Shutter Speed

Stopping motion

Photo by Dan Armendariz, 2004
1/1250s, ISO 200, f/2.8
Sensitivity (ISO)  

ISO 100  

ISO 1600  

Images from http://www.dpreview.com/reviews/canonsx100is/page6.asp

Compact cameras
Aperture

F-number = f/D
Exposure

Over-exposure

Photo by Dan Armendariz, 2004
1/40s, ISO 200, f/2.8
Exposure

Under-exposure
Exposure

Worse: Over- & Under-exposure

1/80s, ISO 400, f/10

Photo by Dan Armendariz, 2006
Exposure

Intentional under-exposure

Photo by Dan Armendariz, 2005
8.0s, ISO 100, f/8
Exposure

Intentional over-exposure

Photo by Dan Armendariz, 2005
15.0s, ISO 100, f/16
Exposure

Metering
Image from http://www.imaging-resource.com/PRODS/E40D/E40DA5.HTM

Metering | Spot
Metering: Center-weighted
Metering

Zone Metering

Photo by Dan Armendariz, 2007

1/2500s, ISO 400, f/5.6
Metering

Exposure Compensation
Metering
Metering

Positive Exposure Compensation

Left: 1/80s, ISO 400, f/2.8, 0ev. Right: 1/80s, ISO 800, f/2.5, +1.3ev

Photos by Dan Armendariz, 2005
Metering

Negative Exposure Compensation

Photo by Dan Armendariz, 2008

Left: 611s, ISO 100, f/256, 0ev. Right: 611s, ISO 100, f/256, -2.0ev corrected in software
• Amount of available light
• Shutter speed
• Sensitivity (ISO)
• Aperture
Exposure

Natural Light

Left: 1/320s, ISO 800, f/2.5, 0ev Right: 1/40s, ISO 1600, f/3.5, 0ev

Photos by Dan Armendariz, 2005
Exposure

Increasing Available Light
Light Inverse Square Law

\[ \frac{S}{4\pi r^2} = I \]

sphere area
\[ 4\pi r^2 \]

intensity at surface of sphere

source strength
\[ S \]
Guide Number = Distance x F-number
Flash: Focal Plane Shutter Re-visited

Images from http://en.wikipedia.org/wiki/Focal_plane_shutter

Left: Slow shutter speed (entire sensor exposed). Right: Fast shutter speed.
Flash

Strobes Are Quick
When Flash Goes Wrong

Red Eye, Shadows, Motion Blur

Photo by Dan Armendariz, 2002

2s, ISO 100, f/2.8, 0ev
When Flash Goes Wrong

Red Eye

When Flash Goes Wrong


Shadows
Left: Front-curtain sync. Right: Rear-curtain (2nd curtain) sync

Images from http://www.nikondigitutor.com/eng/d70/select.php?menu=1&sub=b11&num=4

Flash

Curtain Sync
Flash Old Flash Units on DSLRs
Flash  (Lack of) Fill Flash
Flash

Fill Flash

Photo by Dan Armendariz, 2010

1/200s, ISO 160, f/5.6, -2/3ev