

Tools and Program Needed:



Name: _____

Period: _____ Date: _____






Basic Exposure Worksheet

Exposure, Gray Card & White Balance

Targets:

- Create images demonstrating how to control light using a camera.
- Demonstrate correct use a photographic gray card.
- Create images demonstrating use of bracketing techniques.
- Use and understand exposure and white balance terminology.
- Create an image representing a balance of highlights and shadows demonstrating proper exposure.
- Demonstrate an understanding of the relationship between *f*/stop, shutters speed and ISO.
- Recognize and understand how different light qualities and temperature effect an image.
- Create images showing differences in white balance.
- Demonstrate ability to obtain metadata in Adobe CS6 Bridge and PhotoShop and include in contact sheet without assistance.

What to do:

1. Use **manual mode** for all your photos.
2. Set your camera's **white balance** to the daylight setting (sun mode).
3. You will be taking a series of photos all photos are to have these characteristics.
 - a. Start all photos with an ISO 800 (indoor) setting for light meter reading. Do not change ISO after first photo.
 - b. All photos so they show an 18 percent gray card and the face (and clothing) in the same light.
4. Take a series of photos in four different settings;
 - a. Under florescent light (like the classroom),
 - b. Under direct daylight (sun),
 - c. Under trees (in shade) during daylight,
 - d. Under gym lights.
5. In each of the 4 locations take 5 photos **bracketing** your exposure.
 - a. +2 (four times the amount of light) 
 - b. +1 (twice the amount of light) 
 - c. 0 Normal (according to the light meter) 
 - d. -1 (half the amount of light) 
 - e. -2 (one forth the amount of light) 
6. You will have taken 20 photos when you are done.

Purpose:

- To explore exposure in the camera.
- To understand the triangular relationship between ISO, shutter speed and *f*/stop.
- To understand white balance.
- Learn to use a gray card.

Subject:

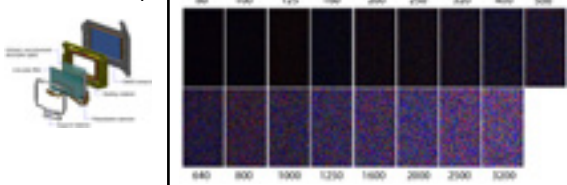
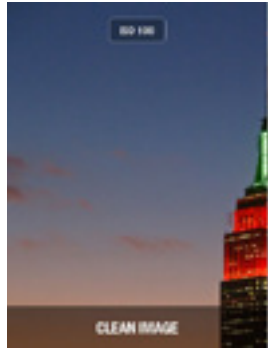
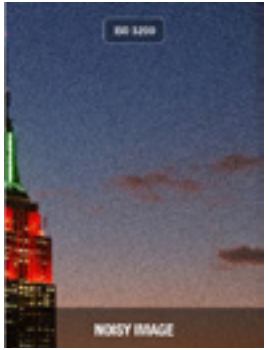


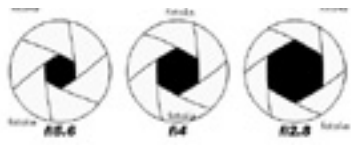
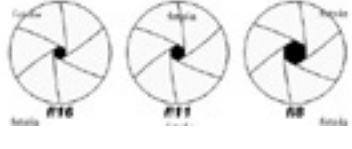
- An 18% gray card
- A human face



Turn In:

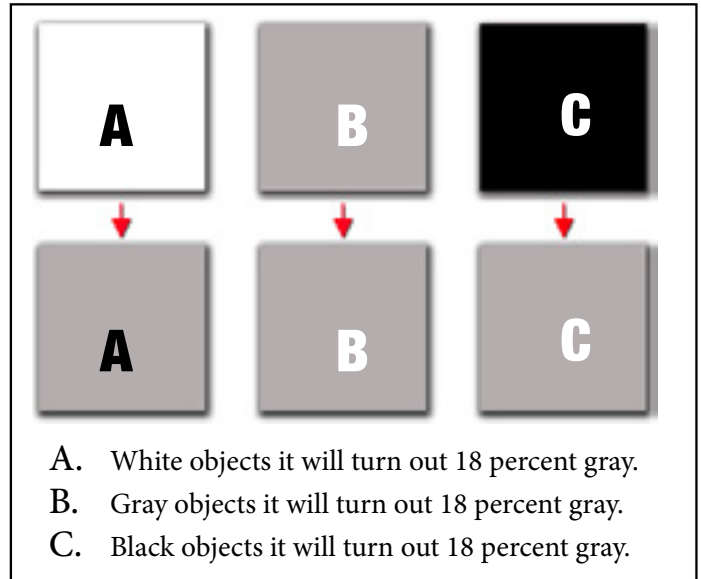
- 20 digital images on server
- Place in class folder the following stapled together:
 - a. 1 contact sheet, 20 images with exposures written on each image.
 - b. 4 printouts
 - i. Best exposure of each lighting type (write name, type and exposure on each image)
 - ii. Label best overall exposure
 - c. Assignment Worksheet

How Elements of Exposure Work Together

	What it Does	Smaller Numbers	Larger Numbers
<p>ISO (Sensor Sensitivity)</p>  <p>Image from Carl Chapman http://blog.carlchapman.com/photography-workflow/camera-sensor-noise-profile-canon-powershot-g12/</p>	<p>Controls the sensitivity of sensor to light and the amount of noise in photo.</p>	<p>Sensor is less sensitive to light (allowing in less light) and have a finer noise on the final picture.</p>  <p>Image from www.exposureguide.com/iso-sensitivity.htm</p>	<p>Sensor is more sensitive to light (able to shoot in less light) and have more noise in final image.</p>  <p>Image from www.exposureguide.com/iso-sensitivity.htm</p>
<p>Shutter (Time)</p> 	<p>Controls the amount of time the camera allows light to hit the sensor, the time spent capturing movement. It is like a window blind.</p>	<p>$\frac{1}{250} - \frac{1}{4,000}$</p> <p>This is a shorter exposure time, thus “stopping” or “freezing” action. Less light reaches the sensor making the photo darker.</p>	<p>$1s - \frac{1}{30}$</p> <p>This is a longer exposure time, resulting in a “blurring” or “feathering” movement. More light reaches the sensor making the photo brighter.</p>
<p>Aperture (f/stops)</p> 	<p>Controls the size of the lens opening. It is like the iris in your eye.</p>	<p>$f/5.6 - f/2$</p> <p>These are there is a larger lens openings letting in more light into the camera.</p> 	<p>$f/32 - f/11$</p> <p>These are a smaller lens openings letting in less light into the camera.</p> 

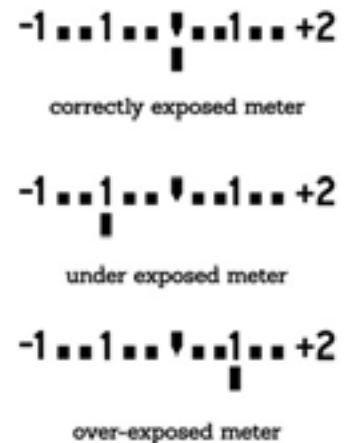
What Light Meters Do

1. Exposure meters read the amount of light reflecting off of an object.
2. These meters are light sensitive sensors designed to “read” everything as 18 percent neutral gray when set to \emptyset .
3. **No matter what the subject matter is the light meter will always “read” the scene at 18 percent gray.**
4. When an exposure is based on the light meter setting of $\pm\emptyset$ the image will turn out at 18 percent gray.



Camera Metering Modes

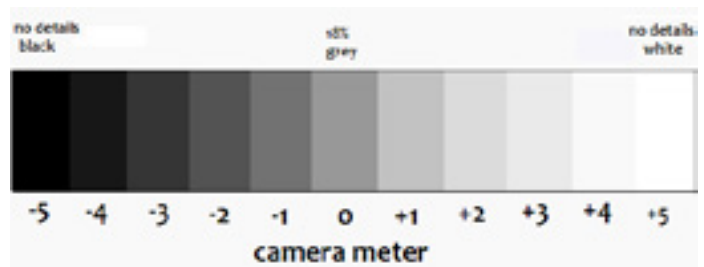
1. Exposure meters can be set to “read” a scene in different ways these are the most common modes:
2. Center-weighted average: the middle area of a scene is “read,” about 60 to 80 percent of viewfinder.
3. Spot metering: only a small area of a scene is “read,” about 1 to 5 percent of the center of viewfinder.
4. Partial metering: a larger area of the viewfinder is “read,” about 10 to 15 percent — more than spot, but less than center-weighted.
5. Multi-zone, Matrix or Evaluative metering: several selected locations throughout the frame are used to determine the exposure.



Good Exposure

A well exposed photo will have

- A balance of highlights, grays and shadows.
- Show 10 different shades of gray.
- Show texture in highlights.
- Show texture in shadows.



Name: _____

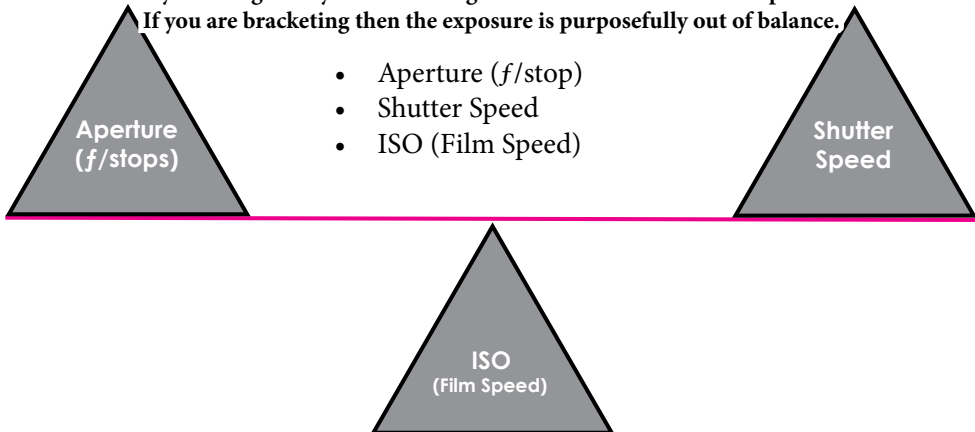
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Exposure Balancing Act

A good exposure has these three elements in balance

If you change one you must change another to have the same exposure.

If you are bracketing then the exposure is purposefully out of balance.



Aperture (f/stops) **f/11**

Shutter Speed **1/500**

ISO (Film Speed) **400**

+1

Over Exposed
Unbalanced



Aperture (f/stops) **f/16**

Shutter Speed **1/500**

ISO (Film Speed) **400**

± 0

Normal Exposure
Balanced



Aperture (f/stops) **f/22**

Shutter Speed **1/500**

ISO (Film Speed) **400**

-1

Under Exposed
Unbalanced



Exposure Stops

Basic Whole Exposure Stops

These are the whole ISOs, *f*/stops & shutter speeds
Understand the actual standard settings and theoretical settings are different.

Digital Standard Lens/Camera Settings	Possible Settings (The Chart)
*Most: <i>f</i> /22 to <i>f</i> /4 Some: <i>f</i> /32 to <i>f</i> /2	<i>f</i> /64 to <i>f</i> /1.4
*Most: 4000 to 1s, B(ulb) Some: 1/8000 to 30s, B(ulb)	1/8000 to 30s, B(ulb)
50 to 3200	50 to 25600

*Most includes cameras the class uses

<i>f</i> /stops	64	44	32	22	16	11	8	5.6	4	2.8	2	1.4	Uncommon	
Shutter Speeds	4000	2000	1000	500	250	125	60	30	15	8	4	2	1s	Tripod Needed
ISO		50	100	200	400	800	1600	3200	6400	12800	25600		Professional Only	

Ways to Change Exposure

Reciprocity (Reciprocal Exposures)

When you keep the exposure **the same** (equal amount of light reaches film) in all photos.

Where 1 stop of light equals 1 change in...

- shutter speed
- f*/stop (aperture)
- ISO (film speed)*

If you change your shutter speed, then you must change your *f*/stop.

If you change your *f*/stop, then you must change your shutter speed.

* ISO changes are usually dealt with during film development.

Same

Exposure Bracketing

When you purposefully **change the exposure** so each photo has a **different exposure** (+2, +1, N, -1, -2) making some photos over exposed (no details in highlights) and others under exposed (no details in shadows).

Usually change only one, either...

- the shutter speed (or)
- the *f*/stop (aperture)
- the ISO

But can also change more than one as long as **exposure is not the same**.

Different

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Bracketing Practice Problems

Exposure Chart

Digital Standard Lens/Camera Settings	Possible Settings (The Chart)
*Most: $f/22$ to $f/4$ Some: $f/32$ to $f/2$	$f/64$ to $f/1.4$
*Most: 4000 to 1s, B(ulb) Some: 1/8000 to 30s, B(ulb)	1/8000 to 30s, B(ulb)
50 to 3200	50 to 25600

*Most includes cameras the class uses

64	44	32	22	16	11	8	5.6	4	2.8	2	1.4	
4000	2000	1000	500	250	125	60	30	15	8	4	2	1s
50	100	200	400	800	1600	3200	6400	12800	25600			

Remember these are bracketing problems they will be out of balance; normal, under and over exposed.

Bracketing Practice Set 1

Initial light meter reading: ISO 800 $\frac{1}{125}$ @ $f/5.6$

How would you adjust your settings to obtain the following bracketing exposures? Fill in the chart then explain your answers in the space to the right.

	-2	-1	Ø	+1	+2
ISO					
$f/$					
SS					

Bracketing Practice Set 2

Initial light meter reading: ISO 400 $\frac{1}{250}$ @ $f/8$

How would you adjust your settings to obtain the following bracketing exposures? Fill in the chart then explain your answers in the space to the right.

	-2	-1	Ø	+1	+2
ISO					
$f/$					
SS					

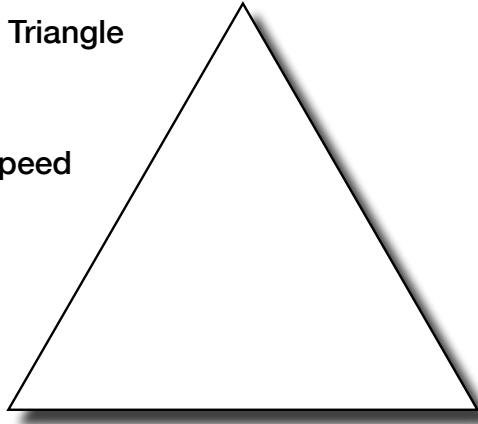
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1. Label Diagram

Terms

- Exposure Triangle
- Aperture
- ISO
- Shutter Speed



2. Gray Card are _____ percent gray. They are used to take

readings and to aid in balancing

Terms to Use Above:

- Color
- Light Meter
- 18

3. What are the advantages and disadvantages of each of the triangle points?

△ Point	Advantage	Disadvantage

4. Stops of light

Terms to use	Doubling	ISO	Half
	Halving	Shutter Speeds	Double

- A stop of light refers to f /stop, the term used express the size of the lens aperture.
- A change in a stops indicates a _____ or _____ of the amount of light entering a lens.
- This term, stop, has been extended to changes between _____ and _____ (two words) because they also _____ or _____ the amount of light when changed by one full value.

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5. Fill in table with standard **full stops**. Note: For this class we only **use full stops**. Half and third stops also exist which can be turned on and off in digital camera.

Amount of Light	ISO	Shutter Speeds	f/Stops

6. Exposure • Terms: Shadows, Over Exposed, Under Exposed, Normal, Both Highlights and Shadows, Bright or Light

Type	Terms	How looks	Where to look for details & texture
+			<i>Highlights</i>
0	<i>Correct Exposure</i>		
-		<i>Dark</i>	

7. **Bracketing** purpose is to vary settings to insure proper lighting and exposure and allow for a variety of lighting conditions. **Write down** standard bracketing changes and **fill in the circle** the correct amount for each.



In Classroom (fluorescent lighting)

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

Exp. #	Bracketing	ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
	+2				
	+1				
	Normal (What the light meter says)				
	-1				
	-2				



Outside in Sun

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

Exp. #	Bracketing	ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
	+2				
	+1				
	Normal (What the light meter says)				
	-1				
	-2				

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Outside in under Tree (shade, diffused light)

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

Exp. #	Bracketing	ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
	+2				
	+1				
	Normal (What the light meter says)				
	-1				
	-2				



In Gym (sodium halide lights)

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

Exp. #	Bracketing	ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
	+2				
	+1				
	Normal (What the light meter says)				
	-1				
	-2				

Reflection Questions

1. Which camera settings produced the best final image? Think about the color of the gray card and skin tones when explaining why you think these settings are the best.
2. Explain what a stop of light is.
3. What is the Exposure Triangle?
4. In your words, what is exposure bracketing?
5. In your words, how is exposure bracketing different from reciprocal exposures?
6. Look at your images, how did different ambient lighting types (temperatures) change the outcome of the image's color?

Type	Outcome of Image Color Description
Classroom	
Sun	
Shade	
Gym	

Don't forget the questions on the back!

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7. How did different ambient lighting types change the outcome of the image exposure? Think about which areas needed more/less light to make the exposures.

8. Explain the relationship of mathematical progression of ISO, shutter speeds and *f*/stops.

9. **Extension:** If your ISO setting is 400 and the light meter reads $1/250 @ f5.6$ then:

- a. What type of exposures are these: bracketing or reciprocal?
- b. What would a +2 stops be if the ISO and shutter speed were not to change?

c. What would a -1 stop change be if the ISO and *f*/stop were the same?

10. What did you learn new from this assignment?

11. What did you learn which surprised you while during this assignment?

12. What did you change about this assignment? Please explain why this change should be made.