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## Exposure

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Each scene you wish to photograph reflects a certain amount of light depending on time of day, the brightness of the subject matter, and the number of shadows in the scene. The camera and lens must therefore have ways to adjust the amount of light striking the film in order to balance the light in a scene with the "correct" exposure necessary for the particular ISO film you are using. The two controllers for this function are the shutter (shutter speeds) and the aperture (f-stop).

### Shutter Speeds and F-Stops

**Shutter speeds** are the length of time the shutter, a moving door that sits in front the film, is open. The shutter speeds are fractions of a second long. Each full shutter speed is always double or half the length of time of the one next to it. Each shutter speed, therefore, passes double or half the amount of light of the speed adjacent to it.

*For example:* 1/125th of a second is half the time and light of 1/60th of a second. This difference is called one stop less light. 1/125th is also double the time and light of 1/250. This difference is called one stop more light.

**F-stops** are the numbers assigned to the different sized aperture openings in your lens. The aperture controls the quantity of light that reaches the shutter. Like the shutter speed, each whole f-stop also allows double or half the amount of light of the f-stop adjacent to it.

*For example:* F5.6 allows half the amount of light to reach the film when compared with F4. This difference is called one stop less light. F5.6 also allows double the amount of light when compared with F8. This difference is called one stop more light.

The following are common full F-stops and Shutter-speeds:

F-stops		Shutter speeds
F1.4	<i>More light</i>	1 second
2		2 (1/2)
2.8		4 (1/4)
4		8 (1/8)
5.6		15 (1/15)
8		30 (1/30)
11		60 (1/60)
16		125 (1/125)
22	<i>Less Light</i>	250 (1/250)
		500 (1/500)
		1000 (1/1000)

The selection of F-stop settings and shutter speeds may be done manually, semi-automatically (aperture or shutter priority) or fully automatically (program). In all cases the selections are determined by a light meter and matched to the ISO of the film in the camera.

### ISO or film speeds

Each film is assigned an ISO or film speed. These numbers represent the sensitivity of the film to light. Some older camera will carry the old designation, ASA which for our purposes is the same

number. When you set this number on your camera, you will be able to use your meter to guide you to the proper choice of f-stop and shutter speed. ISO also represent one "stop" difference in sensitivity.

The following are common ISO or film speeds:

### ISO

50	<i>Needs more light (less sensitive/finer grain)</i>
100	
200	
400	
800	
1600	
3200	<i>Needs less light (more sensitive/larger grain)</i>

### Equivalent exposures

There are multiple "correct" exposures for each scene photographed. An *equivalent exposure* is one in which the F-stop/shutter speed combination is changed in order to achieve particular creative ends. Such equivalent exposures can only be calculated after an *initial exposure* has been established.

Adjustments may be made in shutter speed or aperture so long as opposite adjustments are also made. If the opposite adjustment is not made, then the exposure is not an equivalent exposure.

Example: Correct exposure for scene X with 100 ISO film = 1/125 @ F8. Equivalent exposures to 1/125 @ F8 would be:

1/60 @ F11	1/1000 @ F2.8	1/4000 @ F1.4
1/30 @ F16	1/15 @ F 22	1/250 @ F5.6

Try these ISO Challenges

Start with 1/125 @ F11 with 100 ISO film

What will be the proper exposure with 400 ISO film? 2 stops more light - - either 1/500 at F11 or F22 at 1/125 or 1/250 at 16 (you can 'spend' the light in f-stops or shutter speeds.

What will be the proper exposure with 3200 ISO film? You have 5 stops more light with 3200.

The following would be possible: 1/4000 at F11 or F22 at 1/1000 or F16 at 1/2000.

Knowing how the exposure is determined in your camera is an essential aspect to creative imagemaking. The best photographers use all the automatic functions at their disposal and their experience and knowledge to deviate from them when necessary.