

Let There Be Light

Controlling the camera and lighting so
that they don't control you!

How To Make A Photo Rather Than Take A Photo



We all now have thousands of images on our phone, hard drive and in the cloud. Back in 2000 when film was still at its peak the New York Times reported that “Kodak announced that consumers around the world had taken 80 billion photos, setting a new all-time record.” In 2020 with digital imagery being the norm the number of photos taken is predicted by Life In Focus magazine to be something around 1.6 trillion!

Nowadays we don't have to think about taking a photograph. The camera can do all that for us. All we have to do is point and shoot and hopefully we will get a perfectly exposed image. However the look of this photo has been decided by the camera. The photographer has not decided anything about how that image looks or is perceived by the viewer. As you now begin to analyse and respond to your imagery it is important to learn how to make your own images look the way you want them to so that they are perceived by the viewer the way you intended. This presentation begins to look at how you can use various controls of your camera and lighting to influence the details of how your images will look particularly for the Let There Be Light project.

The Quality of Light

The two main types of light

Hard light: In general, a single-point light source, aimed from a distance is referred to as hard light. This hard light source creates a high contrast look, where the transition between highlights and shadows is sharp and well-defined.

Hard light is caused by the sun, a bare lightbulb, spotlights, a torch, the pop-up flash on a camera



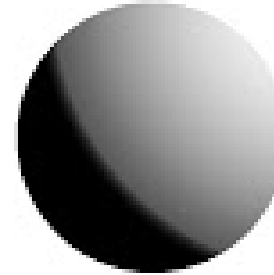
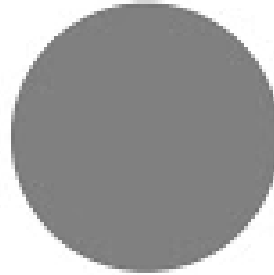
Soft light : On the other hand, a soft light source is a larger, broader light, placed relatively close to the subject. The light tends to be flatter in contrast, and the highlights hold more detail, with the shadow's edges being soft and open.

Soft light is created by the sky on an overcast day, studio soft boxes, bounced flash window-light from a north facing window

Quality of Light 2

INTENSITY

The overall brightness of the light in the scene. Easily controlled through exposure settings.

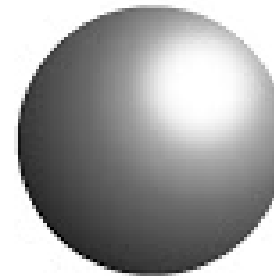
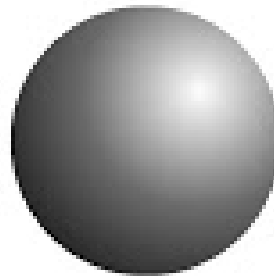


TRANSITION

The size of the penumbra between light and dark. Hard light is high contrast and sharp transition.

DIRECTION

A crucial element in showing the shape and form of an object. Images are all shadows.

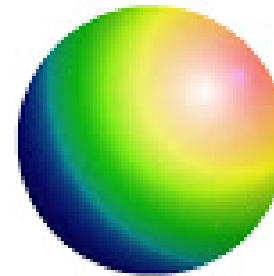
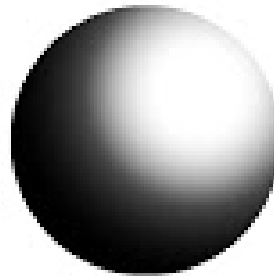


SPECULARITY

The reflective quality of the object you are photographing.

CONTRAST

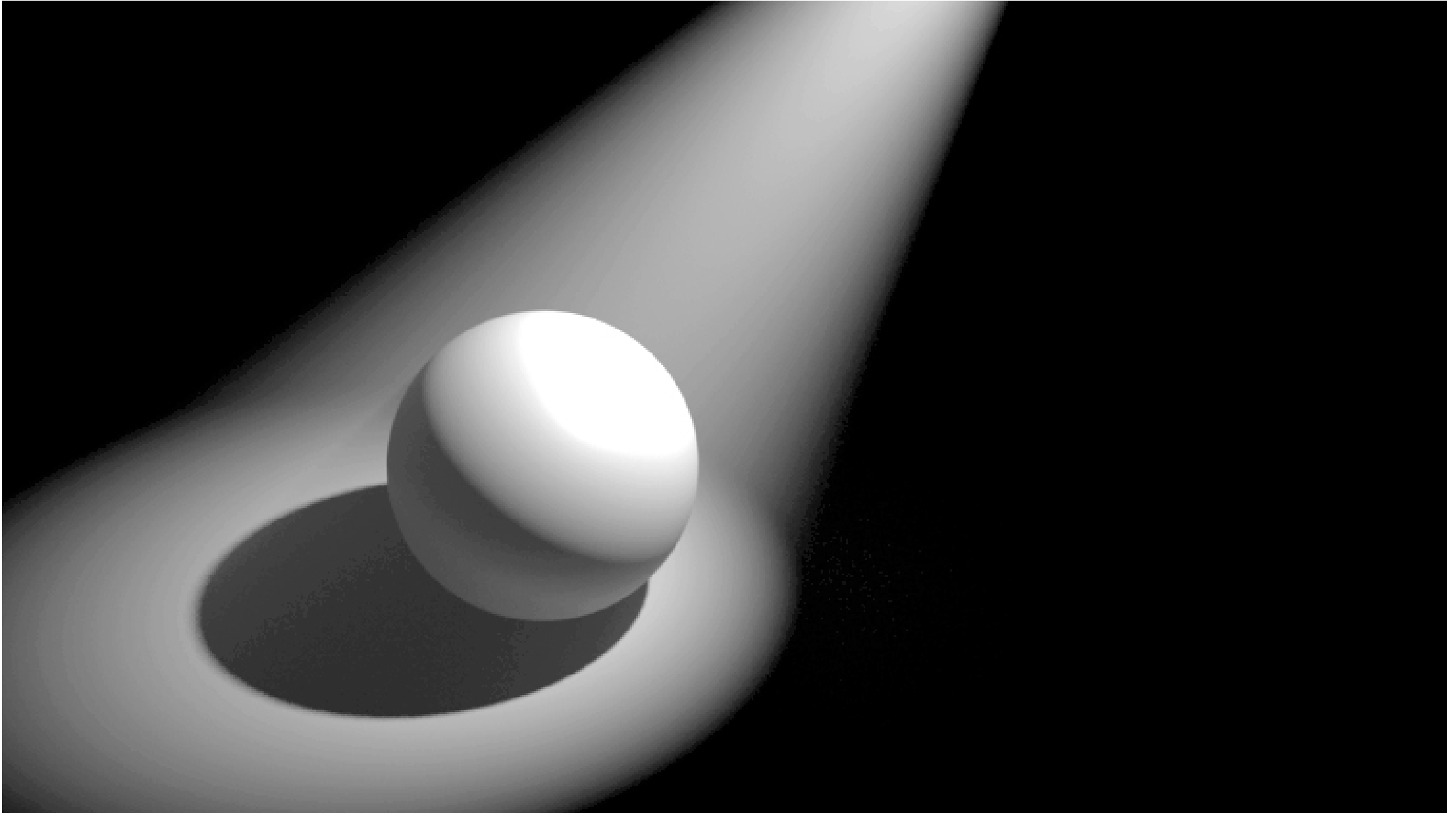
The difference between the brightest and darkest parts of the image.



COLOUR

A colour cast is caused by a bias to one particular colour.

Controlling the Light In The Studio

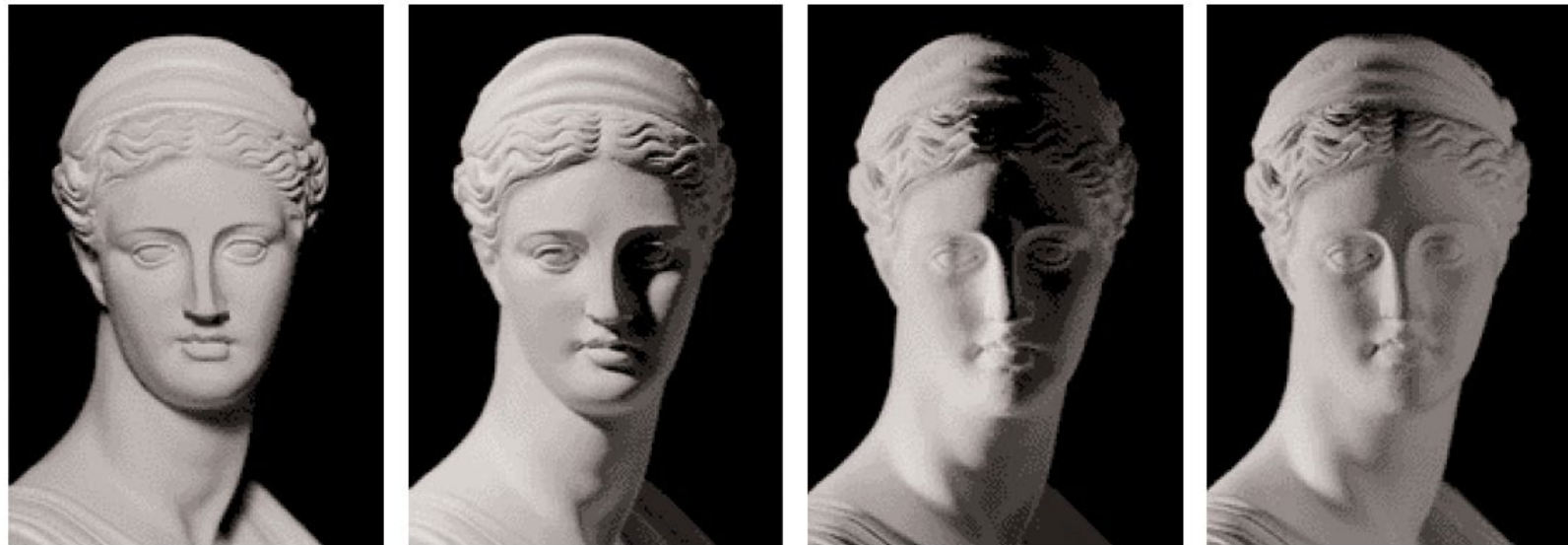


Light Adapters



In the studio you can control the light completely. Light can be harsh, soft, diffused, direct or reflected. The different light fittings such as soft boxes, umbrellas, snoots and reflectors will enable you to change the quality of the light and alter how your subjects will look and be perceived. However by using similar ideas of translucent and shiny reflective surfaces and materials with your light these ideas can be used with any light source, even at home.

How Changing The Light Alters An Image

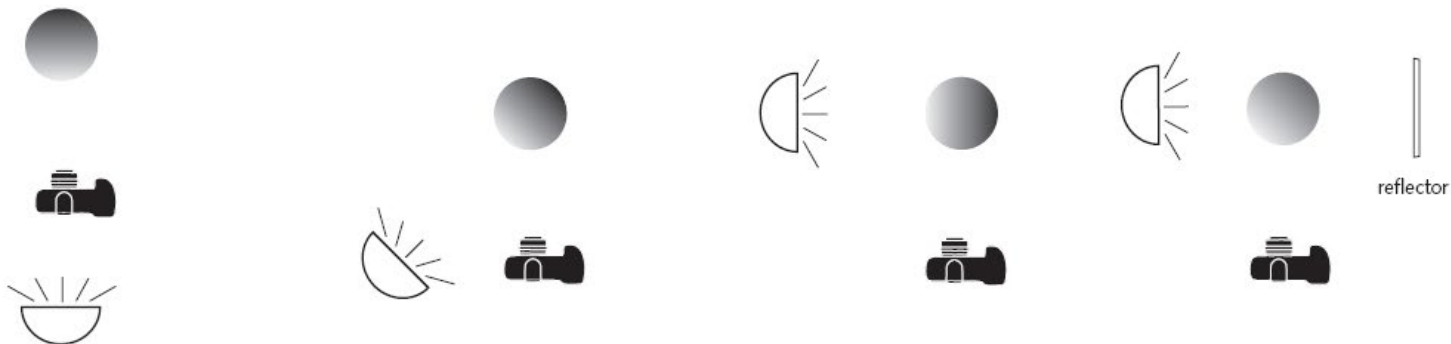


Front, direct

45-degree

Side or 90-degree

Side with reflector fill



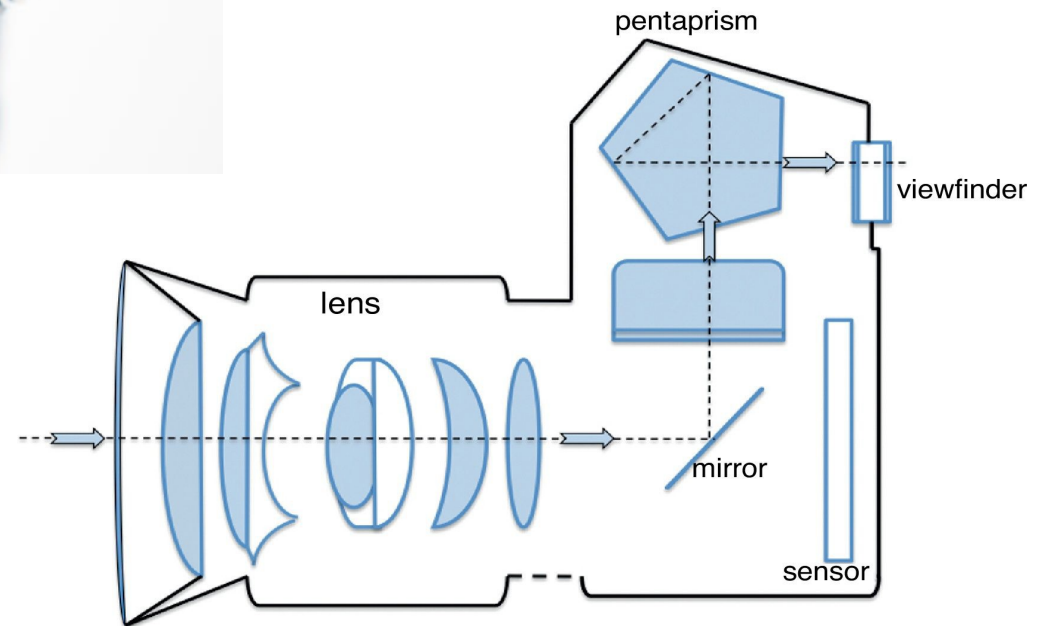
Simply by moving a light around an object and changing the angle, how the subject is perceived can be completely changed. This light can simply be the light coming from a window or a single lamp source in a room

Controlling The Light in Your DSLR Camera



By using your camera controls you are able to change the level of light entering your camera before it hits the camera sensor.

Changing the camera controls effects the light hitting your camera sensor and can effect the exposure of your image. However the exposure controls will also effect other things as well. These can be used to change how your photos are perceived and understood by the viewer.



Camera Modes

P: Program mode has the camera calculate both [shutter speed](#) and [aperture](#) (given a manually or automatically selected ISO). The difference between Programme mode and Full Auto mode is that in programme mode, only the *exposure* is automatic, while other camera settings (e.g. shooting mode, exposure compensation, flash) can be set manually; in Full Auto mode everything is automatic.

A or Av: [Aperture priority](#) or 'Aperture value' enables manual control of the aperture with the shutter speed calculated by the camera for proper exposure (given an ISO sensitivity).

S or Tv: [Shutter priority](#) or 'Time value' enables manual control of the shutter speed with the aperture calculated by the camera for proper exposure (given an ISO sensitivity).

M: In Manual mode both shutter speed and aperture are set manually (with ISO sensitivity also set manually). Used where proper image exposure requires accurate manual adjustment. THIS IS THE BEST CONTROL TO USE TO CAPTURE LIGHTING AND LIGHTING EFFECTS



Lenses



AF Micro Nikkor 60mm F2.8



AF-S Nikkor 12-24mm F1.4



AF Nikkor 35-70mm F2.8



AF-S Nikkor 50mm F1.4



AF-S Nikkor 24-120mm F2.8D

Choice of lens can greatly affect how your image will look. A 50mm lens captures images the way the human eye sees. Wider angle lenses such as the 12-24mm will distort the image. To capture very close up details which can change the viewers perception of an object use either a Zoom lens such as the 24-120mm, or use a micro or macro lens like the 60mm micro.

Examples Of Macro and Zoomed Images

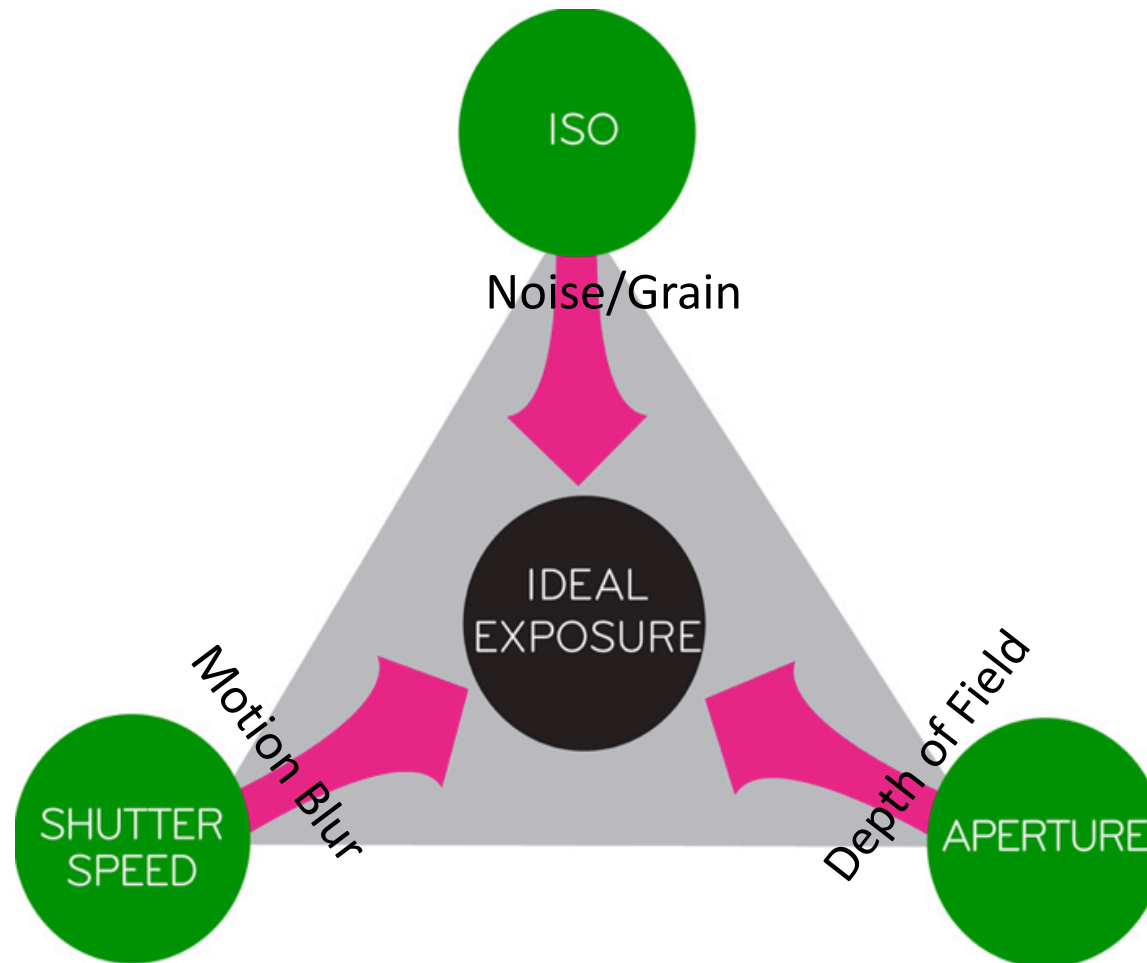


The zoom lens allows you to capture close up details of an object and has a wide enough aperture to blur the background.

The 60mm Micro allows you to place your camera very close to an object to capture abstract angles



Exposure Triangle



The exposure (amount of light) in every image you take will be controlled by the following settings on your camera - shutter speed, aperture and ISO. They will all however change other aspects of your photograph as well such as background blur (depth of field) and freezing or blurring motion. It is important to recognise when these changes occur and how you can control them.

Typical Viewfinder Info



Shutter Speed

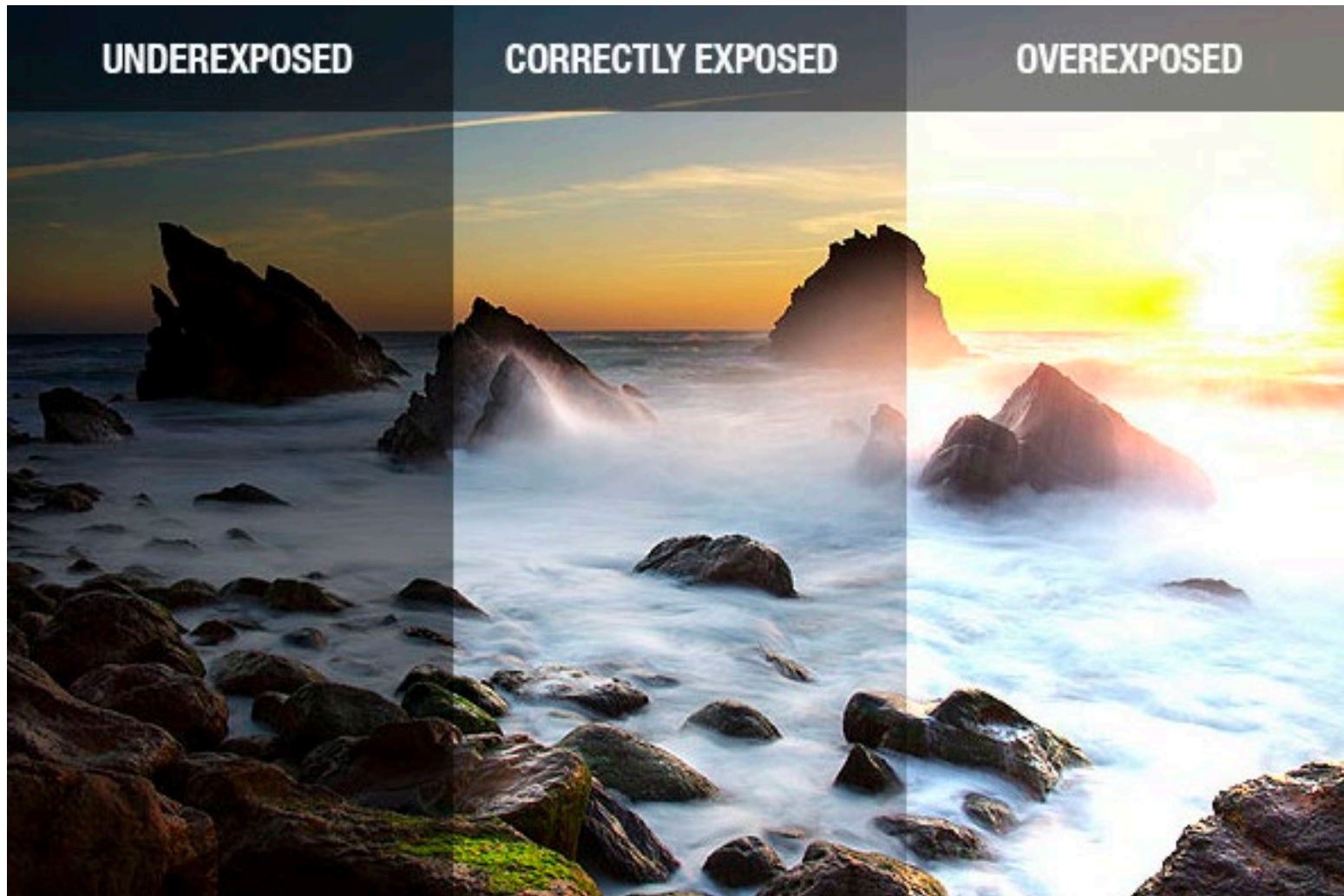
Aperture

Exposure meter

ISO Setting

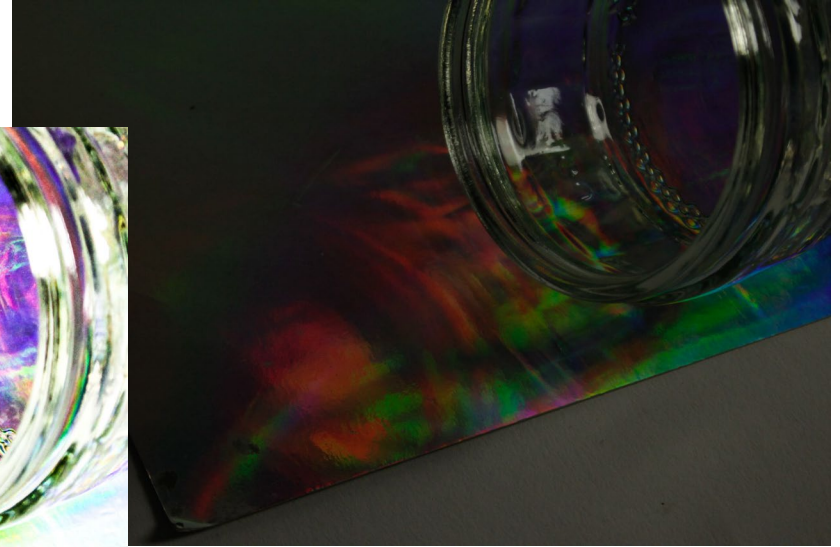
This is a typical display through the viewfinder of a DSLR. All the information on camera controls is shown here and it is worth checking these to ensure the correct effect will be happening in the camera.

Ideal Exposure



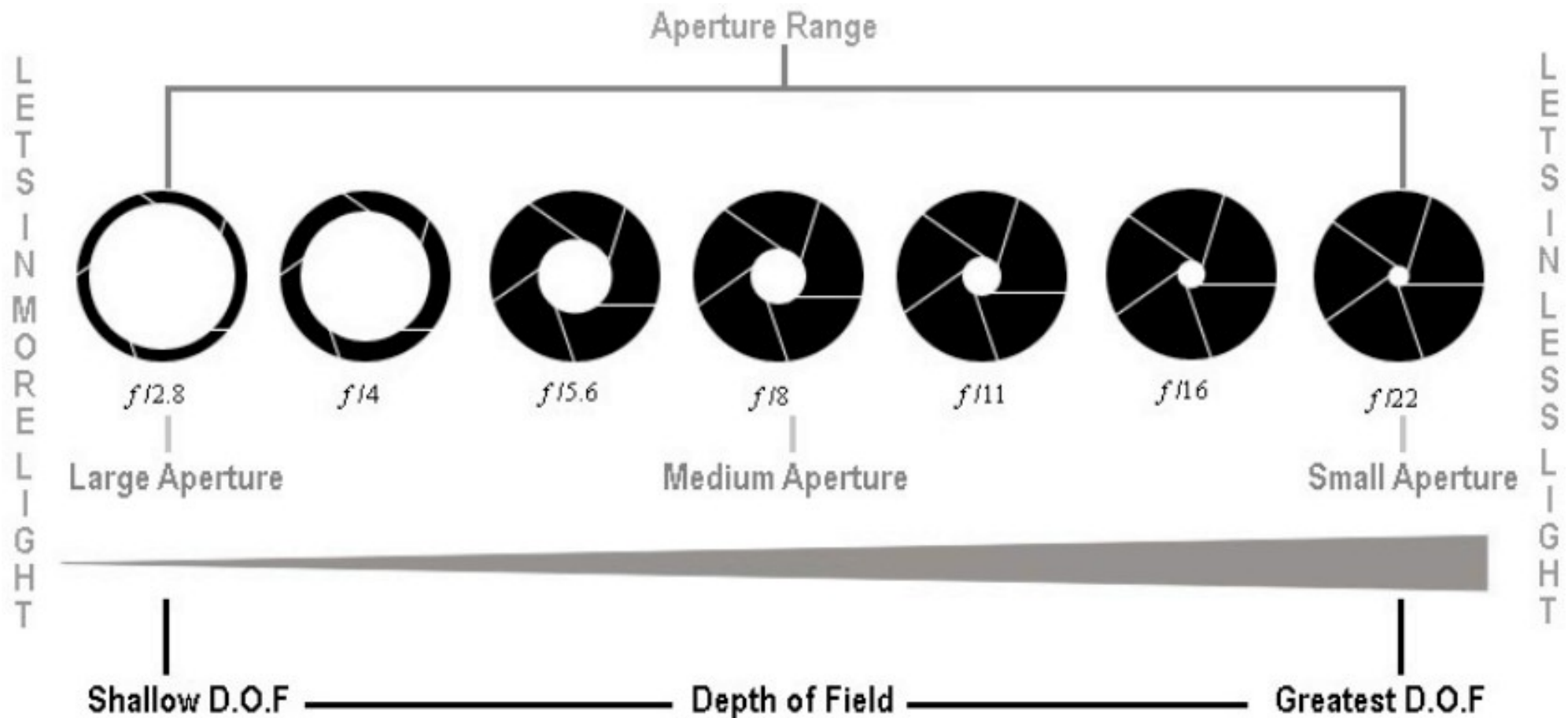
The concept of an ideal exposure is not always easily achieved. A camera's exposure meter will always try to achieve an image that is "correctly exposed." This works for some subjects but not for all and it certainly depends on what details in the light or dark areas you are trying to show.

Getting Your Exposure Right



Sometimes objects can be difficult to expose properly especially when you are trying to photograph light rather than just a lit subject. Shiny, bright, reflective backgrounds can confuse an exposure meter and can cause a picture to be underexposed. Try and “bracket exposure” to find out which is best for your image. Bracketing means to take three different shots of the same scene, one slightly over exposed, one slightly under exposed and one at a “correctly exposed” setting

Aperture



The aperture is just a hole in your lens. This graphic shows that as you shut down or open up the aperture not only do you change the amount of light entering your camera you will also change the depth of field in your photograph. This creates the effects shown on the following page.

Examples of Depth of Field

Broad Depth of Field at f16



A larger aperture like the one selected below will narrow the depth of field blurring the background

Narrow Depth of Field at f2.8

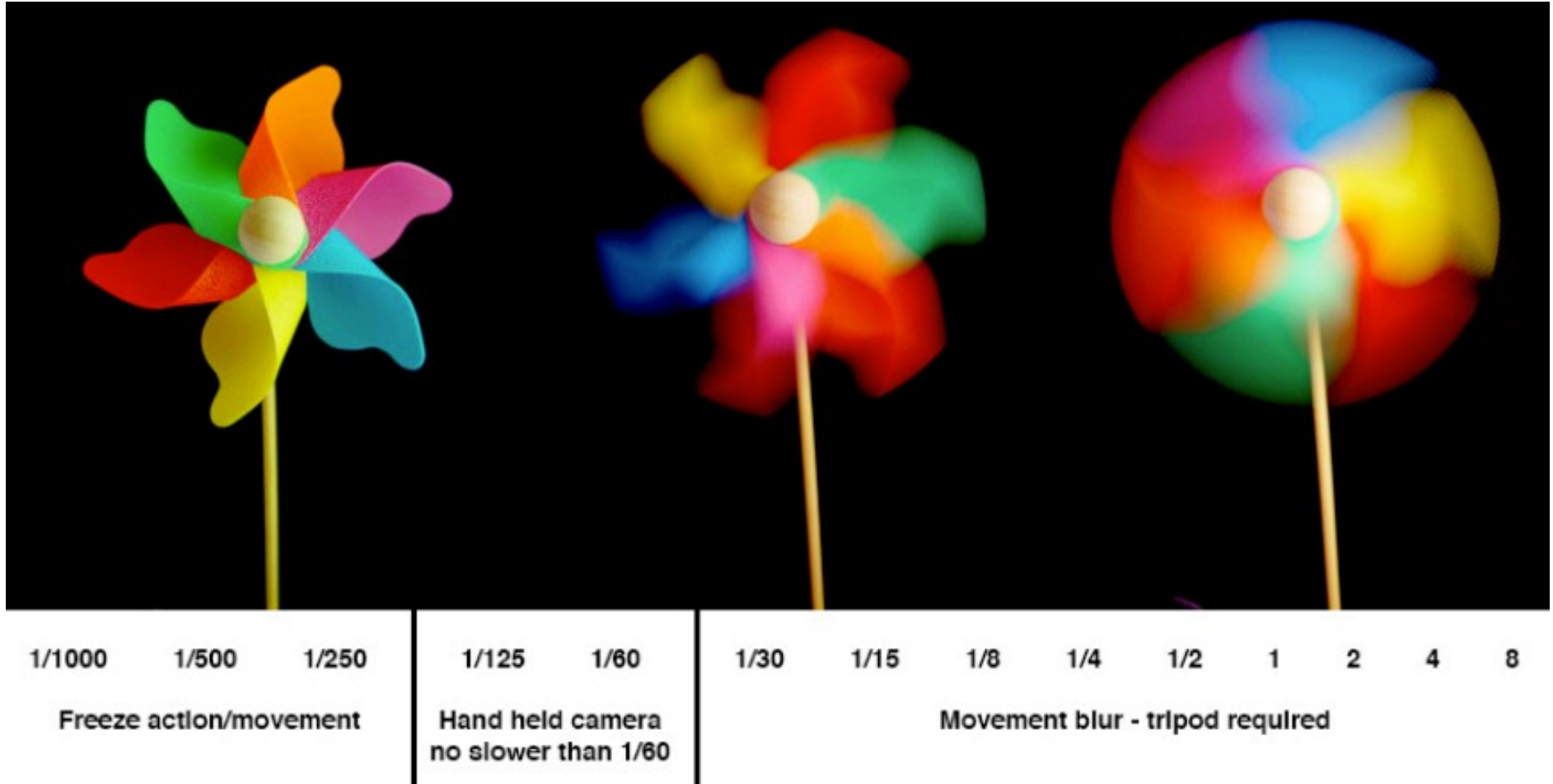


A smaller aperture like the one above will keep things sharp from the front to the back of the image

How To Use Depth Of Field To Isolate A Subject



Shutter Speed



In all these images the windmill is spinning around. A fast shutter speed of $1/1000^{\text{th}}$ or $1/500^{\text{th}}$ of a second will freeze the motion. As you slow the shutter speed down the motion blur begins to show. At 2, 4 or 8 seconds the windmill becomes a blur of colour. Note that if your shutter speed is slower than $1/60^{\text{th}}$ of a second you will need to support your camera to stop the stick from blurring as well when you take the picture.

How Shutter Speed Effects Daylight Photography



shutter speed at
1/3 sec.

The motion is blurred

By blurring the motion, it looks like movement and gives a different impression from when you actually saw it.



shutter speed at
1/640 sec.

Freezes motion

Even a fast-moving action can be frozen in the picture. A moment of motion that even the human eye cannot see can be captured by the camera.

How Shutter Speed Effects Studio Photography

Shutter blur like ordinary movement blur can happen if the shutter is set too slow and there is ambient light present in the studio

Shutter too slow



Shutter too fast



Shutter block or photographing the shutter as it moves across the lens happens when the shutter speed is set too fast

Using A Slow Shutter Speed To Capture Light Movement



By using a slow shutter speed , movement will become blurred. This is very effective for this shot where it has been used to create ta very ethereal effect. In low level lighting conditions, if you want to capture detail and definition, you will need to hold the camera steady by using a tripod. Try doing this and then moving the object being photographed to create an image with blur and sharp details

ISO

Sun, daylight or flash



ISO 100

ISO 200

Cloudy, overcast



ISO 400

ISO 800

Night, low light, indoors



ISO 3200

Examples:

Fuji Reala 100
Fuji Velvia 100
Ilford FP4 125

Examples:

Fuji Pro 400
Kodak Tri-X 400
Ilford HP5 400

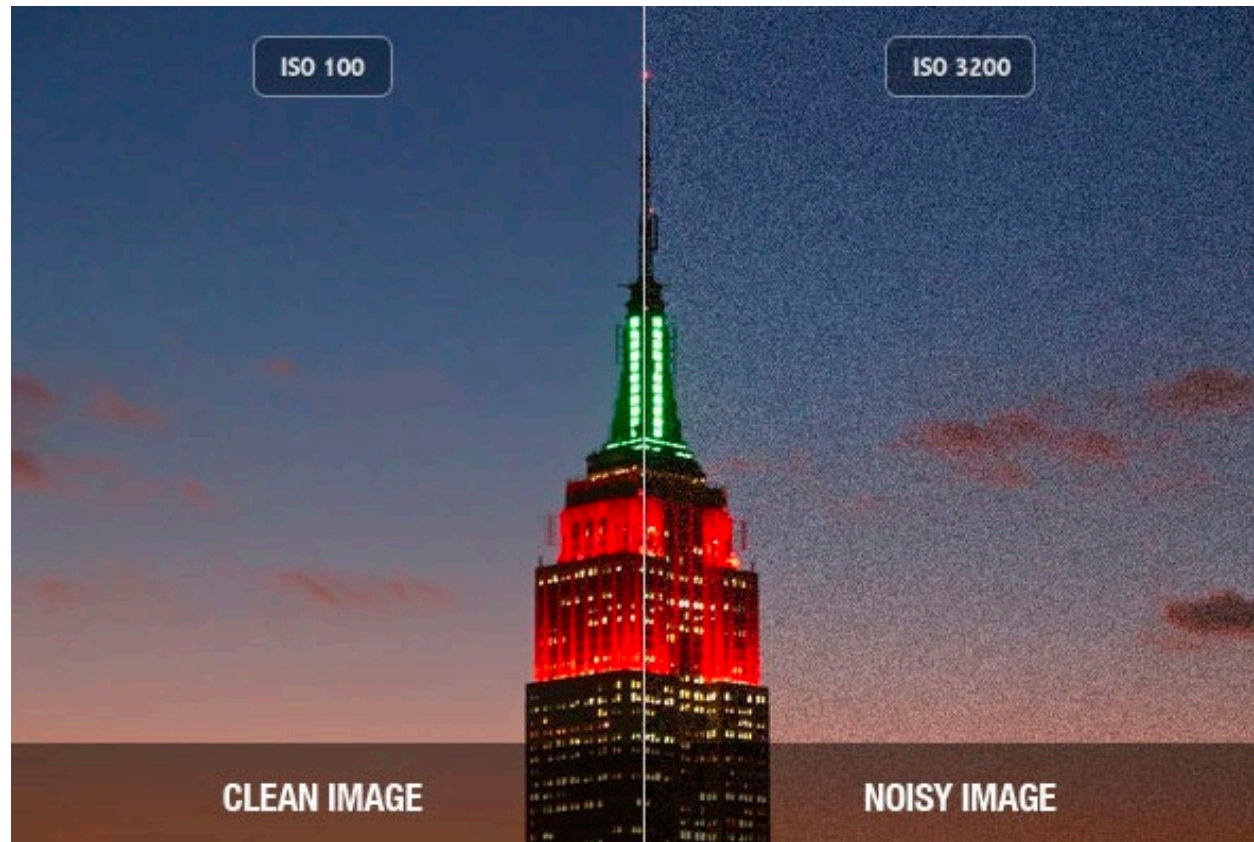
Examples:

Ilford Delta 3200

In traditional (film) photography ISO (or ASA) is the indication of how sensitive a film is to light. It is measured in numbers (you've probably seen them on films – 100, 200, 400, 800 etc). The lower the number the lower the sensitivity of the film and the finer the grain in the shots you're taking.

In Digital Photography ISO measures the sensitivity of the image sensor. The same principles apply as in film photography – the lower the number the less sensitive your camera is to light and the less noise is visible.

The Effect of ISO



Adjusting the ISO allows you to alter the sensitivity to light of your camera's sensor. The higher the ISO number the more possible it is to capture detail in lower light. However as the ISO rises so does the amount of noise in the picture.



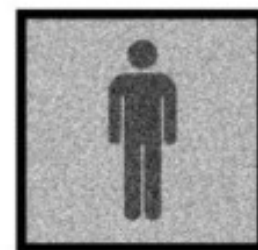
ISO 50



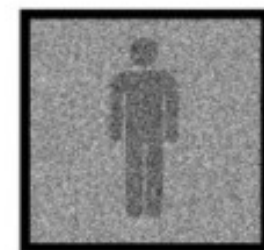
ISO 200



ISO 800

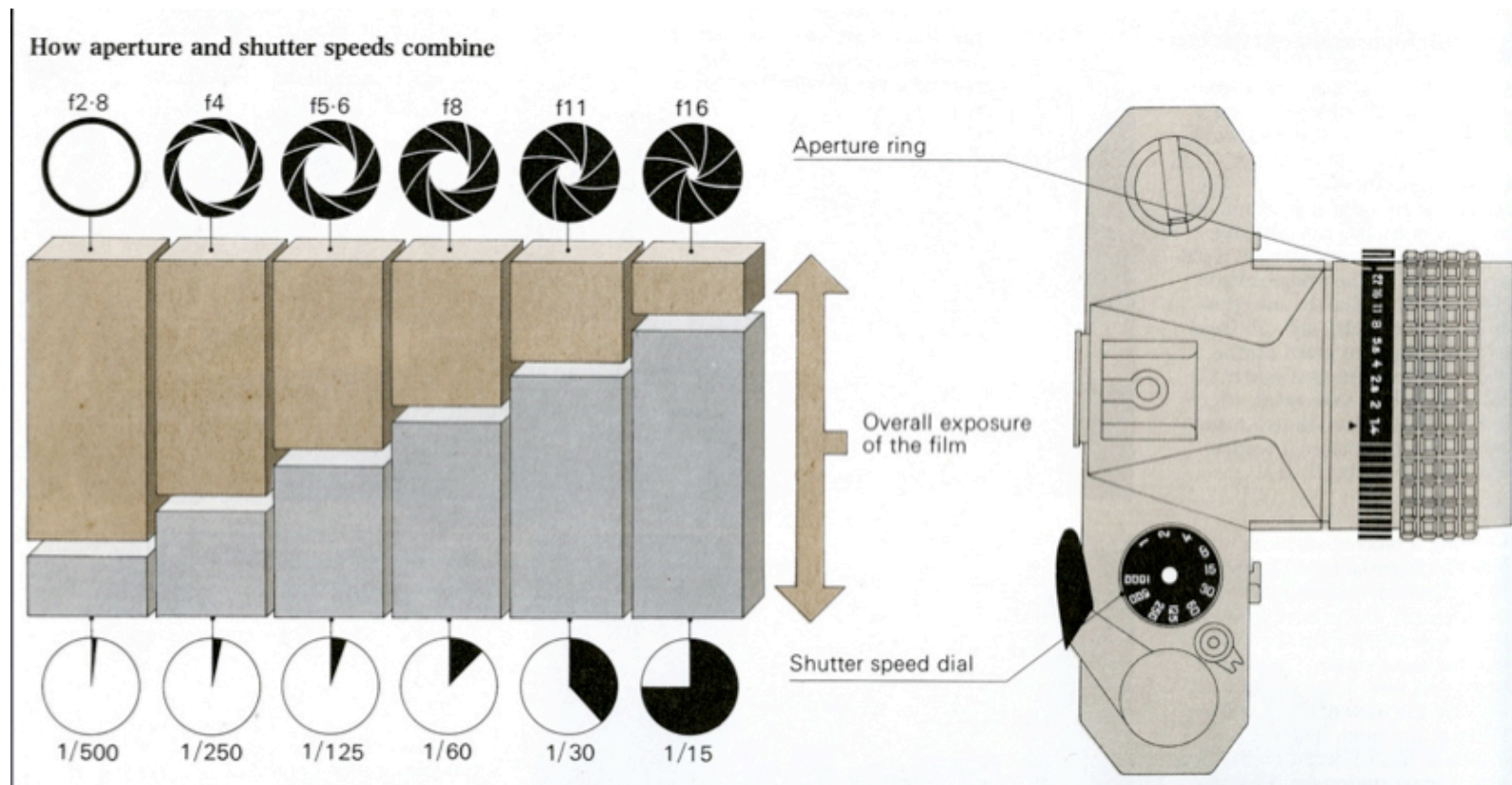


ISO 3200



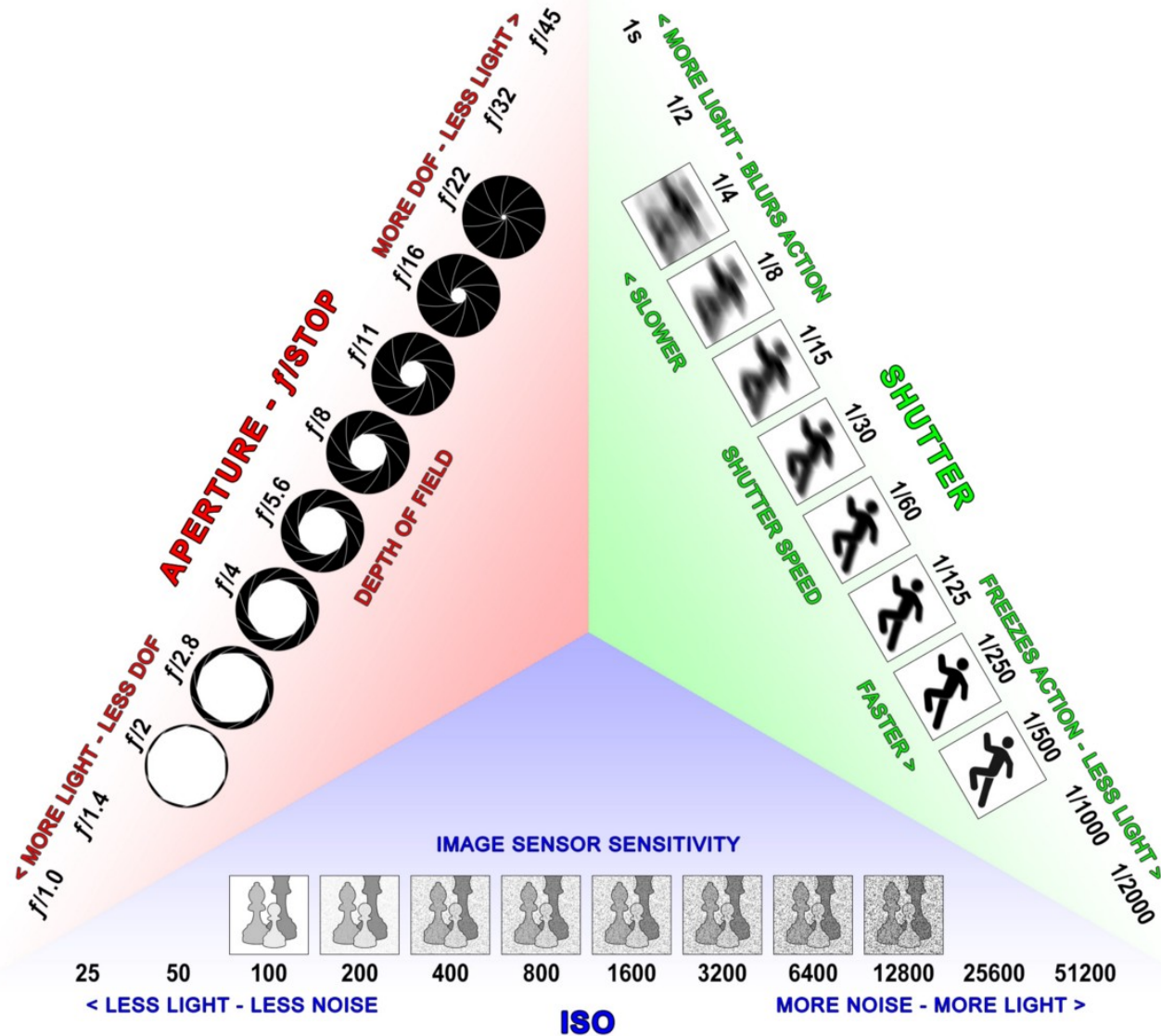
ISO 12800

The Relationship Between Shutter Speed and Aperture

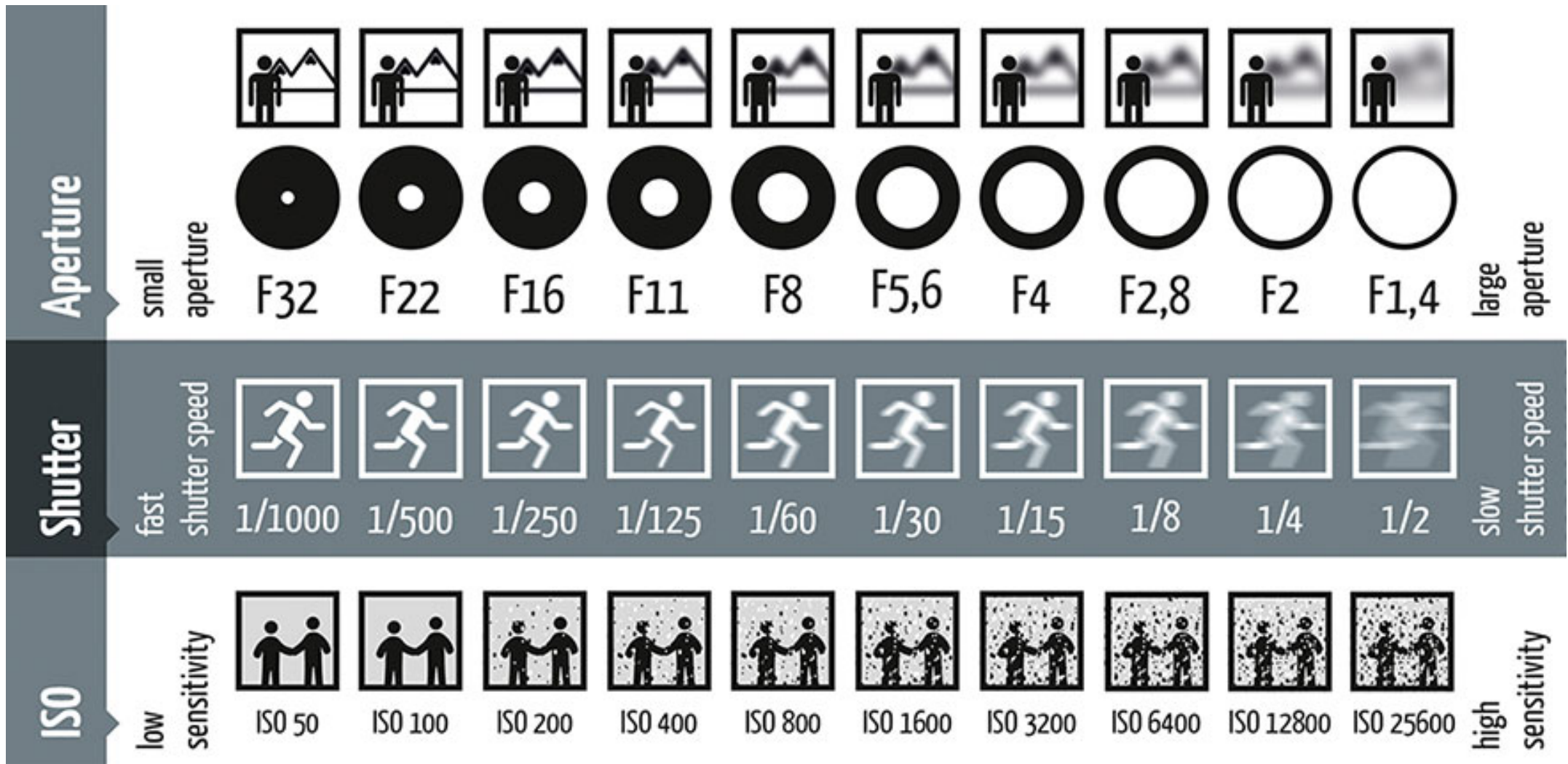


This graphic shows the relationship between aperture and shutter speed. If you “shut down the lens” and make the aperture smaller, say from f5.6 to f8 you reduce the amount of light entering the camera by one stop. If you also adjust the shutter speed from f1/125th to 1/60th of a second you are increasing the amount of light by one stop. At every step in the above graphic the overall exposure remains the same.

How All These Things Work in the Exposure Triangle

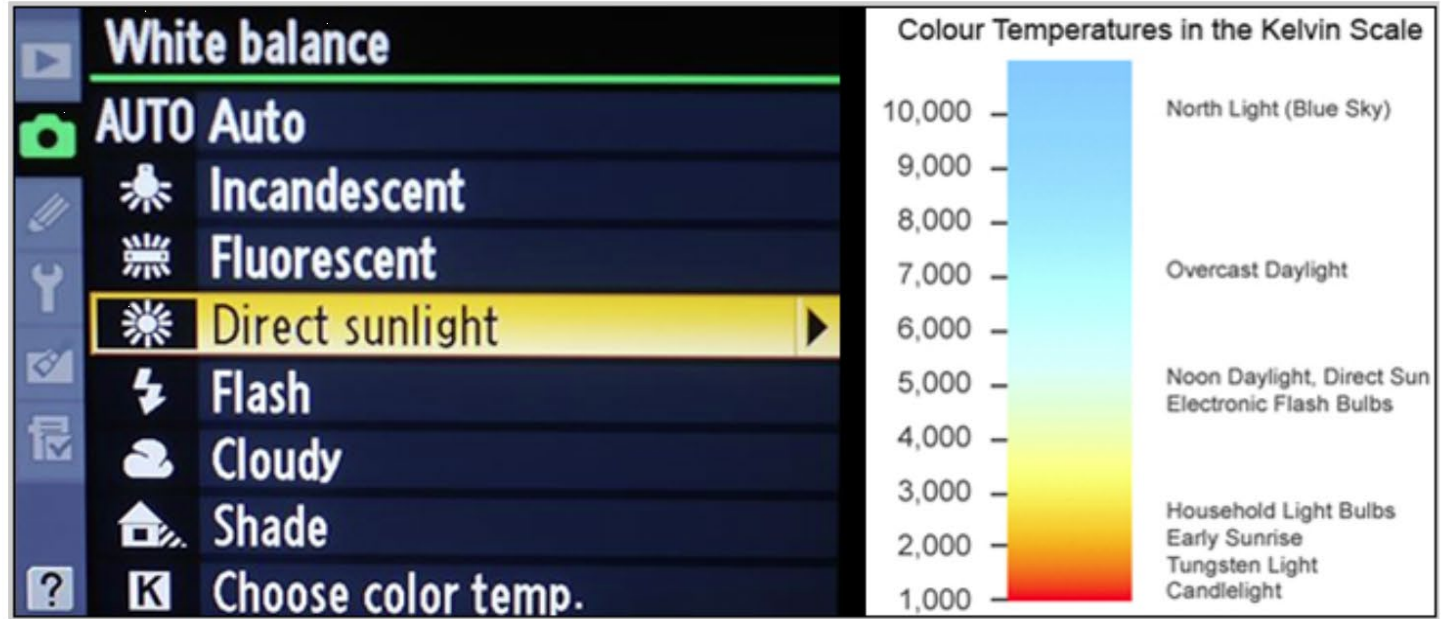


Quick Reference Sheet



A useful reference sheet that can be downloaded from our website and put in your camera bag

White Balance



White balance (WB) is the process of removing unrealistic color casts, so that objects which appear white in person are rendered white in your photo.



White Balance Comparisons



Tungsten



Fluorescent



Daylight



Cloud



Shade

For the **manual white balance** here is a series of photographs of the same subject all shot in daylight using different settings for white balance. The source of light with warmest colours – tungsten light – results in the strongest correction towards cooler colours and on the opposite end it is “shade” giving the strongest adjustment towards warmer colours. This means that if the lighting remains the same (daylight) in all photos but the camera White Balance settings are changed to those shown, an unrealistic colour cast will appear on your photos.

Using Gels To Add Colour



Controlling coloured light through the use of gels can make a more striking and controlled image

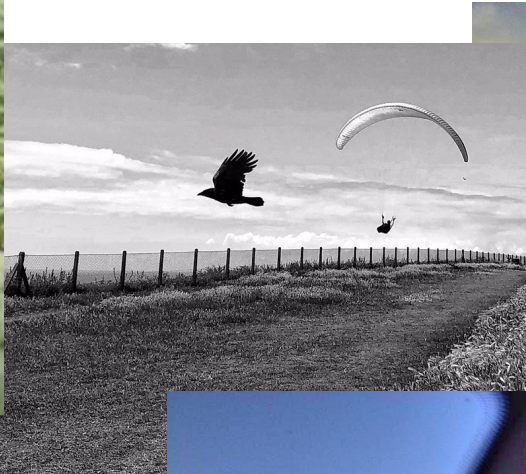
Simple Table Top Studio



A simple table top studio can be built at home to capture images with a neutral background and controllable lighting. Create an infinity curve by gently bending the background paper behind the object. To change the intensity of a light on a subject moving the light closer to an object increases the intensity, moving it away decreases it. Spot-lamps with a very intense directional light can be useful in this project where it is a light effect you are seeking to capture. For lighting an object, as shown above, a more diffuse indirect light would be better as it shows more detail in all areas.

All I've Got Is A Mobile Phone

Sometimes the best camera you have is the camera you have with you. At times like these the best camera you may have is the one in your mobile phone. Mobiles can now come with multiple lenses and manual control functions that along with apps will allow you to use your phone camera like a DSLR.



However you may have a simpler model or you may not want to fork out for expensive apps that don't do exactly what you want. This may mean there are limitations to what you can do to effect how your photos look. However there are some simple tips and tricks to help create great looking photographs with just a simple single lens mobile and the simplest of camera controls.

BENEFITS AND DRAWBACKS

The main benefit of mobile phone cameras is that being light and portable they are always available and easy to use. Also the advancement in computational photography has allowed the mobile phone to electronically, through it's built in software, carry out many functions in camera that would have only been possible in post editing in the past. This includes things such as calculating dynamic range for HDR photos and also using 3D mapping to create the bokeh blur in portrait photography



Put simply the major drawback of a phone camera is the same thing that made it a benefit, the size. Both the lens and sensor in mobile phones are very small and the lens will normally be of both a fixed aperture and focal length, meaning that even with manual camera apps lens settings cannot be changed. The aperture on mobile phone cameras is set at between $f1.7$ and $F2.2$ which seems large and should be able to create a narrow depth of field. However the camera lens and sensor are so close together that the aperture is only useful for capturing large amounts of light.

SIMPLE TIPS FOR BETTER MOBILE PHONE PHOTOGRAPHY

- **Keep your Lens Clean.** Your phone just sits in your pocket or bag with no lens cap. Try to protect it and clean it before taking a photo.
- **Keep Your Camera Steady.** Unintentional camera movement can ruin a photo. Make sure you support your mobile phone or buy a cheap tripod. By moving an object using this set up the object will blur but the background remains sharp. Or use the camera movement to blur the whole shot.
- **Hands Free Shooting.** Another tip to keeping the mobile camera stable is shooting hands free . To do this use the volume button on your headphones to take the picture.

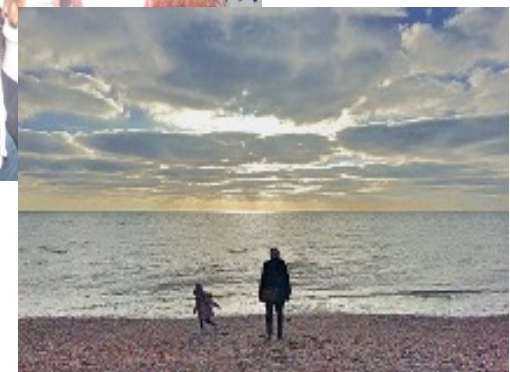


SIMPLE TIPS CONTINUED

- Creating Background blur. To enable a shallow depth of field to a photo you need to move your phone closer to the object being photographed. This effect can be seen in the image shown. The closer the camera is moved towards the glass, the more objects behind the glass, become blurred. However be sure that your main object remains in focus (see Set Exposure and Focus Point below)

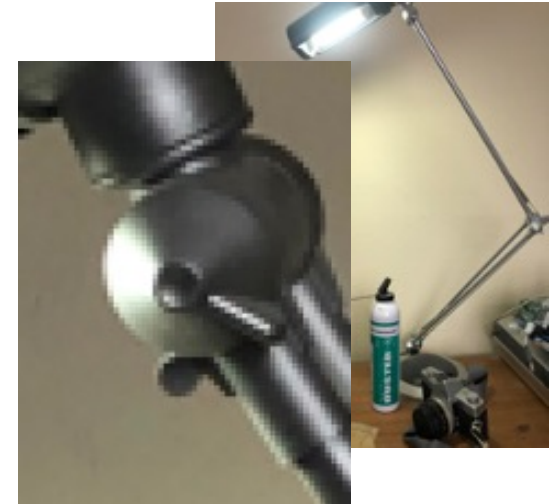


- Turn Off Flash and turn On HDR. Mobile phones deal with low light levels badly. However flash on mobile phones can be unflattering or worse. HDR takes three simultaneous images, one underexposed, one over exposed and one correctly exposed. These are then combined giving details in both light and dark areas. It's a good way of getting an evenly lit image



SIMPLE TIPS CONTINUED

- The Digital Zoom. Optical Zoom in a DSLR lens creates a bigger image by moving the centre of the lens further away from the sensor increasing the focal length. Digital Zoom in a mobile camera is just a normal size image cropped electronically. As the image gets bigger, pixilation gets more pronounced if large enough this pixilation can look distracting like high iso rated images.



- Set Exposure and Focus Point. Your mobile phone will try to automatically set the exposure levels but you can override it by tapping the screen and scrolling up or down. This allows you to alter the exposure levels by darkening or lightening the image. Also the mobile camera automatically focuses on objects in the foreground of the frame. You can set your own focus point by tapping on the appropriate part of the screen which sets the focus point to that area.





Any Questions?

Contact the Photographic Service Unit

PhotographicServiceUnit@brighton.ac.uk