

More from Mike Browne on lighting portraits
https://www.youtube.com/watch?v=mwssosTX_tE

LENSES

Your choice of the right lens for the task can become a complex trade-off between cost, size, weight, lens speed and image quality.

We'll examine lenses in terms of image quality, focal length, perspective, prime vs. zoom lenses and effects of your choice in aperture (F-Stop).

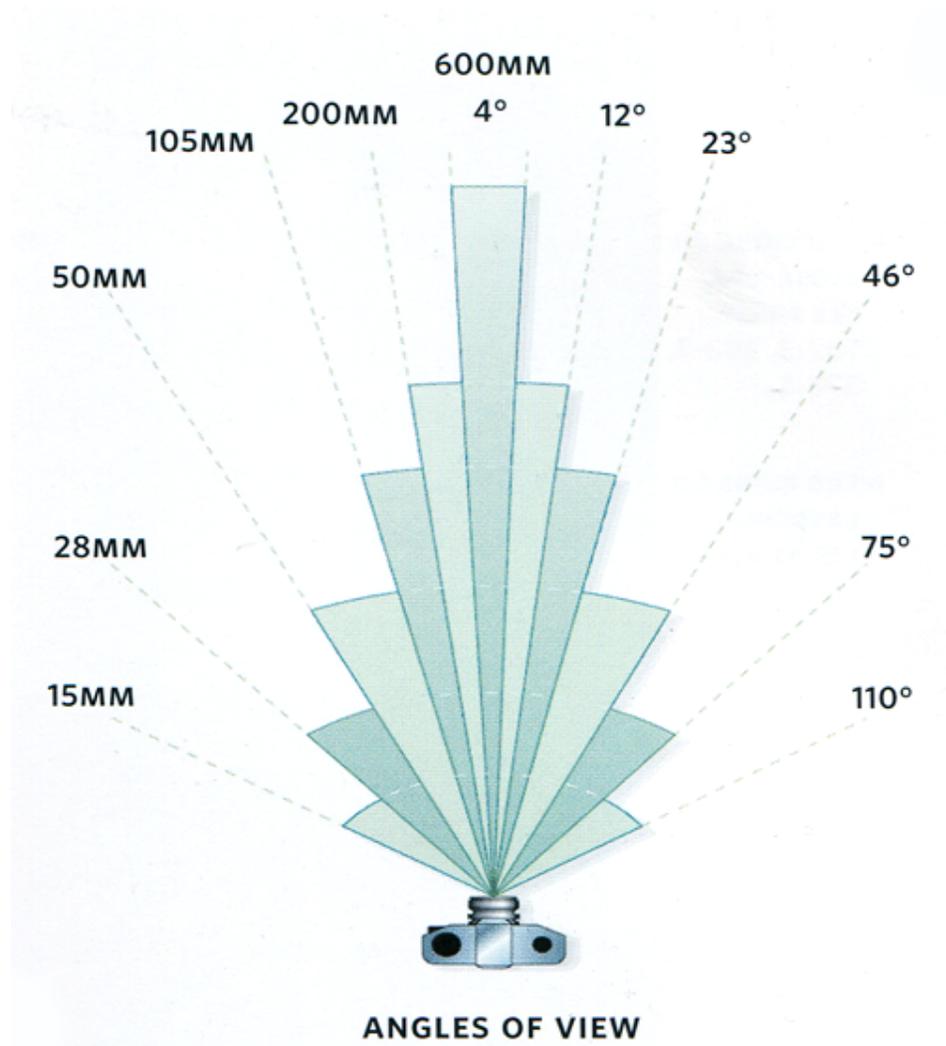
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INFLUENCE OF LENS FOCAL LENGTH

The focal length of a lens determines its angle of view and how much the subject will be magnified.

[Wide angle lenses](#) have short focal lengths, while [telephoto lenses](#) have longer focal lengths. This effects the angle of view:



Focal length, usually represented in millimeters (mm), is the basic description of a photographic lens.

The focal length number 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.

- The longer the focal length, the **narrower** the angle of view and the higher the magnification will be.

- The shorter the focal length, the **wider** the angle of view and the lower the magnification will be.

Wide-angle lenses:

A wide-angle lens can be used as a powerful tool for exaggerating depth and relative sizes of things in a photograph. Here, we'll explore the unique characteristics and power of a wide-angle lens.



Wide angle 18mm image by Laura Hoffman: Tustin LTA Hangar, © Laura Hoffman 2009.

A lens is generally considered to be "wide angle" when its focal length is less than around 35 mm (full frame).

For a reference on crop factors and multipliers for varying sensor sizes:

<http://www.cambridgeincolour.com/tutorials/digital-camera-sensor-size.htm>

The key concept is this: the shorter the focal length, the more you will notice the unique effects of a wide angle lens.

The angle of view increases.

What makes a wide-angle lens unique?

A common thought is that wide-angle lenses are useful for instances when you cannot step far enough away from your subject - yet you still want to capture as much of your subject as possible.

There's more to know about a wide-angle lens.

Wide Angle Lens Can Offer a Unique Perspective.

A wide angle of view means that both the relative size and distance is exaggerated when comparing near and far objects.

This causes nearby objects to appear gigantic, and far away objects to appear unusually tiny and distant. The reason for this is the angle of view:

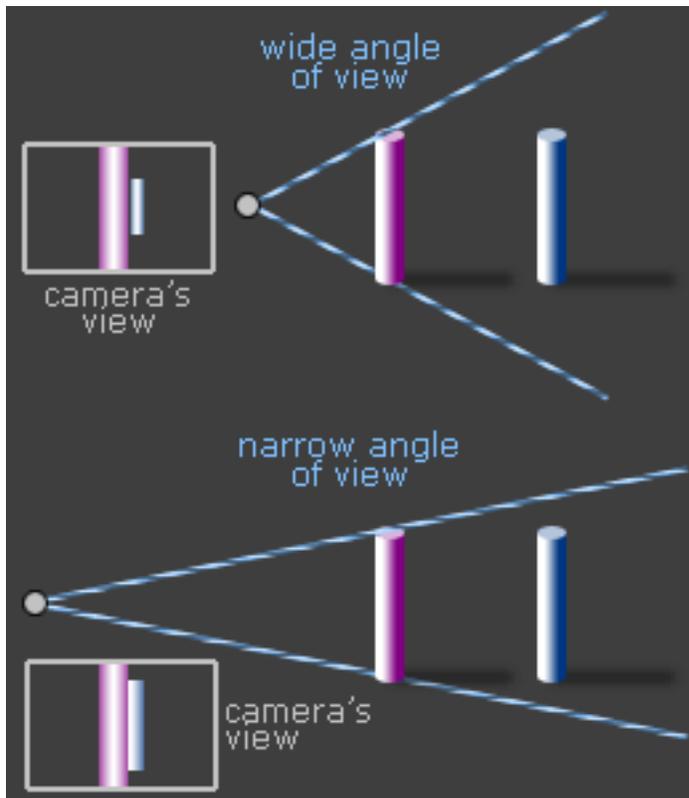


Diagram reference: Cambridge in Colour

Even though the two cylinders above are the same distance apart when photographed with each lens, their relative sizes become very different when a photographer fills the frame with the closest cylinder.

This causes nearby objects to appear gigantic, and far away objects to appear unusually tiny and distant.

Perspective is influenced by where **you** (the photographer) are located when you take a photograph.

However, in practical use, wide-angle lenses often cause you to move much closer to your subject — which affects perspective.



This exaggeration of relative size can be used to add emphasis and detail to **foreground** objects, while still capturing expansive backgrounds.

If you like this effect - get as close as possible to the nearest subject in the scene!

In the extreme wide-angle example above, the nearest flowers are nearly touching the front of the lens, which greatly exaggerates their size. In real life, these flowers are only a few inches wide.

But does this effect work while photographing people?

In the example to below, note how the dog's head has become abnormally large relative to his body. Can be cute and dramatic, but may not be a popular choice for most portraits of people.



Wide angle shows the expanse of a scene.



Wide angle lenses affect perspective: Point your camera at the horizon to avoid converging verticals; otherwise be aware of how your point of view will impact your subject.

Many will say that focal length also determines the perspective of an image, but strictly speaking, perspective only changes with one's location relative to their subject.

For these scenarios only, the wide-angle lens exaggerates or stretches perspective, whereas the telephoto lens compresses or flattens perspective.

Perspective control can be a powerful compositional tool in photography, and often determines one's choice in focal length (when one can photograph from any position). *Move your mouse over the above image to view an exaggerated perspective due to a wider angle lens.* Note how the subjects within the frame remain nearly identical — therefore requiring a closer position for the wider angle lens. The relative sizes of objects change such that the distant doorway becomes smaller relative to the nearby lamps.



CONVERGING VERTICALS

Whenever a wide-angle lens is pointed above or below the horizon, it will cause otherwise parallel vertical lines to appear as if they are converging.

With a wide-angle lens, even small changes in your composition will alter the location of the vanishing point by a large amount — resulting in converging verticals, distorting the image.

Wide angle shot of trees on Vancouver Island, Canada.



This architectural image was photographed close to the door, exaggerating the apparent height of the building.

This gives the unwanted appearance that the building is about to fall over backwards.

18mm, Dresden, Germany.

INTERIORS & ENCLOSED SPACES

Wide Angle Can Be Your Best Friend.

A wide angle lens can be extremely helpful while making photographs in enclosed spaces, simply because it may be impossible to move far enough away from the subject to get all the elements you need in the photo.



Bodie interior, wide angle 18mm lens



Inside small living room - wide angle 18mm lens



These are examples where you could not move more than a few feet in any direction, yet the photos do not give any appearance of being cramped.

However - Be Aware of Wide Angle Distortion:

Barrel distortion causes otherwise straight lines to appear bulged if they don't pass through the center of the image.

Edge distortion causes objects at the extreme edges of the frame to appear stretched in a direction leading away from the center of the image



Bremen street 18mm wide angle



Bremen Street with no distortion – 70mm

Wide-angle lens used, Dresden Germany: Buildings seem to fall into each other.



70mm (normal) lens used, Dresden Germany – changed POV and eliminated distortion.

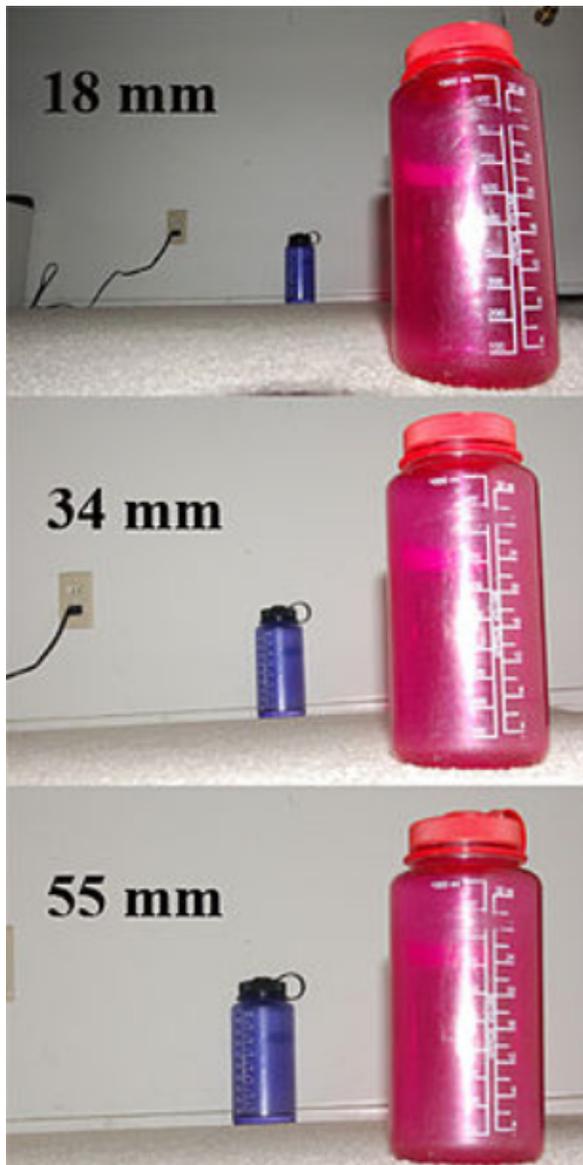


The only **ways to reduce converging verticals** are to either:

- Aim your camera closer to the horizon line, even if this means that you'll capture a lot of ground in addition to the subject (which you crop out later),
- Back up from your subject and use a lens with a longer focal length.
- Use Photoshop or other software to distort the photo so that vertical lines diverge less, or use a tilt/shift lens to control perspective.

Reference:

<http://www.cambridgeincolour.com/tutorials/wide-angle-lenses.htm>



How focal length affects photograph composition:

Three images depict the same two objects, kept in the same positions. By changing focal length and adjusting the camera's distance from the pink bottle, it remains the same size in the image, while the blue bottle's size appears to dramatically change. Also note that at small focal lengths, more of the scene is included.

Telephoto lenses are more susceptible to **camera shake** since small hand movements become magnified, similar to the shakiness experience while trying to look through binoculars.

So what lens should I use?

Lens Focal Length*	Terminology	Typical Photography
Less than 21 mm	Extreme Wide Angle	Architecture
21-35 mm	Wide Angle	Landscape
35-70 mm	Normal	Street & Documentary
70-135 mm	Medium Telephoto	Portraiture
135-300+ mm	Telephoto	Sports, Bird & Wildlife

*Note: Lens focal lengths are for *35 mm equivalent cameras*. Adjust if you have a compact or digital SLR camera with a smaller sensor size.

To adjust the above numbers for your camera, use the focal length converter in Cambridge in Colour's excellent [tutorial on digital camera sensor sizes](#).

Try all focal lengths (wide, normal and telephoto) for very different results.



San Diego – View from Old Town, 40mm



San Diego – View from Old Town, 200mm

Wrong or Right lens? It's all about what you are putting across in your image.



Birds over Miami – with context of the city, normal lens



Birds over Miami. Telephoto (close up) - Could be anywhere, it's all about the birds.

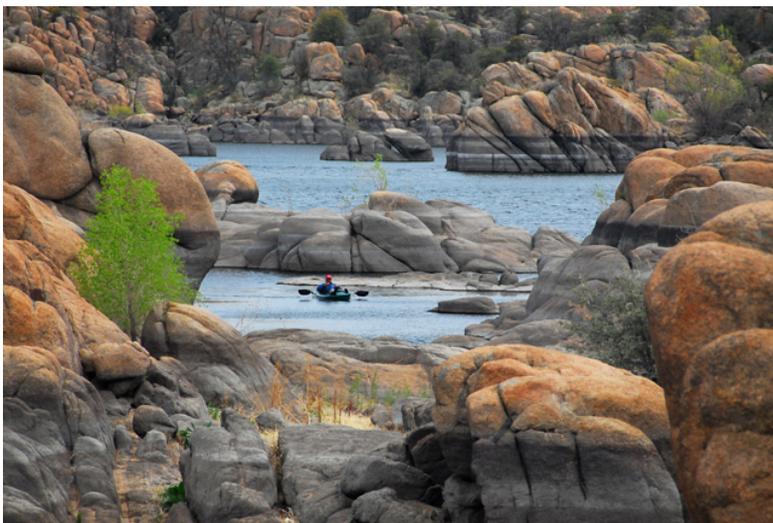




Prescott, AZ 18mm wide angle



Prescott, AZ 55mm - normal lens



Prescott, AZ 200mm - telephoto lens



Berlin Holocaust Memorial, 18mm - wide angle



Berlin Holocaust Memorial, 200mm – telephoto

The Beauty of a long lens (telephoto)

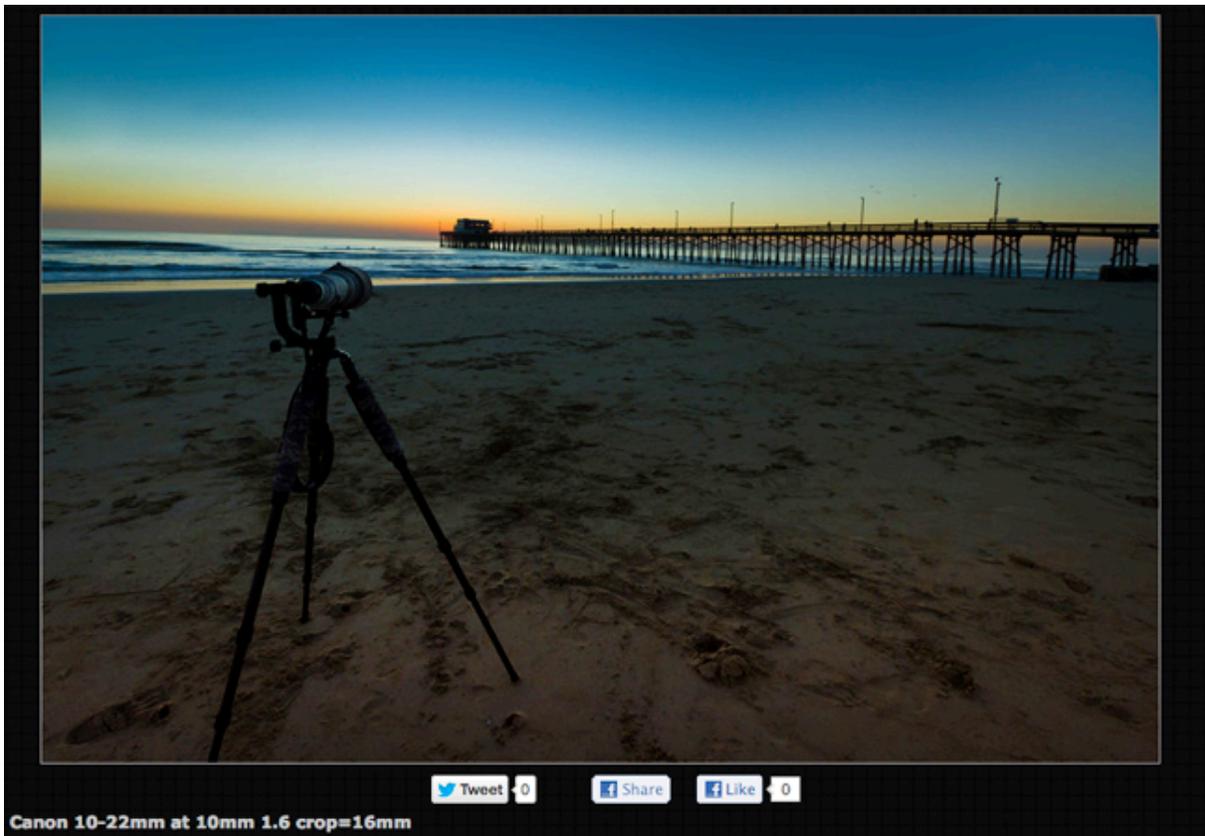
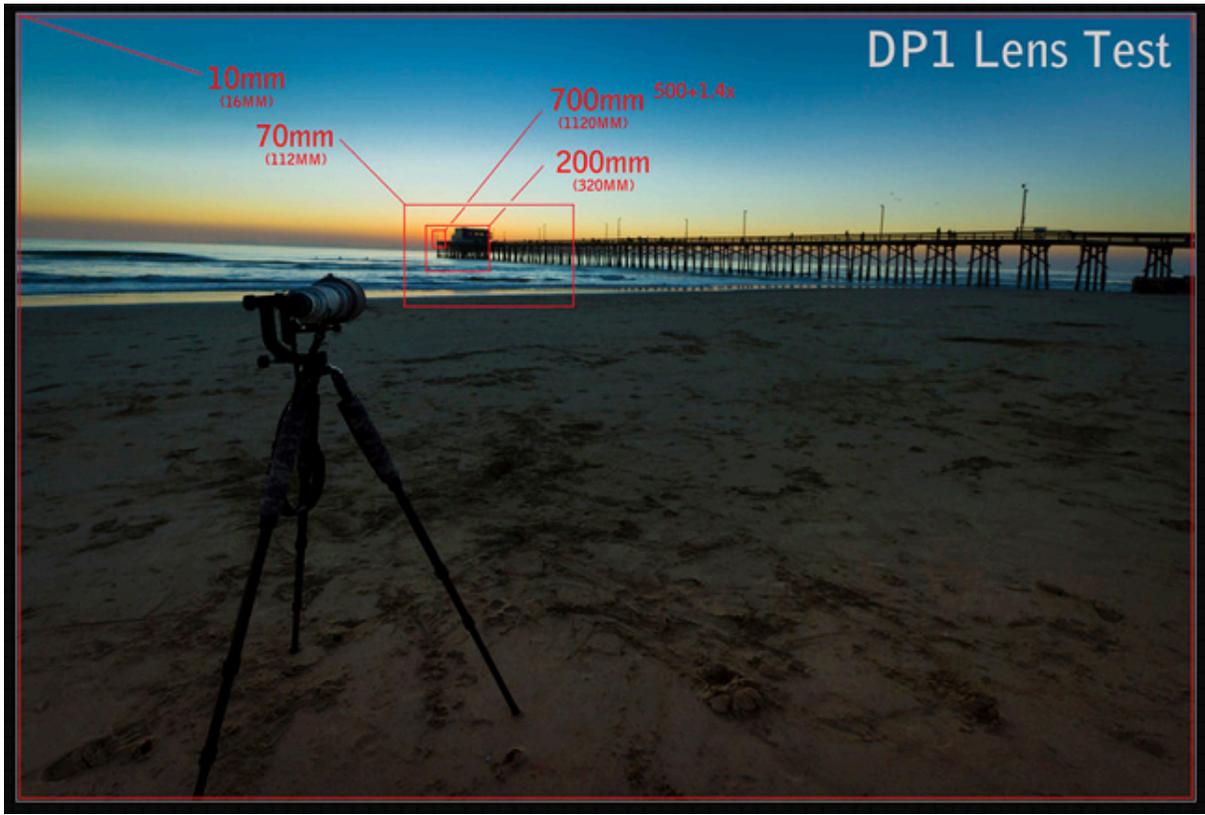


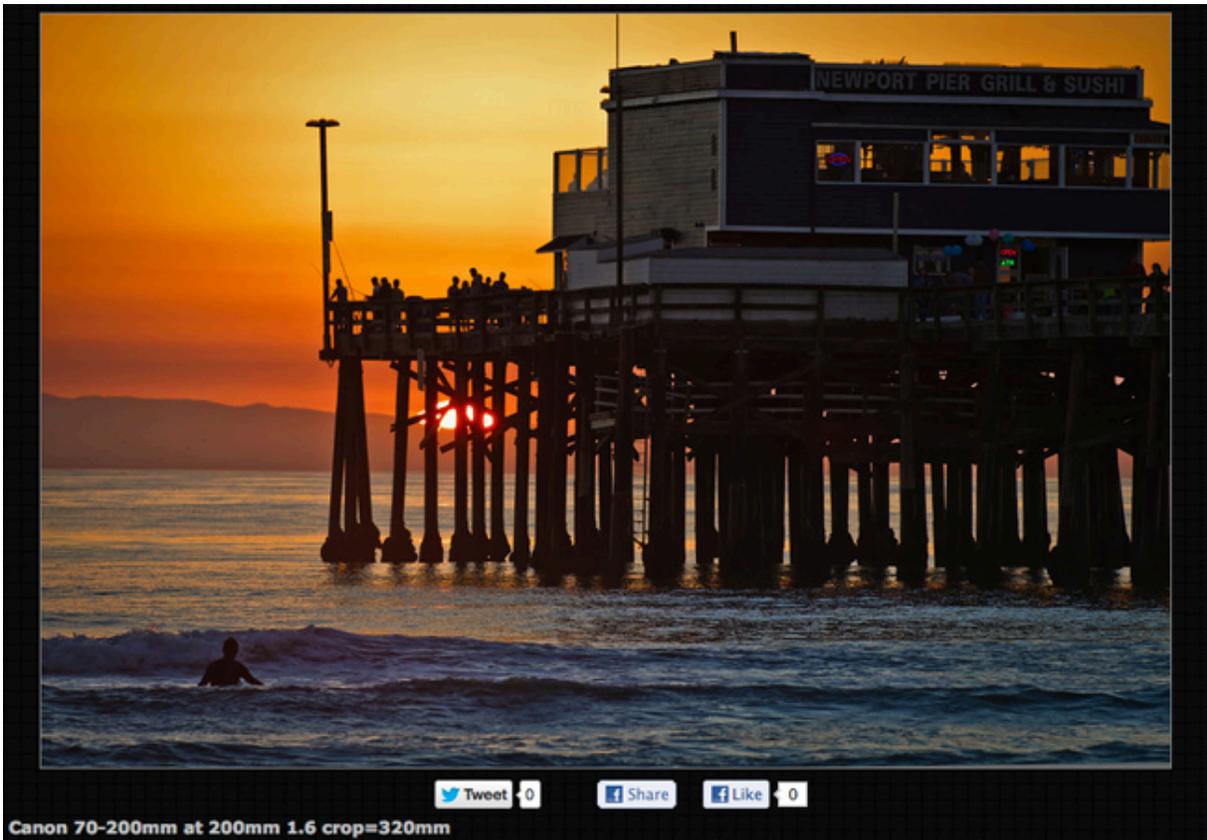
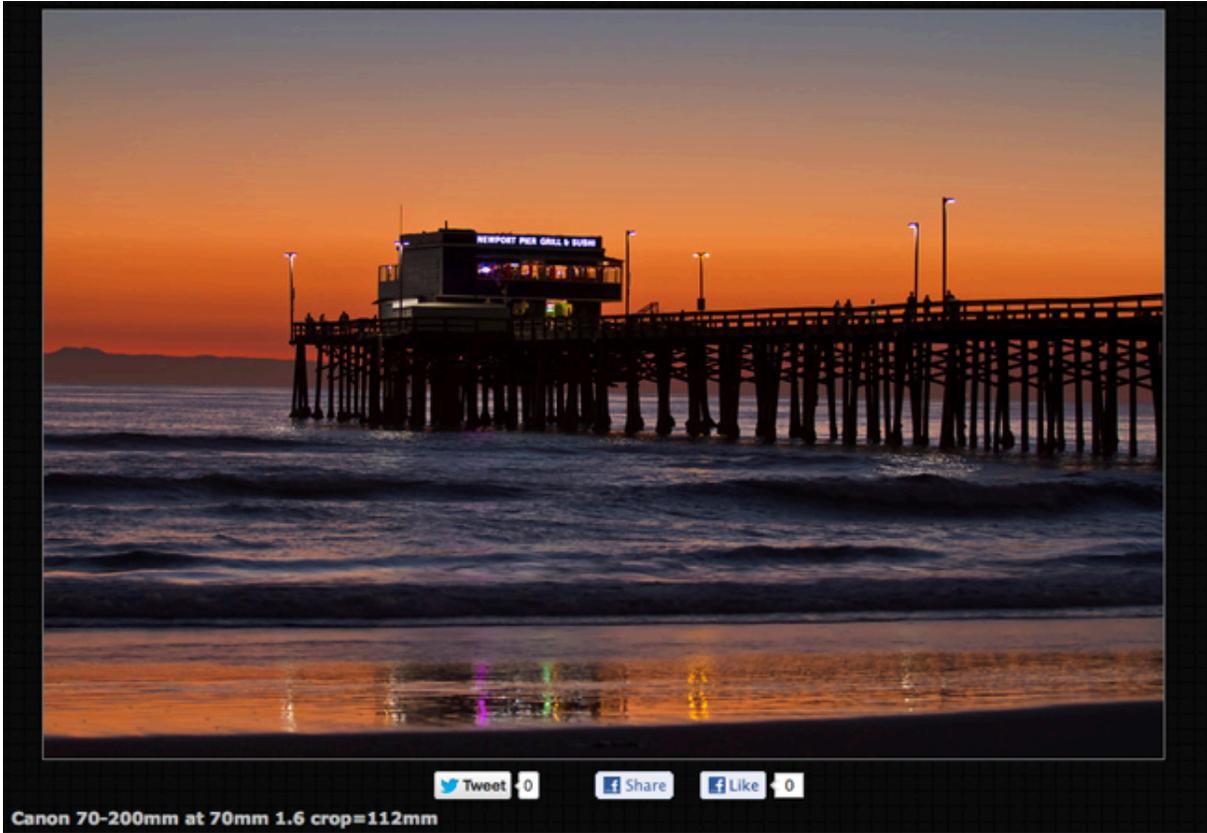
The beauty of long lenses – 120mm telephoto, Bremen, Germany



Architectural detail: Bremen, Germany: 150mm lens

Ultimate Lens Test: thanks to Matthew York







[Tweet](#) 0

[Share](#)

[Like](#) 0

with 1.4X extender at 700mm 1.6 crop=1120mm

Extremely long telephoto

Other extreme: Fish eye lenses



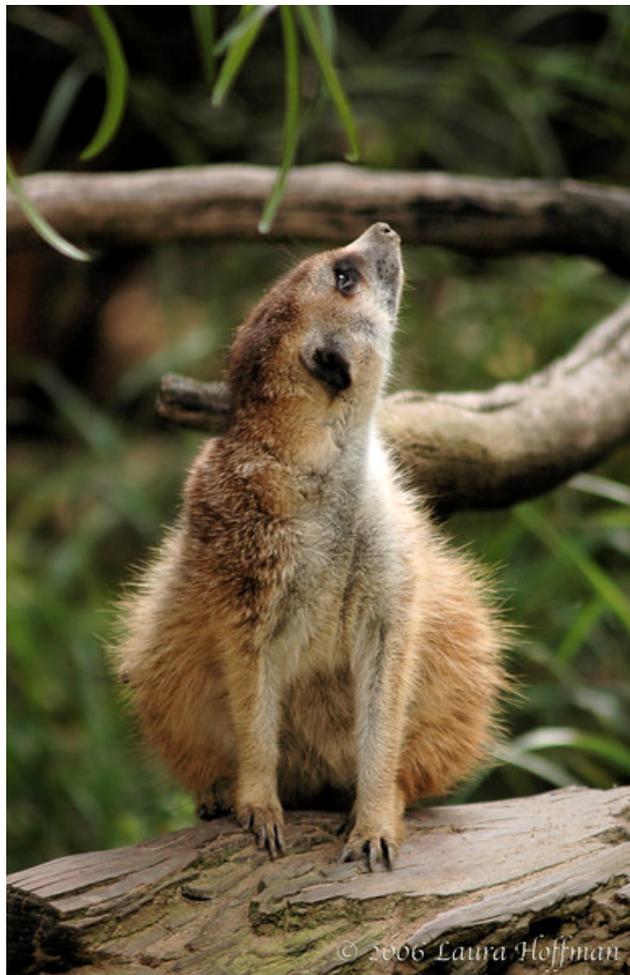


Getting closer: **Telephoto or Long Lenses**

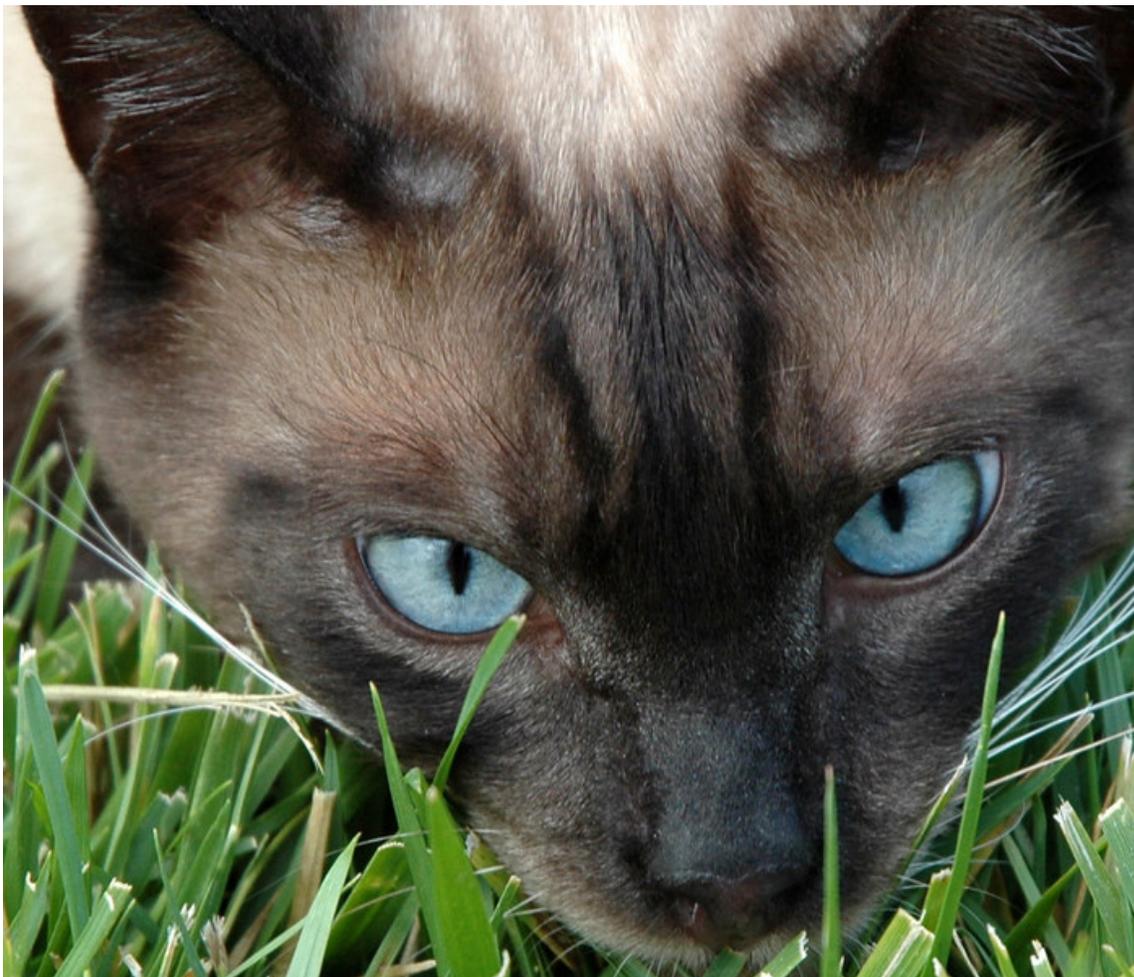
Telephoto lenses are used for magnifying and bringing closer distant subjects. You can alter the size and distance difference between near and far objects, and can make the depth of field appear shallower.



A telephoto lens has a narrow angle of view — but what does this actually do? A narrow angle of view means that both the relative size and distance looks similar when comparing near and far objects.



- With a telephoto lens, you can bring far away subjects closer.
- A telephoto lens encompasses a much narrower angle of view.
- As a photographer, you can be much more selective with what you choose to contain within your camera frame.



Photograph a tight region around someone's interesting facial expression or capture and distill the beauty of natural shapes around you.

This added selectivity can make for very simple and focused compositions.



Telephoto lenses allow for increasingly shallow depth of field, blurring out competing backgrounds - drawing attention to your center of interest.

A “Fast” lens (a lens with a large F-stop opening) can help you achieve dramatic images, using “Shallow Depth of Field.”

It may be worth the money to spend for a maximum aperture opening of 2.8 or larger...

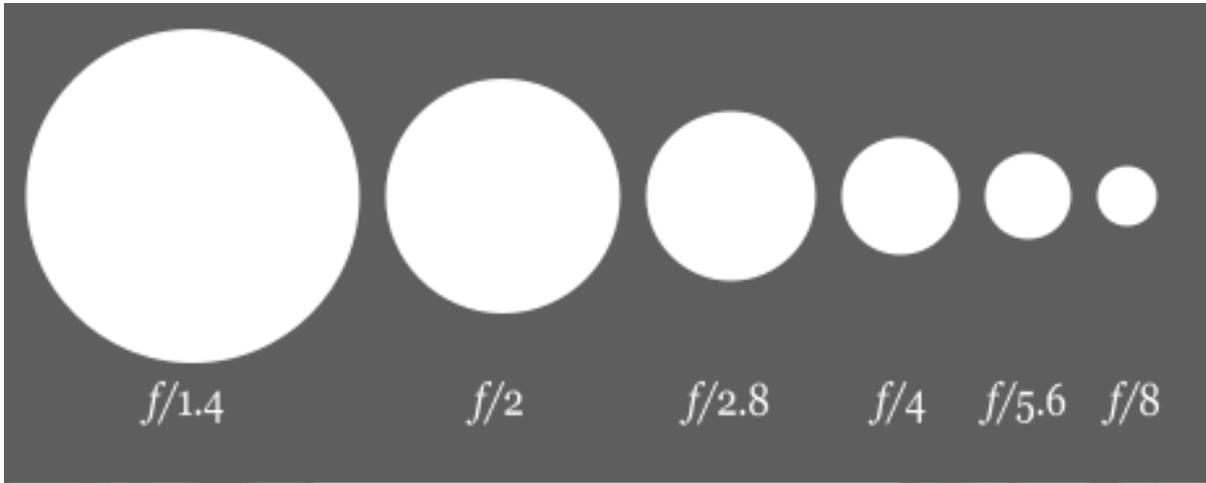
- 1) Can photograph in low ambient light (w/o flash)
- 2) Create dramatically beautiful unique images using narrow depth of field which emulates how we see.



F/3.5 with a 200mm lens: Narrow depth of field

© Copyright Laura Hoffman: Low light situation

Benefits of “fast lenses” offering wide open apertures, e.g. F 2.8 or larger – great when you cannot use a tripod and must create photographs in low light conditions.



Reducing the aperture size increases the depth of field. The smaller the aperture (the larger the number), the greater the distance from the plane of focus the subject matter may be while still appearing in focus.



Macro lenses

Macro lenses are designed for close up photography, coming with long barrels for close focusing. These lenses are available in various focal lengths.

- Continuously-variable focal length – suitable for virtually all macro subjects
- 45–65 mm – product photography, small objects that can be approached closely without causing undesirable influence, allowing for scenes having a natural background perspective.
- 90–105 mm – great for insects, flowers, and small objects from a comfortable distance
- 150–200 mm – insects and other small animals where additional working distance is required

Extending the distance between the lens and the film or sensor, by inserting either [extension tubes](#) or a continuously adjustable [bellows](#), is another equipment option for macro photography.

Extension Tubes:



Know that extension tubes:

- Impede light
- Eliminate infinity focus
- Depth of field becomes extremely narrow.

Here are gorgeous effects using Macro photography:





What about Zoom or Prime Lenses?

There are two types of lenses: **Prime and zoom.**

- **Prime lenses** have a fixed focal length.
- **Zoom lenses** have variable focal lengths.

Advantages: versatility. Ideal when you are photographing a variety of subjects such as landscapes and portraits, and you just want one lens for both situations.

Using a zoom lens also reduces the number of times you need to change the lens which saves time and limits the possibility of getting dust in the camera's mirror box or on the sensor.

Prime lenses have a fixed focal length.

Advantages: Prime or fixed focal length lenses are their size and weight as well as their maximum aperture or f/stop. 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 is an advantage when shooting in low light conditions as it will increase the possibility of hand holding the camera and freezing the subject without shake or blur caused by the longer exposures.

Photographing using prime lenses with large apertures also means you can get a **shallow depth of field**, which is useful for portraiture where you might want a softer or blurred background (also known as bokeh).



What no camera bag should be without: a “Nifty Fifty” high speed, prime 50mm “normal lens” – great for travel and for photographing full length portraits, perfect for street photography in low light.

Great for your budget: at f 1.8, this lens costs \$100.00!

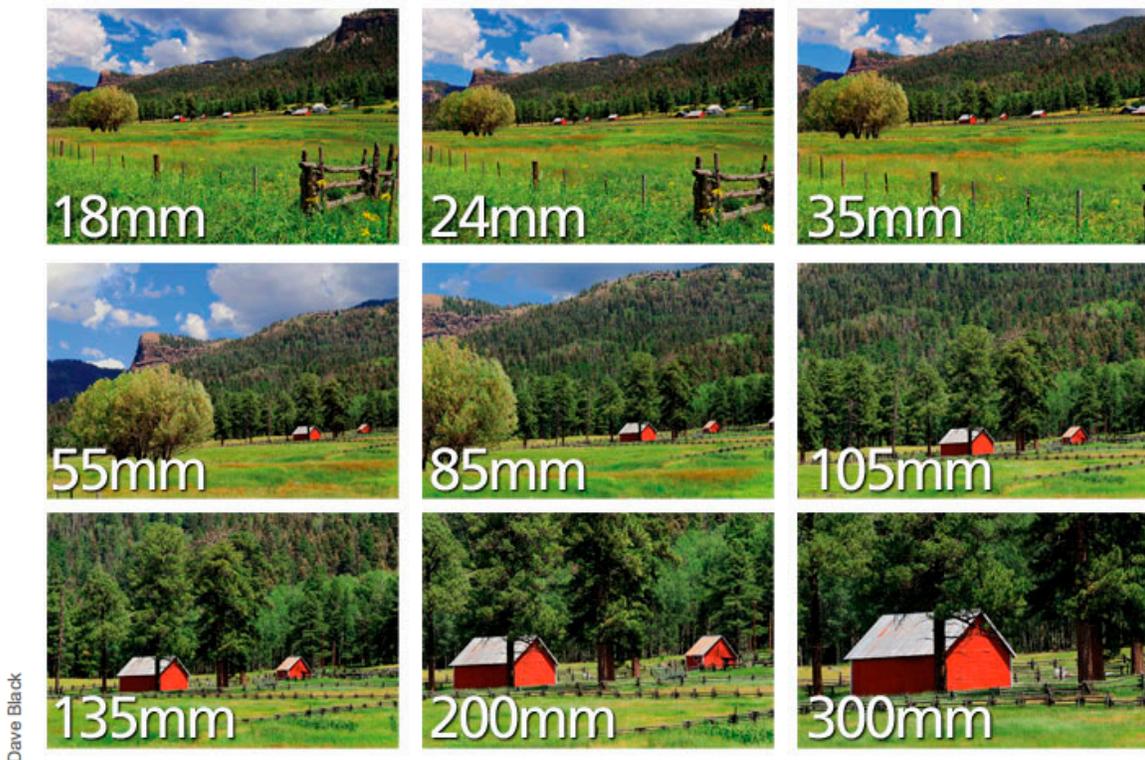
Lenses to buy: if you have a NIKON, get a Nikon Nikkor lens.

Here is my dream lens:

http://www.adorama.com/NK18300U.html?utm_term=Other&utm_medium=Affiliate&utm_campaign=Other&utm_source=rflAID021866

Nikon 18-300mm f/3.5-5.6G ED IF AF-S DX VR II Lens

\$1000.00



DX versus FX lenses:

<http://www.nikonusa.com/en/Learn-And-Explore/Article/g588ouey/the-dx-and-fx-formats.html>

Other great resources:

<http://www.the-digital-picture.com/Canon-Lenses/>

<http://www.the-digital-picture.com/Reviews/> - most lenses, weighted towards Canon.

Canon makes two classes of lenses: EF and L lenses.

<http://www.the-digital-picture.com/Canon-Lenses/Canon-General-Purpose-Lens.aspx>

In the Canon world of lenses....

EF lenses are general-purpose value-packed lenses designed for Canon cameras.

L lenses stand for Luxury.

Canon says, "...these lenses use special optical technologies [such as] Ultra-low Dispersion UD glass, Super Low Dispersion glass, Fluorite elements, and aspherical elements to truly push the optical envelope."

OK so what does that mean in practice?

Canon L lenses will help you make amazing images. In fact, this amazement is said to cause a disease know as "L-Disease". Once caught, it is incurable. You will have to buy Canon L lenses in all of the focal lengths you use. AND you will be happy, while L lenses hold their value. Warning: L lenses are heavy and expensive, but worth it.



Lens hoods: Use them. Don't leave home without them.

© The-Digital-Picture.com



A lens hood will prevent light from hitting the front lens element from the sides - reducing contrast and lens flare. Image results will show much **richer colors and deeper saturation** if you use your lens hood, especially when photographing into a light source.



Burning questions:

If you're on a budget, should you spend more money on the lens or on the camera?

Put your money into your lenses.

Should I go off-brand and save money?

In my humble opinion, a big resounding NO.

Keep in mind how much you have spent for your awesome new DSLR body. Moments in life are precious. You are serious about your photography. You are going to be wasting money if you put an inferior lens on it.

Lenses retain their monetary and photographic value....
indefinitely while camera bodies become worth little in a few years.

Whatever lens you buy today you'll probably still be using in five or ten years. You'll want to trade in your digital camera in not more than 18 months, while the best lenses will still be current for years.

What are my favorite lenses?

For travel: I love my 18mm – 200mm VR II AF-S ED Nikkor lens, now have my eye on the 18mm –300mm powerhouse zoom.

For travel, street photography & fun: My Nifty Fifty Nikkor 50mm f/1.8D AF lens

For product, macro, portraiture & fun: I love my 105mm AF-S Micro Nikkor f 2.8 ED lens (just wish it was not a G lens).

For travel, scenic and drama: Nikon's Nikkor 10-24mm EF AF-S wide angle zoom.

Can I use my old lens on my new camera body?

Usually yes; camera manufacturers are committed to giving their users the most value from their lens investments, so they design both lenses and cameras with backwards compatibility up to a point.

Finding the right lens for your camera? Let your camera store help you.

Confusing?

- Let your camera store help you find the best lens for you.
- Know the results you're going for.
- Rent lenses on your wish list.
- Network and talk to other photographers.
- Join your local photo club and go on field trips.
- Take photography classes to stretch your abilities.
- Don't bother with off-brand lenses (waste of money, low resell value, they don't last, you'll end up buying good lenses anyway).
- Buy a haze/UV filter to protect your lens investment.
Scratches cannot be repaired.
- Never leave home without your lens hood & cap.

My purpose: To help you discover what lenses can do for you. Get the most out of your photography. Let your choice of lens help you express what is in your mind's eye and make photography your art.



Portraits and Lenses:

Resources:

Why lens focal length matters:

<http://petapixel.com/2011/11/07/a-striking-look-at-how-focal-length-affect-head-shots/>

Selecting a Portrait Lens with Correct Focal Length:

<http://petapixel.com/2016/01/04/selecting-a-portrait-lens-with-correct-focal-length/>

How Focal Length Affects Your Subject's Weight in Portraits

Video:

<http://petapixel.com/2012/08/12/how-focal-length-affects-your-subjects-weight-in-portraits/>

How choice of focal length changes this cat:

<http://petapixel.com/2013/01/11/how-focal-length-affects-your-subjects-apparent-weight-as-seen-with-a-cat/>