

Lenses: Focal Length and Perspective

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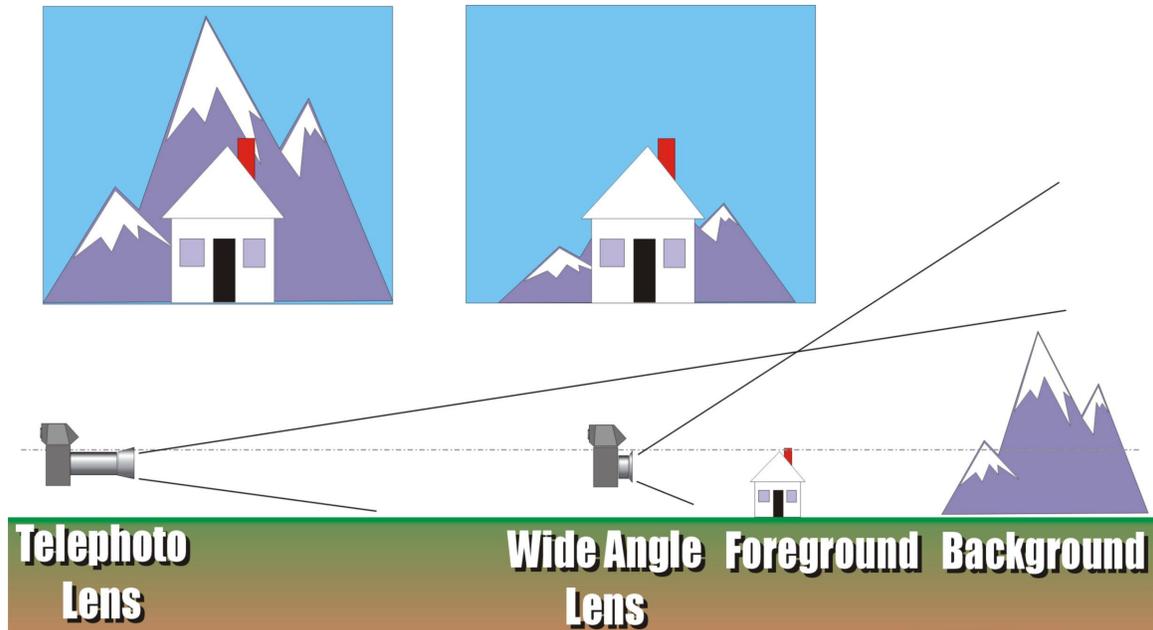
Perspective is the science and art of how items relate to each other in space. These special relationships allow us to determine depth and to simulate 3-dimensional depth in a 2-dimensional image. The rules of linear perspective are simple: the further away something is, the smaller it appears. Additionally the overlap of the items as they recede into space gives us special clues as to their sequencing. Because of the distance between our eyes we see for a short distance in stereo vision and can see in true three-dimensionality. But after a few hundred feet we then follow the clues to create the illusion of 3D. Because most humans have eyes set apart within fairly small variances, we all tend to see and interpret those special relationships alike.

In Photography, the lens that comes the closest to rendering its 2-dimensional image similar to how we perceive the world is the so-called “normal” lens. The spacial rendering and the field of view of these normal lenses appear to be “natural” to us, partially because the human eye is close in focal length (about 58mm). In the 35mm film and full frame digital world, a normal lens has a focal length of about 50mm. Medium format’s “normal” lenses, i.e. those that give the same field (or angle) of view, range from 80-90mm in focal length, 4x5 film has 127mm as its “normal” and 8x10 is about 300mm.

Most beginning photographers use lenses of various focal lengths to simply improve the cropping of their images. Wide angles let them see a wider view without having to undergo the inconvenience of stepping back and telephoto lenses let them simulate moving closer without the burden of actually doing so. Zoom lenses make it all even easier by removing the burden of not only physically moving but also having to undergo the rigors of changing lenses.

But various focal length lenses have an aesthetic impact far beyond simply making cropping easier. They can alter the apparent special relationships of items in your field of view to better help you convey the emotional content of

your scene. By providing that ability, they are one of your most powerful tools for controlling precisely how your final shot will appear to the viewer. First lets diagram what happens and why, and then we'll show some real images so you can see how it works in real-life situations.



In both versions, the foreground house is kept the same size in the frame. However a telephoto shot from a distance exaggerates and compresses the background so it looms larger in the shot. If we move the camera in close and use a wide angle lens to maintain the house at the same size, the background seems pushed farther away and is smaller.

Well, this works great in a diagram but does it work in the real world? Judge for yourself...

Here is a series of shots taken with focal lengths from 17mm to 400mm in which the foreground object (the vehicle) is kept to approximately the same size in each shot. Because the ground was not level as I backed away and I had to shoot around some other objects the angle of view may change slightly shot to shot but not significantly. It was raining off and on during the shoot so the sky changes quite a bit but the important things to look for are the relationship between the vehicle and the city skyline in the background. All were shot at an aperture of $f8$ so you can also see the diminishing depth of field as the focal length gets longer.

At 17mm
Note how small the background seems and how the vehicle shape is distorted. The shot is clearly about the vehicle.



At 80mm
the city in the background is getting larger and we are losing the distortion in the vehicle's shape.



At 150mm the city is becoming even more prominent in the shot and now the vehicle's shape is beginning to flatten out as well.



At 250mm the city is definitely becoming an important part of the shot. (I forgot the tailgate when I ran out between showers to grab this shot.)



At 400mm the city looms in the background and has become an important element in the image.



By using the various focal lengths available to you, either with a collection of prime lenses or using your zoom lenses, you can powerfully influence the “story” of your images and give different visual messages about your subject. The wide angle lens shots tend to make the foreground more important by pushing the background away. There the context of the image is still noted but it is almost incidental and it is the subject itself that is the main item of interest. The telephoto lenses, however, make the context of the subject (the background) far more important by making it appear larger, closer, and far more influential in your scene.

So use your lenses or the various focal length possibilities with your zoom lenses not just to crop the shot, but do alter the apparent spatial relationships in the scene to best tell your story.