CAMERA BASICS

KINGWOOD PHOTOCLUB
WORKSHOP SERIES

Kingwood Photo Club

Purpose/Process of Workshop

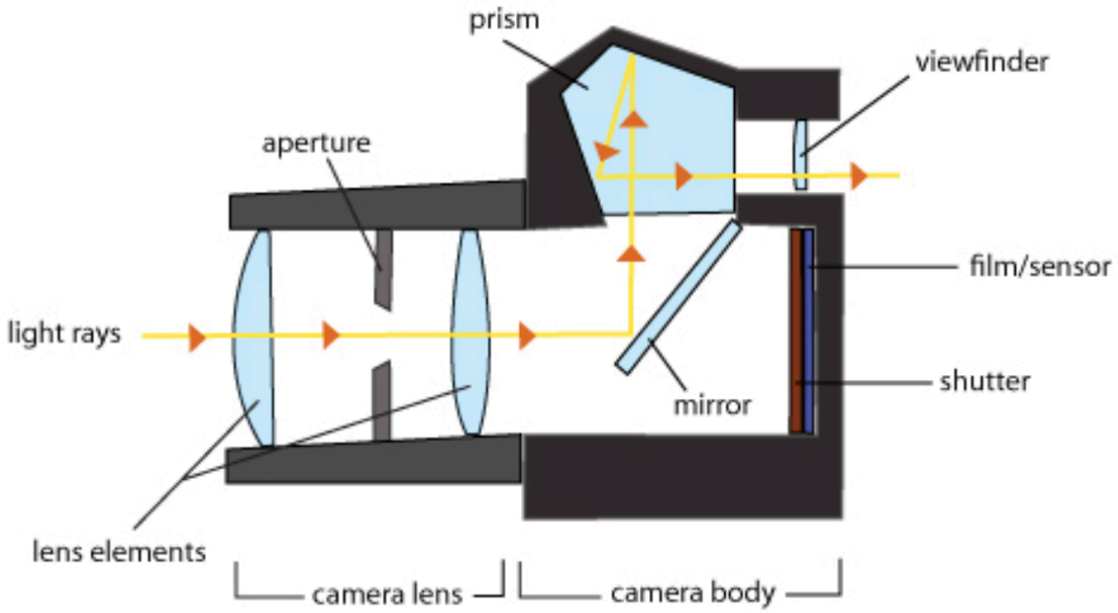
- *Purpose: To address specific questions about your camera*
- *Process:*
  - *Online format makes this an "interesting challenge" - We'll use an outline:*
    - *Into - Mentors, and their cameras*
    - *Camera and Lens Overview*
    - *Common Camera Controls*
    - *Initial Camera Setup - recommendations*
    - *Setting Exposure*
    - *Focus*
    - *Color Balance*

INTRO

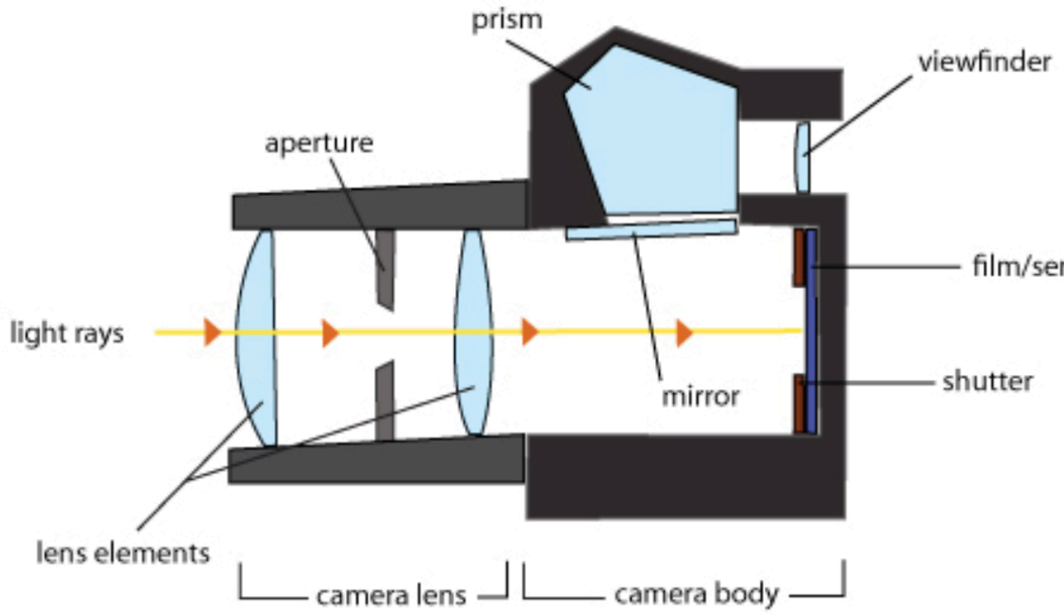
- *Go to our website resources/get individual help from our Mentors:*
- *Poll Results*

Camera Overview

Viewfinder Mode: mirror down

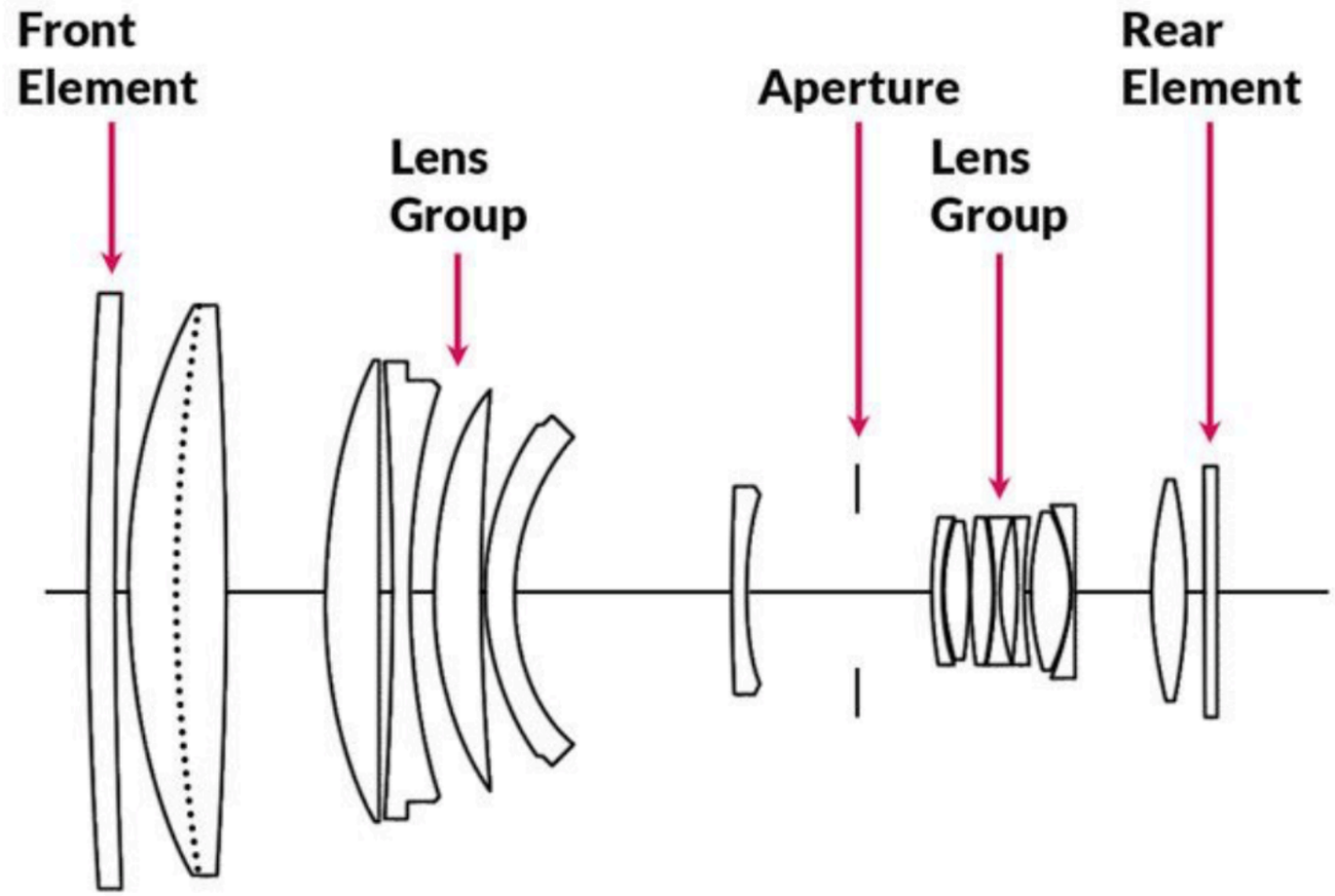


Picture-taking Mode: mirror up



DSLR vs Mirrorless

Lens Overview



Zoom vs. Prime Lens

Common Controls

Shooting Buttons:

- ***Shutter button**: You press this button to **prefocus** the camera and take a picture.*
- ***Mode dial**: On most cameras this is a round dial on top of the camera for selecting different ways of shooting: Auto, Aperture, Shutter, Program...*

Exposure Settings:

- ***Aperture setting**: The aperture determines how wide the shutter opens when you shoot - usually a dial, may be in a Fn button or multiselector*
- ***Shutter speed setting:** This controls determines how long the shutter stays open.- usually a dial, may be in a Fn button or multiselector*
- ***ISO setting**: The ISO determines how sensitive the sensor is to light. - usually a dial, may be in a Fn button or multiselector*
- ***Metering mode**: determines which area of the viewfinder is used to meter raw light for exposing the image.*
- ***Exposure compensation setting**: used to increase or decrease the exposure, when the camera gets it "wrong"on automatic/semi-automatic modes*

Color Correction Settings:

- ***White balance:** Used to correct color when light sources give the image an unnatural color caste.*

Other Functions (some cameras have buttons for these, some have menu items)

- ***Playback and zoom buttons**: used to view your images*
- ***Info Button**: Many cameras have this as a button, or on the "multiselector" (round dial-button) - shows settings on screen of viewfinder*
- ***Histogram display**: This displays a graph showing the distribution of pixels from the lightest parts of the image to the darkest parts of the image.*
- ***Flash control**: If your camera has a built-in flash unit, you push this button to pop the flash unit up and enable it.*
- ***Hot shoe:** You slide a flash unit that's compatible with your camera into this slot.*
- ***LCD panel**: This panel shows you all the current settings may also be visible in most camera viewfinders.*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OLYMPUS 12-45mm 1:4 PRO
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Exmor R CMOS 4K Cyber-shot


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Shooting Buttons


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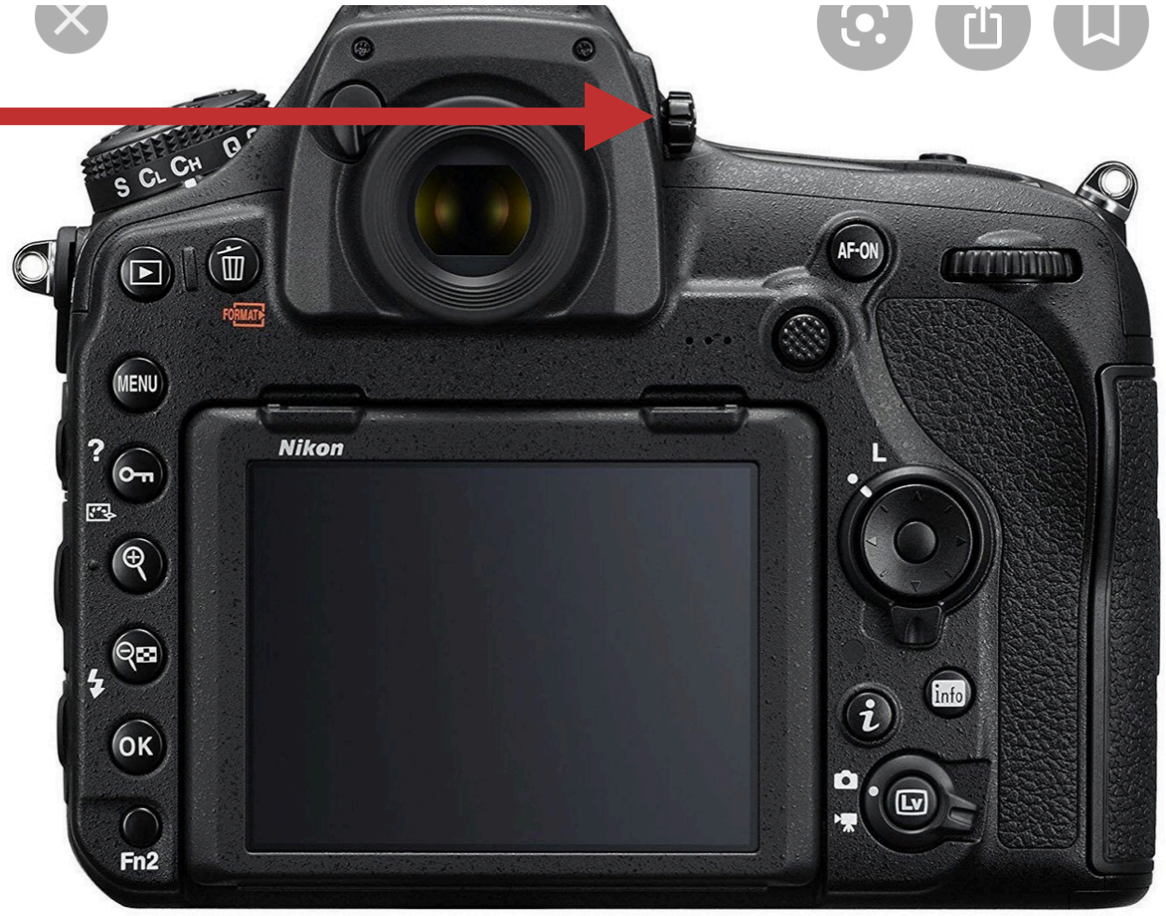
Multiselector

Viewfinder diopter adjustment

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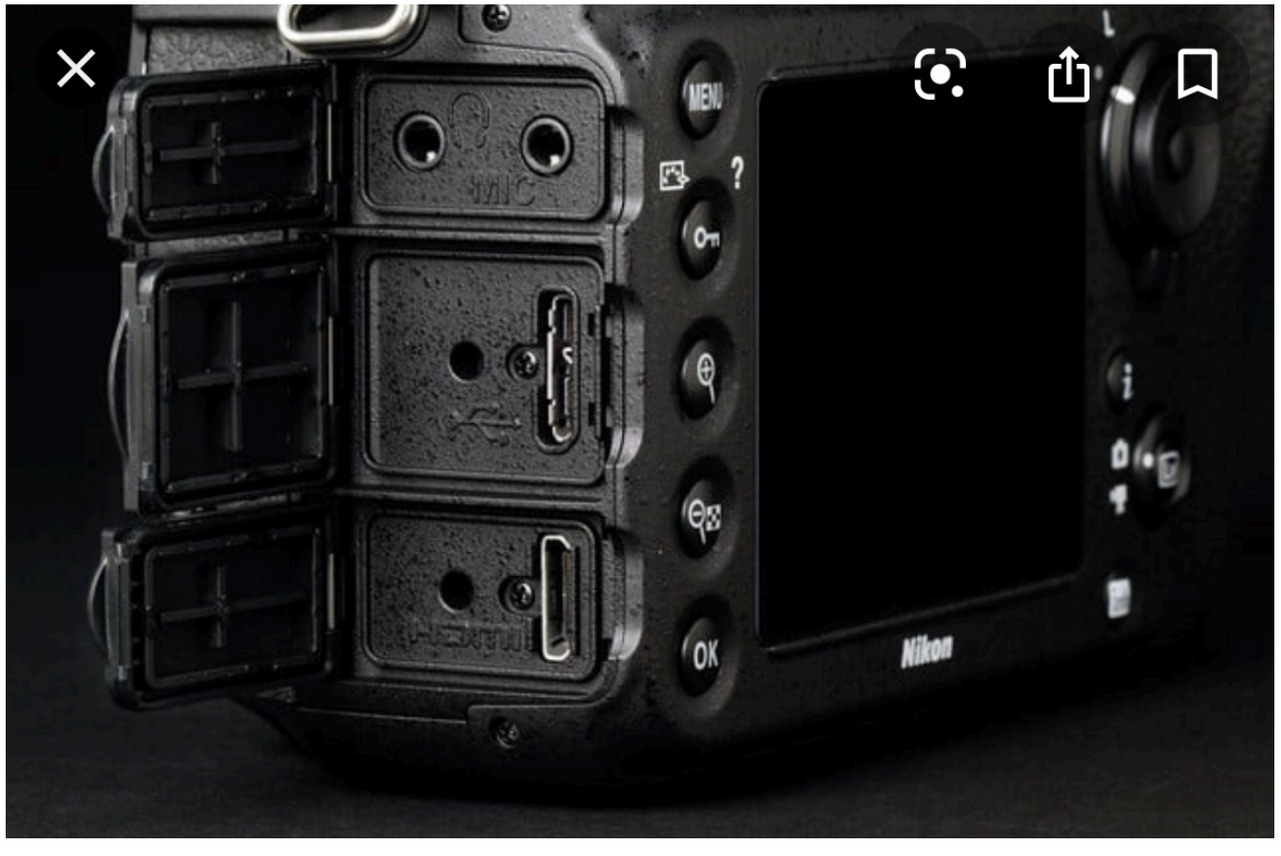

MENU
OK
Nikon


SanDisk

Initial Set Up

No One Right Answer

- ***Date, Time and copyright***
- ***File type and quality*** - *"Raw" has most detail (requires post processing). If you are not going to edit, jpg fine*
- ***Color space*** - *Adobe RGB (sRGB usually standard)*
- ***White balance*** - *set to Auto*
- ***ISO*** - *Start with Auto (fix upper limit based on your camera...mine is 3200)*
- ***File naming*** - *unless you really like your camera's naming*
- ***Copyright information***
- ***Metering Mode*** - *default if usually Matrix or Evaluative metering (leave it)*
- ***Focus Point Area*** - *Dynamic*

Digital File Types

most cameras allow you to select file size and type

- ***Raw File**: minimally processed data from image sensor. not suitable for printing. Uncompressed*, large file.*
  - *extensions: .nef, .crw, .arw....many)*
- ***JPG ("J peg") File**: processed image file. Compressed using a "lossy" process. The degree of compression can be adjusted to trade-off image quality for size (fine, normal, basic in Nikon). Jpg images lose information each time they are compressed (opened and edited)*

*Some cameras offer compressed Raws...chose lossless compression

1. EXPOSURE

Camera Exposure Modes

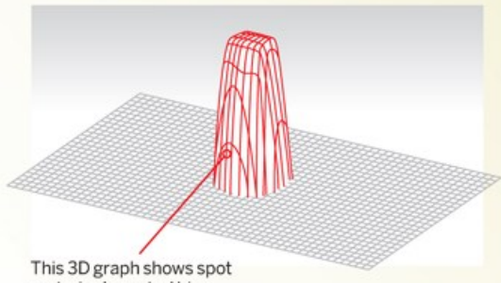
- *Determines how the camera sets aperture and shutter speed*
  - ***AUTO***
    - *Full AUTO: "point and shoot mode" - camera selects both aperture and shutter*
    - *SCENE - the camera selects A and S depending on type of scene*
  - ***SEMI-AUTO***
    - *Aperture Priority - you set aperture, the camera sets shutter*
    - *Shutter Priority - you set shutter, the camera sets aperture*
    - *Program -You vary A or S the camera sets the other*
  - ***MANUAL****- you set both*

At-a-glance guide to metering modes

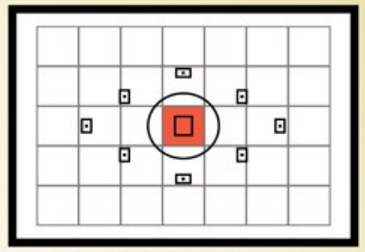
How each of the metering patterns works, and when to use them

Spot metering

Spot metering only measures the intensity of light over a small circular area in the centre of the viewfinder. The average is then calculated by measuring just 2-4% of the picture area.



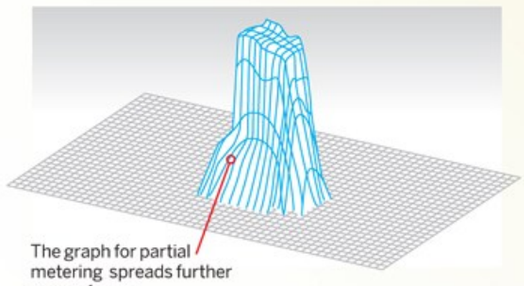
This 3D graph shows spot metering's central bias



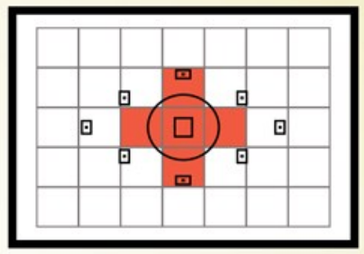
The centre circle in the viewfinder gives a rough guide to a spot meter's coverage

Partial metering

This metering mode measures the intensity of the light over a larger circular area than in Spot mode. The average is then calculated by measuring 8-13% or the picture area.



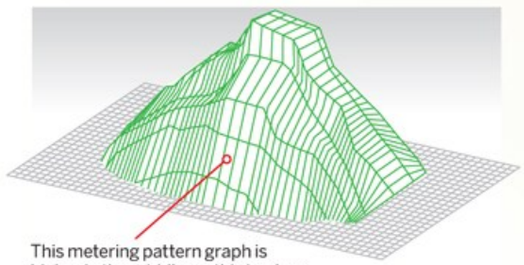
The graph for partial metering spreads further across frame



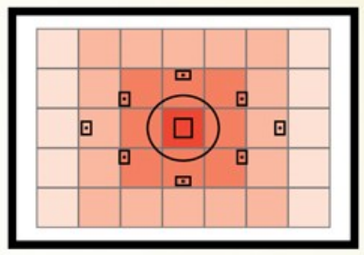
The coverage of the partial meter spreads out slightly beyond the viewfinder's centre circle

Centre-weighted average metering

This light metering mode measures the light across the whole picture area, but strongly biases the reading to the centre of the viewfinder area. Unlike with Evaluative, it does not take the focus into account, so uses the same averaging pattern for every shot.



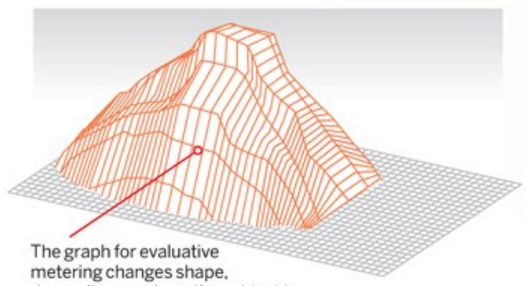
This metering pattern graph is higher in the middle, as this is where the meter concentrates its attention



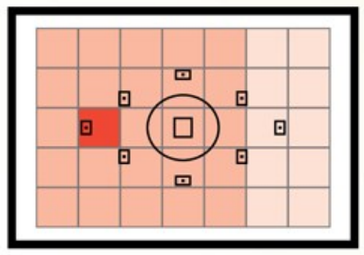
Main metering zone is bounded by the seven central focus points (SLRs with nine AF points)

Evaluative metering

The default metering mode on many DSLRs, and the only option if you choose one of the basic automatic exposure modes. Measures light across the whole frame, but strongly biases the reading to the area around the autofocus point currently being used.



The graph for evaluative metering changes shape, depending on where the subject is



Main zone of interest will depend on which of the autofocus points has been used

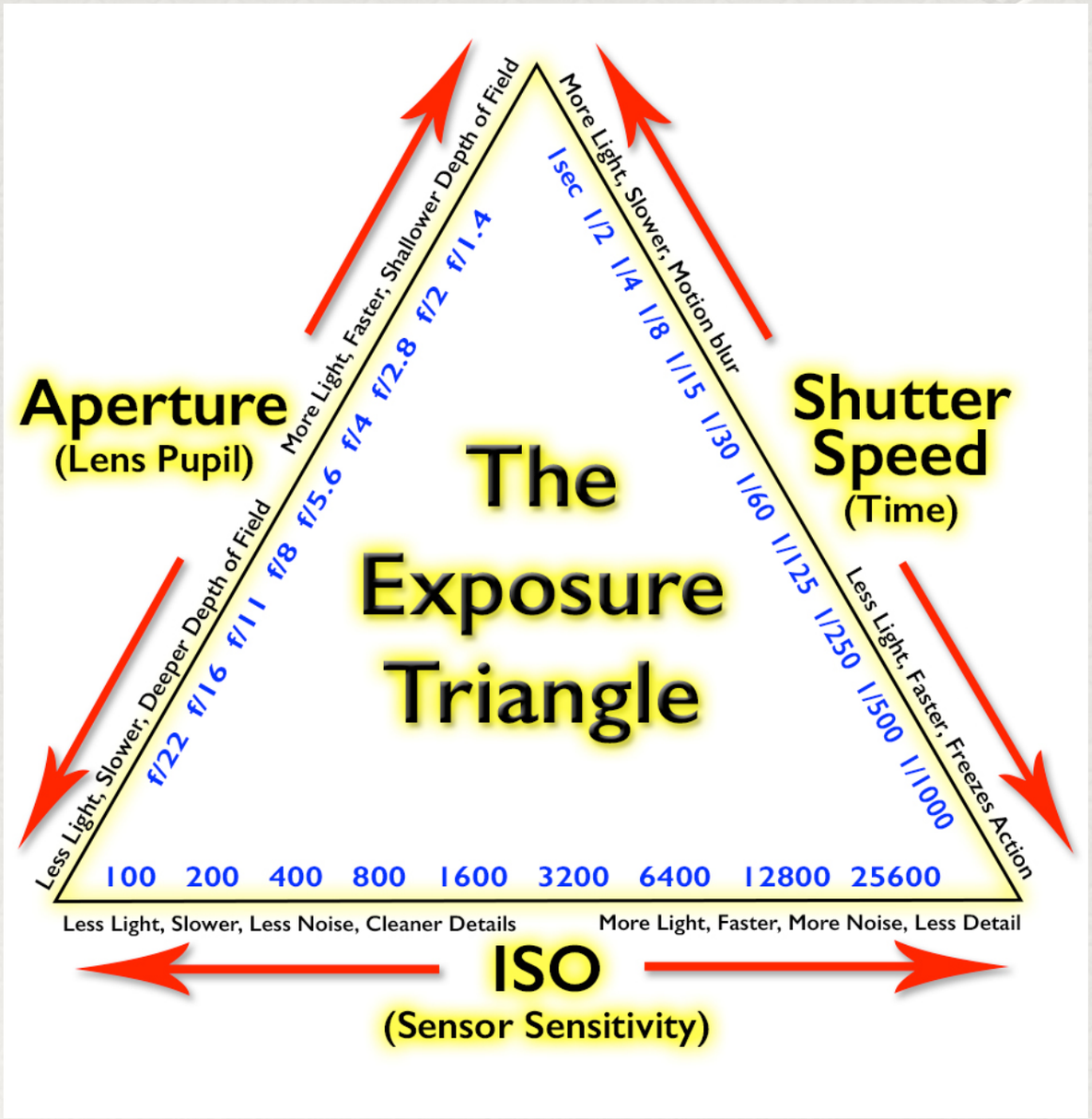
1. Get the Exposure Right

Balance the Triangle

EXPOSURE:
The amount of light reaching the sensor

1. Get the Exposure Right

Balance the Triangle



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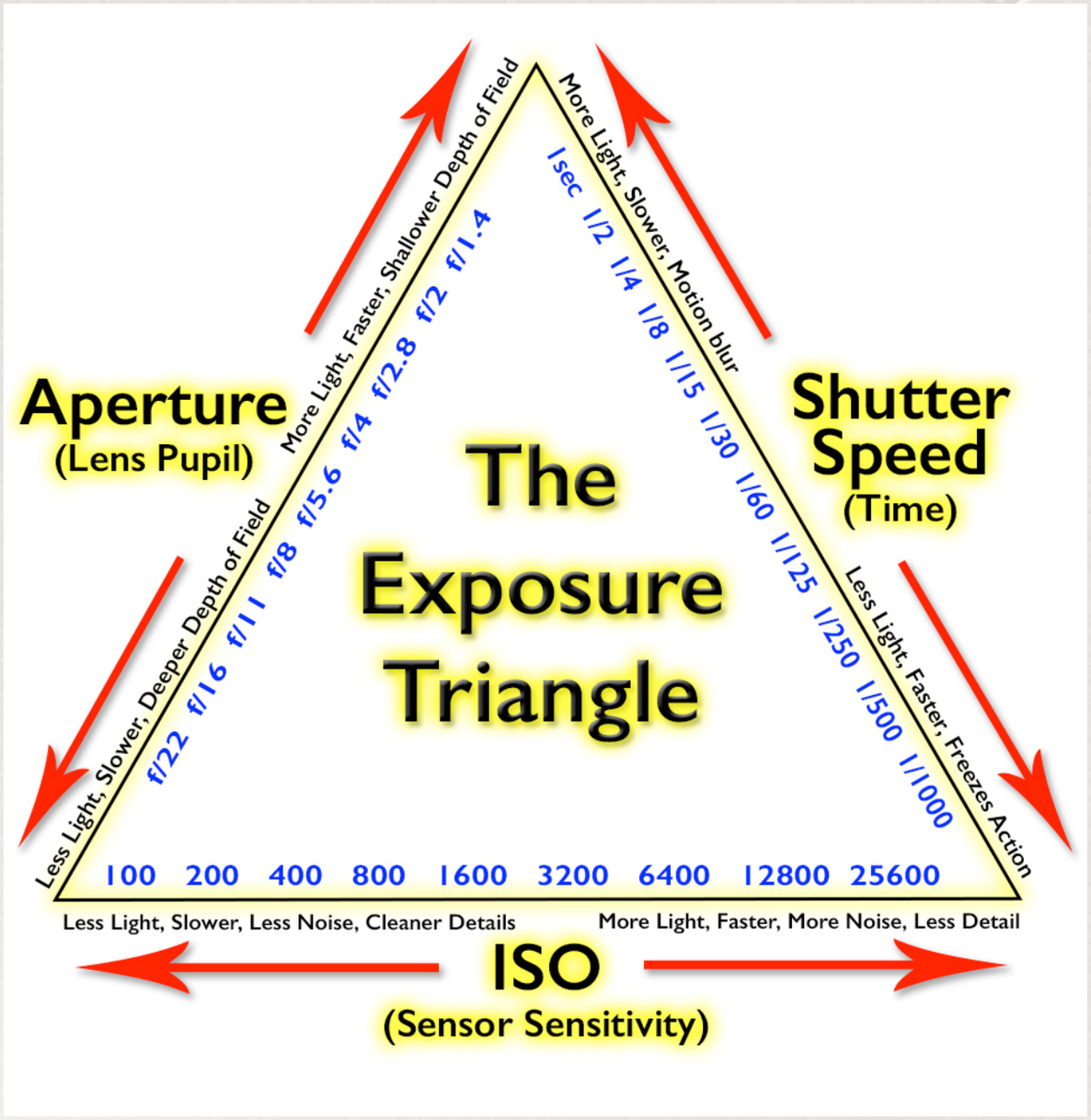
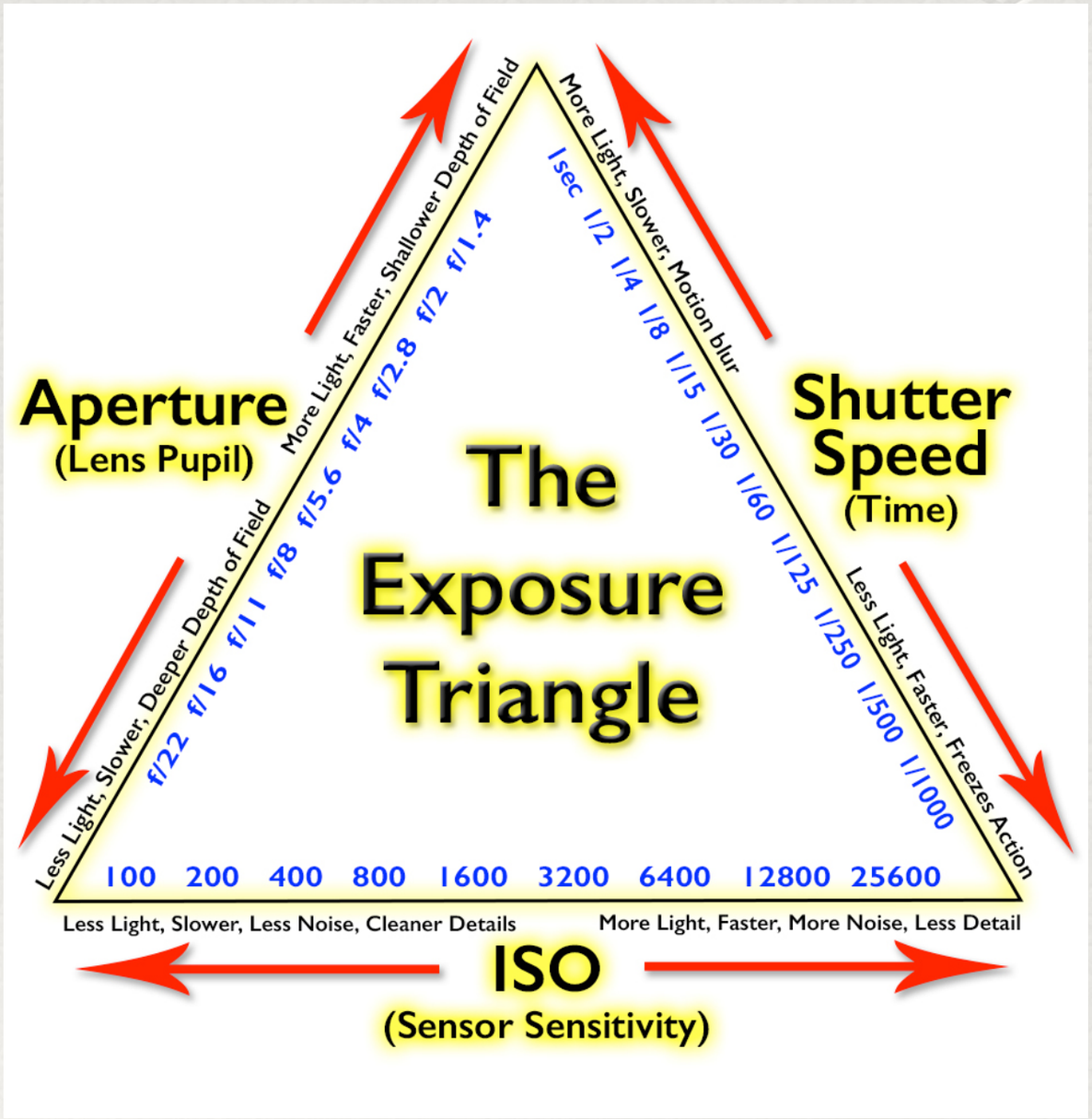


EXPOSURE:
The amount of light reaching the sensor

When you shoot on "Auto" the Camara makes its own choice of Aperture, Shutter Speed and ISO based on what it thinks you want or the "Scene" setting you choose

1. Get the Exposure Right

Balance the Triangle



EXPOSURE:

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Shutter Speed

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Question: What is "bulb" mode...why use it.

Shutter Speed

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- ***Trade offs****: usually faster is better to avoid camera shake blur... Unless you want to show motion blur*

Question: What is "bulb" mode...why use it.

Answer: Bulb mode allows you to keep the shutter open as long as you depress the release button. Used primarily for slow shutter speed photography, with a separate shutter release device.

Shutter Speed

Fast, to stop action

Shutter Speed

Shutter Speed

Slow to capture movement

Slow Shutter Photography

Slow Shutter Photography

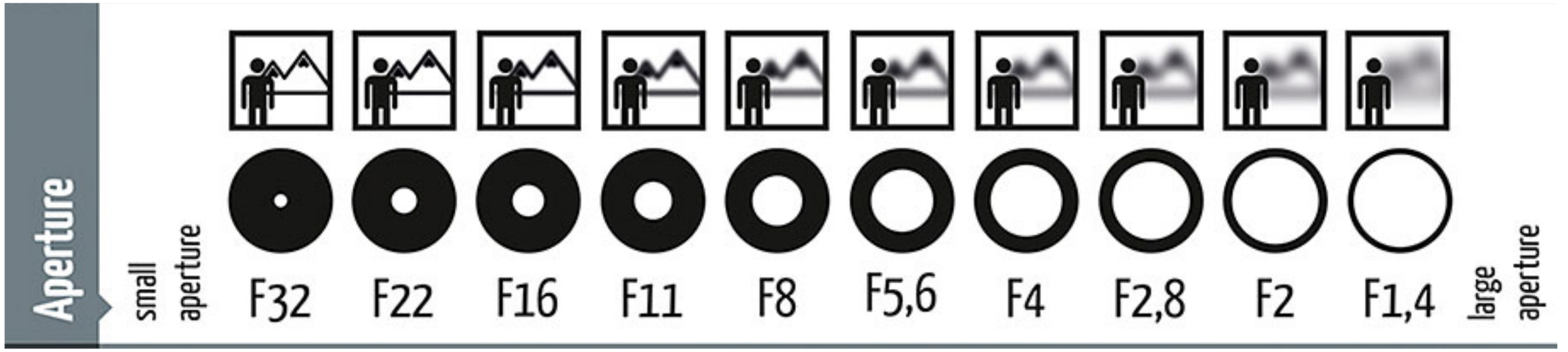
Shutter Speed

Bulb…or very slow

Aperture

- ***What is it****? The hole or opening formed by the metal leaf diaphragm inside the lens through which light passes.*

- *The size of the aperture is indicated by its f-number, i.e., the* ***ratio*** *of the diameter of the opening to the focal length of the lens; a* ***large aperture is indicated by a small numerical f-number (“F” stop)***



- ***Trade off***:
  - *The larger the opening (smaller f stop) the shallower the depth of field.*

Aperture

Small aperture (large number) for large DOF
f/22

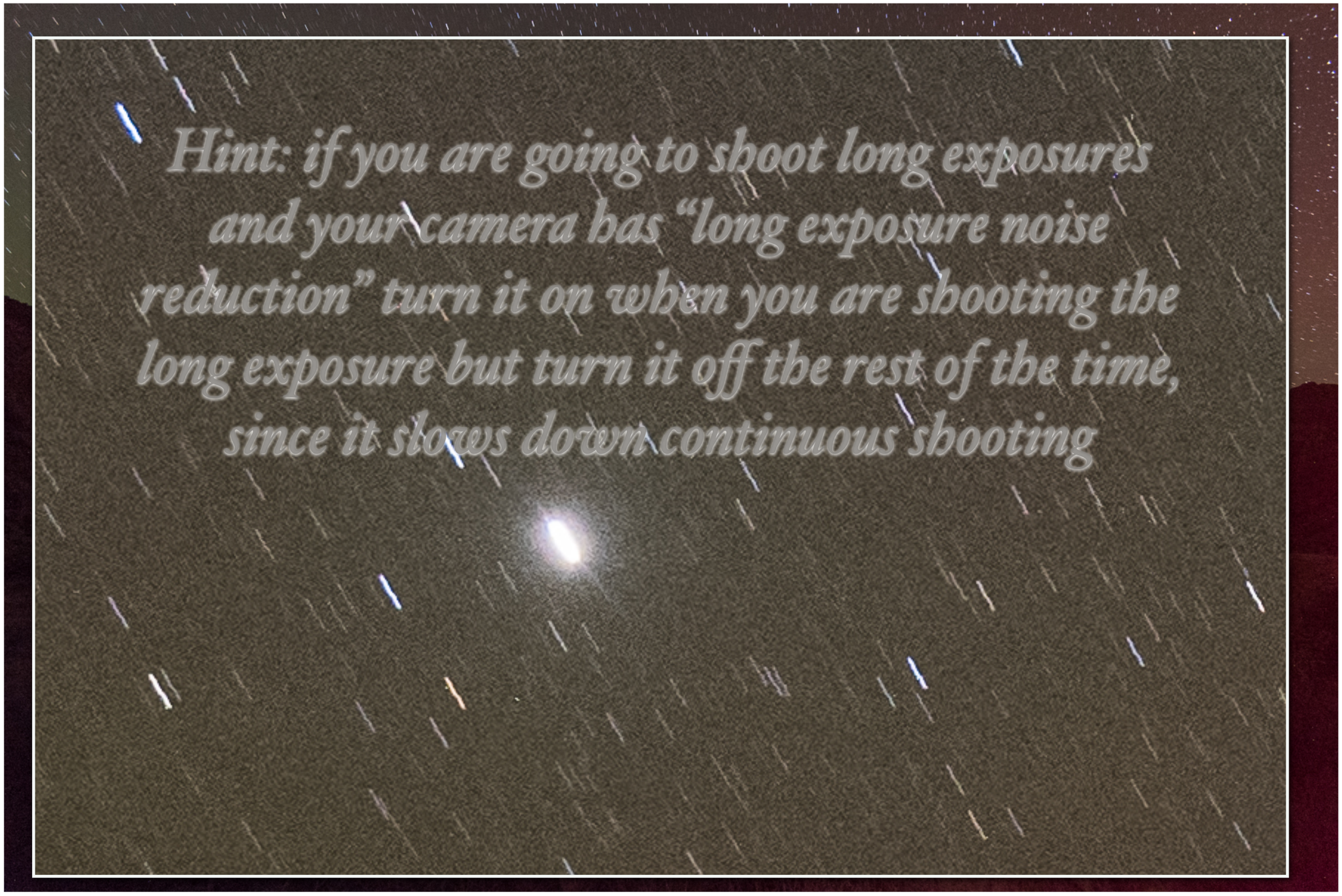
Large aperture (small number) for shallow DOF
f/2.8

ISO

- ***What is it?*** *international standard representing film sensitivity.*
- ***Trade offs****: The higher ISO the more "noise"... ButModern cameras have made great improvements. Acceptable noise can be found up to 1000+ ISO.*
- ***Tip****: a fast shutter speed (to stop motion blur) and/or smaller shutter (for depth of field) is MORE important for a technically perfect image than ISO. Don't be afraid to raise ISO.*
- *What is "Auto ISO"?*

81 seconds at ISO 4000

81 seconds at ISO 4000



81 seconds at ISO 4000

Exposure Compensation

Varying exposure in Aperture Priority

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Exposure Compensation

Varying exposure in Aperture Priority

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***Answer**: it is the manual adjustment of "metered" exposure when the indicated exposure results are less than optimal*

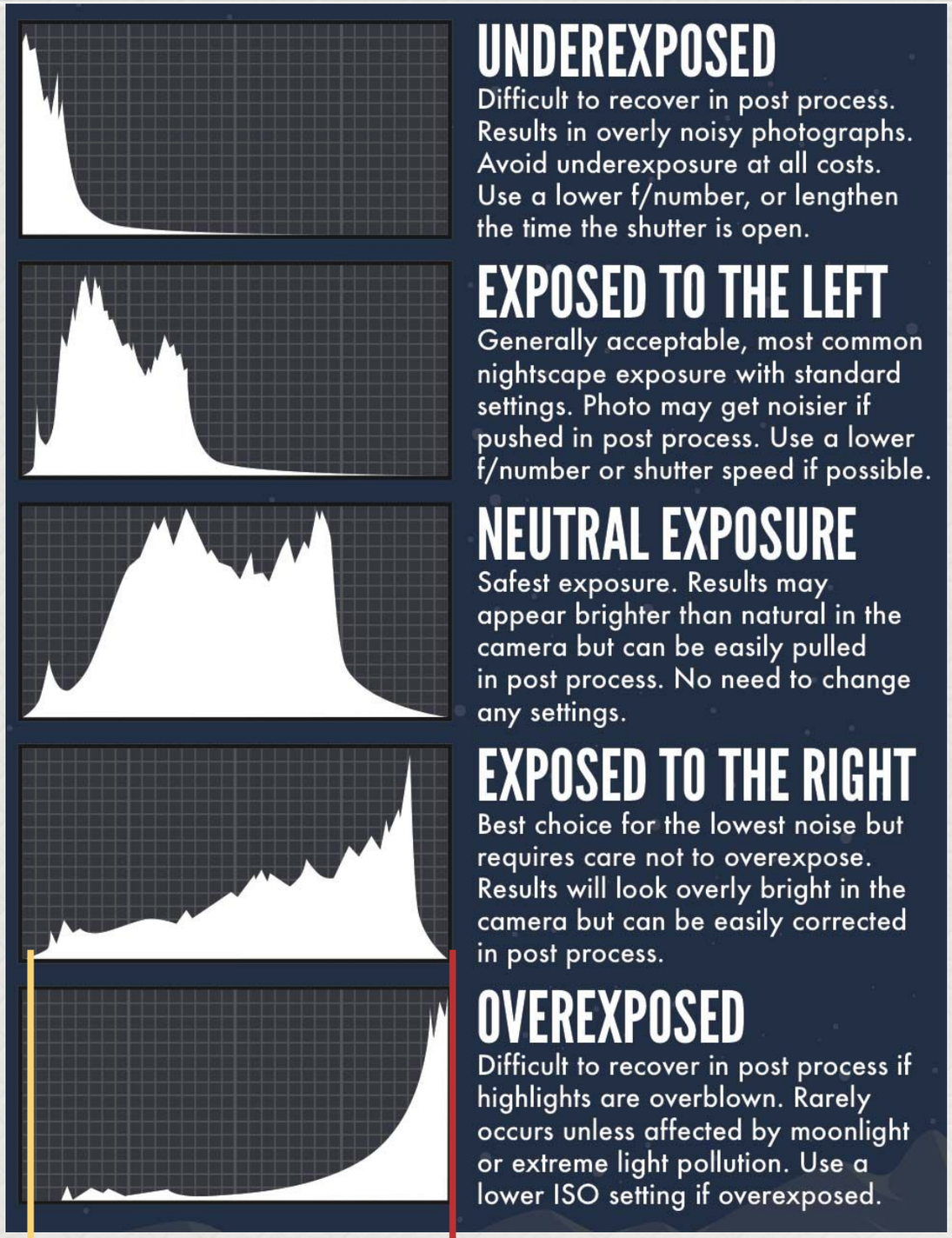
***Question**: when would you want to use exposure compensation?*

***Answer**: when using semi-automatic functions, for dynamic light situations when you want to avoid blowing out highlights or blocking shadows (ex: I want to ensure the sky isn't blown out)*

The Histogram... Is your exposure correct?

graphical representation of tonal (brightness) values in an image

number of pixels



"Blocked" *Pure Black* *Sensor's dynamic range* *Pure White* *"Blown out"*

2. FOCUS

2. Sharp Focus

The second key to a technically perfect image

- ***What is it?*** *Adjustment of the distance setting on a lens to define the subject sharply.*

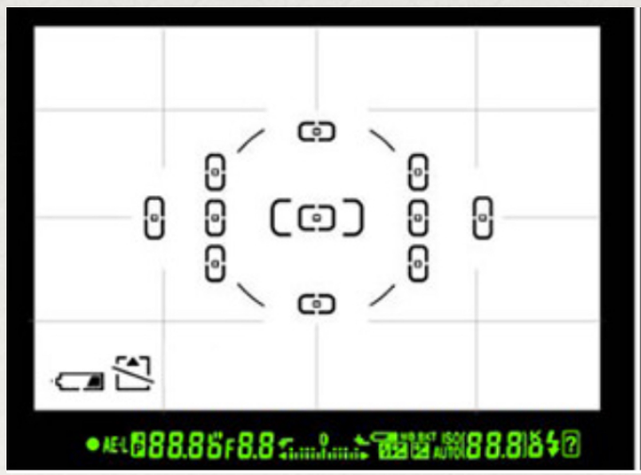
- ***How is it achieved?*** *In auto-focus mode camera focuses when you depress shutter half way. In manual mode you must rotate the lens focusing ring.*

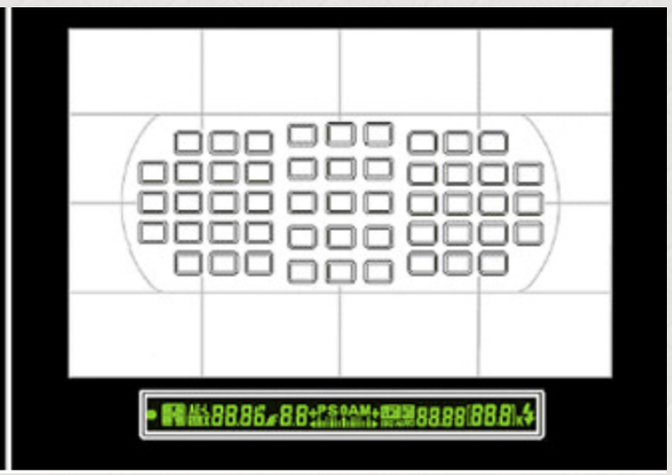
- ***How much of an image can be in focus?*** *Only one distance point is in perfect focus but "**Depth of field**" is the zone of acceptable sharpness in front of and behind the subject on which the lens is focused.*

How Does a Camera Focus

Two types of AF (Autofocus) systems:

- **Active AF** - bounces IR beam off the subject to figure out the distance
  - can be used in very poorly-lit environments,
  - can only use it for stationary, non-moving subjects
  - only works for close subjects within 15-20 feet.
- **Passive AF*** - uses special sensors within the camera to **detect contrast,** looking for edge sharpness. If it is blurry, adjusts lens
  - If Lens begins to “hunt” there isn’t enough contrast. ***Focusing requires enough contrast....problem with smooth gradients, water, snow***
  - Solution: focus on something with edges...tree, boat, then recompose





Modern Cameras may have many focus points....

**Phase detection detects contrast in light through the lens instead of on the sensor so it does not require the camera mirror to be raised*

Focusing Depth of Field

"the zone of acceptable sharpness in front of and behind the subject on which the lens is focused"

- ***Three factors define what is in focus***
  - *Aperture - how wide open your shutter is*
  - *Distance to your subject*
  - *Focal length of your lens - zoom or magnification*

Focal length

The focal length of an optical system is a measure of how strongly the system converges or diverges light.

Focal length is measured in millimeters. For most photography you can consider a 50mm "equivalent" lens as a normal lens. Anything less becomes "wide angle" anything more becomes a "telephoto"

***RULE OF THUMB**: since zooming-in on a shot "magnifies" motion, to avoid blurring from camera shake, always make sure your shutter speed is no slower than 1/focal length. If focal length is 200mm, shutter speed should be at least 1/200th of a second...*
HOWEVER: cameras with shake reduction technology allow you to exceed these guidelines somewhat

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NOTE: "Auto ISO" will optimize exposure by taking into account focal length, for a given aperture and shutter speed

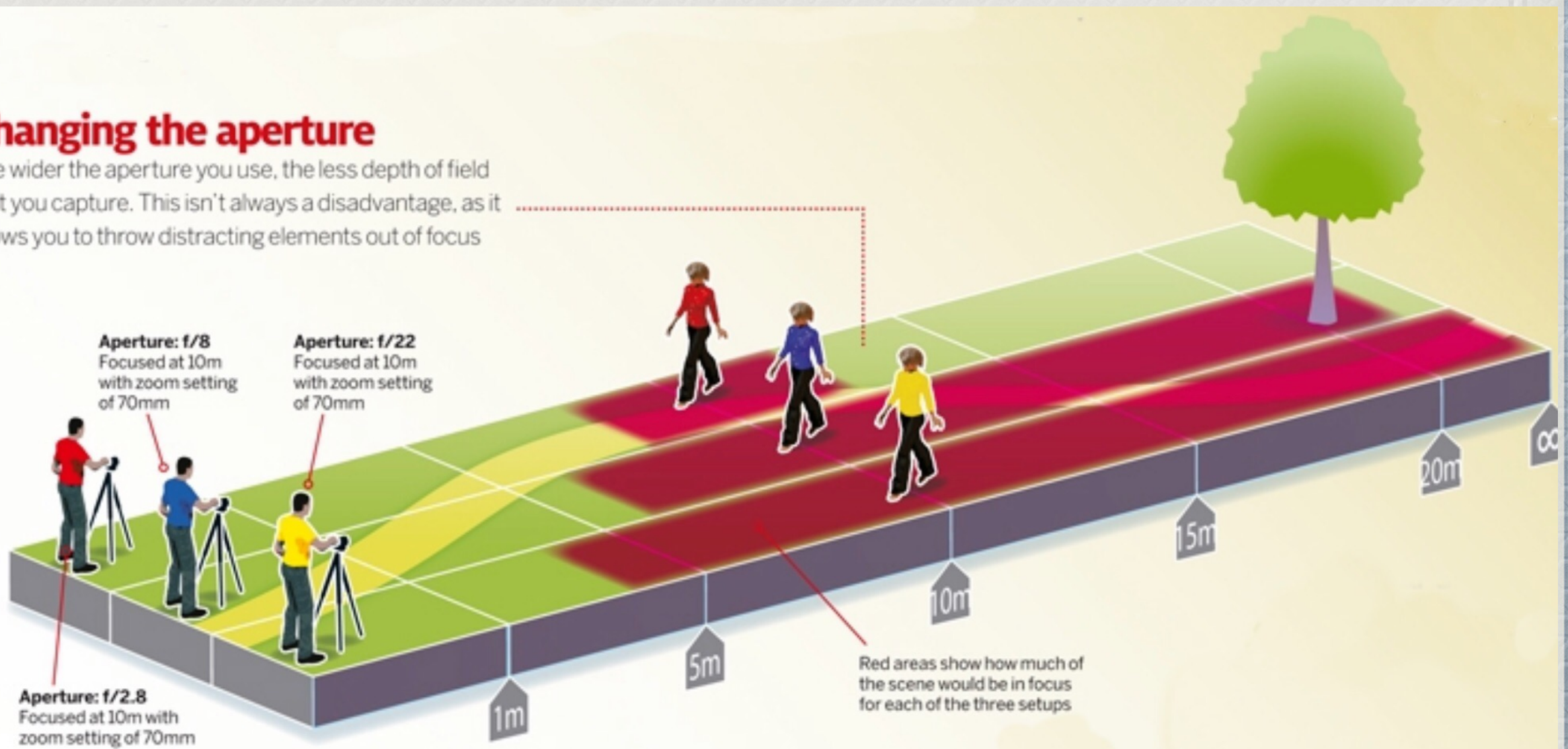
Effects using Focal Length

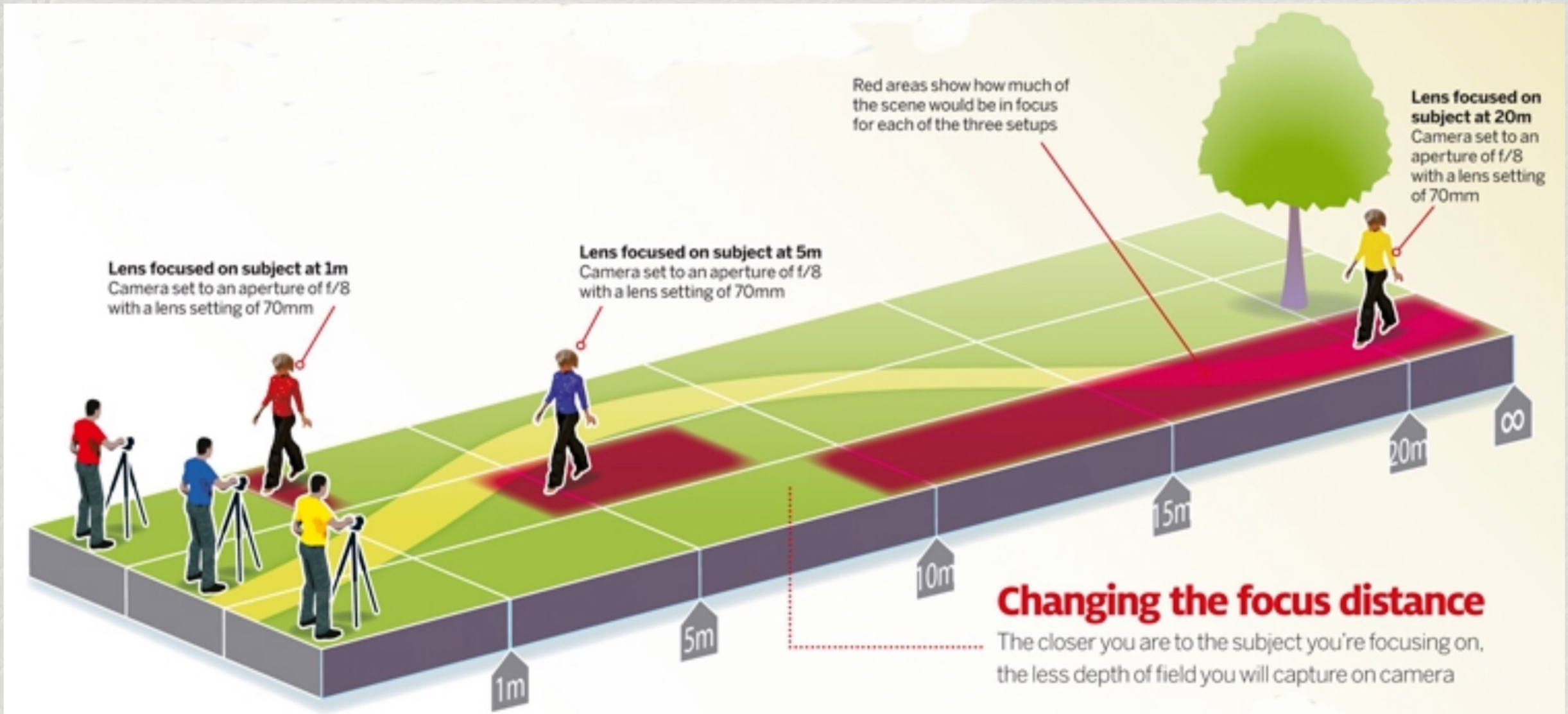
Effects using Focal Length

Effects using Focal Length

Changing the aperture

The wider the aperture you use, the less depth of field that you capture. This isn't always a disadvantage, as it allows you to throw distracting elements out of focus



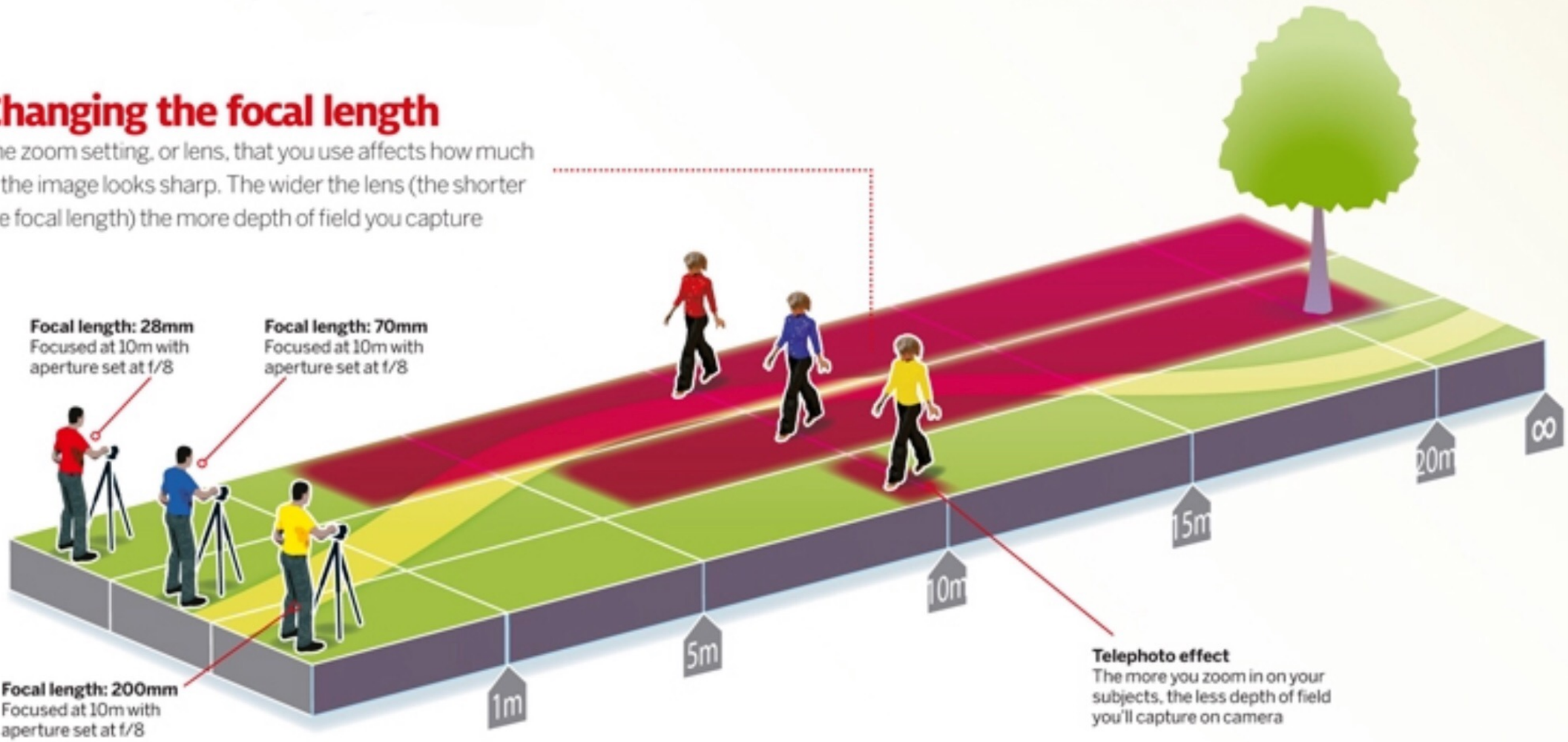


Changing the focus distance

The closer you are to the subject you're focusing on, the less depth of field you will capture on camera

Changing the focal length

The zoom setting, or lens, that you use affects how much of the image looks sharp. The wider the lens (the shorter the focal length) the more depth of field you capture



3. Color Balance

3. Color
The Third Key to Technically Perfect Images

- *The process of removing color casts so that objects that are white, appear white in the photo. The camera must account for color "temperature". Our eyes are good at seeing white under different lighting conditions.*

Auto White Balance works well most of the time. Most cameras have settings for different situations.

You can easily correct white balance in post processing

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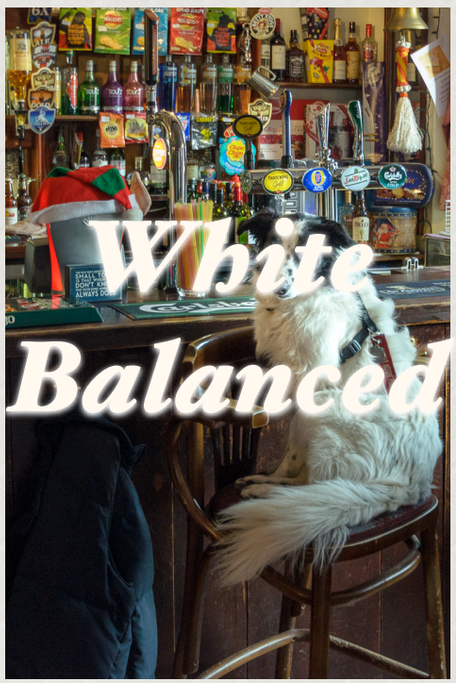

Auto White Balance works well most of the time. Most cameras have settings for different situations.

You can easily correct white balance in post processing