Basic Camera Concepts

Understanding & Reviewing Them

Basic Concepts

- Shutter speed
- One stop
- Aperture, f/stop
- Stopping down, opening up
- Lens speed, maximum aperture,
- Depth of field and focal length / focus distance

Shutter Speed

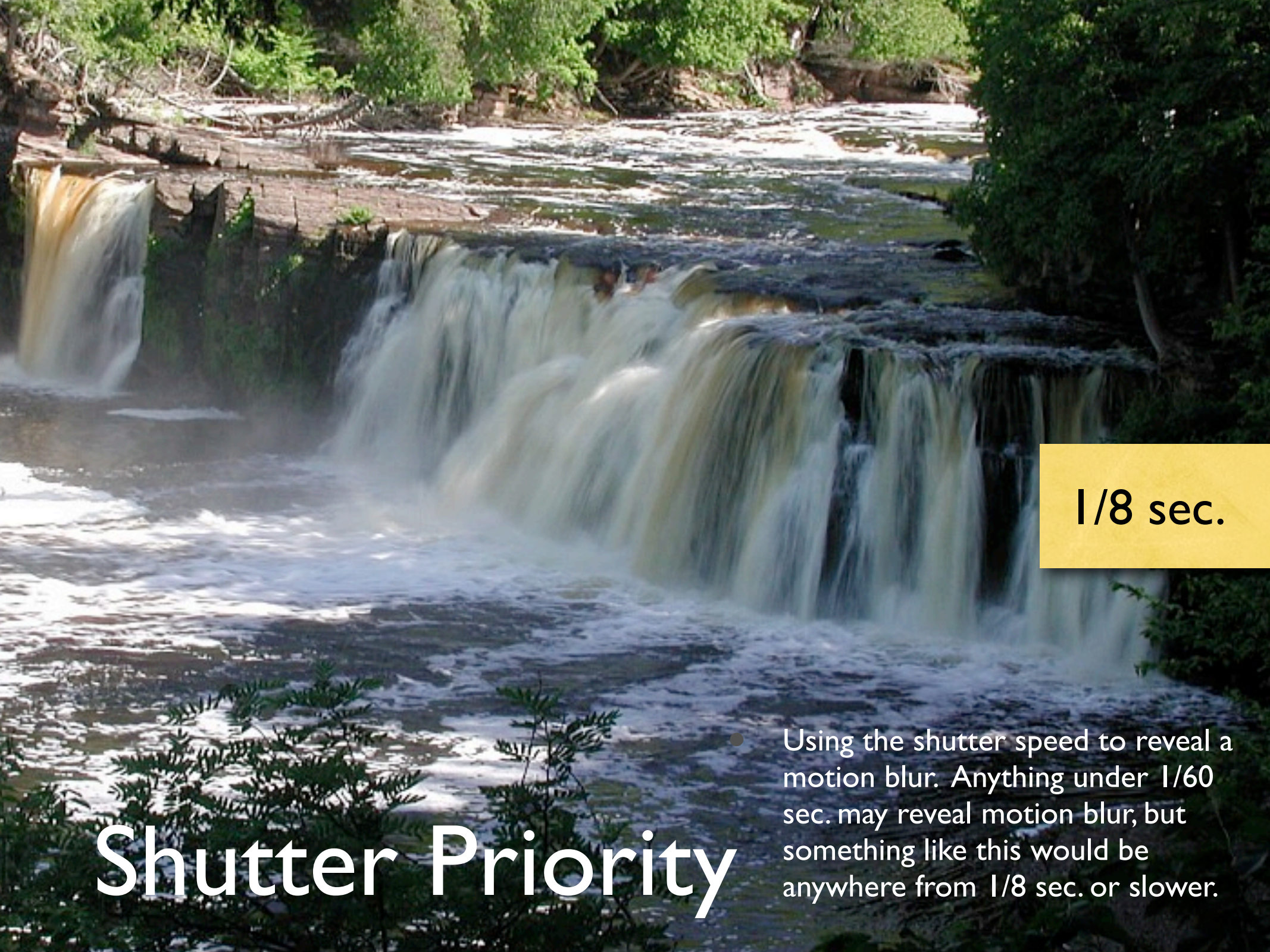
- When the shutter is closed no light can enter; when it is open light may strike the film or imaging sensor
- The interval between the shutter's opening and closing is called the **shutter speed.**

Shutter Speed

- The shutter speed times are represented in fractions of one second.
    - A setting of 60 means that the shutter is open 1/60 sec. A typical sequence of shutter speeds are 1, 2, 4, 8, 15, 30, 60, 125, 250, 500 and 1,000
- Each shutter speed is approximately double the preceding one.
    - Depending on which direction the shutter speed is adjusted, the exposure will be either doubled or halved. To do so would be adjusting the exposure by **“one stop.”**

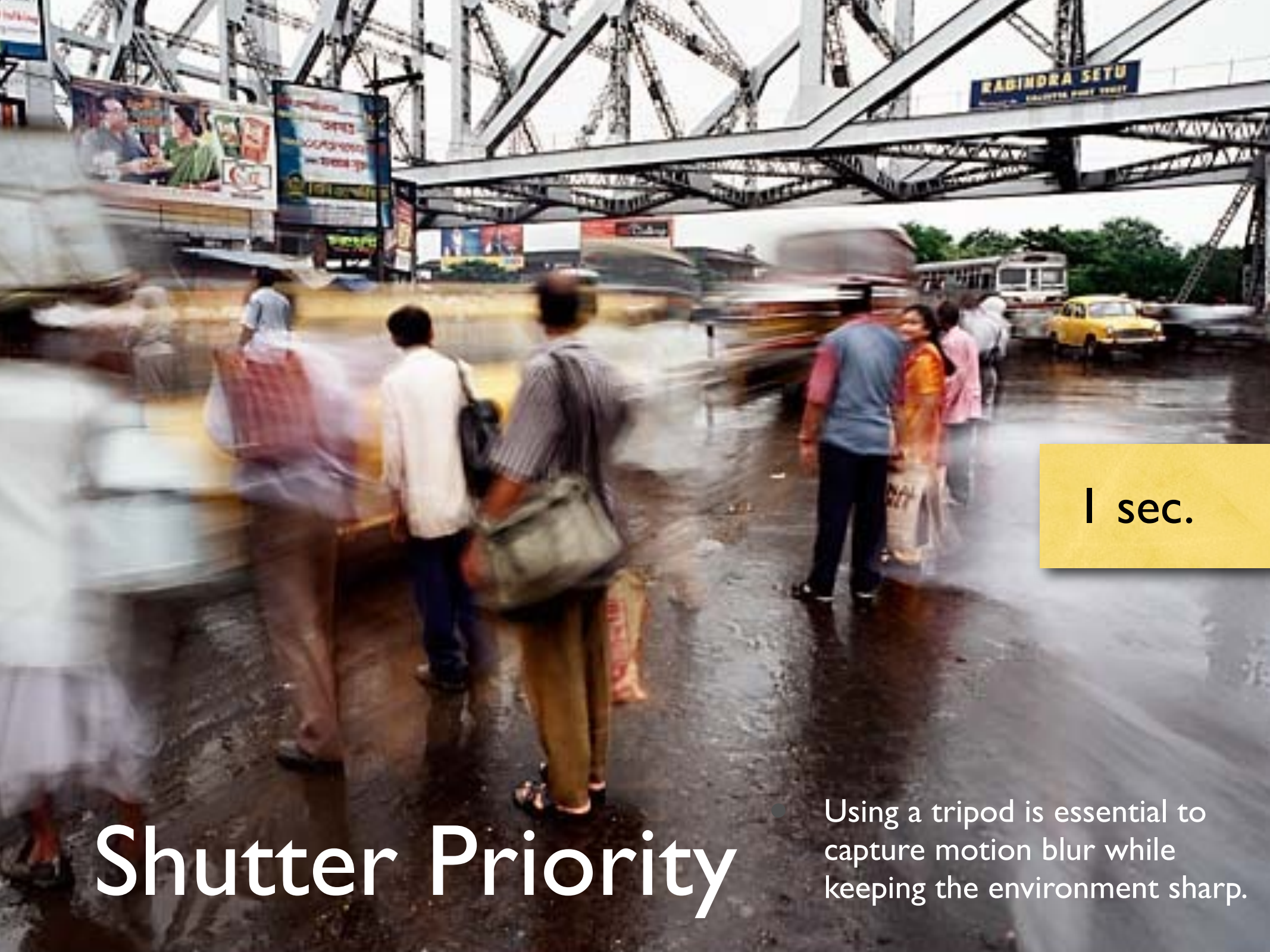
Shutter Priority

Using the shutter speed to freeze motion. To have a sharp hand-held photo, you must be 1/60 sec. or above. You may get away with slower, but will have sacrificed sharpness from hand movement.



Shutter Priority

- Using the shutter speed to reveal a motion blur. Anything under 1/60 sec. may reveal motion blur, but something like this would be anywhere from 1/8 sec. or slower.



Shutter Priority

- Using a tripod is essential to capture motion blur while keeping the environment sharp.


THE HAMMOND
1/30 sec.


30 sec.

1/400 sec


1/4000 sec.

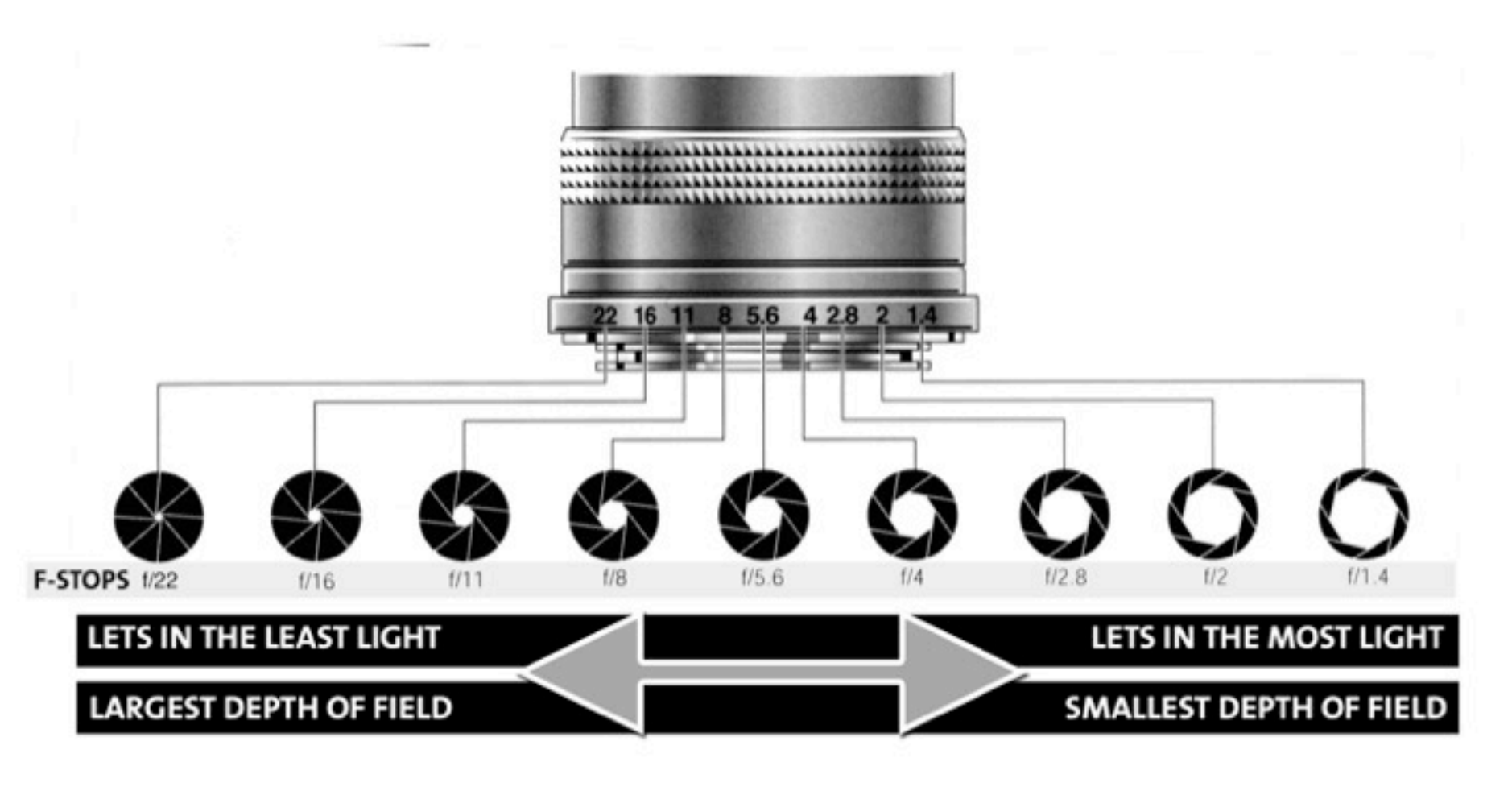
Aperture

- Light passes through the lens through an opening called an **aperture**.
- If the aperture is large much light passes through; if the aperture is small less light passes through.
- A number called the **f-stop** indicates the size of that opening
  - This number reflects the ratio of the diameter of the aperture to the focal length of the lens
  - F-stops, like shutter speeds, are also represented in fractions

F-stops

- Because these f-stops are fractions, the larger numbers represent smaller lens openings while the smaller numbers represent larger lens openings.
- Changing the lens opening from one f-stop to the next is called adjusting the aperture **one stop.**
  - If the stops are changed to make the aperture smaller, this is called **stopping down** one stop.
  - If the stops are changed to make the aperture larger, this is called **opening up** one stop.

F-stop Chart


22 16 11 8 5.6 4 2.8 2 1.4
F-STOPS f/22
f/16
f/11
f/8
f/5.6
f/4
f/2.8
f/2
f/1.4
LETS IN THE LEAST LIGHT
LETS IN THE MOST LIGHT
LARGEST DEPTH OF FIELD
SMALLEST DEPTH OF FIELD

Maximum Aperture / Lens Speed

- The maximum aperture to which a lens can be set is sometimes referred to as the **lens speed.**
- This f-stop is generally inscribed on the front of the lens barrel near the focal length.
    - For example, if the lens reads 50 mm and 1: 1.4, this means that the focal length of the lens is 50 mm and its lens speed, or maximum aperture, is f/1.4.
- F/stops may also read as intermediate speeds, especially on digital cameras. This value usually represents 1/3 of a whole stop (e.g. f/ 6.7).

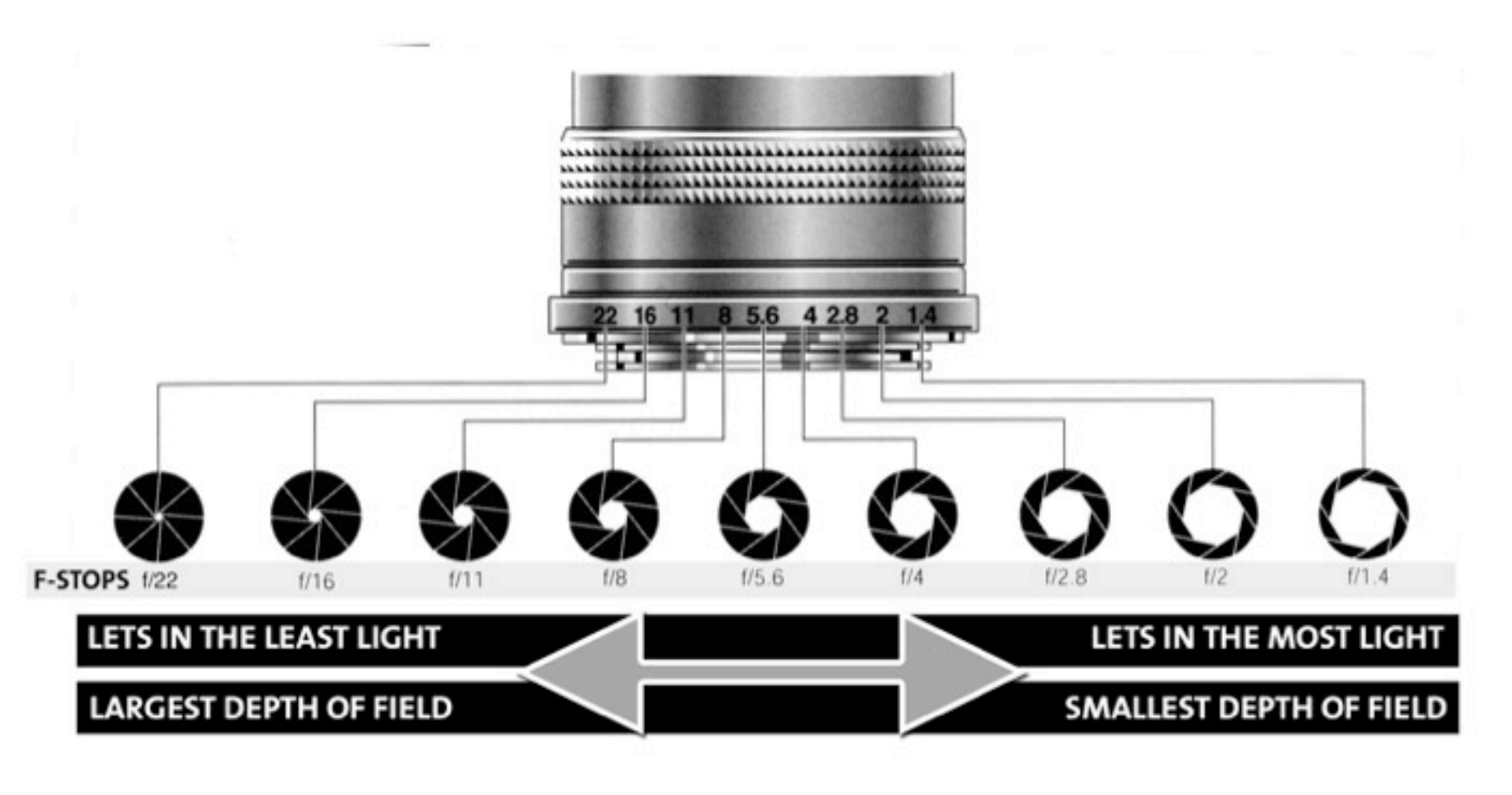
Depth of Field

- Depth of field is the distance range in which objects appear in sharp focus within an image.
  - A shallow or small depth of field indicates that only a small distance is in focus.
  - A deep or large depth of field indicates that a large range within the image is in focus.
- The smaller the aperture opening, the larger the depth of field. The larger the aperture opening, the smaller the depth of field

Aperture Priority

- Using the Aperture Priority setting on your camera, you can select the f-stop you want to shoot at, and the camera will balance the exposure with the correct shutter speed setting.
- For example, if you set the f-stop to f/4 on a sunny day, the camera might set the shutter speed to 2000.
- You can use this program to easily control your depth-of-field with the f-stop you select.

F-stop Chart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LETS IN THE LEAST LIGHT
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LARGEST DEPTH OF FIELD
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f 2.8

f 4


f 7.1

f l l

f 22

Depth of Field and Focal Length

- At any given aperture, the shorter the focal length the greater the depth of field. The longer the focal length, the shorter the depth of field.
- Therefore, wide-angle lenses will produce greater than normal depth of field whereas telephoto lenses will produce shallower than normal depth of field.

Distance Setting and Depth of field

- The distance setting at which the lens is focused also affects the depth of field.
  - When focused on subjected close to the camera, depth of field is reduced.
  - When focused on subjects far from the camera, depth of field is increased.

Summary

- Shutter speed
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