



Night Photography

Nighttime adds magic.....

Darkness can add a bit of magic to our photos. We are used to seeing our town in the daytime. Taking pictures at night adds interest and novelty to our images. We see familiar things in a different way.



Perhaps it's the coloured lights, or the thrill of being out past our bedtime !

This talk will cover some camera settings and equipment, but as each camera requires different settings, it will mainly suggest ideas/projects for you to try.



There's a lack of light.....

The biggest challenge to taking photos at night is the lack of light. Digital cameras are designed to work with light, so a lack of light is a problem, for exposure and for focussing.

We can try to resolve these issues by

- changing camera settings to optimise existing light
- take pictures during twilight, or under artificial light
- take pictures of a brighter object (e.g. the moon)

There are also specialist cameras, for use in Astro Photography, but I won't be covering these in this talk.

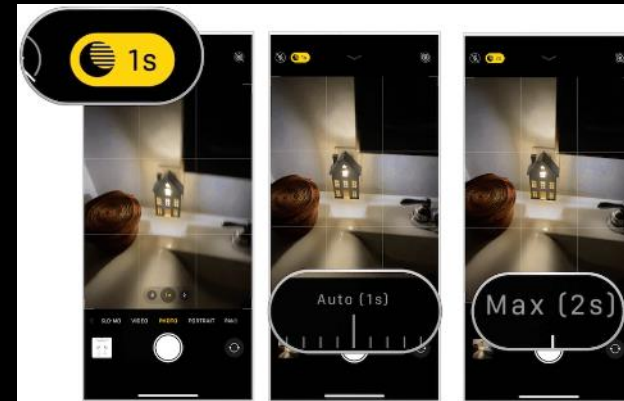


Fighting the camera

The camera will try to compensate for the darkness by adjusting the exposure from lots of dark areas and blacks to a mix of light and dark tones.

As we don't want this, we may have to re-adjust the exposure using **exposure compensation** or via **manual mode**.

On smartphones, adjust exposure by clicking on your subject and then dragging the sun or bulb slider or use night mode – more later !



Camera settings to address a lack of light

Recalling our talks on Exposure, we can either adjust the **ISO**, **Aperture** or **Shutter** settings on the camera.

If we increase **ISO**, we boost the signal from the sensor, as if there were more light available. However, the downside is we can introduce noise into the photo (see right).

If we open the **Aperture** (a lower f number), we increase the amount of light reaching the sensor. However, this reduces the depth of field in the photo.

If the photo has a black/dark background, this may not matter, as there is nothing to capture at long focal lengths. For example, f5.6 was used for the shot on the right



Camera settings to address lack of light

Due to the issues with changing ISO and Aperture, the most common way to increase the amount of light for Night Photos is to **reduce the shutter speed (have the shutter open for longer)**.

However, if we do this, we run the risk of accidentally moving the camera whilst the shutter is open, leading to a blurred photo (see right). This is also called **“camera shake”**.



We can prevent this by using a tripod or stand – more later.

Of course, if the shutter is open and we try to capture a moving subject, we will also get a blurred subject. So we can intentionally do this to introduce light trails. We will also talk about these later.



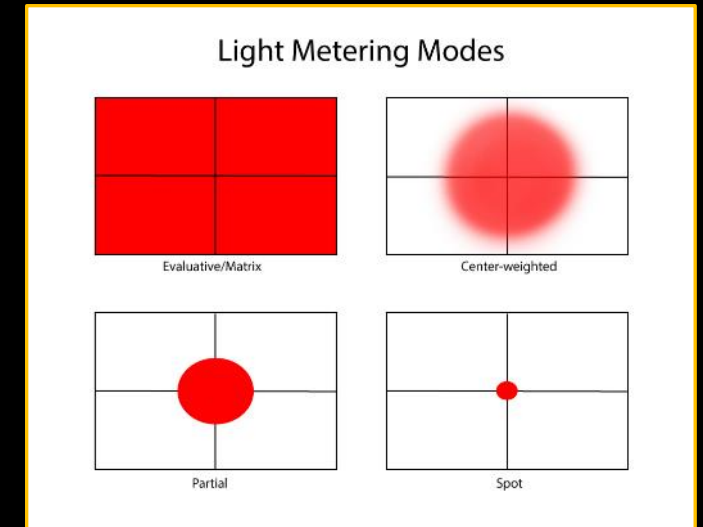
Camera Settings - exposure

For most night scenes, the camera auto-exposure setting is appropriate. This is sometimes called **Evaluative Metering** and it looks at the tones across the whole image.

If you need more control over the exposure, switch to **Spot Metering** and put the spot onto your subject, or a bright area.

Tip - if you're not sure of the exposure, try **Auto Exposure Bracketing (AEB)**. This takes several images, at the current settings, but also at over and under-exposed. Review them afterwards on the computer and choose the best one.

You can also combine them into an HDR photo.



Camera settings - focus

Many cameras use **contrast detection** in their autofocus.

Contrast detection focus looks for edges between dark and light areas. However, in very dark scenes, there may be not enough light for the autofocus to work correctly.

We can overcome this by using Manual Focus – set this to infinity (∞) for sky shots, or where the subject is distant.

Alternatively, focus on a brighter object at the correct distance and then use the **Focus Lock button** to stop the camera from changing the focus whilst you re-compose the shot.

You can also do this by keeping the shutter button half-pressed.



Camera Settings – White Balance

You may also have to adjust the camera's **White Balance (WB)**.









Auto White Balance (AWB) will work most of the time, but consider what you want from your image.

It is fine for city scenes to have a warm look – this matches the streetlights. However, for photos of the night sky, a bluer look is better (tungsten setting)

The examples on the right use Colour Temperature in Kelvin.

You don't have to remember these, just use the table :



Display	Mode	Color Temperature (Approx. K: Kelvin)
AWB	Auto	3000 - 7000
	Daylight	5200
	Shade	7000
	Cloudy, twilight, sunset	6000
	Tungsten light	3200
	White fluorescent light	4000
	Flash use	6000
	Custom	2000 - 10000
	Color temperature	2500 - 10000

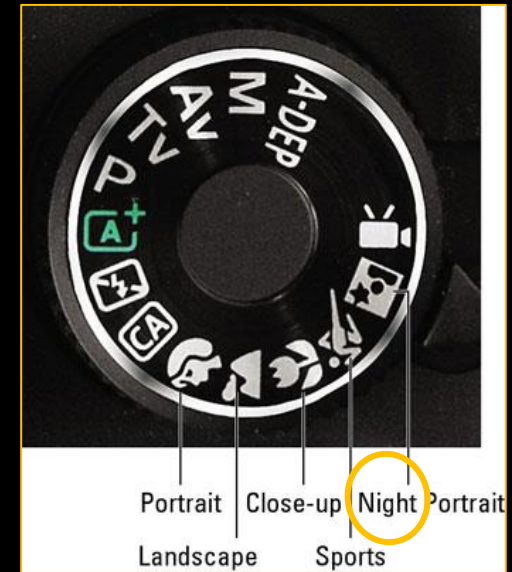
Night mode / scenes








Many cameras have a scene mode for night shooting.

If you choose these, they will usually set a high ISO and wide aperture for you. Sometimes they will also trigger the flash, if you have one.

It is worth trying them out – refer to your camera manual !

However, you will have more control over the picture using one of the other modes, such as Aperture Priority (AP) or Manual (M)



Symbol	Exposure Mode	Description
	Auto	Completely automatic photography; the camera analyzes the scene and tries to choose settings that produce the best results.
	Auto Flash Off	Same as Full Auto, but with flash disabled.
	Portrait	Designed to produce softly focused backgrounds for flattering portraits.
	Landscape	Designed to keep both near and distant subjects in sharp focus.
	Sports	Selects faster shutter speed to capture moving subjects without blur.
	Close Up	Produces softly focused backgrounds especially suitable for close-ups of flowers and other nature subjects.
	Night Portrait	Same as Portrait, but with flash mode set to Slow-Sync, resulting in a slower shutter speed to produce softer lighting and brighter backgrounds.

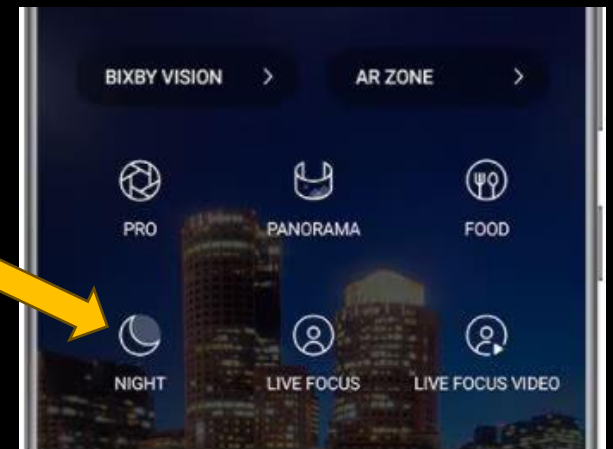
Smartphone Night mode

Many smartphones have a special night mode for shooting in low-light. This is different from the “Night Mode” for your display, which darkens your screen.

For iPhones, Night Mode will only be available if the camera detects a low-light environment. You can tell if it is available by the yellow moon icon at the top of the screen.

On Android phones, Night Mode can usually be found when you choose “More” on the menus.

Depending on your camera, Night mode will either take a long exposure, or combine several shots, to maximise the available light.



Camera settings - tips

One tip is to remember the camera's LCD screen can display an image which looks brighter than it is, especially when our eyes have adjusted to the dark.

This may encourage us to think the image is too bright and to reduce the exposure.

We can also use the **exposure histogram** for get a more accurate reading



Camera settings - tips

Another tip is to shoot in **RAW** mode, if you can.

Raw photos contain more information than JPEGs, so they are better at smoothing the transition between light and dark areas (dynamic range).

At night, most of the colours that a camera captures are at the bright end of the scale.

A JPEG file, with its reduced colour options, can introduce banding in your pictures (see right).



Camera settings - tips

A final tip is to take an initial test photo at high ISO, to try out the exposure values and to set the composition.

By using high ISO values, we reduce the amount of time needed for the shutter. We don't want to wait for ½ hour to see if the photo looks ok !

Once we are happy with the composition, we can use tables to convert from a high ISO to a low ISO, with a longer shutter time.

For example, say our test photo was taken at ISO12500 and 1/60th shutter speed. As long as we don't change the aperture, we can reduce the ISO to say ISO100 (7 stops). Increasing shutter time from 1/60th to 2 seconds (7 stops) will give the same exposure.

The Lists

Shutter Speeds			F Stops			ISO Sensitivity	
Halves	Whole	Thirds	Halves	Whole	Thirds	Whole	Thirds
	1/8000			1.0		12	
1/6000		1/6400 1/5000	1.2		1.1 1.2	16 20	
	1/4000			1.4		25	
1/3000		1/3200 1/2500	1.7		1.6 1.8	32 40	
	1/2000			2.0		50	
1/1500		1/1600 1/1250	2.4		2.2 2.4	64 80	
	1/1000			2.8		100	
1/750		1/800 1/640	3.3		3.2 3.5	125 160	
	1/500			4.0		200	
1/350		1/400 1/320	4.8		4.5 5.0	250 320	
	1/250			5.6		400	
1/180		1/200 1/160	6.7		6.3 7.1	500 640	
	1/125			8		800	
1/90		1/100 1/80	9.5		9 10	1000 1250	
	1/60			11		1600	
1/45		1/50 1/40	13		13 14	2000 2500	
	1/30			16		3200	
1/20		1/25 1/20	19		18 20	4000 5000	
	1/15			22		6400	
1/10		1/13 1/10	27		25 29	8000 10000	
	1/8			32		12500	
1/6		1/6 1/5	38		36 42		
	1/4			45			
1/3		1/3 1/2.5			50 57		
	1/2			64			
1/1.5		1/4 1/3					
	1 sec.						
1.5		1.3" 1.6"					
	2 sec.						
3		2.5" 3"					
	4 sec.						
6		5" 6"					
	8 sec.						
12		10" 13"					
	16 sec.						

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Long exposures - equipment

A **remote camera release** will allow you to take a shot, without touching the camera (and introducing vibration).

If you don't want to buy one, try setting the camera to the **self-timer mode**. This will (typically) introduce a 2 second countdown before the shot is taken. This gives you time to set the camera, press the shutter and back away.

Tip - if you use a tripod, you should also turn off the **image stabiliser** within your camera. The stabiliser is anticipating some movement (and correcting for this), so if the camera is steady, the stabiliser can actually introduce blur !



More Camera Equipment

A **tripod** is essential for long exposure shots, to avoid camera shake. If you don't have one, look for something stable around you, for example, a park bench, a closed bin, a wall etc.



A **lens hood** will cut down on (unwanted) flare from streetlights, lighted windows etc



Spare batteries are also a good idea – long exposures consume battery power !



Other Equipment

A torch will help you see the camera controls and gear at night. A head-torch is better, as it frees up your hands.

If you can, buy a red-light torch (e.g. a bike light), or cover your torch with **red cellophane** to preserve your night vision.

NB – only do this on LED torches, so the cellophane doesn't get hot !

Warm clothing is also worthwhile, plus a hot drink / snacks

If you are planning to go into remote areas, take your mobile phone and tell someone where you are going !



Bulb Mode

On most cameras, once you increase the exposure time to the maximum number, the next setting is a “B”, which stands for **Bulb mode**.

In this mode, the camera shutter will stay open for as long as the shutter button is depressed, or held open on a remote release.

On older cameras, the photographer was able to keep the shutter open, by continually pressing a rubber bulb on the remote release cable. Even though electronic versions now exist, the name has stuck.

On the Bulb setting, the photographer uses another device to time the exposure – for example, setting a countdown on your mobile phone.

You may also be able to program the camera with a pre-set time for the Bulb mode, for example, 60 minutes, so you can leave it open and come back later.



Other Equipment – telescope adapters

If you want to get into Astrophotography, a simple telescope is much cheaper than an expensive zoom lens.

Once you have a telescope, if you have the right camera, you may be able to clamp your camera onto the telescope and use it to capture most distant objects, such as planets.

The fittings are for SLR cameras or interchangeable lens cameras and are called **T rings and adapters**.

You can also just hold your smartphone lens over the telescope viewfinder !

It is best to get advice from a camera shop before making a purchase.



Make use of any light -Twilight

At twilight, there is still some light in the sky, so this can help brighten the image and reduce the amount of exposure time needed.

Be aware that the remaining light will fade quickly, usually within ½ hour. So it's a good idea to prepare the shoot beforehand, at the very least know your equipment and have a rough idea of your composition.

You can also use the time to nail the focus and to take test shots. You will also probably have to adjust the White Balance – aim for a bluer look, by setting it to “Tungsten”.



Make use of any light - Moonlight

At full moon, or close to this, there will actually be quite a lot of light available to the photographer, especially with longer exposures.

This effect can be magnified by snowy scenes.

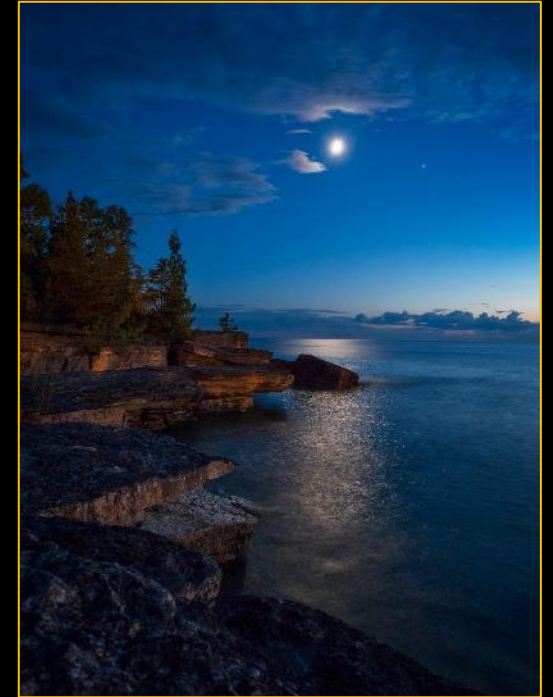
Bear in mind that cloud cover can reduce the amount of light !

In terms of composition, either we want the moon to appear in the shot, or to just use the moonlight.

Settings for these 2 photos :

Top = f2.8, ISO1250, 6 seconds

Bottom = f2, ISO 500, 13 seconds



Streetlight and Neon Photography

We can use street lighting to keep shutter speeds relatively short. In brightly lit areas, about 1/125th is possible at wide apertures and higher ISO.

One tip is to find brightly lit areas and wait there for someone/thing to walk past

Another tip : you will get different results if you keep the light source behind you, but shining on the subject vs shooting towards lighted signs – see bottom image.

The top image used f2.8, ISO1600 and 1/80th second.

The bottom used f2.8, ISO3200 and 1/60th second.



Safety

It is a good idea to have someone with you when working at night. Not only may this deter a thief, they can watch out for cars, hazards etc

Other tips

- Try to scout the area during daylight, particularly for countryside shoots
- Try to stay in brightly lit areas, avoid dark alleys !
- If it is very dark, use your torch to illuminate the path.
- Take your mobile phone, especially if going to remote areas.
- For street photography, try to be discreet – for example, avoid the use of the flash – and be considerate of other's feelings
- Remember it is easier to walk away and find another area than to provoke a confrontation !



Photographing a brighter object

If the object is itself bright, we can use this to reduce the time required for the shutter to be open. The shot on the right used f11, ISO400 and only 4 seconds exposure.

These settings work because there was a lot of ambient light in the photo. If the overall scene is dark, but the subject is bright, the amount of exposure and ISO needed depends on how much of the dark areas you want to capture.

For the shot on the right, the photographer used ISO1600, f5.6 and 6 seconds to include the dark rocks.



Photographing a brighter object

We can also use a bright background, to create a backlit or silhouette shot

In this case, we are using the benefit of lots of ambient light to use a shorter exposure time, so that the subject remains sharp

To achieve this, we can assumed Depth of Field is not required, so we can use a wide-open aperture, say f2.8 and raise ISO to allow us to keep the shutter at 1/125 or faster.



Photographing a brighter object – concert

Photography at a concert is very difficult, due to the dark arena and bright lights on the performer. There may also be rules preventing you from taking photos of the performers, so check first !

Assuming you only have your phone with you ...

Tip 1) Lock your focus on the stage and reduce your exposure

This is the most critical step for concert photography to prevent overexposed, blurry images.

Open the Camera app and tap on the brightest part of the stage. Press and hold on that spot until you see a yellow "AE/AF Lock" banner appear at the top of the screen.

Once the exposure is locked, drag the sun icon slider that appears next to the yellow square down to manually lower the brightness. This will prevent stage lights from washing out your photos.



Photographing a brighter object - concert

Tip 2) Use Burst Mode for action shots

Performers move fast, so use Burst Mode to capture a sequence of shots and increase your chances of getting a clear one.

To take a burst of photos, tap and hold the shutter button. On older iPhones, you may need to swipe the shutter button to the left.

Later, you can review the sequence and save the best images.



Tip 3) Don't use your flash

Your phone's flash is too weak to properly light up a stage and will only create harsh hotspots on the backs of people's heads in front of you.



Photographing a brighter object - concert

Tip 4) Avoid digital zooming and over-cropping

Zooming in on your Phone crops the image and reduces quality. It's better to "zoom with your feet" by getting closer to the stage if possible. If you have a Pro model with multiple optical lenses (like a 3x or 5x telephoto), use those for better quality zoom shots.



Tip 5) To give an idea of the atmosphere, capture Photos in Landscape Mode

This gives a better sense of the concert surroundings and crowd.



Night Photo subjects – the Moon

A full moon is a very bright object, relatively speaking and so it is good choice for starting night photography.

You may be surprised, but the moon moves quite quickly across the sky and so a short exposure should generally be used.

Some photographers use the “**Looney 11 rule**”, for the best results. You set the aperture to f11 and the shutter speed to the reciprocal of the ISO setting. For **ISO100, set the speed to 1/100s**. For **ISO200, use 1/200s** and so on.

The “rule” doesn’t guarantee perfect results, but is a good starting point for working out exposure.

You can modify the rule for other phases of the moon using the table on the right :



Lighting Condition	Aperture
Full Moon	f/11
Half Moon	f/8
Quarter Moon	f/5.6
Crescent Moon	f/4
Total Eclipse	f/2.8
Star Gaze	f/2
Backlighting	Add one stop

Night Photo subjects – the Moon - phases

Although it is easier to photograph a full moon, the resulting image can look flat.

For a more interesting composition, photograph different phase of the moon. As the sunlight is striking at an angle, shadows and craters are more clearly defined.

Remember, there will be less light than at the full moon, so open the aperture to compensate.



Night Photo subjects – the Moon

Also consider what sort of composition you are going for...

Do you want the moon in the sky, with no land visible ?

Or perhaps, a moonlit landscape ?

Think about the phases of the moon – how much light will I need ?

Are there any sources of light pollution (street lights) which will spoil the effect ?



Night Photo subjects – stars and star trails

There are basically 2 types of star-shot, either the stars are static or they are moving in star trails.

For static stars, we want the aperture as open as possible, so we can keep the shutter to a minimum. We will also have to increase ISO. 1600 is a good starting point. Usually a small amount if ISO noise is not noticeable if the bulk of the photo is dark, so don't worry about this too much.

Also use manual focus and set this to infinity ∞ – the stars are far away !

Use the “500” rule to calculate the maximum shutter time before we will get trails. **The rule is 500 / camera crop factor x focal length.**

Full frame SLR = $500 / 1 \times \text{say } 24\text{mm} = 21 \text{ seconds}$

Compact = $500 / 3 \times 24\text{mm} = 7 \text{ seconds}$



Night Photo subjects – stars and star trails

As the earth is moving around the sun and rotating on its axis, if we use a longer exposure, we will see streaks of light from the stars.

This can be used in creative effects. It helps if there aren't any obstacles in the way – for example, our “big skies” in East Anglia are good.

It is also a good idea to avoid brighter lit areas. For example, more stars are visible in the countryside than in city areas, so more trails will be captured.

NB the centre of the circle will be North, or South for the Southern Hemisphere !



Night Photo subjects – the milky way

The Milky Way is actually a faint object and will require higher ISO settings. For example ISO 3200 or 6400, with the lens wide-open (f2.8 or better).

You should also head for dark areas, to minimise light pollution.

Apps are available to tell you where and when the Milky Way will appear.

Remember the longer you have the shutter open, the more risk of getting star trails. Keep in mind the “500 rule” to avoid this.

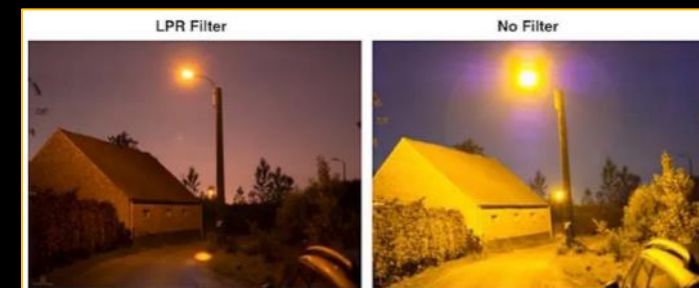


Light pollution

Orange light from street lights can ruin the atmosphere for a moody night shot. Street lights will also compromise your Astro Photography shot !

If you can't avoid the orange light, try to put it at one side of the photo. This can then suggest movement from light to darkness, or it might be possible to crop it out later.

You can also purchase **light pollution filters**. They are designed to block certain wavelengths of light, like yellow sodium lamps, but not neon lights, car headlights etc. The reduction in light can make your photos darker, which may help for star shots.



Night Photo subjects – vehicle light trails

For light trails disappearing into the distance, you will need a smaller aperture, for greater depth of field. However, as the car lights are bright, you can get away with lower ISO. The shot on the left was f13, ISO100, 25 seconds



For multiple trails, you will need to leave the camera open for longer, as each vehicle will move slightly differently to the previous one. The shot on the left used f5.6 (shallower Depth of Field), ISO100 and 235 seconds



However, you can get decent results with a much shorter exposure, if there is some ambient light around. The bottom shot used only 2 seconds !



Night Photo subjects – sparklers/phones

We can also introduce movement trails by asking a friend to move a sparkler or phone light around during the exposure.

Note that reducing the exposure to 2 seconds has improved the sharpness of the boy's face. We don't need to go above ISO400 as the light from the sparkler will help illuminate the subject.

The photographer set the focus manually by having his wife shine a torch on his son's face and then he **locked the focus**.

Please take care with sparklers, especially when photographing children. Having other adults on hand is strongly advised, as you may be distracted with the camera settings.



Night Photo subjects – sparklers/phones

You can achieve a similar effect from mobile phone lights or even using torches. These are safer than sparklers (just don't drop the phone !!)

Note the blurriness of the girl's face in the top shot. It is hard to keep still for several seconds !



The bottom shot was using glow sticks, which you can purchase online or from outdoor activity shops.



Night Photo subjects – reflections

If there is a lot of ambient light around, reflections at night are a wonderful way to add colour and light to your image.

Still or slow moving water can add to the mood of the image.

Remember that a long exposure will smooth out wave movements, leaving a silky water surface.



Night Photo subjects – reflections

Tip – if there is no river or sea around, look for a puddle. This works particularly well in city shots !

If there aren't any around, if you have a water bottle with you, pour some on the ground to create your own !



Night Photo subjects – buildings

Photographing lit buildings at night is a good way to add interest to a shot, as we don't normally see them like this.

Buildings don't usually move, so we know the image will largely be sharp, with no blurriness – the flags are slightly blurred, so there was some wind !

A building with lights on inside will look more welcoming than one with the lights off, unless we wanted to emphasise this – Halloween is approaching !



Night Photo subjects – cityscapes

Cities present lots of opportunities for night photography. We may feel overwhelmed by the amount of choice, so it is best to narrow this to a few locations.

What are you trying to photograph ?

A popular attraction at night ?

A panoramic skyline ?

Perhaps using black and white for a more ethereal look ?



Night Photo subjects – cityscapes

Another idea is to turn streetlamps into stars using a small (f11 or less) aperture.

We can use light glistening from a wet pavement to add a touch of magic to an ordinary scene.



Night Photo subjects – cityscapes with blur

We can deliberately introduce blur to emphasise the movement of people, vehicles etc.

For the shot on the right, a 10 second exposure was enough to blur the pedestrians, whilst still preserving some recognisable shapes.

In the lower image, a long exposure has turned the bus into a “ghost”



Night Photo subjects – landscapes

Night Landscapes are the opposite of Astro Photography.

Instead of capturing the night sky, the natural landscape will form the majority of the composition.

The problem is that the natural landscape is very dark at night, so it is best to take these during moonlit nights, use artificial lights (cityscapes) or aim for silhouettes like the one on the right.

If you don't do this, you may need an extremely long exposure and/or high ISO to pick up whatever light is available from the stars.

Again, first get the composition you want with high ISO and a faster shutter speed, then lower the ISO to reduce noise.



Night Photo subjects – Portraits

For Portraits, we cannot use a long exposure, as the subject is bound to move and cause blur.

So we need to use a wide aperture, say f2.8 and higher ISO to compensate. You may also need to use a spot focus at these settings.

Try to use whatever light is available – a reflector will bounce light back into the subject. This is less harsh than using a flash. If you don't have one, how about a lit shop window ?

This obviously works best in brightly lit city areas, but you can add additional light – for example, car headlights.

If you must use flash, try to diffuse or bounce it, so that it doesn't strike the subject's face



Summary

- Night photography is an exciting genre to try
- Be prepared – know your camera and have the appropriate gear with you
- Try shooting familiar, safe locations first
- Take extra care at night – taking someone with you is a good idea
- **Take extra care with fireworks and sparklers !**
- Don't be afraid to experiment with higher ISO. This will mean your shutter times can be shorter, so you can try out settings without waiting around
- **And have fun !**

