3D Design Lighting and Photographing your Work
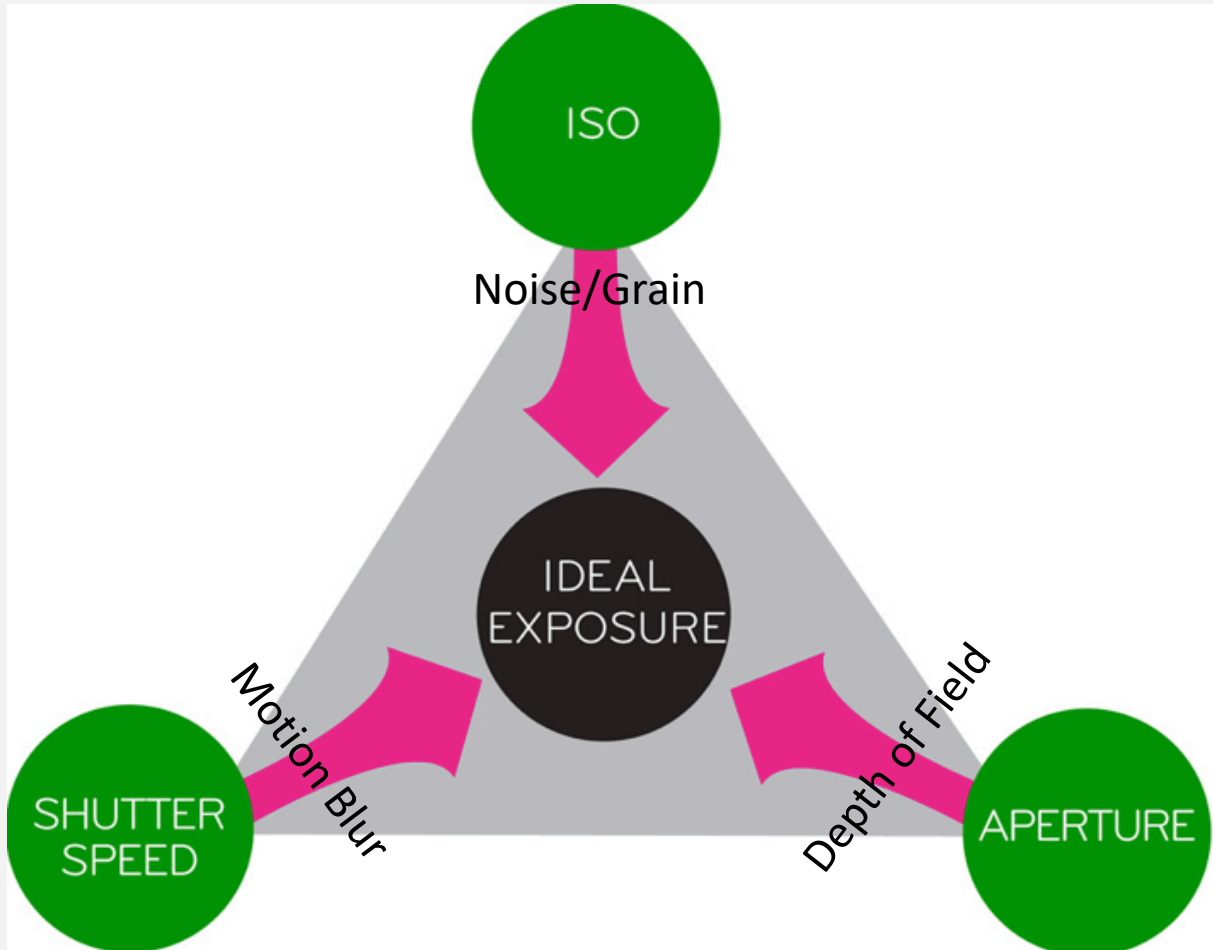
Controlling exposure: working with flash and available light

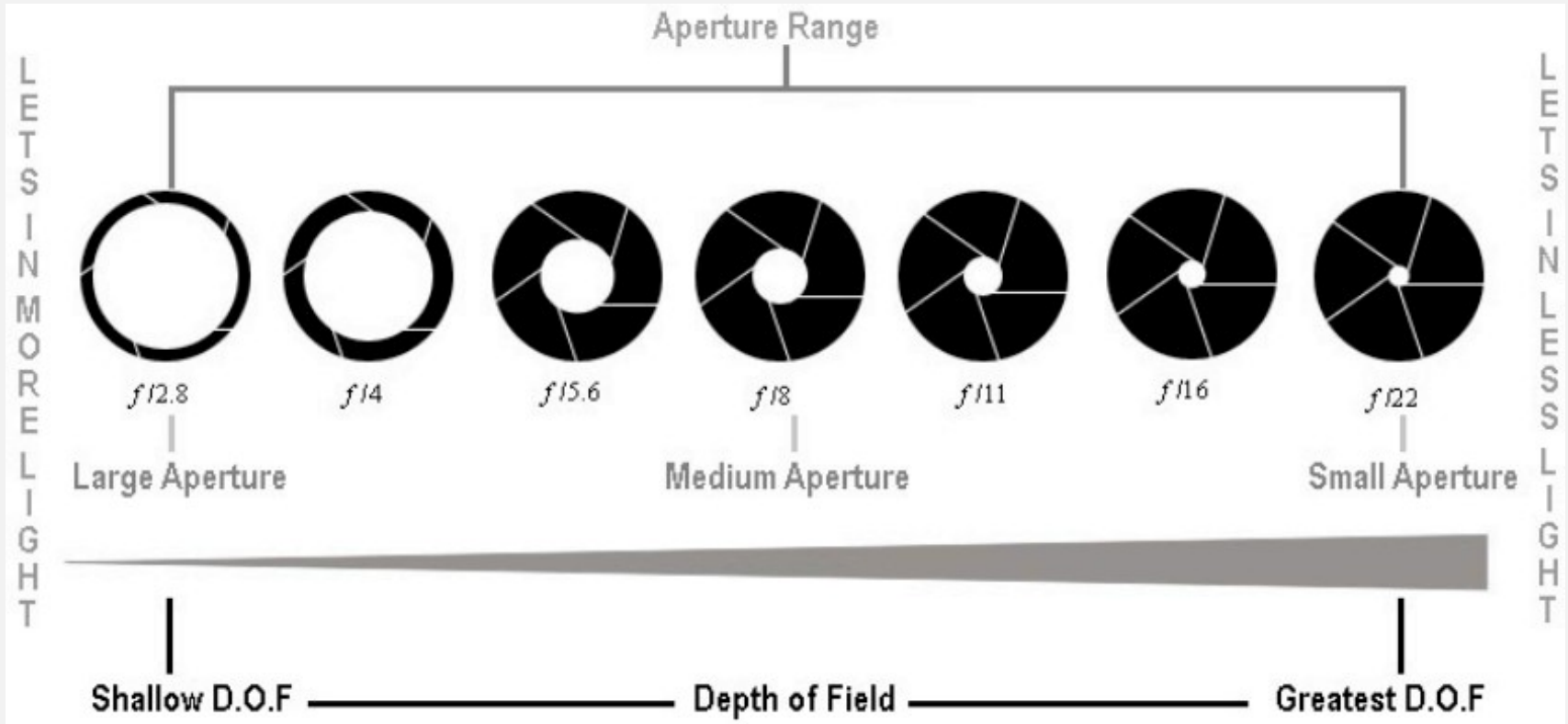# Exposure Triangle

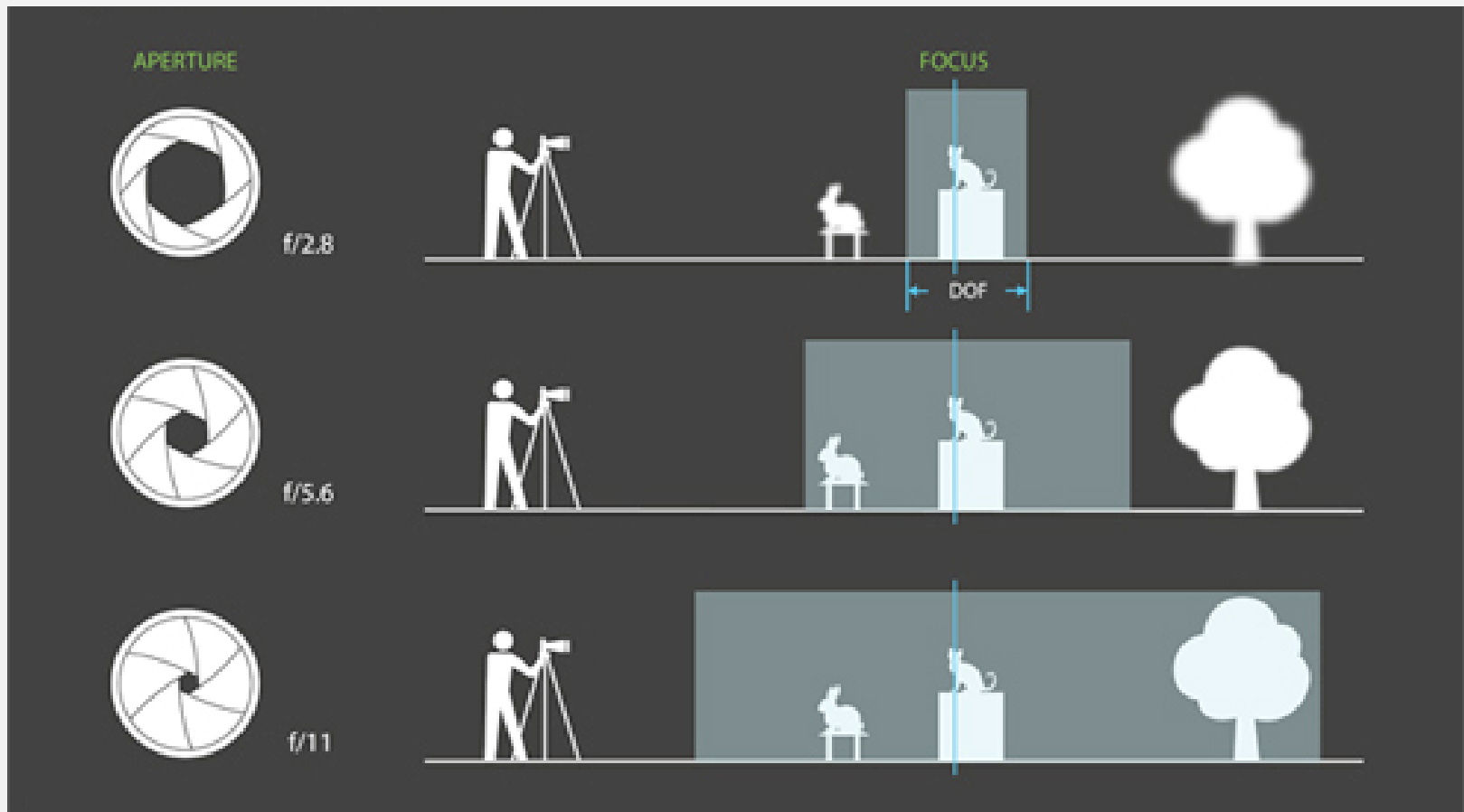To take a well exposed image you need to set your ISO, Shutter Speed and Aperture.

Aperture

Depth of Field (DOF)

In optics, particularly as it relates to film and photography, depth of field (DOF) is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image.

Examples of Depth of Field

Depth of Field at f8

Narrow Depth of Field at f2.8

Depth of Field at f11

Shutter Speed
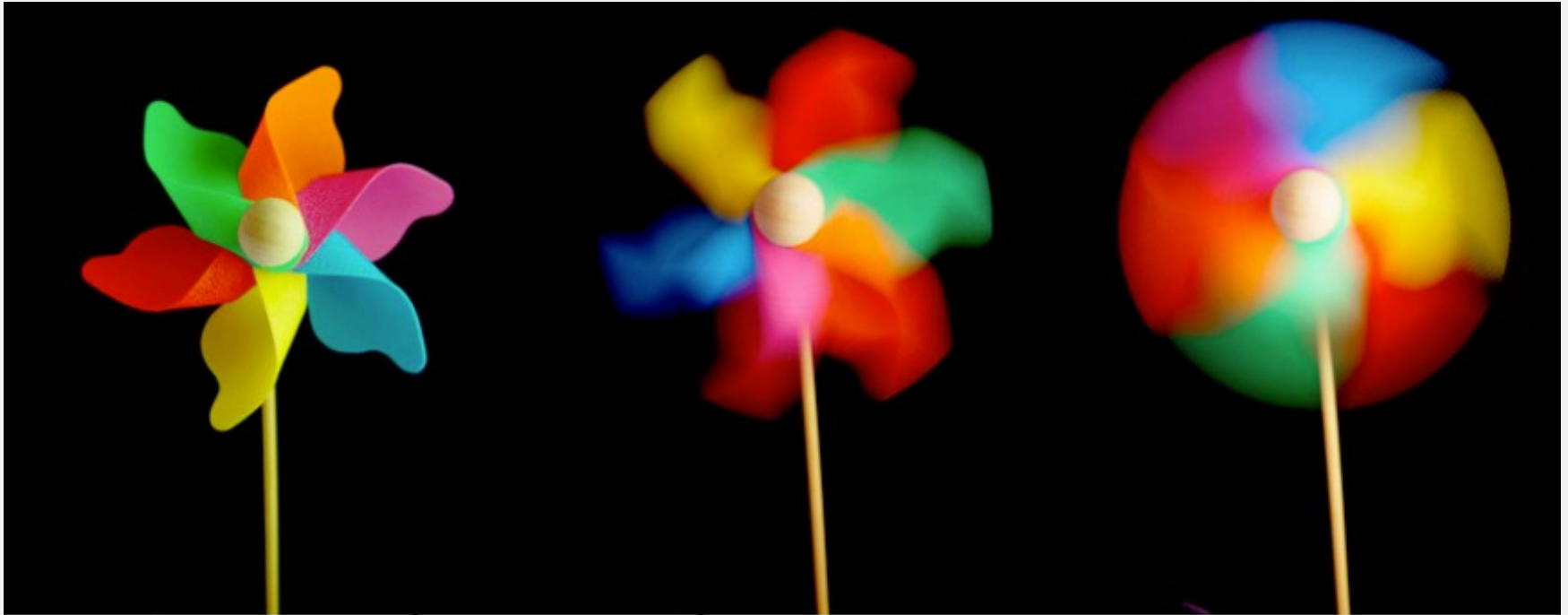
1/1000	1/500	1/250	1/125	1/60	1/30	1/15	1/8	1/4	1/2	1	2	4	8
Freeze action/movement			Hand held camera no slower than 1/60		Movement blur - tripod required								

How Shutter Speed Effects Studio Photography

Shutter too fast

Shutter too slow

In the studio the shutter must be set at a speed to synchronise with the flash. In digital cameras this can vary but a setting of $1/125^{th}$ will work.

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
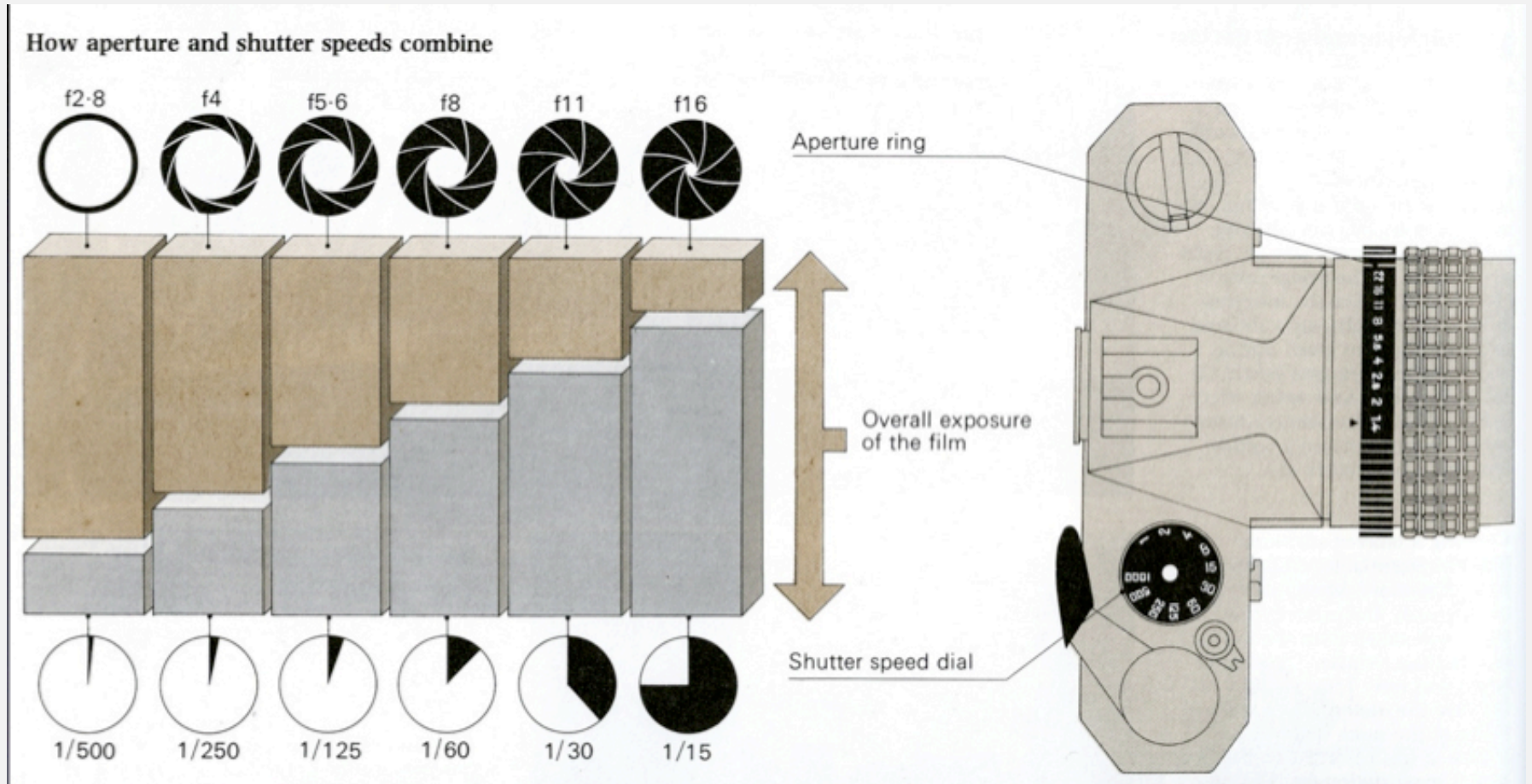**1/640 sec.**

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.

Example of Using a Slow Shutter Speed

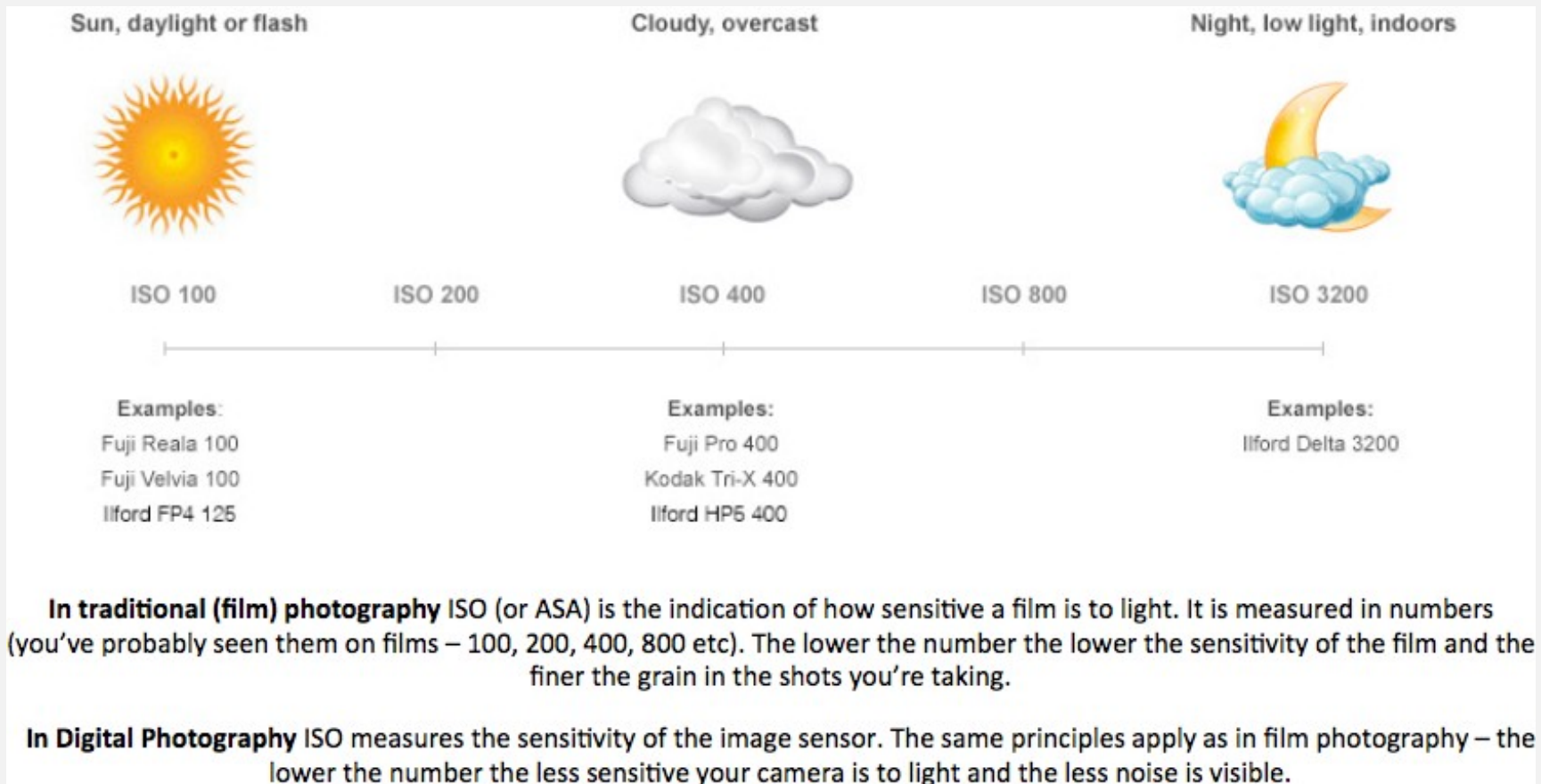In a crowded studio space the slow shutter speed makes people blur and disappear. However movement of the camera would also make the main subject blur so always use a tripod.
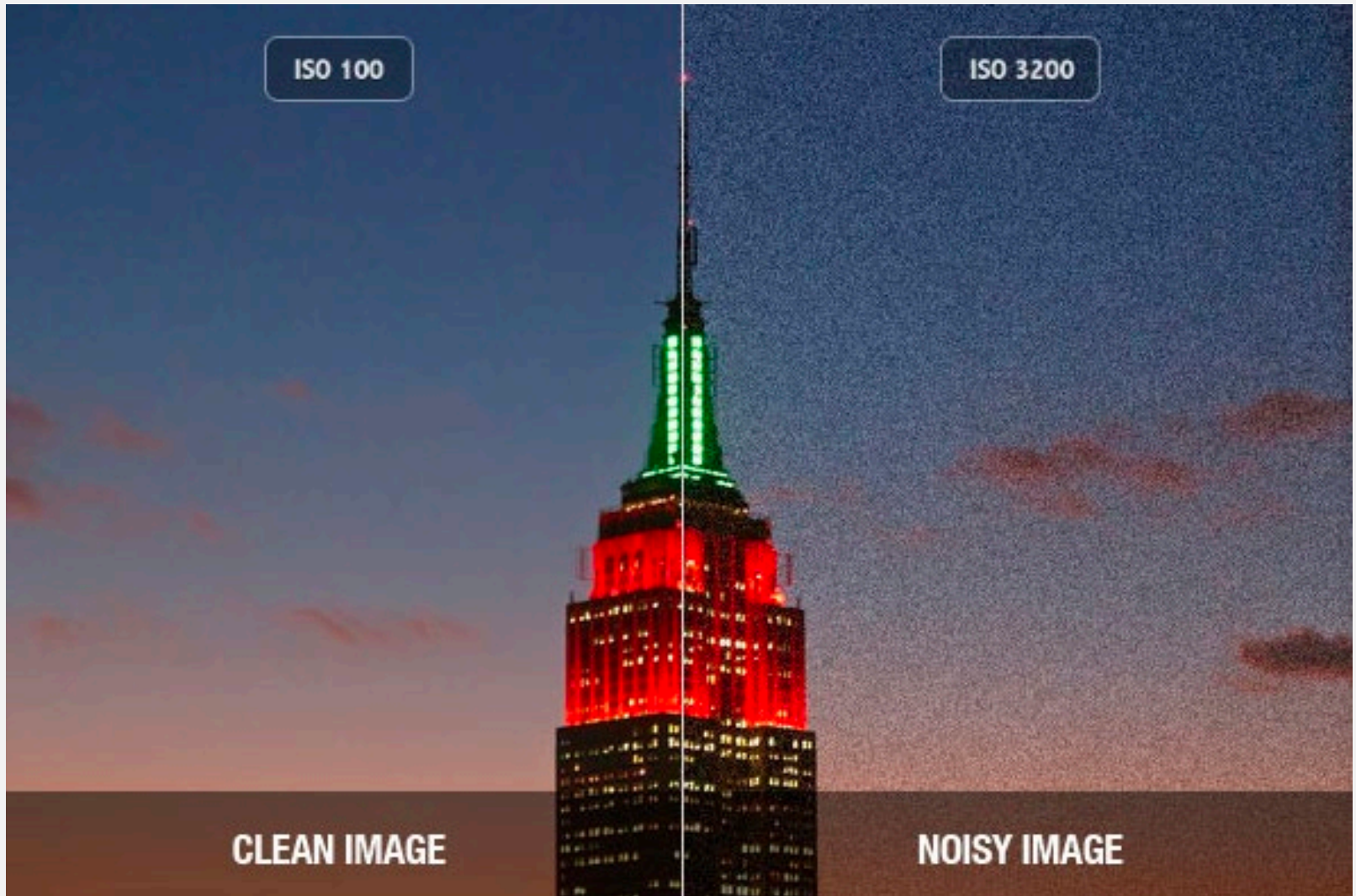
The Relationship Between Shutter Speed and Aperture

How aperture and shutter speeds combine

f2·8   f4   f5·6   f8   f11   f16

Aperture ring

Overall exposure of the film

Shutter speed dial

1/500   1/250   1/125   1/60   1/30   1/15

ISO

Sun, daylight or flash		Cloudy, overcast		Night, low light, indoors
ISO 100	ISO 200	ISO 400	ISO 800	ISO 3200

Examples:	Examples:	Examples:
Fuji Reala 100	Fuji Pro 400	Ilford Delta 3200
Fuji Velvia 100	Kodak Tri-X 400	
Ilford FP4 125	Ilford HP5 400	

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

Aperture

small aperture — large aperture

| F32 | F22 | F16 | F11 | F8 | F5,6 | F4 | F2,8 | F2 | F1,4 |

Shutter

fast shutter speed — slow shutter speed

| 1/1000 | 1/500 | 1/250 | 1/125 | 1/60 | 1/30 | 1/15 | 1/8 | 1/4 | 1/2 |

ISO

low sensitivity — high sensitivity

| ISO 50 | ISO 100 | ISO 200 | ISO 400 | ISO 800 | ISO 1600 | ISO 3200 | ISO 6400 | ISO 12800 | ISO 25600 |

Using a DSLR Camera

Both of our studios come fully equipped with lighting, cameras and all the things you need to take your images.

If you are working elsewhere and you do not have a camera of your own there are a range of digital cameras and other items including lighting available to loan from the Photo Unit.

Always borrow a tripod as it is important to keep your camera stable (and level) when taking your images.

We suggest you take photographs from as many angles as possible to capture all the details and then edit down to those that show the best aspects.

Camera Modes

P: Program mode has the camera calculate both shutter speed and aperture (given a manually or automatically selected ISO). The difference between Program mode and Full Auto mode is that in program 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: Manual mode both shutter speed and aperture and independently set manually (with ISO sensitivity also set manually), where proper image exposure requires accurate manual adjustment.

Lenses

There are many different lenses that are available for our Nikon and Canon cameras. For photographing 3D work it is tempting to use a wide angle lens, particularly if you are working in a small space. However these lenses will distort your work. A lens of 50-70mm focal distance will work best. Additionally a 120mm or 60mm macro/micro lens will help capture close up details.

AF-S Nikkor 50mm F1.4

AF Nikkor 35-70mmn F2.8

AF Micro Nikkor 60mm F2.8D

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

Check Your Exposure

Typical Viewfinder Info

Shutter Speed   Aperture   Exposure meter   ISO Setting

Exposing for Light Fittings

When exposing for light fittings you do not necessarily want any additional lighting and you need to expose for the light in the fitting itself. Keeping the ambient light low will show off the detail within the light. Use shutter speeds, not high ISO to capture the detail and always use a tripod to prevent camera blur

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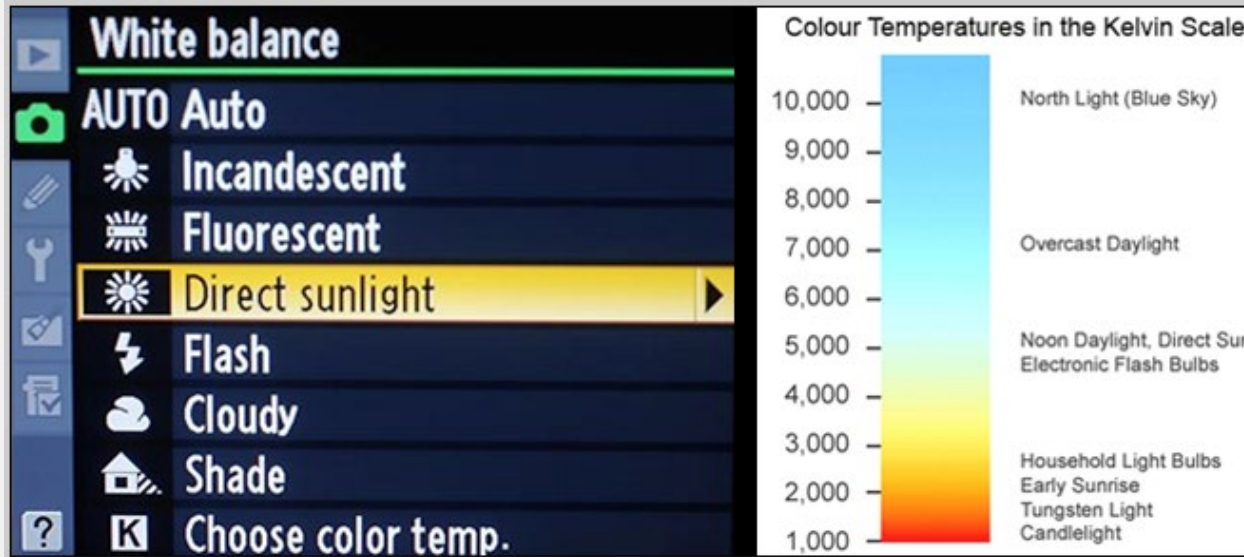
White balance (WB) is the process of removing unrealistic color casts, so that objects which appear white in person are rendered white in your photo.

White Balance Comparisons

Tungsten

Fluorescent

Daylight

Cloud

Shade

For the **manual white balance** here is a series of the same subject but 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, a colour cast will appear on your photos

The Studios

Small Studio Room 241

Room 203

Benefits Of Lighting In The Studio

In the studio the lighting is fully controllable in its positioning, intensity and quality. Every angle of an object can be lit and fully detailed to show every facet and detail. In our studio one of our team can help you create the lighting effect which best shows off your work.

Safety In The Studio

- If the fire alarm sounds, stop working, leave all your belongings and go to the nearest fire exit.
- No food or drink is to be consumed in the studio.
- Report faulty equipment and breakages to a Technician as soon as possible.
- Be aware of trailing leads, lights from above you and objects around the studio that could be a trip hazard.
- Beware as the studio lights can become very hot, turn them off when not in use.
- The pantographs (which the lights hang from) can be dangerous as they can retract upwards if the weight on them shifts. To avoid injury please do not place your fingers into them or try to adjust the pantographs- always ask a technician.
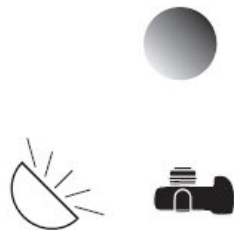
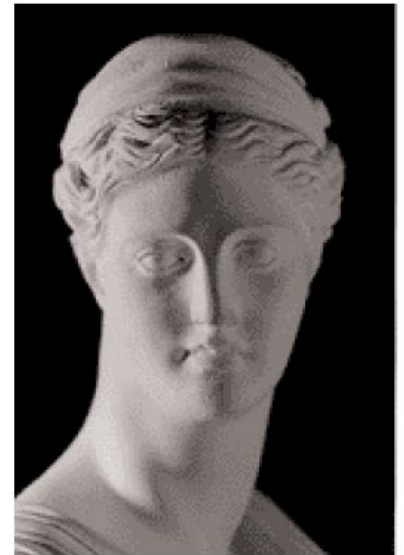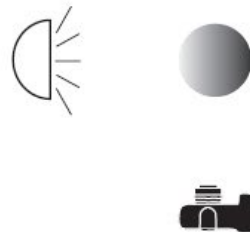# How Simple Lighting Changes Make Objects Look Different
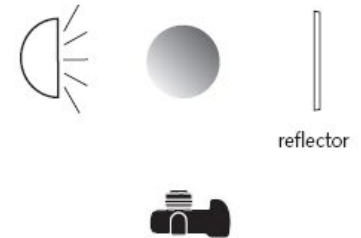

Front, direct

45-degree
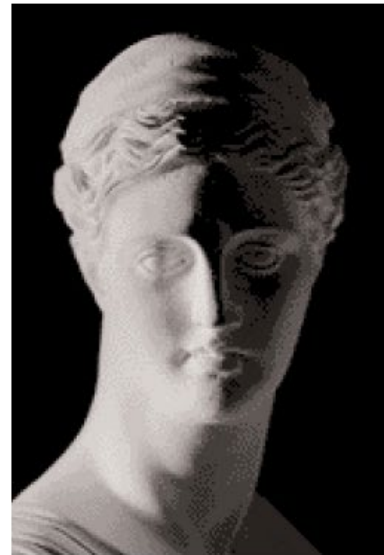
Side or 90-degree

Side with reflector fill

reflector

An Example of a Well Lit Object

The lighting in this image looks very basic but it is carefully controlled to show off all the details of the chair. The lighting is diffused and even in the highlights with no details lost or hard shadow. However a soft shadow is used to bring out the sculptured aspect of the form of the chair. White balance control in the camera has been used to show the true colour of the work.

Light Adapters and Accessories
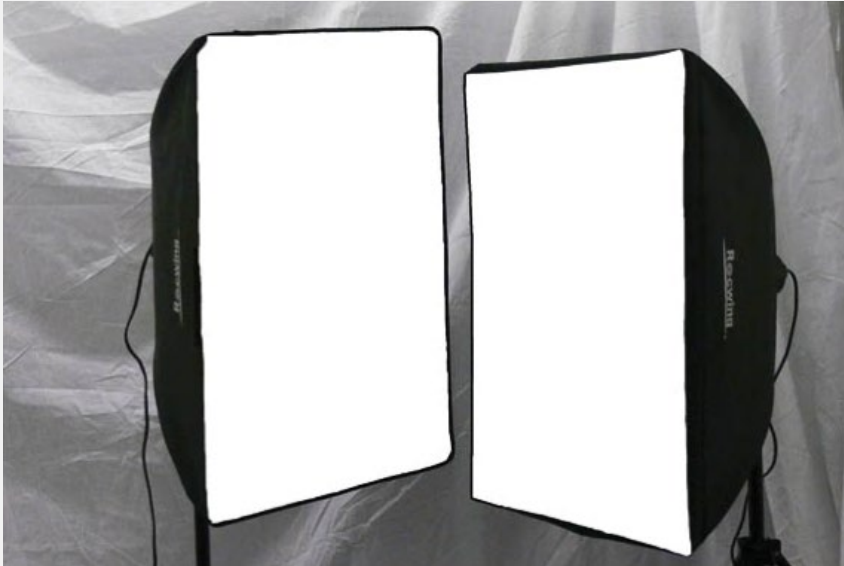
Snoot

Beauty Dish

Umbrella

Softbox

There are various different fittings available in the studio which all change the quality of the light from the flash unit.

Reflector

Softboxes

Softboxes generate a softer diffused light due to the translucent material lining that the light passes through before hitting the subject. They are ideal for controlling light and shadows on reflective surfaces and offer a more even and neutral looking light.

Umbrellas

Top 10: Photography Light Modifiers For Creative Portraits

Umbrellas create soft and diffused light and give you a greater span of light by throwing the light out wide. There are two main types:

1 - **Shoot-through Umbrella:** The umbrella is placed between the Light source and your subject. It's known as a shoot-through because light is diffused as it passes through the umbrella's translucent material similarly to the softbox.

2 - **Reflective Umbrella:** The light source is targeted away from your subject and towards the umbrella. The diffusion comes when the light bounces on the umbrella and back towards your subject. For example you would turn the umbrella around so it points away from the subject you want to light- the reflected or bounced back light will be the light that hits the subject

Beauty Dish

Most light modifiers diffuse the light. A beauty dish *reflects* light, illuminating the subject from all angles because of its unique shape. Because the light wraps around the subject, it creates good contrast and highlights angles.

When used up close, the beauty dish provides a very focused light source without a hot spot in the middle. It delivers a semi-hard light – softer than an on-camera flash or strobe unit, but harder than a softbox. The beauty dish provides a concentrated light source where the center is the brightest and the light gently falls off at the edges.

Snoot

A snoot is a metal tube that is attached to the front of your light. The tube restricts the light down to a narrow beam. This isolates the light and allows you to direct it to a certain area.

Usually used to create strong shadows or a 'spot light' effect. This allows for a more dramatic or theatrical type of lighting.

Alternatives to Studio Lighting

In some cases your only option may be to shoot indoors using only the available light. Bright direct sunlight through a window will cause harsh shadows particularly when the sun is low. Cloudy days can provide a natural diffusion to sunlight or you should use a north facing window if available.

A flash will sometimes be an option to light your work. Always use a speedlight which fixes on to a camera rather than a pop-up flash. Firing a flash directly at a subject will cause harsh shadows. Always turn the head of a speedlight away from an object and bounce it off a wall or from the ceiling. This will create a softer diffused light. A speedlight also allows you to alter the power settings which will give you more control over how your picture looks.

Reflectors

A reflector takes light that would usually spill out to the sides and redirects it back towards the subject. Without the use of a reflector a large quantity of usable light could be wasted. The color of the reflector will show up onto the subject.

- Gold – produce warm tones
- White – creates neutral color effect
- Silver – creates neutral tones but brighter than white

For photographing your work try to ensure that you use a white or silver surface. The reflector can even be a simple piece of card

Using a Reflector

Natural daylight can be controlled by using a reflector. By bouncing light back onto an object shadows can be filled as if you were using a fill light in the studio. The examples on the left show how this can be used, particularly with light coming through a window. You can either use one of the Photo Units reflectors or a simple piece of white or silvered card.

Build a Home Studio

It is possible to construct a simple home studio set up either on a table top or in your room, if you have space, for larger objects. A white sheet or white paper can be used as a backdrop. Pull the paer out to form a curve at the bottom so no shadows are created there. Either use available light and a reflector or two equally powered lights placed on either side of the object will work. Take care not to mix colour temperatures of lighting

Take care not to mix colour temperatures of lighting creating colour casts. Constant lighting units both daylight and tungsten are available from the Photo Unit. To increase and decrease the intensity of these and other lamps move them closer or further away from an object.

Editing Your Images

Sometimes its hard to get both the lighting and background right. This example shows how post editing can greatly enhance your image. This example was taken during one of the Graduate Exhibitions. The exposure is poor as it was the chair was in the corner of the studio and lighting was low. Although there was daylight present the chair was being lit only by the overhead tungsten bulbs so the white balance is not set correctly and there is a yellow colour cast. There is also a distracting line running behind the chair.

By downloading the Raw image to Photoshop the exposure and white balance can be easily corrected and the background completely removed and replaced to let the image stand out.
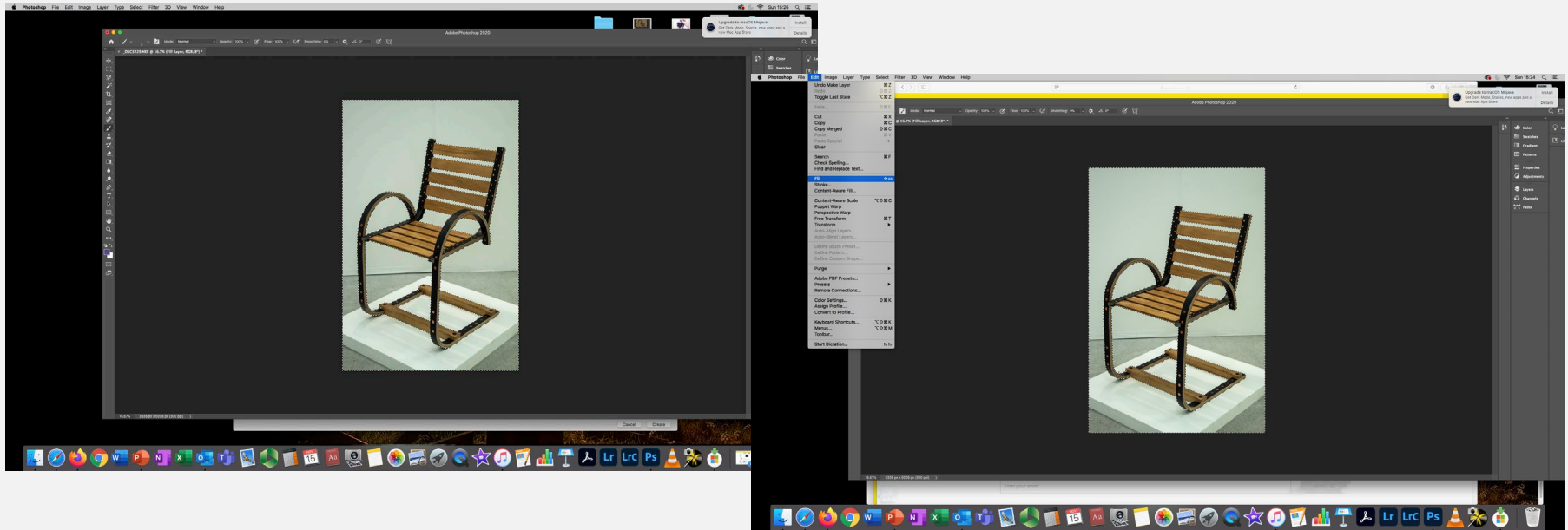
Camera Raw Adjustment
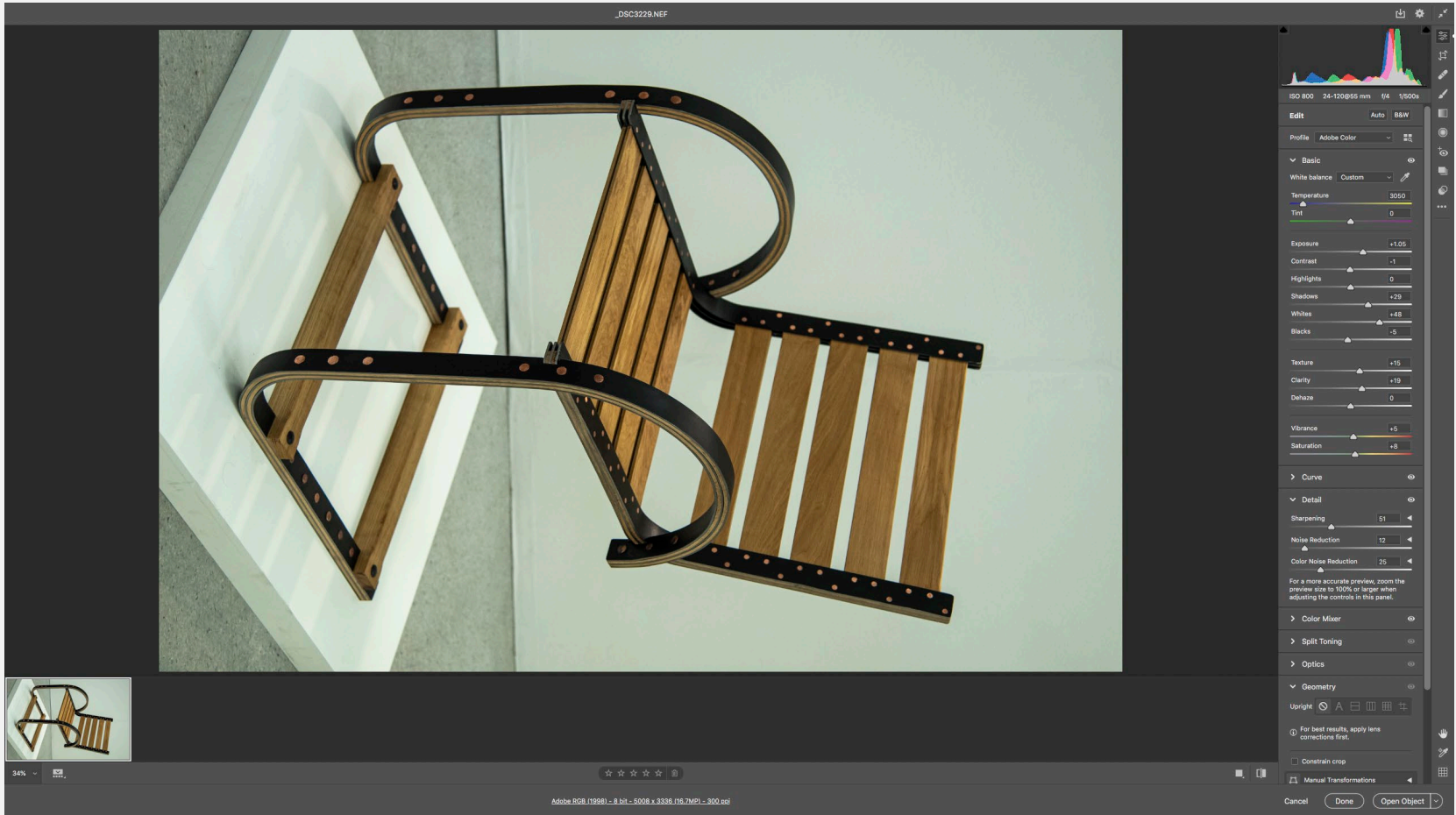
By shooting a RAW image your photo will open in Photoshop's Camera RAW plug-in as an NEF file. You can then make adjustments to exposure and colour temperature and these will not effect your original. If you then click OPEN you will have a JPEG image you make further adjustments to in Photoshop

Photoshop Adjustments

By using the Magnetic Lasso tool the chair can be selected. You may need to carefully select every single section. Then click Inverse in the Select drop down menu and this will select the background.
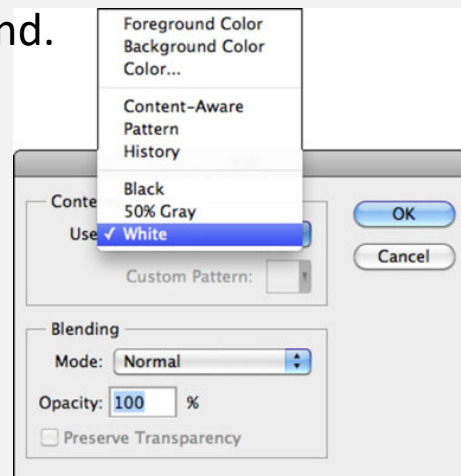
Then click Edit and select Fill. This will show the Fill dialogue box. Select White and click Ok and the entire background will become white.

Using a Colour Checker or Grey Card
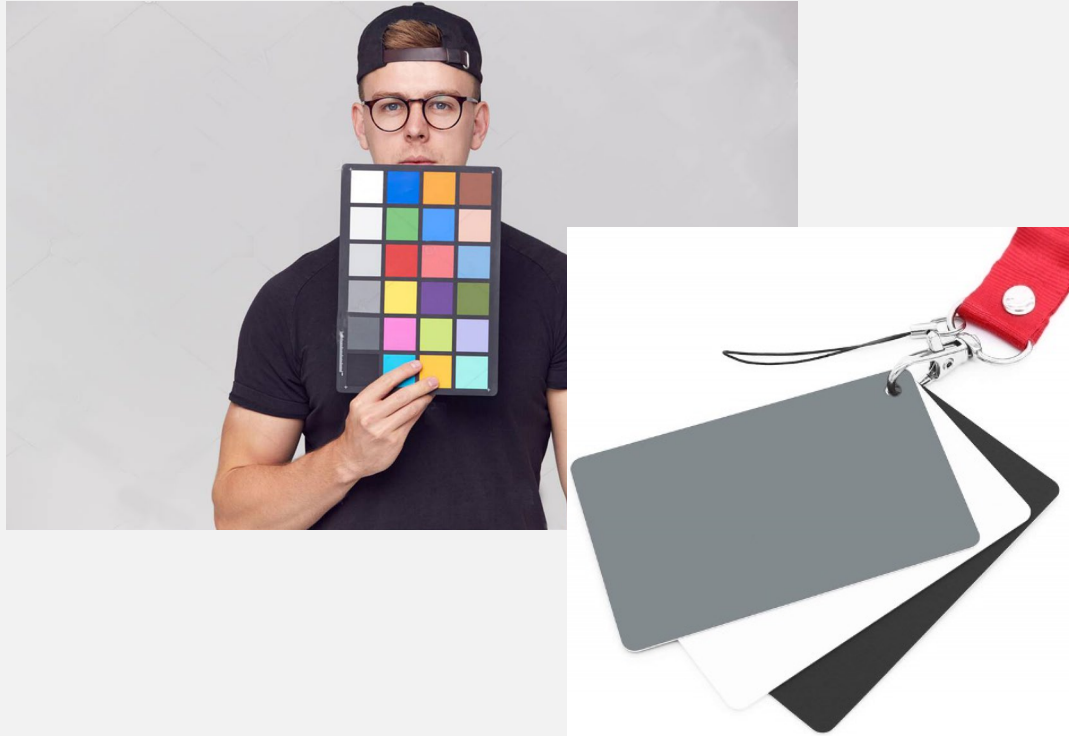
Using the Colour Checker or Grey Card ensures the correct colour of your images and can fine tune any slight white balance problems .

Set up your camera and make all adjustments to the camera controls or lighting before you start. Place the Colour Checker or Grey card into the frame next to the subject. Take a photo. Now you have your reference image. For now, you can remove the card from the frame and proceed with your photo session. If at any time either the lighting changes or you change the camera controls then take another reference photo.

The Grey Card or one of the grey squares in the Colour Checker card are set to 18% grey which is what your camera meters for. You can use this shot to get the correct White Balance in Lightroom. To do this, take the eyedropper icon and select and area on the grey card. It will choose the right white balance number for the lighting conditions you were shooting in. You can then sync this number to all your photos.
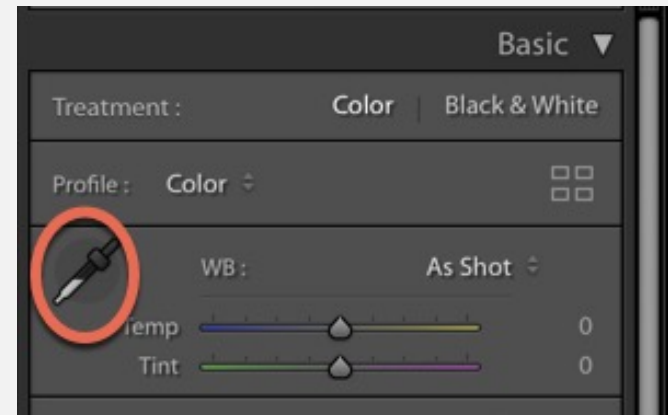
Questions?

Please contact:
PhotographicServiceUnit@brighton.ac.uk