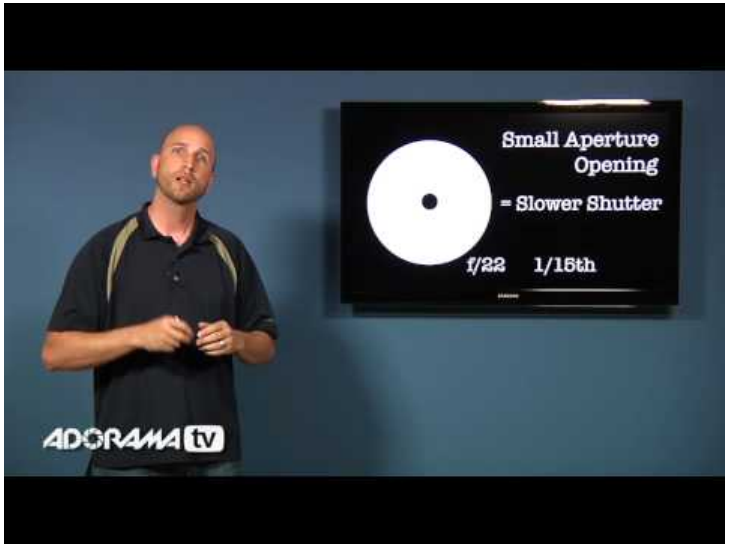
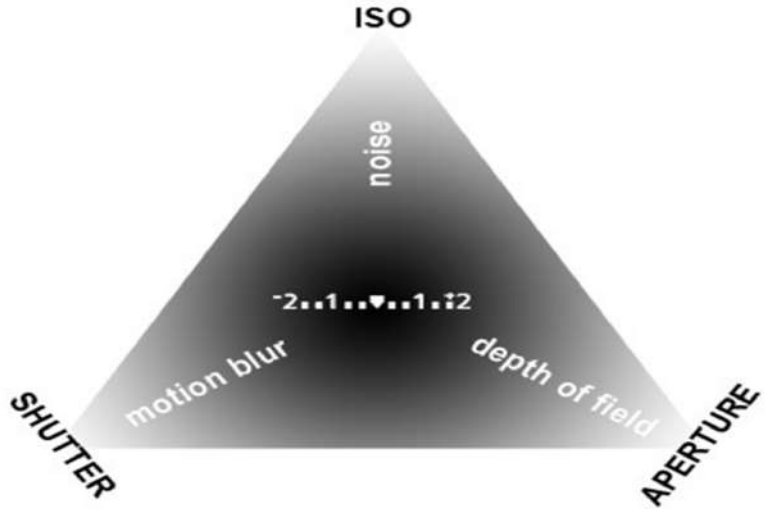

EXPOSURE

Exposure

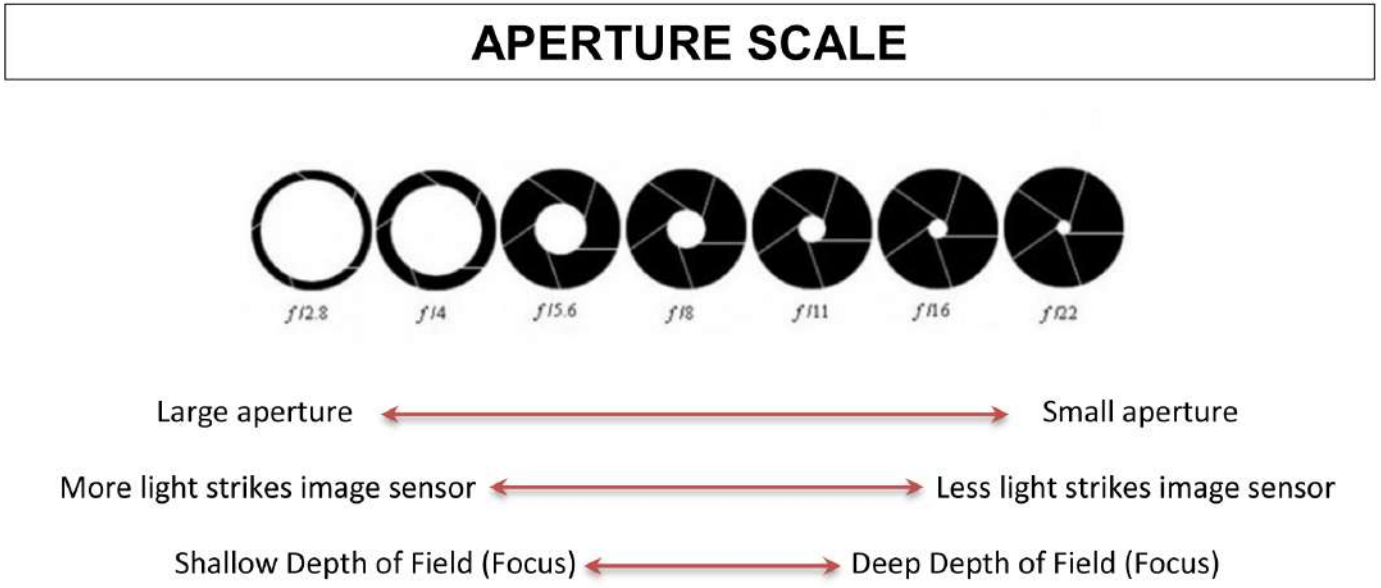
- The amount of light that hits the sensor
- Controlled by the Aperture size (f-stop), the shutter speed and the ISO





C. **overexposure:** too much light hits sensor resulting in too bright of an image

D. **under exposure:** not enough light, Image is too dark



Aperture:

- An opening inside the lens that lets in more light when it's wide open and less when it's small (closed down).
- Each Aperture opening is called an **f-stop**.
- Brightly lit subjects requires smaller opening than dimly lit subject

Every step in this table represents a ONE STOP change in exposure.

Smaller f #’s (f/2.8)= More light
Larger f #’s (f/22) = Less Light

F-STOP CHART

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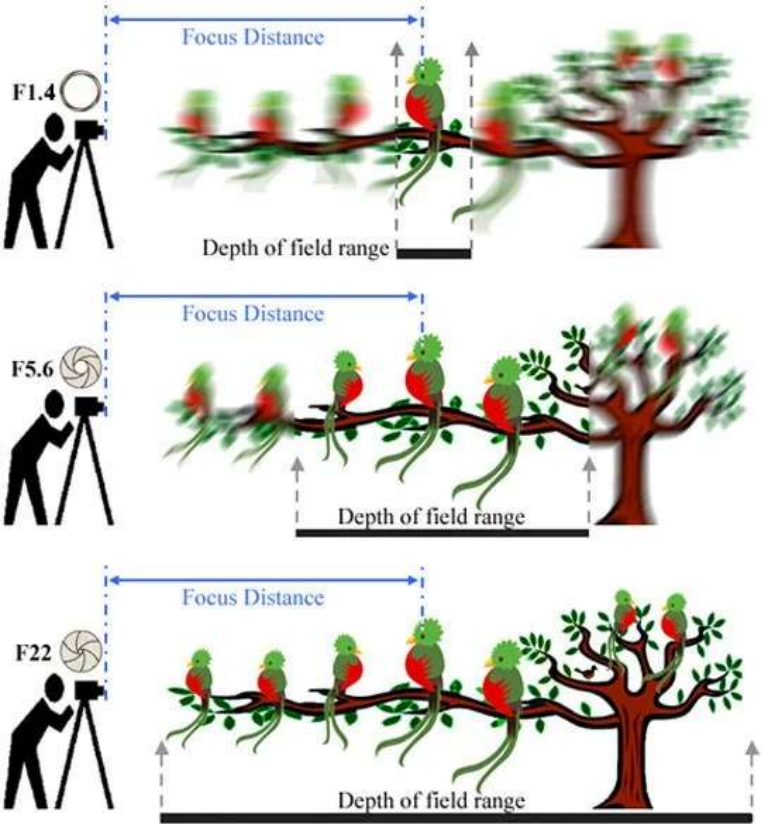
APERTURE	FULL STOP	1/2 STOP	1/3 STOP	DEPTH OF FIELD	LIGHT	SWEET SPOT
	f/1.0	f/1.0	f/1.0			
			f/1.1			
		f/1.2	f/1.2			
	f/1.4	f/1.4	f/1.4			
			f/1.6			
		f/1.7	f/1.8			
	f/2	f/2	f/2			
			f/2.2			
		f/2.4	f/2.5			
	f/2.8	f/2.8	f/2.8			
			f/3.2			
		f/3.3	f/3.5			
	f/4	f/4	f/4			
			f/4.5			
		f/4.8	f/5			
	f/5.6	f/5.6	f/5.6			
			f/6.3			
		f/6.7	f/7.1			
	f/8	f/8	f/8			
			f/9			
		f/9.5	f/10			
	f/11	f/11	f/11			
			f/13			
		f/13	f/14			
	f/16	f/16	f/16			
			f/18			
		f/19	f/20			
	f/22	f/22	f/22			



Aperture controls the **depth of field**:
Range or distance of acceptable of focus

f/2.8 will create the most shallow DOF.
F/22 will create the largest DOF

LARGE APERTURE OPENING= SMALL F/NUMBER = SHALLOW DEPTH OF FIELD

SMALL APERTURE OPENING = BIG F/NUMBER = LARGE DEPTH OF FIELD

LONGER FOCAL LENGTHS PRODUCE A SHALLOW DOF

Review Aperture and DOF control

ISO: The sensitivity of your image sensor to light

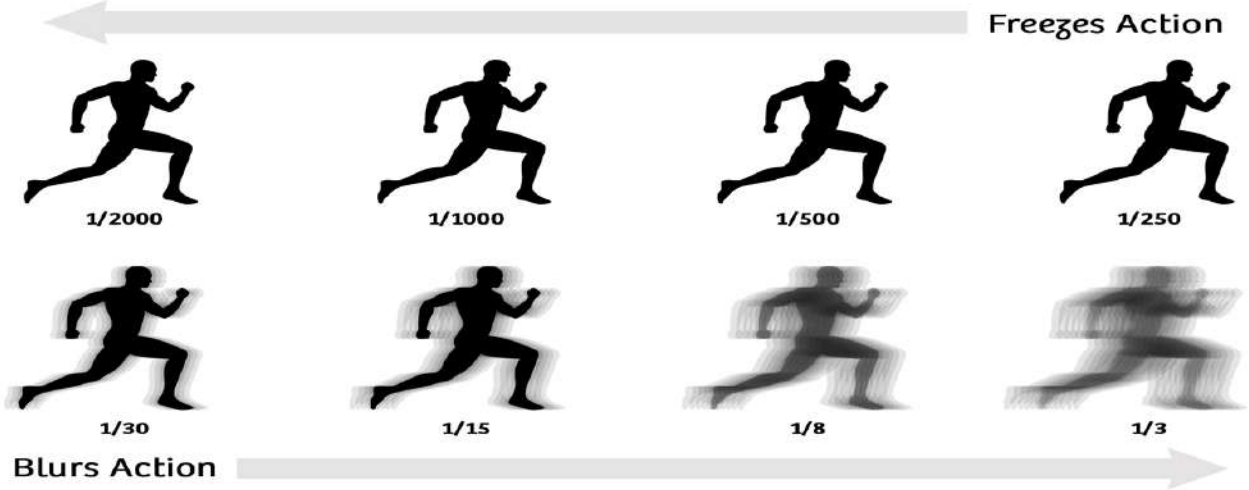
- Lower ISOs (such as 100) are less sensitive to light & should be used in bright sunlight
- Higher ISOs (such as 12800) are more sensitive and should be used in lower light situations (indoors)
- Higher ISOs (such as 12800) have more noise. It looks similar to grain found in film photographs, but can also look like splotches of discoloration when it's really **bad**, and can ruin a photograph. Noise tends get worse when you're shooting in low light.
- Always use the lowest possible ISO to achieve the best quality image

ISO review

Shutter Speed:

Determines HOW LONG the shutter stays open & how MOTION is stopped or blurred

- **SLOWER (LONGER) shutter speeds such as 30 seconds**= MORE light & blur action
- **FASTER (SHORTER) shutter speeds such as 1/2000**= LESS light & freeze action
  - 1 stop change in exposure means doubling (stopping up) or halving (stopping down)



Stop Action:

- Uses fast shutter speed such as 1/2000
- Freezes the motion

Blurred Action

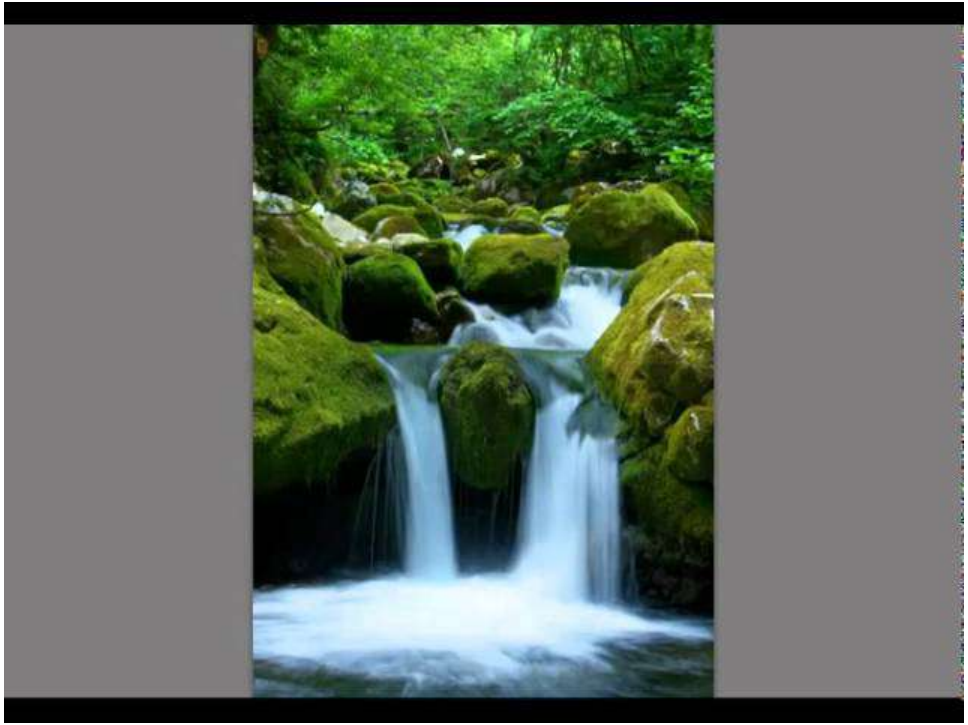
Uses a slow shutter speed such as 1/4 or slower with a tripod.
DO NOT GO SLOWER THAN the reciprocal of your focal length W/O TRIPOD OR YOU WILL HAVE CAMERA SHAKE!!

How to avoid camera shake

- Your shutter speed must be at least as fast as the reciprocal of your focal length or even object that are not moving will be blurred
- Don’t push the limits! It is better to go faster or use a tripod!
- 18mm- slowest shutter speed 1/20
- 55mm- slowest shutter speed 1/60
- 135mm- slowest shutter speed is 1/160th

IF YOUR SHUTTER SPEED IS TOO SLOW INCREASE YOUR ISO OR USE A TRIPOD!

shutter speed review:



IV. Stop

Stop= a change in exposure

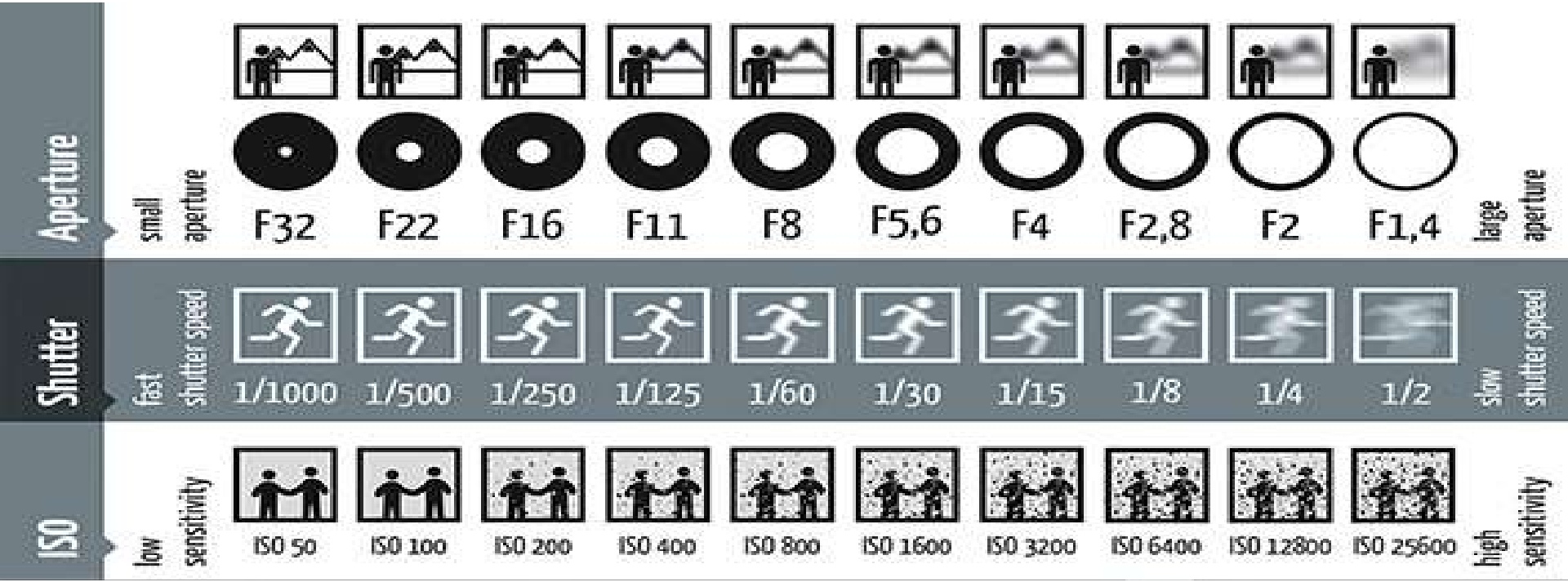
One stop Up= Double the light

- add light when underexposed
- Decrease the f# (open aperture) or go to a slower shutter speed
- Increase ISO

One Stop Down= half the light

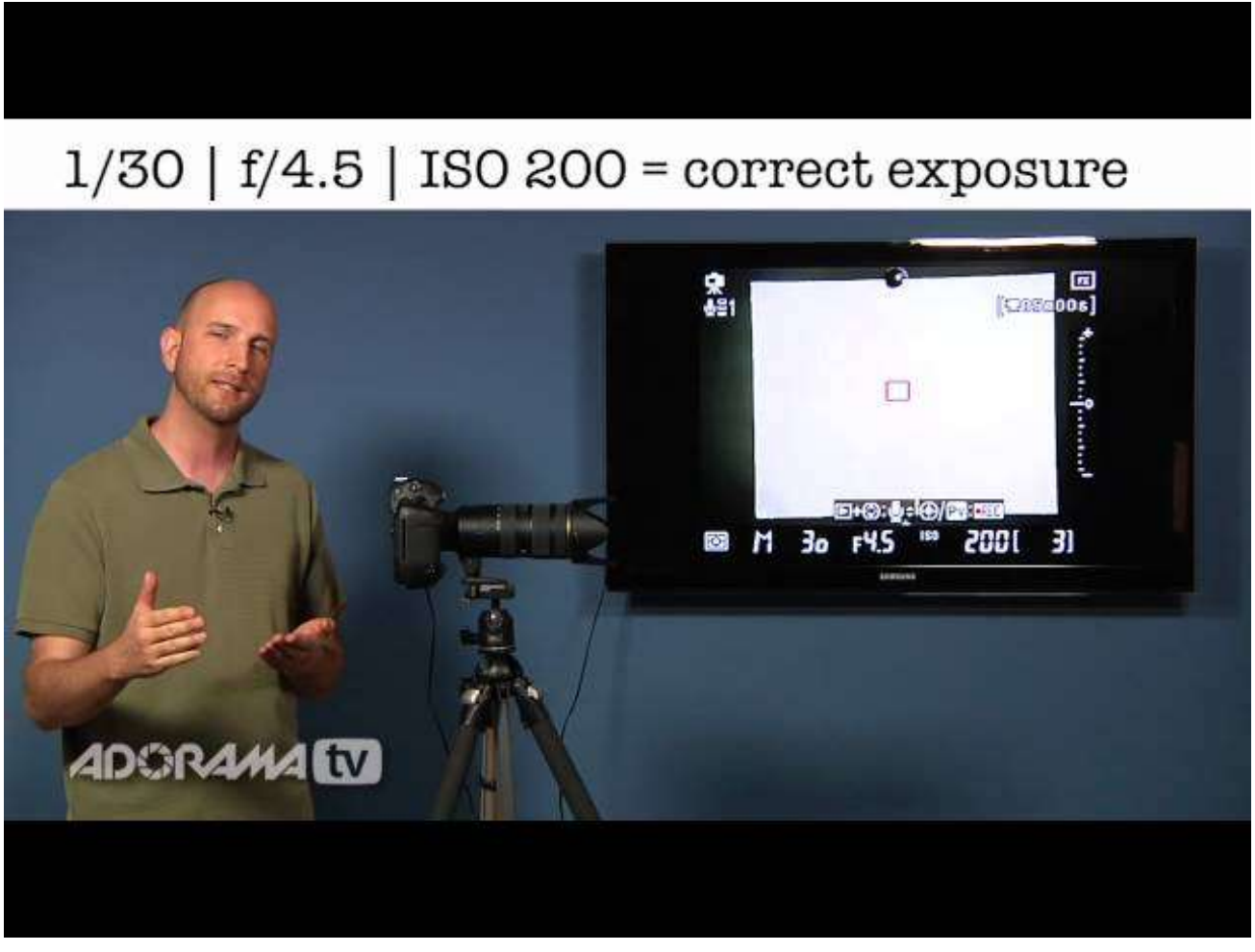
- decrease the amount of light if over exposed
- Increase the f# (close down aperture) or go to a faster shutter speed
- Decrease ISO

Lets in least light ⟵ ---------- ⟶ **let's in most light**



Stopping down ⟵ ---------- ⟶ **Stopping up**

Stop review



Where do you begin???

1. **FIRST SET ISO based on available light:** higher # for lower light, lower # for brighter light (100 iso), **set it as LOW as possible, try to avoid using anything higher than 800 iso**

1. Ask yourself: What is more important depth of field or stopping motion?
    - If there is little to no movement shoot in aperture priority
    - If there is movement shoot in shutter priority mode
    - Once you understand all this stuff shoot in manual:)

How to avoid camera shake

What is Camera Shake?

caused by movement of the **camera** which becomes noticeable as blur when using a slow shutter speed.

What Are the Factors That Lead to Camera Shake?

- *Shutter speed*
- *Camera support*
- *Shutter release*
- *Camera type*
- *Lens focal length*
- *Mirror slap*
- *Image stabilization hardware or software*

shutter speed: A general rule of thumb for DSLRs is don't handhold your camera at a shutter speed less than the reciprocal of the focal length of your lens. If your shutter is too slow to hand hold your shot either increase your ISO or steady your camera on a tripod.

Focal Length	**Slowest Shutter speed that you can use for handheld shots**
18mm	1/20 (if you are EXTREMELY steady)
50mm	1/60
135mm	1/160

Camera Support

- When hand-holding a DSLR camera, push your elbows tight against your chest and keep the viewfinder tight to your face. The ergonomics of an SLR style camera is to use your arms, chest, and face for support of the camera. Use your left hand as a support under the camera and your right to release the shutter.
- If you're using live view mode, or a point-and-shoot model without a viewfinder, try kneeling so you can support your left elbow on your thigh. This creates a mini monopod.
- Holding a camera steady in live view mode is difficult. Cameras were not originally designed to be held with the arms extended out in front of the face. If you're shooting something important always using a tripod when in live view mode, or, find an object to brace the camera against: a tree, a wall, a friend's shoulder, etc.

How to hold a camera

It's worth taking a few minutes to practise holding your camera before you start shooting – you'll get sharper shots

FINGER
The camera body is designed to be gripped with your right hand and your index finger over the shutter release. You should be able to press the button without having to reposition your grip.

HAND
Rest your lens in your left hand. You should be able to twist the barrel of the lens to zoom or focus with this hand, leaving your right hand to grip the camera body.

ELBOWS
Tuck your elbows into your body to keep your camera sturdy. The further out your elbows are, the more unstable you will be.

EYEBROW CONTACT
Lift the camera up to your eye and rest the viewfinder against your eyebrow. This makes another point of contact on the body for more stability.

PORTRAIT
If you need to switch your camera to a portrait orientation then turn it over so the shutter release sits at the top. If you do it the other way around your arms will become all twisted up!

BACK PANEL CONTROL
With your hands in the correct position, your thumb is well placed to access the controls on the back of the camera to alter the shooting settings.

LEGS
Place your legs a little apart so you're balanced. If you're leaning in to take a shot then move one foot forward to create a sturdier body shape.

TAKE A MAT
When kneeling to take shots outdoors, you might get a wet or dirty knee. Take a mat or a plastic bag to place under your knee for comfort and to avoid ruining your clothes.

BRING ONE LEG UP
By coming down into a crouching position and bringing your leg up you can turn your body into a human tripod. Place your elbow on your knee to connect your leg and arm together, creating a braced position so you don't wobble around.

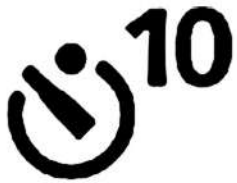
REST ELBOWS
If you have a surface area in front of you, lean your elbows onto it to steady yourself. Look for level surfaces, such as a table or wall.

CONTROL YOUR BREATHING
Breathe out when you take a shot. If you hold your breath or breathe in, you'll find you move around a lot more. It's amazing how much of a difference controlling your breathing can make.

LEAN IN
Leaning against a wall creates instant support for your camera. This can be useful when shooting at slow shutter speeds without a tripod.

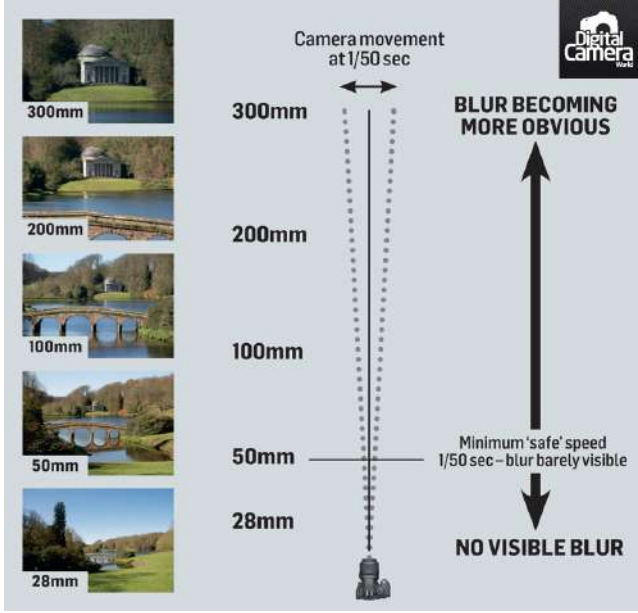
Shutter Release

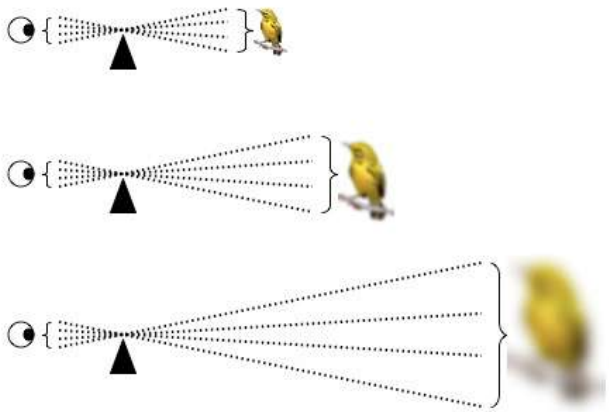
- draw a breath, hold it, and with slow steady pressure release the shutter button. Don't jam it.
- When using a tripod for extended exposures attach a cable release, or a wireless release, to your camera. If you don't have one set your 2-10 second timer to release the shutter (this allows you to press the release button and let the camera settle down before the shutter fires).



Focal Length

- the longer your lens, the more you have to be concerned about camera shake.
- The longer your lens the faster your shutter speed needs to be
- If your shutter speed is too slow you can increase your ISO



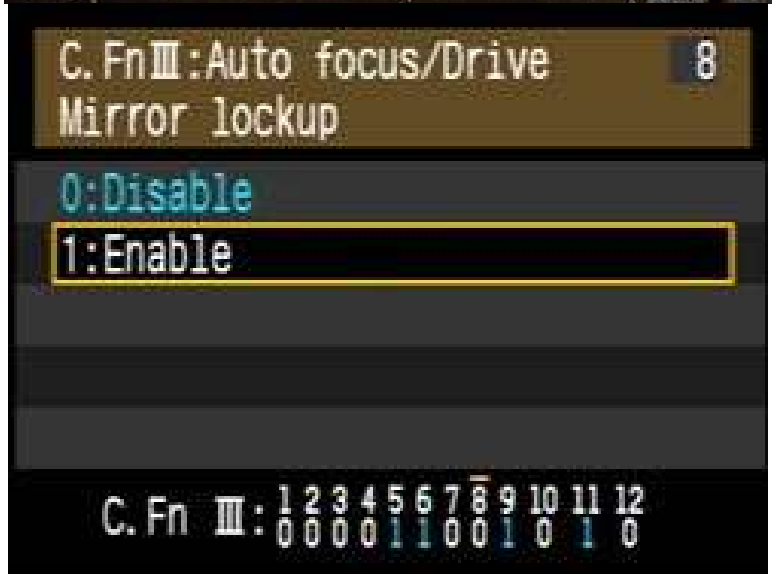


Camera Type

- A standard DSLR with a small to medium length lens is probably the easiest to hold steady.
- Point & shoot cameras are more susceptible to camera shake

Mirror Slap

This phenomenon becomes more apparent at extremely slow shutter speeds, or when using the bulb setting on your camera, or when shooting with medium format cameras. When you press the release to take a picture, the mirror flips up, out of the way, allowing for an exposure onto the sensor or film. When the shutter has completed its cycle, the mirror drops back down. Modern cameras have dampening mechanisms to try and reduce the movement created by the mirror flipping up and down. However, it's still apparent, especially in medium format cameras which have large mirrors. The best way to combat this camera shake problem is to lock the mirror up before releasing the shutter.



Stabilization Hardware or Software

- There are two different flavors of stabilization:It can be built into the camera body or the lens.
- It helps you take clearer photos of non-moving subjects in dim light when you're not using the flash
- It helps you take clearer photos when the camera is moving around a lot (for example: from the window of a car on a rocky road)
- It helps you take clearer photos when using lenses with long focal lengths
- It does NOT help when you're trying to capture photos of fast-moving subjects
- Turn OFF IS when using a tripod!
- **image stabilization technology is there to help you but don't rely on it. It's a tool not an answer.**


Fix Blurry
Photos