

Introduction to Digital Photography

An Overview of digital camera technology, basic photographic techniques.

Oh the Technology!

DSLR, Megapixels, Image Stabilisation, Dust Reduction,
Live View, Sensors, facial recognition.....

What does it all mean?
(and why does it matter to me?)

Types of Digital Cameras

3 Main classifications

- Point and Shoot
- Prosumer*
- Digital SLR



Point and Shoot digital Cameras (P&S)

- Commonly referred to as “consumer” digital cameras.
- Represent probably 90% of all digital cameras on the market
- Typically small, compact and lightweight
- Targeted at broad majority
- Typically very User-Friendly
- Image Quality has improved drastically



Prosumer Digital Cameras

- Not technically its own specification
 - Common term used to describe advanced models of P&S (now also used to describe many entry level DSLR's)
 - Similar in shape and appearance to Digital SLR's
 - Typically have extended zoom range (8-12X Optical Equiv)
- Typically combine user friendly P&S features with more advanced manual features.



Digital SLR (DSLR)

SLR Stands for Single Lens Reflex

- Have larger sensors, resulting in greater image quality
- Tend to favor manual control, lacking many automatic settings found on P&S
- Much larger and heavier
- Ability to interchange system lenses



So What is the REAL difference between a digital SLR and a point and shoot camera?



The short answer is.....Image Quality

But Why?

How can a 6 megapixel DSLR take a better picture than a 10 megapixel point and shoot?

Because Size Matters!

How the digital sensor works

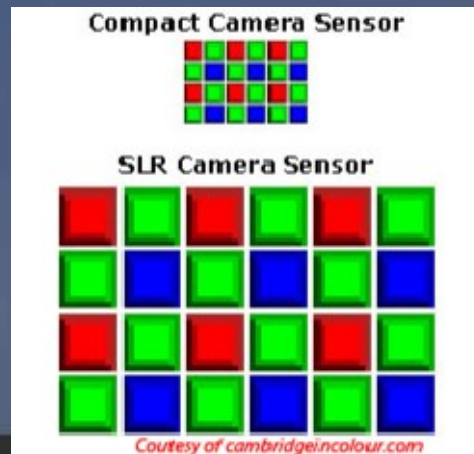
- Each digital image is made from millions of tiny squares, known as pixels.



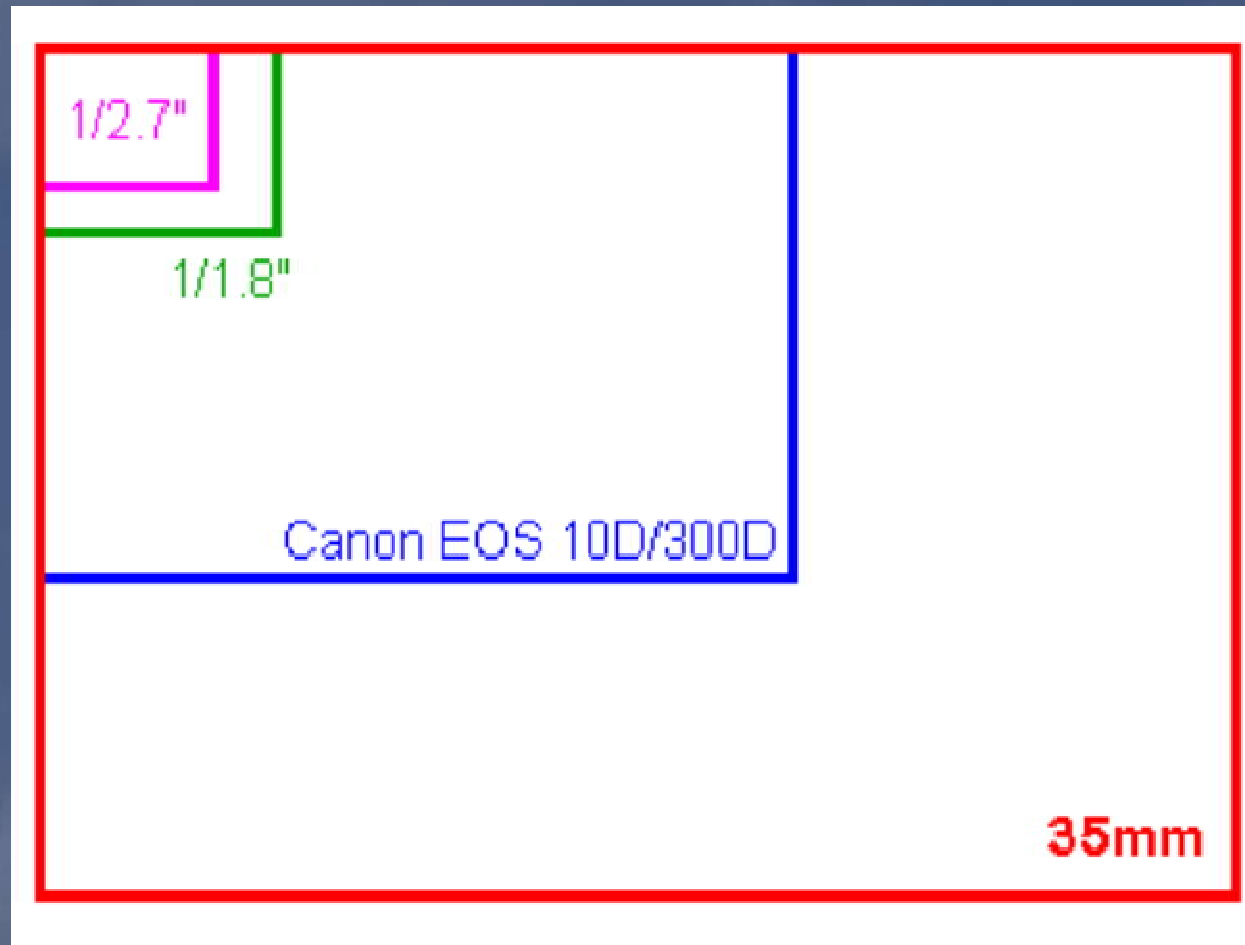
- Essentially, an image is recorded by tiny microlenses (pixels) which make up the cameras sensor

All Pixels are not created equal!

- A digital sensor is essentially made up of millions of tiny micro-lenses (pixels)
- Pixels are analog devices which record light and color data
- Larger Sensors contain larger pixels, which are much better at collecting this data



Digital Sensors Compared



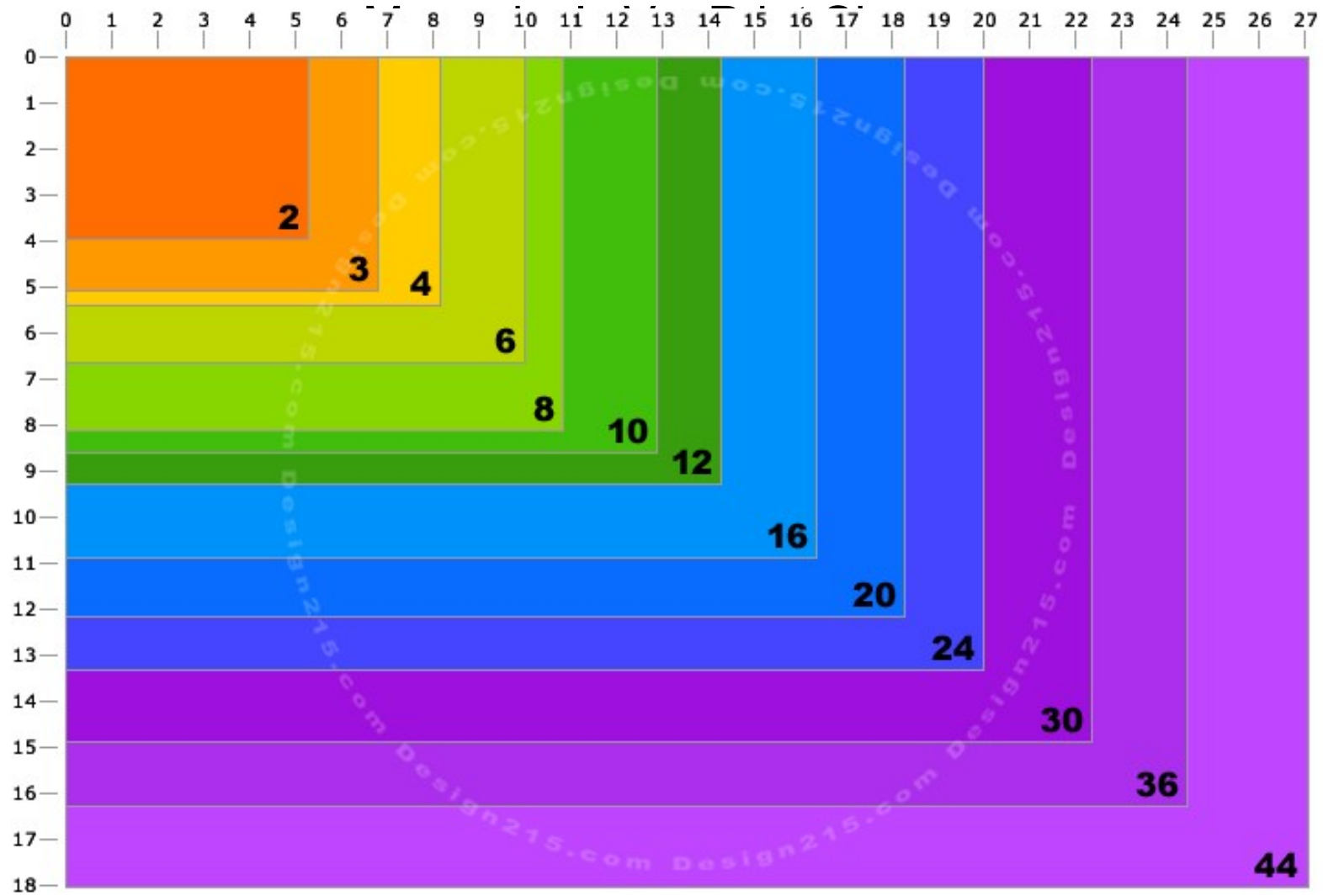
Full-Frame versus APS-C Sized Sensors



Digital Camera Features and Technologies

Megapixels – Determine the total size (Dimensions) of the image recorded by camera

- More MP does not always mean a better picture
- Digital Image dimensions do not equal print dimensions
- For example a full quality image from an 8 megapixel camera will produce a digital image measuring approximately 9X14 inches but printing standards say that you should not print to “Photo Quality” any larger than 8X10



Movement Compensation

Refers to the cameras ability to correct small movements by the user while taking a picture, in order to reduce the blur caused by camera shake.

Very Useful in low-light or telephoto situations

Movement Compensation

Represented differently by different companies:

Nikon – VR – Vibration Reduction

Canon – IS – Image Stabilization

Pentax – SR – Shake Reduction

Sony – SSS – Super Steady-Shot

Dust Reduction

Dust is more of a problem in DSLR's due to changing lenses
Once dust gets on your sensor, it can be difficult to remove
Dust reduction is essentially a mechanism which shakes the
cameras sensor to free any clinging dust particles
Special anti-static coatings or filters may also be used

Live View

- Refers to the ability to use the lcd screen on the camera the same way you would use the viewfinder
- Shots can be composed even while holding the camera away from your face
- Originally only a feature in P&S, DSLR's now use Live View also

Facial Recognition

- Camera detects faces in your frame based on color, contrast change, etc.
- Focus is automatically adjusted so detail in faces is high
- Color and contrast are automatically adjusted to create pleasing skin tones

Getting a “Good” shot

While there are hundreds of factors which can make a photo “good”, it is still a relative term, and good to one person may not be good to someone else.

For our purposes we will refer to good in the sense of a correct exposure.

Exposure

A “correct” or “good” exposure occurs when you maintain as much detail as possible in both the very bright parts (highlights) as well as the very dark parts (shadows) of an image. How much of a range in which you can capture detail from light to dark is referred to as the Dynamic Range. As you are about to see, there can be many “correct” or “good” exposures

There are three factors which influence the exposure of your image:

- Shutter Speed
- Aperture
- ISO

Shutter Speed

Refers to how long the shutter is open, exposing the image sensor to light.

(how long the camera “sees” the picture)

Measured in Seconds, from 30 down to $1/8000$

Shutter Speed

Fast Shutter Speeds (600 and up) are used to stop motion and will freeze the subject.



Shutter Speed

Slow Shutter Speeds ($1/60$ or slower) can be used to portray movement or speed



Shutter Speed

Very Slow Shutter Speeds (5 sec. or slower) can be used in very low light situations to obtain correct exposure, or achieve dramatic effects.



Shutter Speed

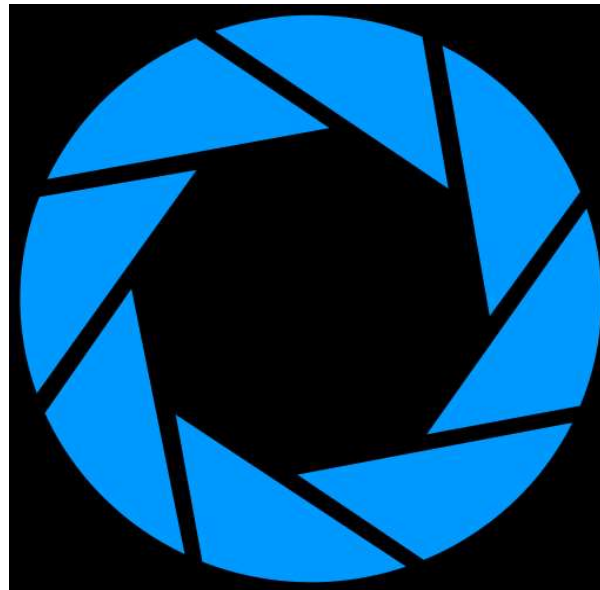
Beware!

As your shutter speed decreases, your chances of getting a blurry image increase because you must hold the camera steady for a longer period.

Aperture

An aperture is defined as a hole or opening through which light is admitted.

Inside the camera lens is a system of blades which open and close to increase or decrease the opening through which light passes into the camera



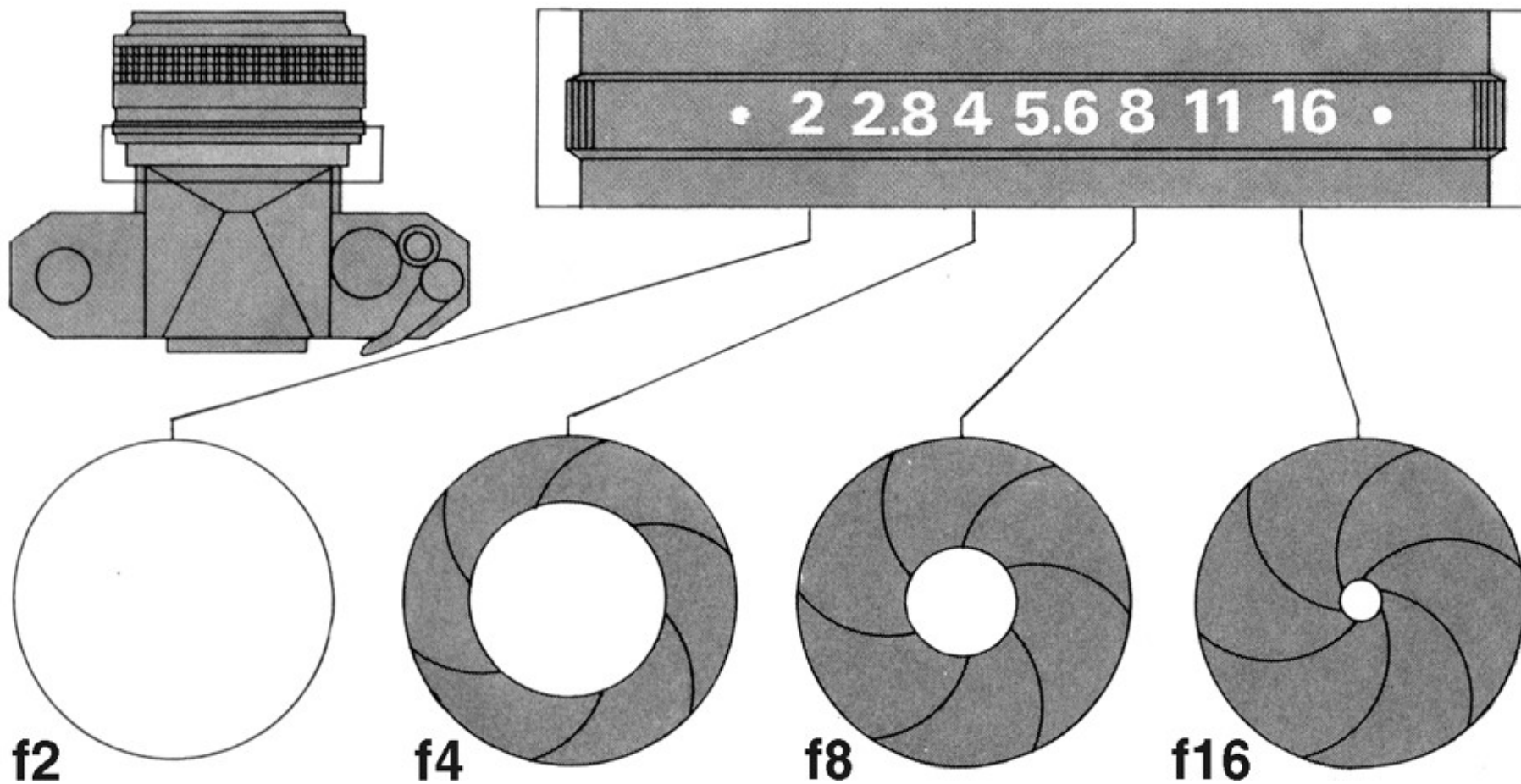
Aperture

Often referred to as an f-stop, aperture is usually represented by: f/1.8, or f/5.6

A Smaller # means a wider opening and is referred to as a larger value (eg. A large aperture of 2.0, a small aperture of 22)

The wider the lens is open (larger aperture value), the more light gets in (you can use faster shutter speeds)

Aperture



Depth of Field

Aperture also controls depth of field (DOF), which refers to how much of your image is in focus.

A wide aperture (small #) will give a shallow DOF and can be used to isolate a subject.

Depth of Field



Shallow Depth of
Field (F2.8)



Wide Depth
of Field (F32)

ISO

Refers to the light sensitivity of the sensor

HIGH ISO value means the sensor will be MORE sensitive to light, meaning it will take LESS LIGHT to get the right exposure

Similar to Film Speeds in 35mm format

ISO

Typically ranges from 100-1600

Newer Digital cameras have a higher range
(up to 64000)

Using High ISO values causes the sensor to produce much more heat, which creates digital “noise” in images.

ISO

Noise is similar to film grain and causes loss of fine detail in images

It is more visible in dark parts of an image and is generally more noticeable when displayed on screen than in print

ISO

Some cameras claim to have “Digital Image Stabilization”

This just means that the camera will automatically increase the ISO in order to allow a faster shutter speed

Faster Shutter Speed will reduce the likelihood of camera shake, but high ISO will most likely result in a grainy image.

The fourth Element

White Balance

White balance doesn't really affect your exposure, just the appearance of colors in the image

Different light sources cast their own colors, which cannot usually be noticed with the naked eye.

White Balance is essentially the camera compensating for the color cast of the light in order to reproduce the “correct” colors

White Balance

The color cast of light is referred to as its Color Temperature and is rated in degrees Kelvin

Ranges from “Cool” to “Warm”

Most Digital cameras have Automatic White Balance, but also specific options for different sources of light.

Basic In-Camera Settings

Exposure Modes

There are several modes available which offer a combination of automatic and manual control over the three elements of exposure.

Auto, sometimes represented by an A, or simply a green square, is fully automatic functioning. True “point and shoot” where the camera decides all the settings for you



Basic In-Camera Settings

Av or Aperture Priority allows you to choose the aperture value while the camera chooses the shutter speed required to obtain a correct exposure

Tv or Shutter Priority allows you to choose the shutter speed while the camera chooses the aperture which would produce the correct exposure

M or Manual gives you complete manual control. You choose both shutter speed and aperture

Basic In-Camera Settings

Scene Modes

Scene Modes are basically fully automatic modes designed specifically for a certain situation. They typically place emphasis on one or more settings based on the typical circumstances of the situation chosen.

Most digital cameras have very similar scene modes available

Scene Modes

Backlight - eliminates dark shadows when light is coming from behind a subject, or when the subject is in the shade. The built-in flash automatically fires to "fill in" the shadows.

Beach/Snow - photograph beach, snow and sunlit water scenes. Exposure and white balance are set to help prevent the scene from becoming washed out looking. Use of tripod recommended.

Scene Modes

Fireworks - shutter speed and exposure are set for shooting fireworks; pre-focusing & use of tripod recommended.

Landscape - take photos of wide scenes. Camera automatically focuses on a distant object.

Macro - take close-up shots of small objects, flowers and insects. Lens can be moved closer to the subject than in other modes. Hold the camera steady or use a tripod.

Scene Modes

Night Portrait - take photos of a subject against a night scene. The built-in flash and red-eye reduction are enabled; shutter-speeds are low. Use of tripod recommended.

Night Scene - photograph nightscapes. Preprogrammed to use slow shutter speeds. Use of tripod recommended.

Scene Modes

Party - take photos in a dim lit room; exposure and shutter speed are automatically adjusted for room brightness. Captures indoor background lighting or candlelight. Hold the camera very steady when using this mode.

Scene Modes

Portrait - main subject is clearly focused and the background is out of focus (has less depth of field). Best when taking shots outside during the day. Shoot using a mid to long telephoto lens, stand close to your subject within the recommended camera range and, when possible, select an uncomplicated background that is far from the subject.

Scene Modes

Sports (also called Kids & Pets)- take photos of a fast moving subject; fast shutter speeds "freeze" the action. Best when shots are taken in bright light; pre-focusing recommended.

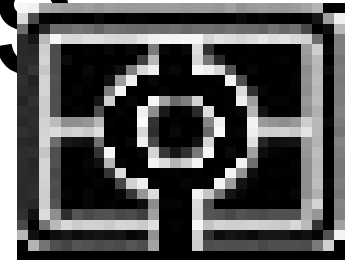
Sunset - take photos of sunsets and sunrises; helps keep the deep hues in the scene.

Metering Modes

The metering system within a camera measures the amount of light in a frame and determines the best exposure. Many cameras have more than one metering mode and each evaluates a scene in a different way. Essentially, by changing the metering mode you are telling the camera to evaluate the scene in a different way.

Metering Modes

Center-weighted metering



Currently the most common digital camera metering system. Center-weighted is the metering system of choice on digicams that do not offer other metering modes.

Exposure metering is averaged over the entire frame with emphasis placed on the central area. Used for general and portrait photography.

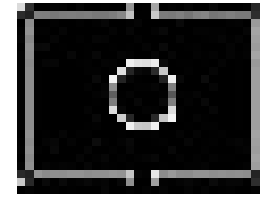
Metering Modes

Matrix (evaluative) metering



A complex metering system whereby a scene is split up into a series of zones. Overall exposure is based on evaluating each zone individually and taking an average of the total light readings.

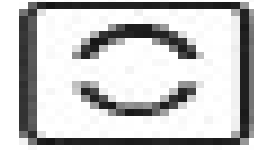
Metering Modes



Spot metering

Spot metering covers just under 4 percent of the viewfinder area. It takes a precise exposure reading only at the very center of the frame and disregards the rest. A spot meter is used when a subject is backlit or has bright light upon it and the background is dark -- for example, when there are extremes in brightness in a scene.

Metering Modes



Partial metering

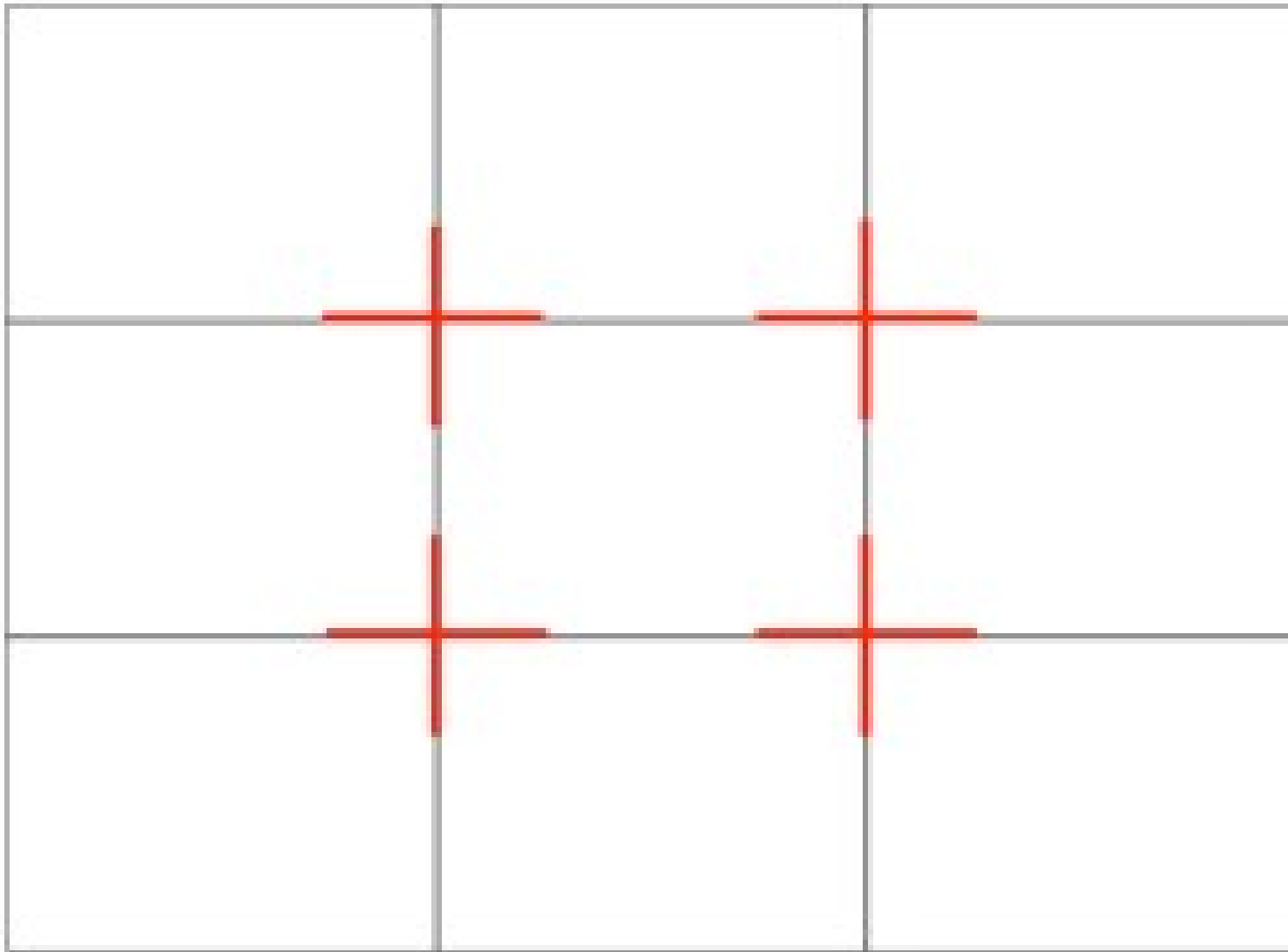
Partial metering is similar to spot metering but covers a larger area of the viewfinder, about 13.5 percent. It is useful for taking portrait photos when the subject is back lit. Underexposure is minimized by metering on the face.

Both spot and partial metering are considered advanced settings. They give the skilled photographer more control over exposure than do matrix and center-weighted metering.

Composition: The Rule of Thirds

- Imagine the frame divided into three equal sections both horizontally and vertically
- Divided into “thirds”
- The Concept is: Placing your subject or elements along any of these lines, and especially on or near the intersecting points, makes a photo more naturally attractive to the viewer.

The Rule of Thirds



Rule of Thirds Illustrated



Rule of Thirds Illustrated



• Rule of Thirds

- Again, the concept is simple: Place subjects along the lines, or near intersecting points
- For portraits, the eyes are often positioned along one of the horizontal lines preferably near one of the power points to make the photograph more pleasing to look at, and naturally draw attention to the eyes.
- For landscapes the horizon is aligned to any of the horizontal lines depending on how much land/water/sky you want to show.

Post Processing and Image Management

- Picasa
- Free to download
- Distributed by Google
- Simple, User friendly functions and interface

- Thank You!

- Now go out and take some pictures!!!

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