

ANGLES OF PHOTOGRAPHY (v4)

Lenses categorised in to 3 major groups based on their **FOCAL LENGTH** -

1. **TELEPHOTO (100mm upwards)**
2. **STANDARD / Mid-range (35-100)**
3. **WIDE (12-35)**

A lens in any category could have other characteristics to group by e.g. ULTRA WIDE/SUPER TELEPHOTO; ZOOM/PRIME; auto-focus; stabilisation etc. and these categories are broad and just a guide to the type of lens it is.

There are also very specialised lenses available for specific purposes e.g. Tilt & Shift, Macro, Fish-eye but for today I'm going to limit it to the more common lenses available, with emphasis on WIDE ANGLE lenses.

FOCAL LENGTH –

Is The distance from the optical centre of the lens to the image sensor in mm.

This determines the lens's **ANGLE OF VIEW** (How much of a scene the lens can see) and the perspective a lens will give to the eye.

NOTE - A lens with a FOCAL LENGTH of 100mm for a Full Frame camera/sensor is equivalent to a 66mm Focal length lens on an APSC camera/sensor! (Micro 4/3 would be 50mm Focal length). True equivalence includes applying the crop factor to the Aperture as well and adjusting the ISO by a calculation. This is important to understand when looking at like for like lens comparisons and the benefit (or otherwise) that it can give to Full and crop Frame Users.

The sensor size (physical) has a bearing on focal length if comparing with a lens is designed to work with a different sized sensor – the smaller the sensor is below Full Frame (35mm) the greater it's 'CROP FACTOR' i.e. how much less of the scene it can accommodate at the same focal distance. This means for a crop sensor camera (smaller than Full frame) you have to divide the FF (full frame) LENS Focal length by the camera crop factor to get its 'EQUIVALENT FOCAL LENGTH' on that camera. E.g. On a Sony APSC sensor camera, it's (the sensor's) crop factor is 1.5X (it is approx. half the size of a full frame sensor). So when talking about a FF 100mm lens, to get it's equivalent focal distance on an APSC sensor you have to Divide the FOCAL LENGTH by your camera Sensor's Crop Factor – $100\text{mm} / 1.5 = 66\text{mm}$. This is the EQUIVALENT FOCAL LENGTH for that lens on an APSC Camera. (NOTE – true equivalence so a photo taken on an APSC looks the same as that from a FF camera with equivalent Focal length lenses, includes applying crop factor to Aperture and adjusting ISO to compensate – another calculation). (A good explanation of how/why a lens has different characteristics on different sensor sizes can be seen at <https://northrup.photo/gear-basics/camera-body-features/sensor-size-crop-factor/>)

QUICK CATEGORY COMPARISONS -

In 90% of cases any lens can be used to photograph any subject of any type. However due to the characteristics of the lenses, the results can and will differ dramatically. This is where your skill as a photographer is applied to decide what lens characteristics suits the scene/subject and thus which to use.

A 'SUPER TELEPHOTO LENS' (anything over 600mm) -

This gives a very **narrow field of view** and a **highly magnified view**, bringing the distant subject a lot closer to the eye and **condensing the perspective between far and near** (relative to how the human eye sees it normally).

The '**DEPTH OF FIELD**' (the amount in focus) is also less than wider lenses at any given F stop.

Generally used for sports, nature, action etc. where the action/subject is a long distance away, but they can be used in virtually any other circumstance where you want to bring a subject closer to the camera or foreshorten the perspective.

A 'TELEPHOTO LENS' (from 100 – 600mm, some might say 70-600) -

Compared with a Super Telephoto, the **field of view** is getting wider and the objects in the distance look further away with everything being smaller in the scene.

Generally used for sports, nature etc. where the action a fair distance away and you want to bring it closer.

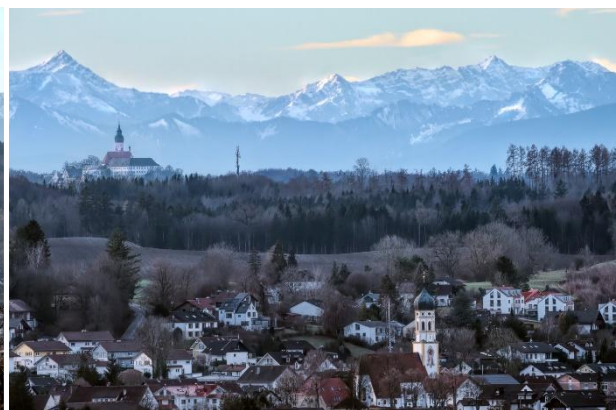
They can also be used in landscapes deliberately to foreshorten the foreground.

At the shorter end they are also used for Portrait type work.

These two photos are of more or less the same scene, one taken at 400mm and the other at 600mm. You can clearly see the narrowing of the Field of View and the foreshortening of the near and middle ground (condensed perspective).



400mm



600mm

NOTE – A VERY USEFUL FACILITY FOR FULL FRAME Users (especially if you have a high resolution sensor (40mp+)) - Many Full Frame digital cameras have a 'CROP MODE' to enable them to work with lenses that were designed for smaller/older sensors (e.g. on Sony Full frame cameras the crop mode is for an APSC camera sensor which is smaller). If you use a lens designed for Full frame camera on a full frame camera but switch the camera to CROP MODE, you are telling the camera that the lens is designed for an APSC sensor (smaller), so it crops the sensor edges to that size causing the lens's EFFECTIVE FOCAL DISTANCE measurement to increase by a specified CROP FACTOR – for APSC Sony its 1.5. The result is the 400mm native lens becomes a 600mm lens – 400×1.5 (called the EFFECTIVE FOCAL DISTANCE). ... **The compromise** ... What you lose is all the cropped area of the full frame sensor. So if your full frame sensor was say a 64mp sensor, it would reduce it's available Megapixels to 26, still plenty to post crop if needed whilst losing no optical quality in your image ... a very useful facility for this reason alone. This was how I shot the above picture at 600mm with my 400mm lens.
Note – this is NOT the same as DIGITAL zoom, there is no digital manipulation going on.

NOTE – There is a lot of debate as to whether this is the same as cropping the Full frame image to APSC size, in post production. I do not believe it is, based on tests I have carried out and simple logic. When you switch into crop mode, you and your camera are seeing the APSC sized portion of the scene, which is a cropped section from the Full frame. All your cameras' evaluations of the scene (exposure and focus) are then based on what the sensor (you, in the viewfinder) is seeing, which is not the same as the full frame view (it's a smaller portion).

By 'cropping in camera' (Switching to Crop Mode), the exposure of the image can be affected (Imagine a photo up an avenue of shady trees to an open bright space ... Take the photo in FF correctly exposed with say 'center weighted' metering mode, then without moving/changing anything other than switching the camera into CROP MODE, look at the exposure settings and you will see that (if in manual mode) the camera is saying you are overexposed as your camera is evaluating much more of the bright space so causing your camera counteract by telling you to reduce exposure (in an auto mode this would decrease your aperture or increase your shutter speed) . Also the depth of field will be slightly affected (although the latter I am less certain about as it's more difficult to identify/test for the points at which focus is dropping off). The above is regardless of any theoretical argument as to whether you need to take account of exposure changes due to Effective Focal length change!

So as you can see I do not believe cropping in Post production is the same (or has the same practical effect) as Crop Mode although the differences may be minimal depending on the scene.

Additional benefits are, Focus can be easier for you and the camera as the subject is magnified for the duration in crop mode; and the camera 'AUTO FOCUS AREA' which previously may have covered 80% of your sensor is now covering it all; and of course your camera is working on small file sizes so it handles faster.

A very useful option provided you can fit/track the subject within your frame when it is magnified (it's sometimes more difficult to keep the subject within your frame) and you have the available megapixels to result in a large enough image for your needs.

The photo below was taken at 200mm so that the 'OLD MAN of STORR' was magnified enough to be recognisable within the wider environment. The fore and Mid grounds are condensed/foreshortened so they are less of a feature, just supporting the main subject - the Old Man and cliff, the sun dappling and the stormy sky. I could have zoomed in on the 'Old Man' but that wasn't the photo I was after.



200mm

A '**STANDARD LENS**' or mid-range (from 35-100, some might say 35-70).

Compared with a TELEPHOTO, the **field of view** is getting wider still and the objects in the **distance look further away** with everything being smaller in the scene.

These lenses are closer in perspective to how the eye normally sees things. For this reason they are used as general, landscape and Portrait lenses, where you are wanting to replicate normally perceived perspectives.

This photo of Eilean Donan Castle was taken with at 55mm. This was to capture the castle in it's environment/setting. The foreground is quite prominent, but far less so than if taken with a wide angle so as not to distract from the Castle, but giving detailed interest and a base to the image that would probably be lost with a longer lens. Certainly the scene would have been too 'tunnelled' for what I wanted if a longer lens was used and key elements would have been too small with a wider view.



55mm

A **'WIDE/Ultra wide ANGLE LENS'** (from 12-35 mm).

The **field of view** is getting much wider than the eye/brain consciously sees without moving your eyes or head.

Objects in the middle and far distance are **getting relatively much smaller** whilst objects close to the lens are **relatively much larger**.

The **'DEPTH OF FIELD'** (the amount in focus) is also greater at any given F stop than longer lenses.

Generally used for land/city/sea scape, architecture, street and even portraits. In many cases they are used to deliberately distort (to the eye) the subject to make a feature stand out. In 95% of cases, the **Foreground** becomes the main subject of interest with the background playing a supporting role.

WIDE ANGLE lenses are 'Rectilinear', they are designed to keep verticals and horizontals as straight as possible over as much of it's field of view as it can i.e. lens distortions are controlled (but still present) – lens distortion is **not** the same as perspective change. This is the main differentiation between WIDE ANGLE and FISHEYE, although there are other technical differences.

This photo of the 'Sun Voyager' in Reykjavik was taken at 26mm to get the whole subject in (whilst standing quite close) but also to use the attributes of a wide angle to 'stretch' the lines and especially the Stern to pull your eyes through the image. It also made the sky more dramatic by 'stretching (distorting)' the clouds.



26mm

A very interesting and thought provoking article on 'How Focal Length Alters the Psychological Impact of Your Images' is worth a read at <https://www.premiumbeat.com/blog/various-focal-lengths-for-images/> (Its mainly relating it to Cinematography but applies equally to Stills). It labels Wide Angle photos as 'IMMERSIVE' in the emotion they evoke in the viewer – a term used widely to describe the potential for Wide Angle photos.

So concentrating on WIDE ANGLE

I love the ability Wide angle lenses give you at the time of shooting to *Capture reality and transform it into an unreal manner whilst it remains absolutely recognisable.*

I feel Wide Angle Photography, through the lens alone, gives you the tool to mix 'record capture' with 'artistic interpretation' **to capture a reality in a dramatic and exaggerated manner.**

Whilst I may take far **more pictures using my 24-70 lens (above 35mm)**, I will often go out of my way to take photos using wide angle lenses because I love **the potential for warped perspective and drama** it gives without necessarily becoming unbelievable or gimmicky. Wide Angle lenses are FUN lenses to use and demand experimentation. They also require more considered thought at the taking stage, especially in relation to the composition.

Wide Angle lenses have to be used **judiciously** especially at the lower focal lengths to **avoid including too much in your image (as you have a very wide field of view)** and thus no clear point of interest in your picture **or the subject being too small (too far from the lens) or too distorted (too close to the edge of the scene) or too big (as too close to the lens).**

However, if used well they can produce amazing and captivating images and make you look at scenes differently.

I challenge you to walk past a good Wide Angle photo, that has made full use of the perspective and

distortions, without at least taking a second glance to understand what your eyes just saw! – half the battle won!

The key tips I can pass on to anyone thinking of using a wide angle lens are -

(note – I don't claim to be a wide angle expert, just someone who loves the drama the lens offers and WANTS to become an expert!)

1. Almost a necessity to be successful with wide angle photography - **Have a strong foreground** (often located within a matter of cms from the lens).

The lens will make the foreground subject appear **significantly bigger** than things further away, creating a striking and dramatic image where **you almost feel you are immersed in the scene, actually standing on the foreground or you feel you can step into the scene** (you probably were lying on it to get the photo!), giving an **almost three dimensional feel**.

The photo below was taken at 17mm and in Portrait.

Initially my interest was getting the milk churns with the Daffs around, then I got fixated on the sunstar created by using a small aperture (f18) and adjusting my viewpoint so the sun is partially obscured by the milk churns. After looking at the first couple of shots I realised the sunstar was 'echo'd' to some degree by the Daffodil flowers, so I had to lie on the ground to get the best composition I could – Churns separated and roughly on 1/3; sunstar visible; Dafs close but not too close and reasonable spread whilst just breaking the horizon (with one just covering an ugly hedge behind).

The drama of the photo is created by the dominance of the foreground (Dafs) leading to the Milk Churns that are deliberately left with a slightly distorted perspective to give the impression they are larger than they are (exaggerated by very slightly pointing the lens downwards, causing the verticals to splay). The contrast across the scene also helps the drama.



17mm

2. Remember you **can get away with smaller F stops** and still retain Depth of Field as it is quite large the wider you go, so items a foot from the lens (subject to min. focus distance) can be in focus as well as items 50 feet away. The challenge is getting a dramatic foreground which usually means being **very** close to it whilst having enough depth of field for the background. If you do have a subject very close to the lens and want the background largely in focus, you would then have to use smaller Apertures to achieve the extreme depth of field, but less so than with longer lenses.

3. You can **hand hold** a Wide Angle for a much slower shutter speed than with longer lenses. It is less sensitive to camera movement, but NOT IMMUNE.

4. **GET DOWN AND DIRTY** – Getting low to the ground with a wide angle allows you to get foreground interest & texture into your photos. It is almost a necessity to make the most of these lenses.

A low viewpoint, very close to the 'lead in' or subject, emphasises the foreground in size and detail whilst the rest of the image tails away. This effect invites you in to the image as the foreground is so dominant and tactile.

5. **Beware of getting too much sky in your picture.** Unless there is a specific reason for a large amount of sky, it's usually the land that holds the interest. Having said that, because of the 'stretch from centre' attribute of a wide Angle lens, cloudscapes can often be very dramatic as they are stretched out to the edges and corners, elongating streaks of cloud/light (a little similar to slow shutter effect, but with a lateral stretch also).

6. **Be aware of everything in the image** (visible in your viewfinder).

It is very easy **to miss things creeping in to the edges** of your picture with such a wide angle and even easier **to be tempted to include too much** in the picture so everything becomes insignificant and lost.

7. **Know how/where your lens distorts.**

Be aware that especially at the 12-24 range, natural lens distortion is inevitable (degree probably depends on how much you spend!), but you can use it to your advantage. In fact I would view it as a largely positive attribute. Yes, you may have to straighten some lines in post production, but you can also deliberately use this for more interesting leading lines or to emphasize a curve in the scene or simply be creative.

You should be especially aware if you have people in the scene. Nobody likes seeing their faces with huge noses or bulging eyes or a stomach that looks twice as big as it really is unless you are after a 'cartoon look'!



'The VINDALOO VAPOURS'

8. USING A WIDE ANGLE LENS

A very good video discussing how to use Wide Angle lenses from 'The Photographic Eye' can be seen at this link - <https://www.youtube.com/watch?v=HyeifT83acc>

If you want your subject to have **minimum distortion (or in reverse to use distortion)**-

- a) Ensure the subject (in foreground!) is as close to the centre of the picture as possible (away from edges).
- b) Keep the camera on a level plane with the subject i.e. don't tip or twist the camera. Anything approaching the edge of the frame is distorted/stretched far more than in the centre. Again you can use this attribute by deliberately tipping the camera to 'stretch' top or bottom of the image, making it relatively larger/smaller and closer/distant (but you must remember the lens 'distorts' on the x, y AND Z axis i.e. top to bottom, left to right and back to front).
- c) Ensure your subject is not really close to the lens (unless your aim is to deliberately draw attention to it). Anything close to the lens is relatively highly magnified, making it appear far bigger than the scene around it.

The three images below were snapped just to demonstrate how tipping the camera (hence where the centre of the lens is pointing in the scene) up or down, alters how the lens distorts the scene. Similarly if you tilt it left, the right side of your image is stretched/distorted, especially closer to the edge of the frame (and vice-versa by tilting to right).

These images were quick snaps and no corrections to perspective have been done (NOTE the distorted verticals).



LENS POINTING CENTRAL

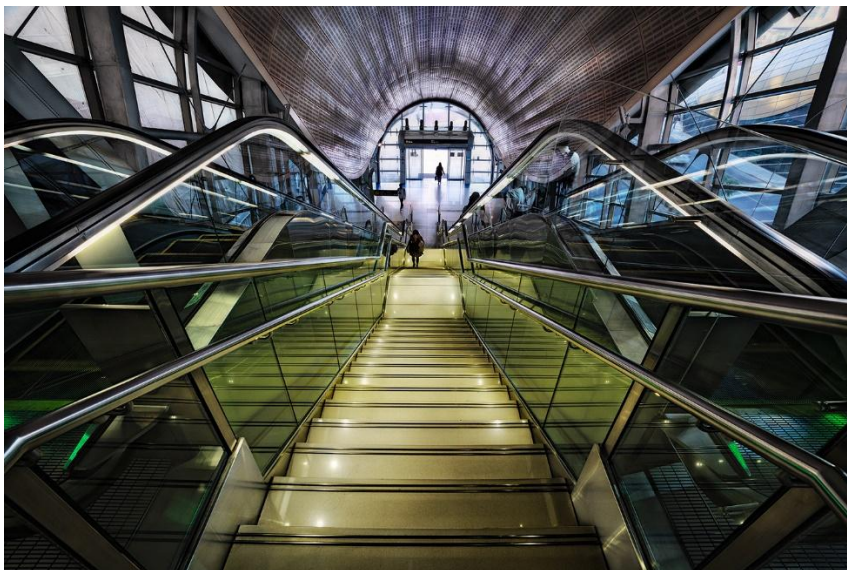


LENS ANGLED DOWN



LENS ANGLED UP

This photo of a Dubai Metro station was taken at 16mm. The perspective almost makes you feel you could fall down those steps! Foreground is disproportionately large leading the eye into the picture. The centre of the lens would have been pointing to the bottom of the steps so everything radiates out from that point .



Taken at 12mm. Rock formation on Dartmoor



The rest of the talk is showing a number of photos taken in the 12-35 range, to hopefully give some inspiration to use or get a Wide Angle lens.

This is the fun of a wide angle – to use the attributes of the lens to give you a view that ‘INVITES YOU IN’ or ‘SHOVES THE SUBJECT IN YOUR FACE’ or simply gives a different take on a worn out subject ... so many possibilities.