LENS STRUCTURE AND FUNCTION

Focal Length Magnification (x1.6/x1.5)
Also called Field of View Crop (FOV)

A lens focal length adjustment is necessary when using a small sensor camera. The focal length magnification only affects cameras where the image sensor is smaller than a frame of 35mm film; you must add 50% (depending on your camera) to the lens focal length to be able to anticipate how the lens will perform on the camera. Most of the digital cameras made today are small sensor cameras. With cameras that have a “Full Frame” sensor no adjustment is necessary.

Standard lens designs form an image circle that surrounds a 35mm film frame. When these lenses are used with “small sensor” digital camera, the small digital sensor is only capable of capturing a smaller portion of the center of the image circle projected by the lens. The net effect is a “cropping” effect of the image. Through the camera the lens looks 50% longer in focal length, however, its depth of field characteristics are that of the original focal length.

The Focal Length Magnification issue made having a wide-angle lens very challenging for small sensor cameras. A standard 24mm wide-angle lens was now looking like a 36mm with the small sensor DSLR. Camera manufacturers had to rush to create a line of super wide lenses to solve this issue.

Canon EF-S Lenses
The EF-S series is designed exclusively for select EOS Digital SLR cameras with APS-C sized sensors.

Nikon DX Series Lenses
Designed exclusively for use with the Nikon DX format, to fit the image sensor of all of it’s D-Series Digital SLRs.

Lens Focal Length Comparison – Traditional Lenses (Full Format / 35mm)
24mm Lens 84˚ Angle of View
50mm Lens 47˚ Angle of View
-This is the “normal” focal length for a 35mm SLR camera. It’s the closest to the angle of view the human eye sees clearly and maintains the eye’s perspective.

100mm Lens 24˚ Angle of View
-This focal length is excellent for portraits. It keeps the subject and camera from being uncomfortably close while taking someone’s picture. It also avoids “foreshortening” that occurs with 50mm lenses.

200mm Lens 12˚ Angle of View
-Great for sports photography and for “head and shoulder” portraits. 300mm lenses are also a good focal length for these subjects.

500mm Lens 5˚ Angle of View
-Great for close-up sports/wildlife photography.
How focal length affects an image:
The shorter the focal length of a lens, the more of a scene the lens takes in and the smaller it makes each object in the scene appear in the image. A long focal length lens appears to bring the subject closer. As the focal length gets longer, less of the scene is shown (the angle of view narrows). These are useful when you are unable to be physically close to your subject, but want to shoot a close up shot.

Prime Lenses
The new term for “Fixed Focal Length” lenses – lenses with a single focal length as opposed to zoom lenses. Many photographers feel that prime lenses are inherently sharper than Zoom lenses since fewer glass elements are used in their manufacture.

Zoom Lenses
This is now the most popular and convenient lens designed now. We buy lenses that encompass a range of popular focal lengths in one lens. A few examples would be: 24-70mm, this is now what most of us buy as a “Normal Lens”. This encompasses a wide angle, a normal and a portrait lens in one package. Another popular zoom lens configuration is a 70mm-200mm; this encompasses both a short telephoto (a portrait focal length) and a longer telephoto for sports subjects.

Wide Angle Lenses:
Generally 35mm or less, such as, 35mm, 24mm, 20mm, 17mm. Depth of field on these lenses is greater than longer lenses. At an f-stop of 8 for instance, most of the foreground and background will be sharp, along with your subject. Wide-angle lenses often distort the edges of your image and “stretch out” the spatial relationships of foreground and background objects.

Telephoto Lenses:
Generally 70mm or more, such as, 70mm, 105mm, 135mm, 150mm, 200mm, 300mm, 400mm, 500mm and 600mm. Depth of field with these lenses is less than shorter lenses. At an f-stop of 8 for instance, some of the foreground and most of the background will be fuzzy or un-sharp. Telephoto lenses often give the look of “compacted” spatial relationships of foreground and background objects.

Macro Lenses
These lenses allow us to get closer to our subject than the average lens. They often allow a 1:1 ratio, which means we can photograph a small subject, life size on the film.

Fisheye Lenses
These lenses have a VERY wide angle of view-up to 180°. They exaggerate to an extreme degree differences in size between objects that are close to the camera and those that are further away. They sometimes form an image that is rounded, by bending the straight lines at the edges of the image.

Experiment with lenses to increase the creativity and impact of your images!