

Learning Objectives for Chapter 02

Forming an image. Although a good lens is essential for making crisp, sharp photographs, you don't actually need one to take pictures. A primitive camera can be constructed from little more than a shoe box with a tiny pinhole at one end and a digital sensor, a piece of film, or a sheet of light-sensitive photographic paper at the other. A pinhole won't make as clear a picture as a glass lens, but it does form an image of objects in front of it.

A simple lens, such as a magnifying glass, will form an image that is brighter and sharper than an image formed by a pinhole. But a simple lens has many optical defects (called aberrations) that prevent it from forming an image that is sharp and accurate. A modern compound lens subdues these aberrations by combining several simple lens elements made of different kinds of glass and ground to different thicknesses and curvatures so that they cancel out each other's aberrations.

The main function of a lens is to project a sharp, undistorted image onto the light-sensitive surface. Lenses vary in design, and different types perform some jobs better than others. Two major differences in lens characteristics are focal length and speed.

Lens focal length is, for a photographer, the most important characteristic of a lens. One of the primary advantages of a single-lens reflex camera or a view camera is the interchangeability of its lenses; photographers own more than one lens so they can change lens focal length. More about focal length appears on the following pages.

Lens speed is not the same as shutter speed. More correctly called maximum aperture, it is the widest aperture to which the lens diaphragm can be opened. A lens that is "faster" than another opens to a wider aperture and admits more light; it can be used in dimmer light or with a faster shutter speed.

TOPICS:

- Lens Focal Length: The basic difference between lenses
- Normal Focal Length: The most like human vision
- Long Focal Length: Telephoto lenses
- Short Focal Length: Wide-angle lenses
- Zoom, Macro, and Fisheye Lenses
- Focus and Depth of Field
- Automatic Focus
- Depth of Field: Controlling sharpness in a photograph
- More about Depth of Field: How to preview it
- Perspective: How a photograph shows depth
- Lens Attachments: Close-ups and filters