



Aperture Photography Group  
Camera Skills  
Lenses

[www.aperturephotographygroup.co.uk](http://www.aperturephotographygroup.co.uk)



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# Camera Skills

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Tonight:

- ❖ Lenses
- ❖ Recap the key points from the Nick Rains video
- ❖ Q&A

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# Lenses

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Three questions:

- ❖ What lenses should I buy?
- ❖ Why are they necessary?
- ❖ What different effects do they offer?

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# Lenses

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- ❖ Most camera systems offer a wide range of lenses.
- ❖ You don't need to buy all of them.



# Identifying Lenses

- ❖ All lenses have three characteristics:
- ❖ Focal length
- ❖ Widest aperture
- ❖ Filter thread size

Filter Thread Size

Widest Aperture

Focal Length



Filter Thread Size

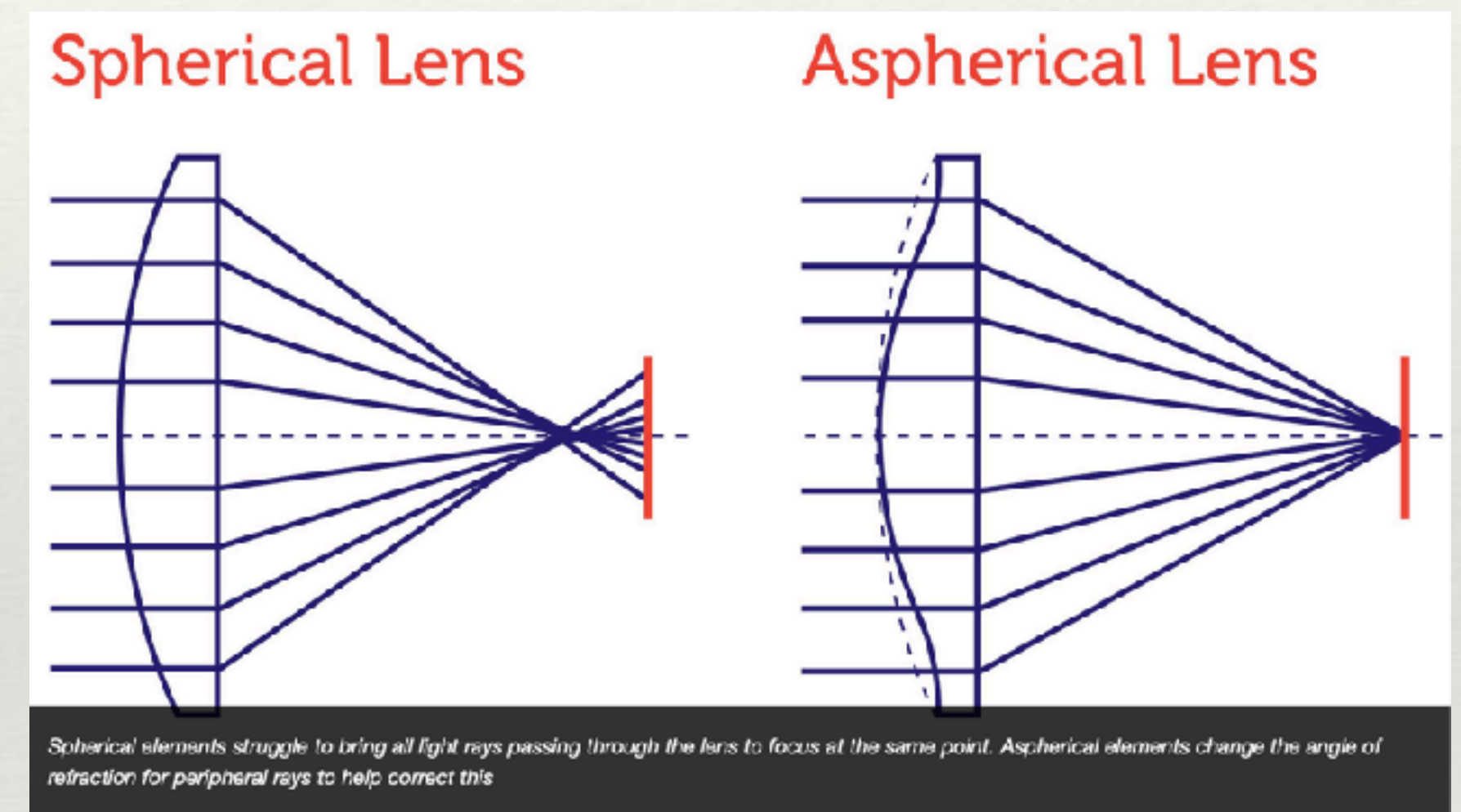
Widest Aperture

Focal Length



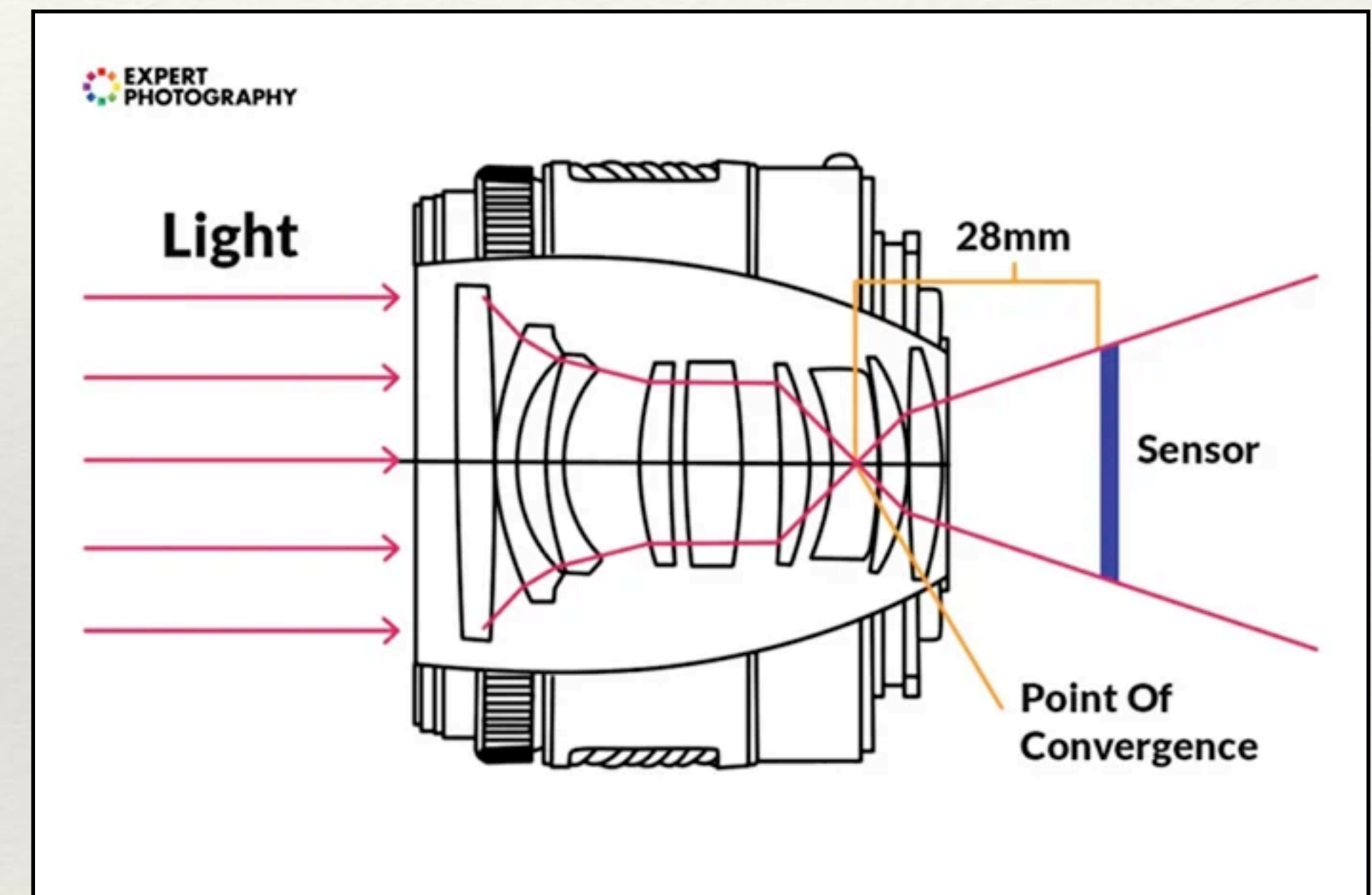
# Aspherical Lenses

- ❖ Photographic lenses are made up of a series of smaller lenses, commonly referred to as elements.
- ❖ Many lenses, contain at least one 'aspherical' element – simply, one that is not perfectly spherical.
- ❖ Aspherical elements are used widely inside lenses to help improve image quality.
- ❖ Some lenses may offer just five or six of these elements while telephoto optics can reach to 20 and beyond.
- ❖ Each element will have either a concave or convex profile depending on its role, and many will be spherical in shape.



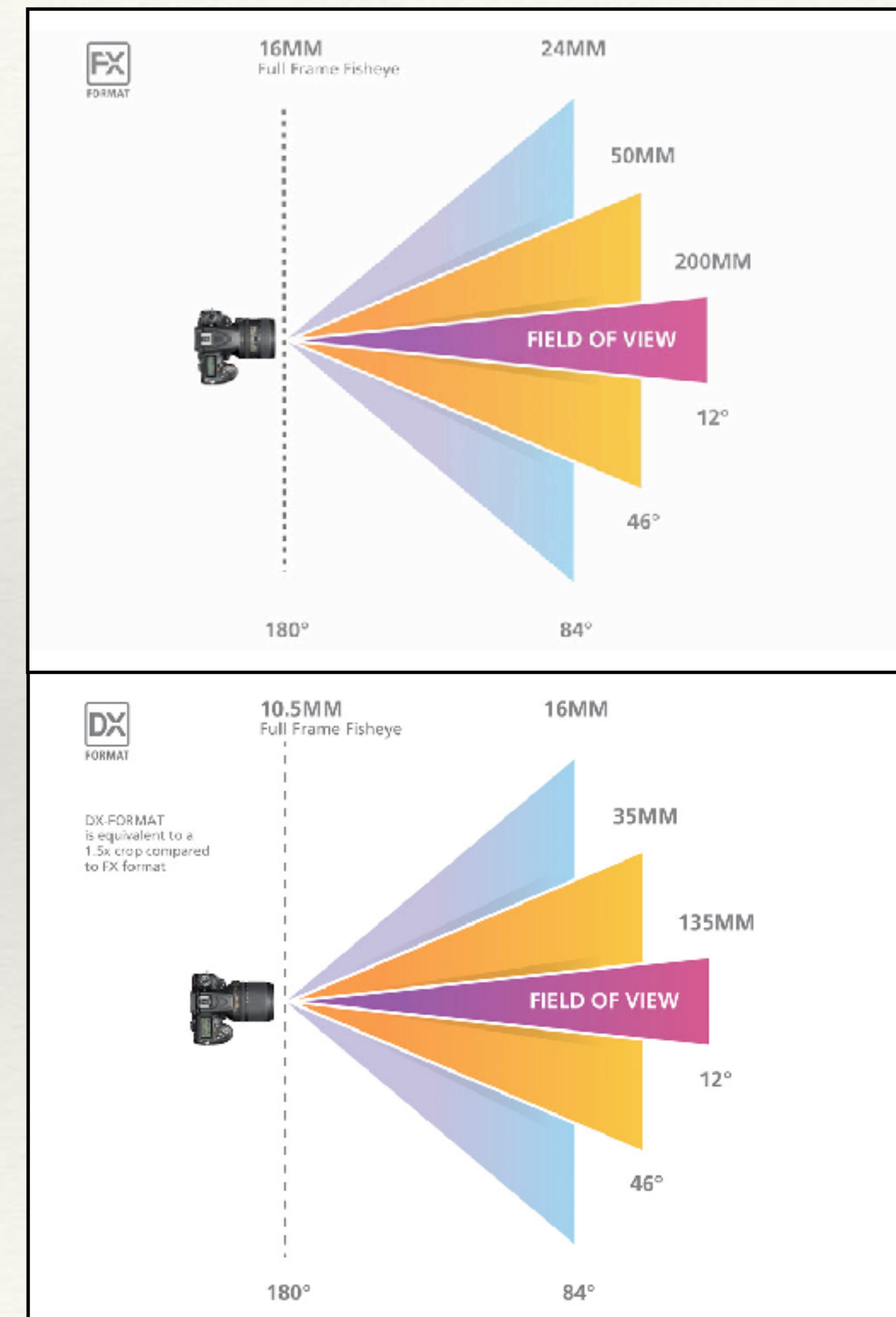
# What is Lens Focal Length

- ❖ Focal length, usually represented in millimetres (mm), is the basic description of a photographic lens.
- ❖ It is not a measurement of the actual length of a lens, but a calculation of an optical distance from the point where light rays converge to form a sharp image of an object to the digital sensor or 35mm film at the focal plane in the camera.
- ❖ To standardise the measurement, the focal length of a lens is determined when the lens is focused at infinity.



# Focal length of lens relates to the angle of view

- ❖ Lens focal length tells us:
  - ❖ The **angle of view** - how much of the scene will be captured.
  - ❖ The **magnification** - how large individual elements in the scene will be.





# Focal length of lens relates to the angle of view

- ❖ The longer the focal length, the narrower the angle of view and the higher the magnification.
- ❖ The shorter the focal length, the wider the angle of view and the lower the magnification.



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# Full Frame v Crop Sensor

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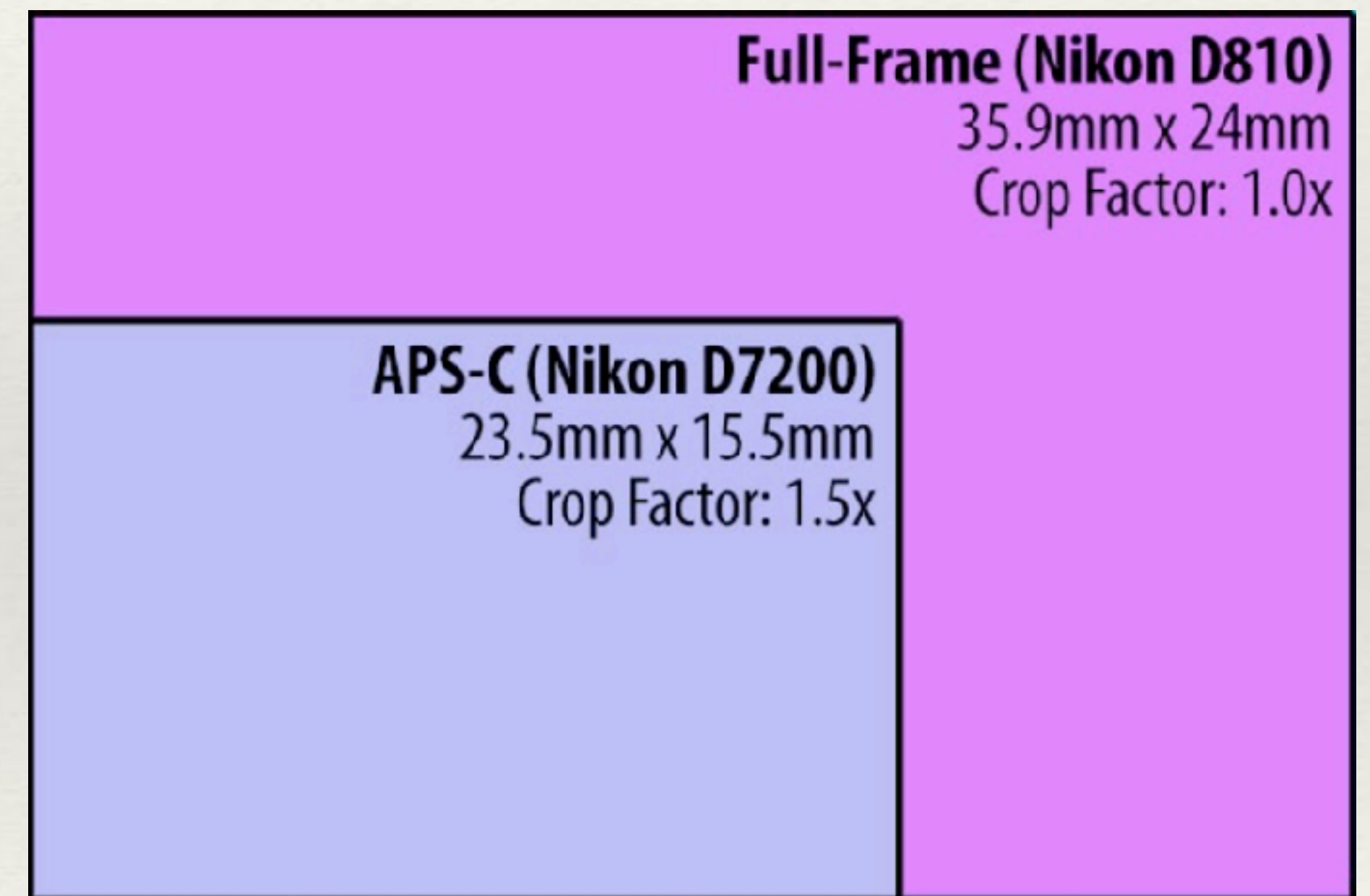
## Full Frame

- ❖ In a full-frame camera, the sensor is 24mm high and 36mm wide, giving it a 3:2 aspect ratio.
- ❖ These dimensions, as well as the term 'full frame', derive from the days of film cameras – specifically, the fact that these sensors have the same dimensions as a single frame (or negative) on a roll of 35mm film.

# Full Frame v Crop Sensor

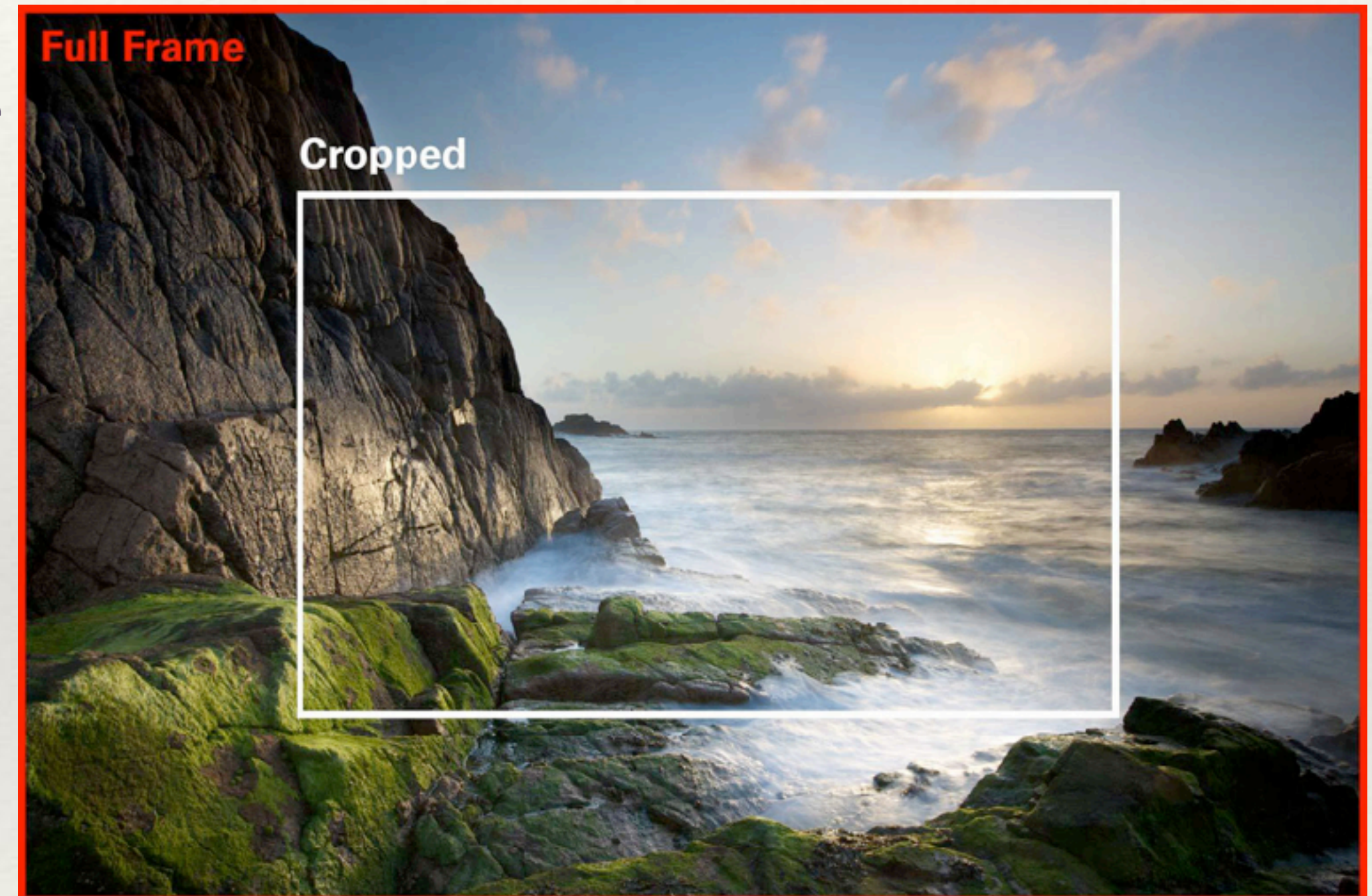
## Cropped Sensor

- ❖ In a crop sensor camera (or, to use its proper name, a cropped-frame sensor camera), the sensor is much smaller.
- ❖ Exactly how much smaller (known as the 'crop factor') can vary, and depends on the kind of crop sensor camera you're using.



# Full Frame v Crop Sensor

- ❖ If you are using a lens with the same focal length and you're standing in the same position, photographing the same thing, a smaller sensor will simply capture a smaller part of that image.
- ❖ Your angle of view will be slightly less which will give it the impression of it being a slightly longer focal length lens.
- ❖ A 35mm lens on a 1.5 crop sensor camera will give a 50mm full frame equivalent.





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# Types of lenses

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- ❖ Super-wide lenses
- ❖ Wide Angle Lens
- ❖ Standard Lens
- ❖ Telephoto Lens
- ❖ Super-telephoto Lens

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# Types of lenses

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- ❖ **Super-wide lenses**
  - ❖ <21mm
  - ❖ Extremely wide angle of view
  - ❖ Works in tight places - will include a lot of subject matter, which can make it difficult to organise the subject matter.
  - ❖ Need to get close to the subject as well.
  - ❖ Normally have large depth of field, unless you have extremely wide apertures (eg f1.4).

# Types of lenses

## ❖ Wide Angle Lens

- ❖ 24mm-35mm
- ❖ Gives you the effect of parallel lines converging into the distance (eg shadows).
- ❖ Near subjects appear larger in the frame and so you get good sense of perspective.
- ❖ Allows you to get more subject matter in the frame and better organise the subject matter.
- ❖ Most popular prime lenses and good for Street photography.
- ❖ Perspective is almost natural in appearance.
- ❖ Versatile, general purpose prime.



# Types of lenses

- ❖ **Standard Lens**
  - ❖ 40-60mm
  - ❖ Closest to what our eyes see.
  - ❖ Allows you take a shot without any effect (geometric or perspective).
  - ❖ Good for portraits.





# Types of lenses

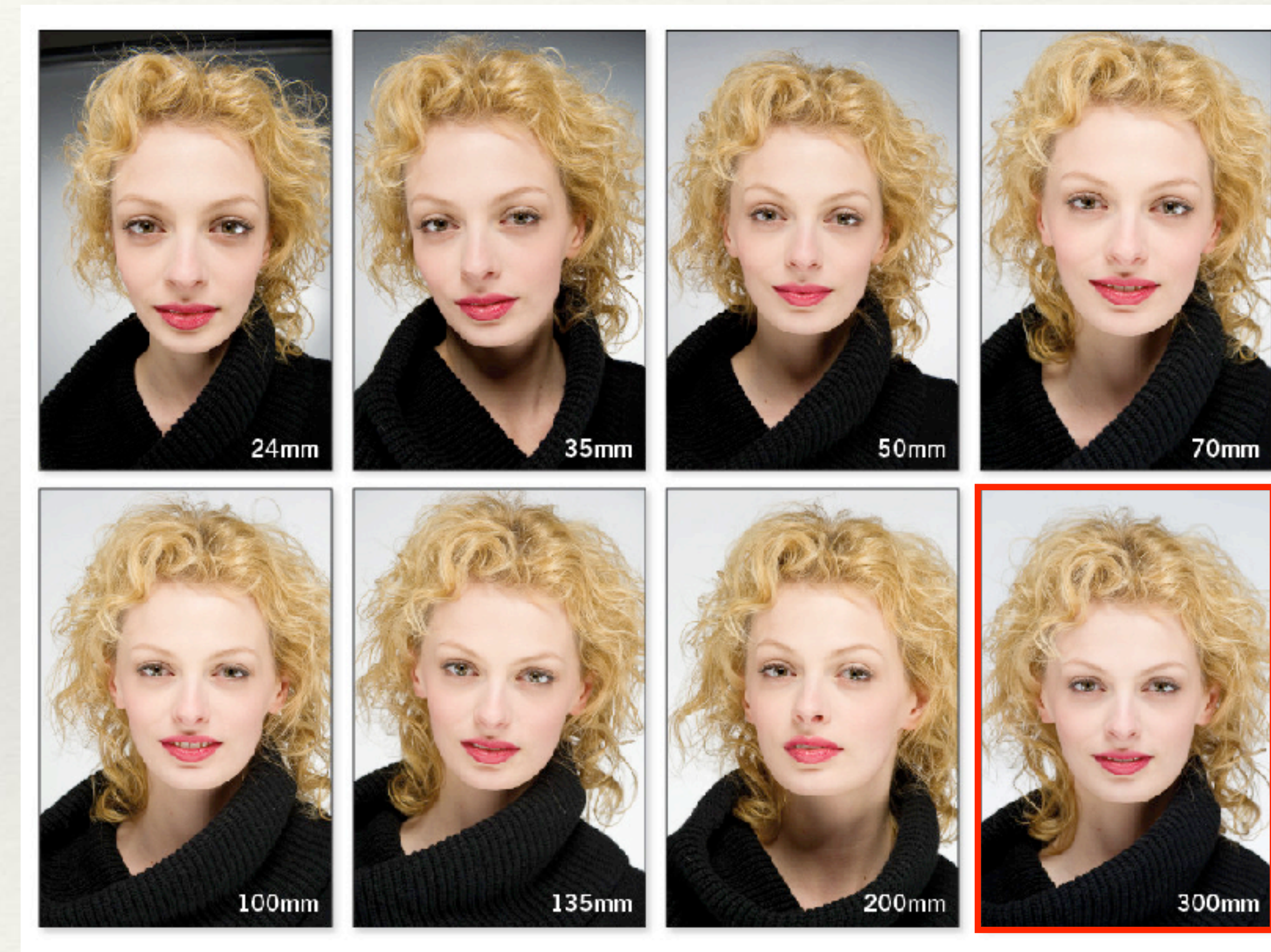
## ❖ Telephoto Lens

- ❖ 70mm-200mm
- ❖ Allow you to isolate the subject.
- ❖ Good for head and shoulder portraits.
- ❖ Give you less angle of view and so less in the background.
- ❖ They give you compression of perspective - they bring the background closer.



# Types of lenses

- ❖ **Super-telephoto Lens**
  - ❖  $>200\text{mm}$
  - ❖ Allows you to get tight in and eliminate background.
  - ❖ Good for sport and wildlife.
  - ❖ Enhances the effect of dust.



# Perspective

- ❖ **Wide Angle Lenses**  
Bring close things forward and push distant things away. Also converge perspective. Stretches and exaggerates perspective.
- ❖ **Standard Lens**  
Objects look the same as in real life.
- ❖ **Telephoto Lenses**  
Pushes close things away and brings distant things closer. Compresses the scene - brings far away things closer. Enhances atmospheric conditions.





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# Zoom v Prime Lenses

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- ❖ There are two types of lenses: prime and zoom.
  - ❖ Prime lenses have a fixed focal length.
  - ❖ Zoom lenses have variable focal lengths.

# Zoom Lens Benefits

- ❖ The advantage of a zoom lens is versatility.
- ❖ They are ideal when you are photographing a variety of subjects and you just want one lens for both situations.
- ❖ Using a zoom lens reduces the number of times you need to change the lens which:
  - ❖ Saves time.
  - ❖ Limits the possibility of getting dust in the camera's mirror box or on the sensor.



# Prime Lens Benefits

- ❖ Prime lenses tend to be more compact and lightweight than zoom lenses.
- ❖ Prime lenses also tend to have a larger maximum aperture (f/1.4 to f/2.8) - this can be an advantage:
  - ❖ When shooting in low light conditions.
  - ❖ It will increase the possibility of hand holding the camera and freezing the subject without shake or blur caused by the longer exposures.
- ❖ Prime lenses with large apertures gives you a shallow depth of field which is useful for portraiture where you might want a softer or blurred background (also known as bokeh).



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# Lens Sets (Full Frame examples)

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	Zoom	Prime
First	24-70mm	50mm
Second	70-200mm	90mm
Third	16-35mm	28mm



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# Other Types of Lenses

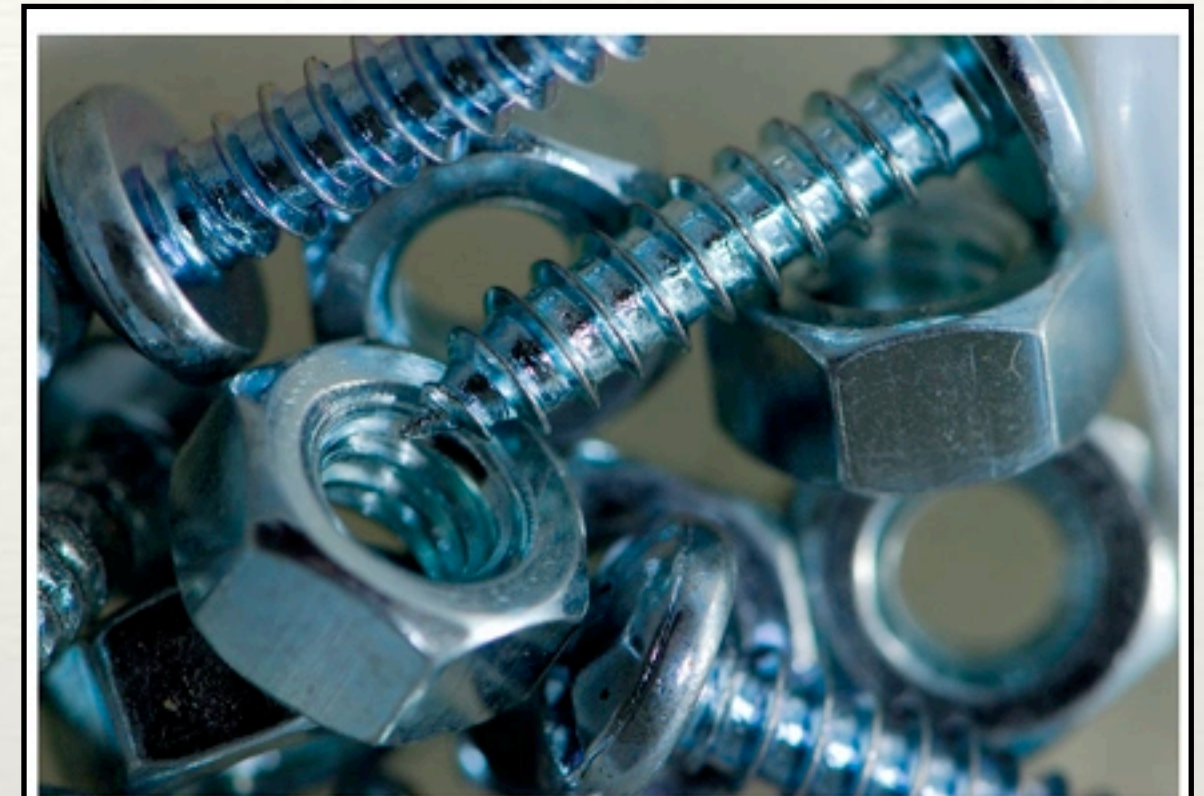
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- ❖ Macro lenses
- ❖ Tilt-shift lenses



# Macro Lenses

- ❖ Used for close-up photography.
- ❖ Allow you to focus very close to the subject and reproduce them at life-size.
- ❖ Focal Lengths usually between 50 mm and 100mm.
- ❖ Popular for subjects such as: flowers, insects and small products.



Product



Nature

# Tilt-Shift Lenses

- ❖ A tilt shift lens is one that changes the orientation and position of the lens mechanism with respect to the image sensor.
- ❖ Typically, a lens and sensor are parallel to one another on the same plane.
- ❖ With a tilt shift lens lens, the ability to tilt and /or shift the lens in different directions changes the entire plane of focus.



# Tilt-Shift Lenses - Tilt

- ❖ By changing the angle of the plane between the lens and the camera's sensor, you can change the scale of focus and the depth of field.
- ❖ Changing the scale can allow your images to appear miniature.
- ❖ Shifting or tilting can also minimise or maximise the blur behind your subject.



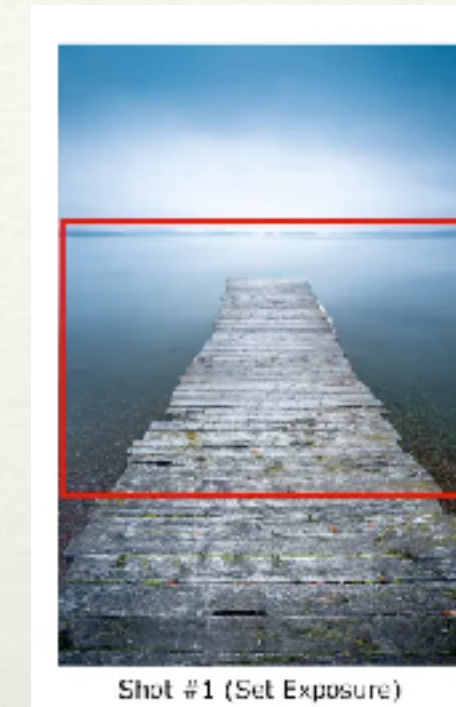
# Tilt-Shift Lenses - Shift

- ❖ Shifting your lens up or down can eliminate the angle your camera captures.
- ❖ Tilt shift photography can straighten out the converging lines and is often used for architectural photos for this reason.

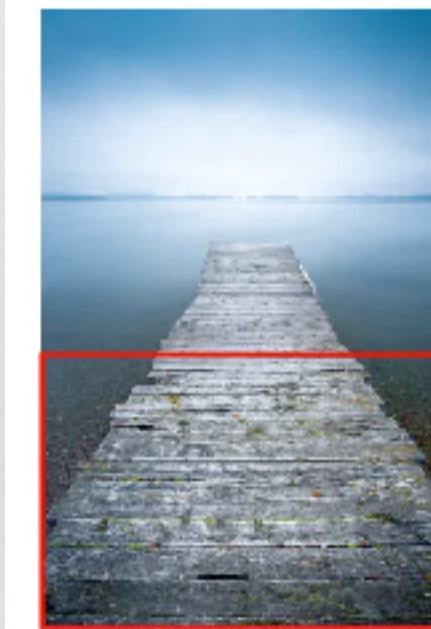


# Tilt-Shift Lenses - Shift Panoramas

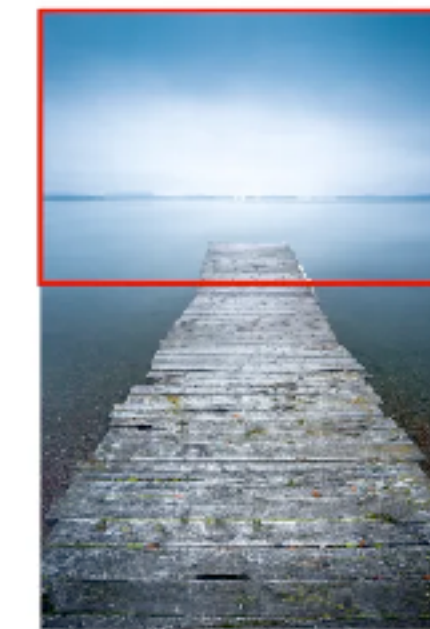
- ❖ Shifting your lens from left to right makes it perfect for capturing those panoramic shots without moving the actual camera.
- ❖ By keeping the camera still, a series of photos can be taken by adjusting only the lens position, to create panoramic photos.



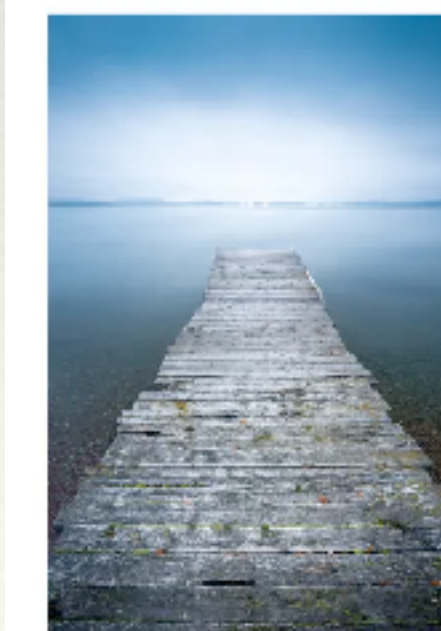
Shot #1 (Set Exposure)



Shot #2 (Shift Down)



Shot #3 (Shift Up)



Final Photograph



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# Lenses - Summary

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- ❖ Lenses can be identified by the writing around the object lens.
- ❖ Lenses are made up of a series of smaller lenses, commonly referred to as elements.
- ❖ Focal length tells us the **angle of view** and the **magnification** of the lens.
- ❖ There are many types of lenses - buy what you need.
- ❖ In terms of quality, you get what you pay for.



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# Lenses

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❖ Q&A