07.Exposure2

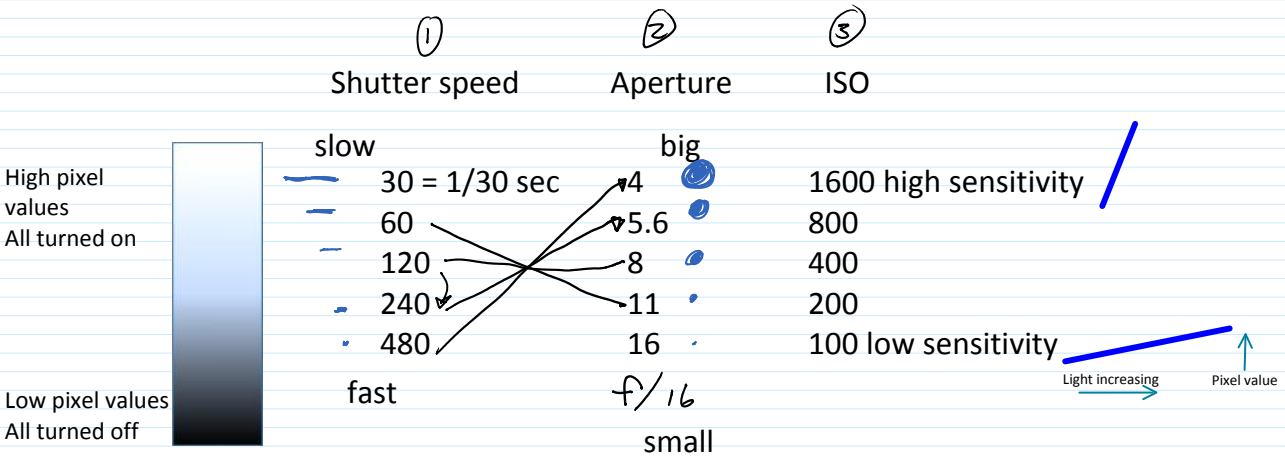
Thursday, January 23, 2014 4:36 PM

Today: Finish Exposure, shutter speeds, ISO/Sensitivity

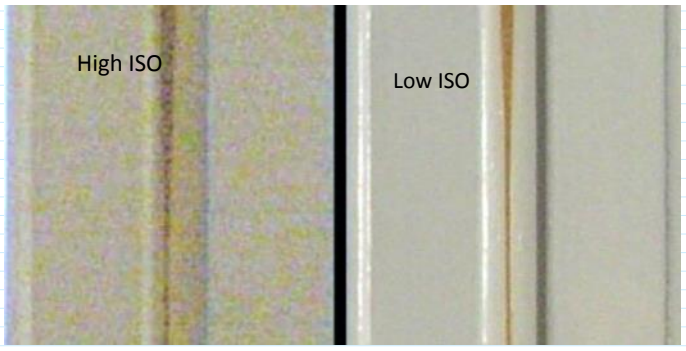
BEST OF WEB: VOTE!!!!!

Proper exposure = middle value on an average pixel

3 ways to control pixel values so far



Other implication of ISO: Noise



http://en.wikipedia.org/wiki/Image_noise#Low_and_high-ISO_noise_examples

$$$$ in camera buys less noise at high ISO

Autoexposure programs (AE)

Wide variety. Stay away if you can.

Semi -automatic programs are better.

Av = aperture priority. You choose the aperture, camera will choose shutter speed. ISO might be automatic too.

Tv = Time priority; you set the shutter speed and ISO, camera AE will choose the aperture.

M = Manual (maybe). You choose both aperture and shutter speed. Meter will tell you if exposure is OK.

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to set over/under exposure

Lighten image, overexpose compared to AE suggestion +++
Darken, underexpose compared to AE, -----

4 ways to control pixel values

1. Deliberate over/under exposure

Overexposed = More light, or more sensitive ISO
EV = +1

Proper exposure = middle value on an average pixel

Underexposed = Less light, less sensitive
EV = -1

2. Shutter speed

slow
30 = 1/30 sec
60
120
240
480

3. Aperture

big
4
5.6
8
11
16
f/16

4. ISO

1600 high sensitivity
800
400
200
100 low sensitivity

Light increasing
Pixel value

How to choose?
Minute paper in groups: list pros and cons of

1. small aperture vs large aperture
2. short shutter (high shutter speed) vs long (slow)
3. high ISO vs low
4. Deliberate over/under exposure

1) Pro small aperture, Big f/ LARGE DOF. Con: less light, Diffraction blurring
Pro large aperture: small DOF, blur background More light, might affect colors More light!
Cons: possible overexposure, subject depth blur
2) Pro short shutter: needed for proper exposure, MINIMIZE MOTION BLUR Freeze the flow
Cons short shutter : less light, need high ISO, noise, synch problem
3) Pro high ISO: shoot in low light, maybe high contrast
Con: noise
4) Deliberate overexpose: good for more detail in shadows,
But lose the highlights
Deliberate underexpose, good for highlights, bad for shadow detail.

1. Aperture: large f/ = better DOF, but less light, maybe less sharpness overall
2. Short shutter = freeze the flow, minimize motion blur, but less light
3. High ISO adds noise, but can use low light
4. Need to be careful about which value gets changed to achieve what you asked for.

Usually, set ISO for overall conditions, then choose
Av = aperture priority, let AE (auto exposure) choose
shutter
or
Tv = shutter priority, AE chooses aperture

Other considerations of shutter speed: Motion Blur

Short enough to 'freeze' flow, or long enough to get desired particle tracks.
Short:
DSLR Cameras: 1/4000 sec max
High speed video: 20,000 fps, but tradeoff is poor resolution. Tech and prices changing fast here.
Flash: leave shutter open in dark room, then single flash will freeze flow. "synch" is shortest shutter setting for shutter completely open. Typically 1/30 or 1/60. Slower, down to T or B is good.
http://www.photosbykev.com/wordpress/tips-and-trick/water-droplet-photography/flash-and-motion-blur/
Flash on camera or separate
Speedlights: 1/20,000? http://www.scantips.com/speed2.html

In summary, the **studio light** capacitor is partially charged depending on the power level setting. Then it is always fully dumped when fired, and this is relatively slow. The **speedlight** capacitor is always fully charged to maximum level, but it is abruptly interrupted to produce lower power settings, and this is often quite fast - however then its comparative power level is rather low.

From <http://www.scantips.com/speed2.html>

Pulsed laser Nd:Yag 3-5 ns