fast speed to freeze moving objects
- Slow speed to capture motion blur (waterfall)

## **Program Mode**

Best for you controlling a bit more than in Auto Mode

- Similar to Auto
- Rotate command dial to alter shutter speed and f stop combinations

## **Fully Manual Mode**

### **Manual**

Best for you to have complete control over your camera

- Allows you to set up your shots as you wish
- To be more creative
- Must have a good understanding of how a camera works

## **How to Hold a Digital Camera**

**Camera Shake:** Blurry pictures often occur because the camera was not held correctly while the shutter was depressed.

### **Causes of camera shake:**

1. Holding the camera at arms length.
2. Holding the camera with one hand.
3. Jerking the shutter.
4. Bobbing when you release the shutter.

### **Solutions to camera shake:**

1. Grip the **right hand** side of the camera with your right hand.
  - place your forefinger lightly above the shutter release
  - place your other three fingers curling around the front of the camera.
  - your right thumb will grip onto the back of the camera.
2. **Left hand:** should **support** the weight of the camera by sitting under the camera or under/around a lens if using a DSLR.
3. Use your **elbows** as a tripod against your stomach. Just lean the camera a little away from your face if using the LCD.
4. Use a **tripod**, bean bag or lean against something solid like a tree or telephone pole.
5. **Breath properly:**
  - take a gentle but deep breath, hold it, then take the shot and exhale, or
  - exhale and before inhaling again take the shot.
6. **Other techniques:** faster shutter speed, image stabilization lenses.

# LCD or Viewfinder

## Why use the LCD to compose shots:

1. **Size:** digital cameras have very small view finders compared with the LCD.
2. **Instant playback:** You can immediately see the shot you've taken.
3. **Creativity:** You don't have to have the camera at eye level to be able to get your composure right. You can put it up high or down low and still be able to line things up well.
4. **What you see is what you get:** The viewfinders on point and shoot digital cameras do not show you through the lens. The lens and viewfinders are slightly askew. This can be especially difficult when doing close up photography.
5. **Obstructed view:** A fully extended zoom on some point and shoot digital cameras can obstruct the view from your viewfinder.
6. **Eye glass wearers:** Seeing through a small viewfinder can be difficult.  
–Many digital cameras come with a diopter adjuster to help sharpen the view.

## Why NOT use the LCD to compose shots:

1. **Battery killer:** The LCD uses battery power faster than almost any other feature on your camera.
2. **Camera shake:** When using your LCD as a viewfinder you need to hold your camera away from your body, often at arms length, increasing the chance of camera shake – especially if you hold your camera with only one hand.
3. **Competing light:** It is difficult to see the LCD in bright light.
4. **DSLR's:** Most digital SLR's do not give you the opportunity to use the LCD as a viewfinder at all.

## Other Functions

### Focal Lock

- Aim center of camera on main subject.
- Press shutter part way to focus and meter, hold.
- Recompose and shoot.

### AE/AF Lock

- Press shutter release part way to focus and meter.
- Press AE/AF Lock button with thumb and hold.
- Recompose and shoot.

### Depth of Field Preview Button

- Press and hold the depth of field preview button.
- The lens will stop down to the current aperture value.
- Allows you to see what is or is not in focus.

## Preset White Balance Settings

- Auto:** The camera makes a best guess on a shot by shot basis. Works in many situations.
- Tungsten:** For shooting indoors under tungsten (incandescent) lighting. It generally cools down (yellow to blue) the colours in photos.
- Fluorescent:** Warms up (blue to yellow) the cool of fluorescent lights.
- Daylight/Sunny:** A fairly “normal” white balance (about 4500 kalvin)
- Cloudy:** Generally warms things up a touch more than the daylight mode.
- Flash:** The flash can be quite cool so Flash WB will warms your shots up a touch.
- Shade:** The light in shade is generally cooler (bluer) than shooting in direct sunlight so this mode will warm things up a little.

## Shutter Release Technique

Apply a steady, gentle pressure to your shutter button rather than jabbing at it. Don't press the shutter with the very tip of your finger. Use the flat part .