Introduction to Flash Photography
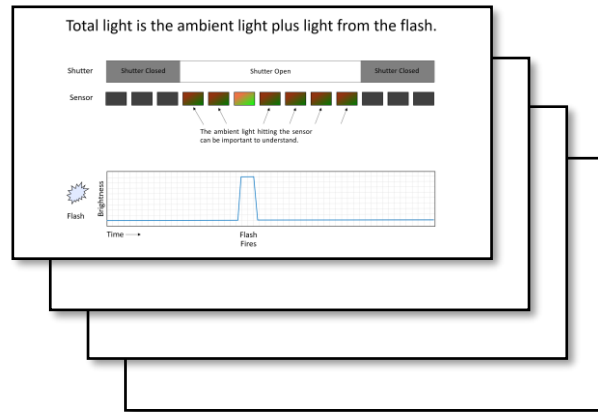## *Plus Some Advanced Topics*

This presentation has two types of slides:

Technical Explanations

Easy to Remember Stuff

Types of Camera Lights

Built-In Flash

- Cell Phones
- Point-and-shoot cameras
- Low-end DSLRs
- Low-end Mirrorless cameras

External Flash

This Talk

- Also called strobes, speedlites and speedlights.
- Fits in a camera hot-shoe
- Works on or off camera
- Most versatile of all lights

Studio Strobes

- Also called studio flash, monolight.
- Typically mounts on a light stand.
- Advanced capabilities like modeling light, extremely bright light, large battery, external power.
- More common in professional photography.

Video Lights

- Typically mounts on a light stand, although small ones can be camera mounted.
- Always on
- Every You-Tuber uses these.
- Not camera-specific
- Usually LED-based
- Useful for video *and stills*.

This talk will cover 4 topics:

1. A few tips for buying your first flash

2. A variety of lighting situations that can be improved with a flash

3. Settings and techniques to use in these situations

4. Some technical details on how the camera and flash work to help you understand how the settings work

What Does a Flash Do Besides Add More Light?

1. Control of the *direction* of light and harshness/softness
   - For studio portraits, create a sense of depth and presence.
   - Selectively add light to shadows or backlit foreground subjects.
   - Light up backgrounds or objects other than the subject.
2. Freeze motion
   - Reduce motion from camera shake or subject movement. All pictures will look sharper.
   - Freezing action: sports, dance, tossed objects, special effects.
3. Better color
   - Light from a flash has better color quality than any other type of light, including sunlight.
   - Many indoor lights have poor color for photography, including most fluorescent lights & older LEDs.
4. Some flashes have an autofocus assist light.

Buying Your First Flash
also called strobes, speedlights, or speedlites.

- Buy a flash designed to work with your camera brand (Canon, Sony, Nikon, Olympus, Panasonic, etc.)

- 3rd party flashes cost half of the major brands and are just as good and sometimes better. Two excellent brands are Godox and Yongnuo. They make models specifically designed for Canon, Nikon, Sony, etc.

- Flash brightness (power) is the most important specification when picking a flash. A brighter flash will obviously go further, but will also allow you to do more things with it.

  - Bouncing light off a ceiling.

  - Filling in shadows outdoors.

- The tradeoff for a more powerful flash is more size, weight, and cost.

- Brightness, or flash power, is measured by Guide Number. Bigger is better.

- More expensive flashes have more features, but all flashes have so many features that features don't need to be part of your decision criteria.

Flash Specs

Specification	Example Spec	Explanation
Guide number	197 ft at ISO 100 at 200mm	Guide number describes flash brightness (flash power). Bigger is better. When comparing models make sure the ISO and focal range match.
Angle of coverage	12° to 94°	Many flashes have a built-in zoom to automatically track the camera zoom. You can also set flash zoom manually. The largest angle may involve flipping out a built-in plastic diffuser.
Rotation (up/down)	-7° to +90°	0° is pointed straight ahead. 90° is pointed straight up which is useful for bouncing light off the ceiling to fill a room with light. -7° means the flash can tip down slightly.
Swivel (left/right)	360°	Swivel is useful for bouncing light off a wall for softer side lighting on a subject.
Recycle time	0.1 to 5 seconds	How fast the flash can take two pictures back to back at full power. Recycle time varies with the type of battery, the charge on the battery, and how bright the flash fires. Sometimes you may be taking pictures with flash and notice a dark picture in the middle. This means the flash didn't recycle before you pressed the shutter. You won't usually notice the missed flash looking through the viewfinder because the viewfinder blanks when taking the picture.
Power range	1/1 to 1/128	The lower number (e.g. 1/128) indicates how dim the flash can fire. Since flash brightness is controlled by flash pulse duration, a smaller number means the flash is capable of faster pulses, which can be useful for freezing high speed motion.
Wireless Operation	Optical pulse, radio	This is for controlling an off-camera flash. Use Radio. It is more reliable and goes further.

Rotation and Swivel Can be Used Together to Point the Flash in Any Direction

Rotation: 0°
Swivel: 0 °

Rotation: 45°
Swivel: 0 °

Rotation: 90°
Swivel: 0 °

Rotation: 45°
Swivel: 180 °

Rotation: 0°
Swivel: 180 °

Rotation: 0°
Swivel: 90 °

Batteries for Your Flash

Some flashes have custom lithium batteries but most use AA batteries. My preference from high to low:

- Panasonic Eneloop (rechargeable)

- Panasonic Eneloop Pro (rechargeable)

- EVEREADY lithium AA's (not rechargeable) Lightweight, long shelf life, $2.65 each.

- Premium alkaline batteries work, but cycle slowly and wear out quickly. Not the best choice.

• It's OK to start with a charger that only charges 4 batteries, but if you have a spare pair of batteries or a wireless remote or additional flashes that have more batteries, it's nice to be able to charge all them at once.

I use this charger. Tenergy makes a similar model for $41.
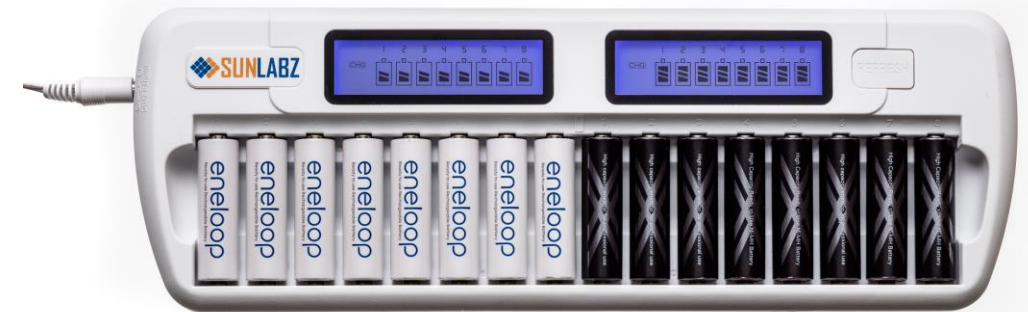
	Eneloop	Eneloop Pro
Price	$3.50 each	$8.50 each
Power	2000 mah	2550 mah
Number of charge / discharge cycles	2100 cycles	500 cycles

Light Pulse Time for Common Flashes

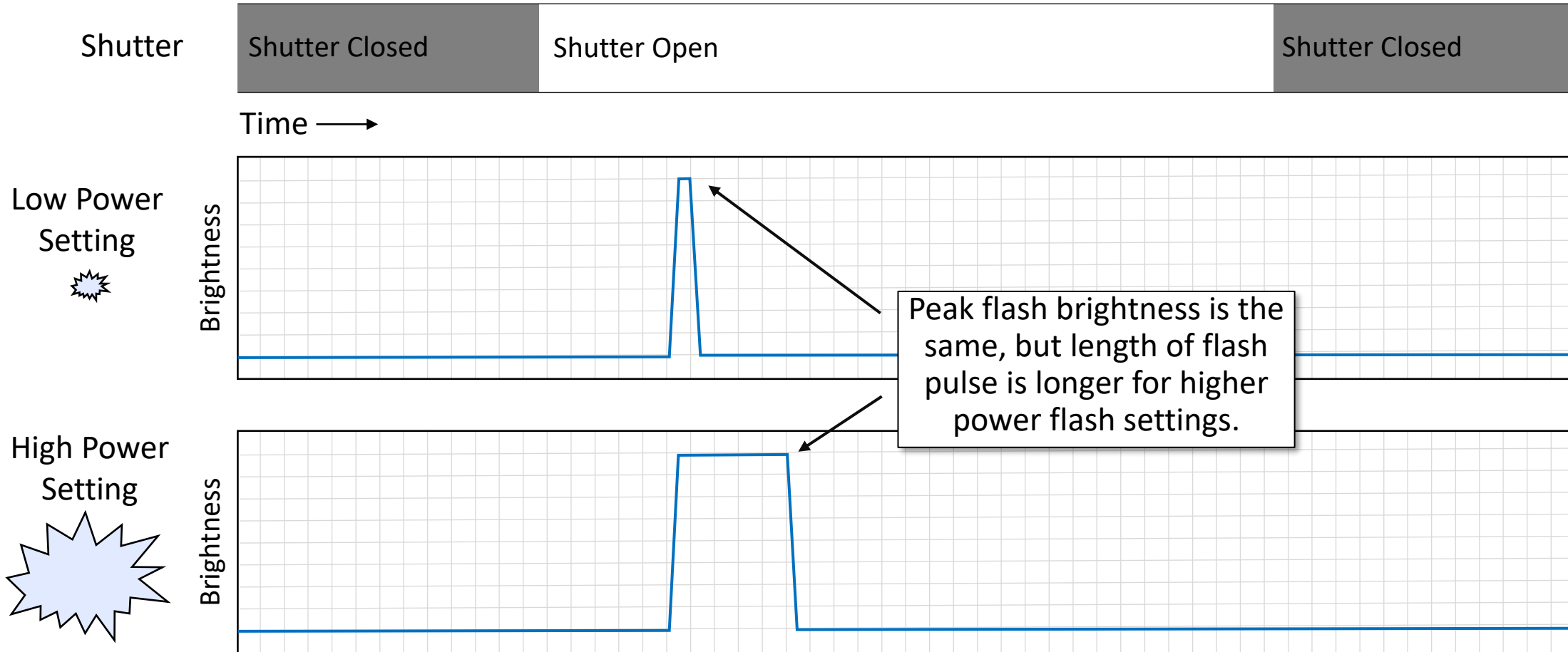|	Full Power	1/2 Power	1/4 Power	1/8 Power	1/16 Power	1/32 Power	1/64 Power	1/128 Power
Canon 430 EX II	1/350 s	1/1630 s	1/3000 s	1/4300 s	1/5250 s	1/5600 s	1/6500 s	
Canon 580EX	1/250 s	1/919 s	1/2066 s	1/3759 s	1/6024 s	1/9470 s	1/13966 s	1/19,841 s
Canon 580EX II	1/285 s	1/1400 s	1/2800 s	1/4600 s	1/6500 s	1/7500 s	<1/8000 s	<1/8000 s
Canon 600-EX RT	1/1000 s	1/2000 s	1/4000 s	1/9000 s	1/15,000 s	1/21,000 s	1/30,000 s	1/35,000 s
Nikon SB-24	1/231 s	1/794 s	1/1366 s	1/3425 s	1/5208 s			
Nikon SB-26	1/245 s	1/1389 s	1/2717 s	1/4902 s	1/7813 s	1/10,870 s	1/13,889 s	
Nikon SB-28	1/265 s	1/954 s	1/2016 s	1/3623 s	1/6313 s	1/9921 s	1/13,889 s	
Nikon SB-80DX	1/258 s	1/1157 s	1/2451 s	1/4492 s	1/7396 s	1/11,062 s	1/15,823 s	1/21,930 s
Nikon SB-600	1/265 s	1/875 s	1/2150 s	1/3500 s	1/5250 s	1/7000 s	<1/8000 s	
Nikon SB-700	1/305 s	1/1000 s	1/2300 s	1/400 s	1/5250 s	1/8000 s	<1/8000 s	<1/8000 s
Nikon SB-800	1/1050 s	1/1100 s	1/2700 s	1/5900 s	1/10,900 s	1/17,800 s	1/32,300 s	1/41,600 s

What you can do with flash at 1/128 power

My off-camera flash was placed close to the faucet and manually set to 1/128 power. This corresponds to a flash time of 1/35,000th second.

This kitchen sink picture was fairly easy:

- Adjust the water flow to get a little aeration, but not too much.
- Manually focus on the closer part of the stream. I did this by looking at the engraving on the faucet. Notice the letters "GPM" on the left side are sharp while the letters closer to the camera, "min", are soft.
- Manual aperture f/8
- Manual shutter speed 1/200 sec
- Do this at night and turn off the room light so the flash is the only light.
- Use a cutting board for the backdrop.

Higher Flash Power is Produced with a Longer Flash Pulse, not brighter light

Shutter	Shutter Closed	Shutter Open	Shutter Closed

Time ⟶

Low Power Setting

Brightness

High Power Setting

Brightness

Peak flash brightness is the same, but length of flash pulse is longer for higher power flash settings.

Using Flash in a Back-lit Scene

Flash: Off

Flash: ETTL (Automatic)
Flash Direction: 0° (forward)

Trying to fix the backlight problem in Lightroom

Flash: Off

Exposure adjusted
+3.5 Ev in Lightroom

- Dog looks great.
- Background washed out.
- Adjusting Ev in camera would produce the same result.

Flash: ETTL (Automatic)
Flash Direction: 0° (forward)

Mixed Illuminant – outside light vs flash

- This is what the picture looked like out of the camera.
- White balancing on the snow in Lightroom produced the same result.
- It's pretty good, but the actual couch is more golden.

- White balancing on the white fur between Jasper's eyes in Lightroom also improved color accuracy of the couch.
- Outside now looks too yellow.

Light from the flash decreases with the square of distance

1'	5'	10'	15'	20'
100%	4%	1%	0.44%	0.25%
	4.6 stops	6.6 stops	7.8 stops	8.6 stops
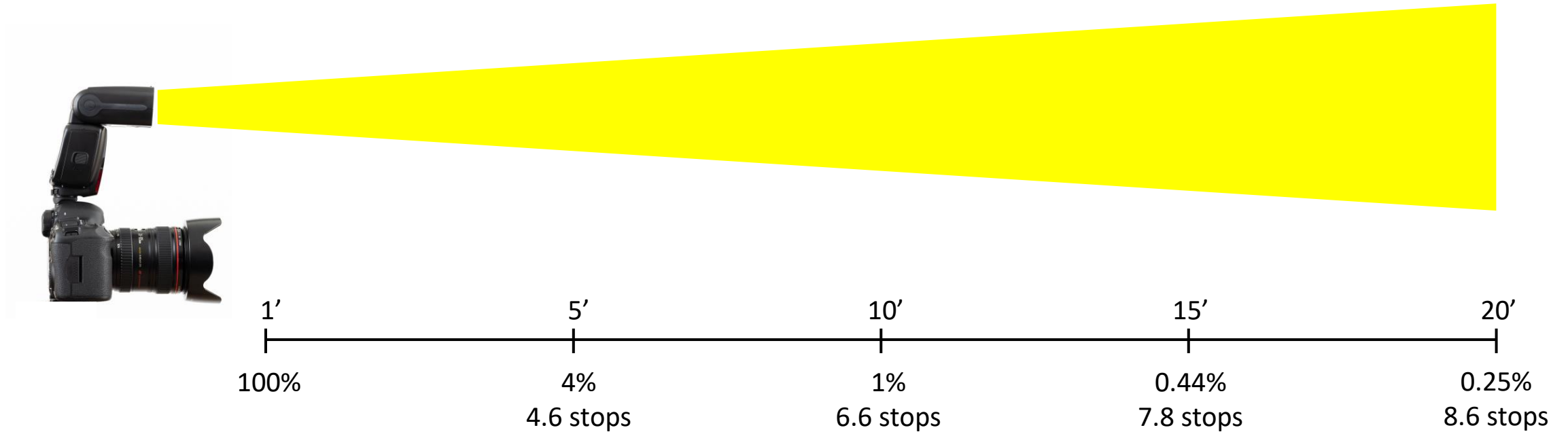
Relative Brightness with increasing distance

Dining room light: On
Flash: ETTL (automatic)
Flash Direction: 0° (forward)
Camera Mode: Av, f/8 (Aperture Preferred)
ISO: 200

Things to notice

1. The close end of the table is brighter than the far end. This is a good example of how quickly light falls off with distance.

2. Hard shadow of ukulele neck on the table.

3. The flash seems to be dominating the total light. Although a ceiling light is on over the table, it's effect is weak relative to the flash.

What if we wanted to keep the same amount of flash, but allow more ambient light in to the exposure? There's 2 ways to do this:

1. Put the camera in Manual mode and make the exposure longer.

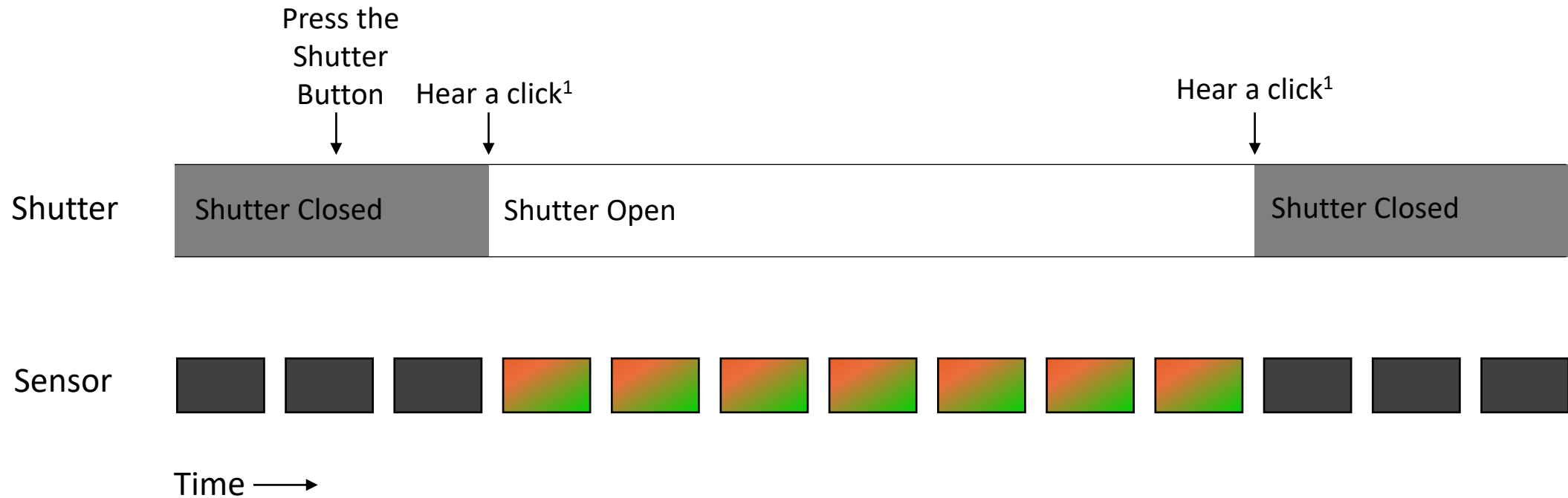2. Turn on Slow Synchro, also called Slow Synch.

Slow Synchro

Dining room light: On
Slow Synchro: Off
Flash Direction: 0° (forward)
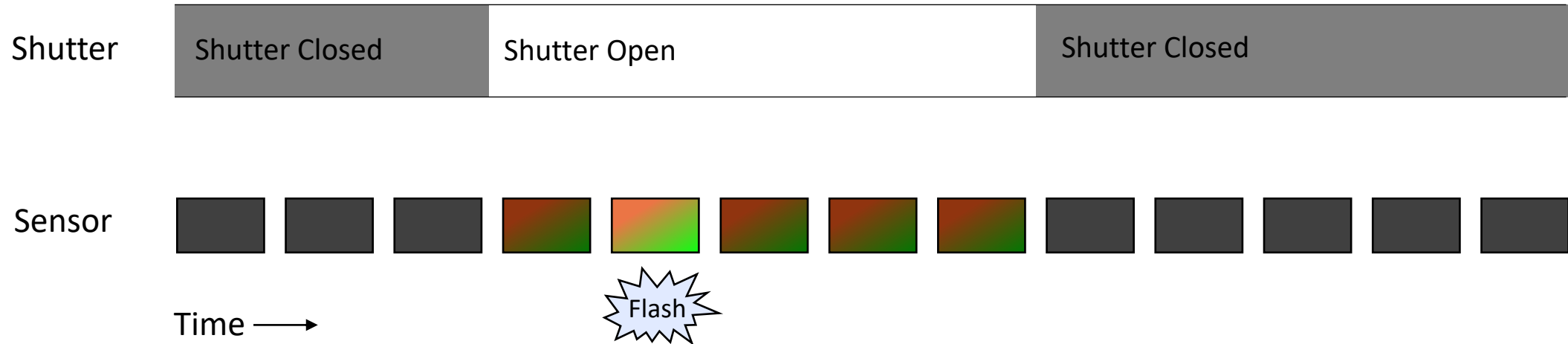Camera Mode: Av, f/8 (Aperture Preferred)
ISO: 200

Dining room light: On
Slow Synchro: On
Flash Direction: 0° (forward)
Camera Mode: Av, f/8 (Aperture Preferred)
ISO: 200

Camera Shutter Without Flash

Press the
Shutter
Button

Hear a click[1]

Hear a click[1]

Shutter

| Shutter Closed | Shutter Open | Shutter Closed |

Sensor

Time ⟶

[1] There won't be a click if you're using an electronic shutter, although you might hear the aperture switch from wide open to the aperture you're using.

Camera Shutter With Flash

Shutter

Shutter Closed	Shutter Open	Shutter Closed

Sensor

Time ⟶

Flash

Important to know: The duration of the flash pulse is *very short* compared to the exposure time.

Exposure with Slow Synchro Enabled

Shutter

| Shutter Closed | Shutter Open | Shutter Closed |

Sensor

Time ⟶
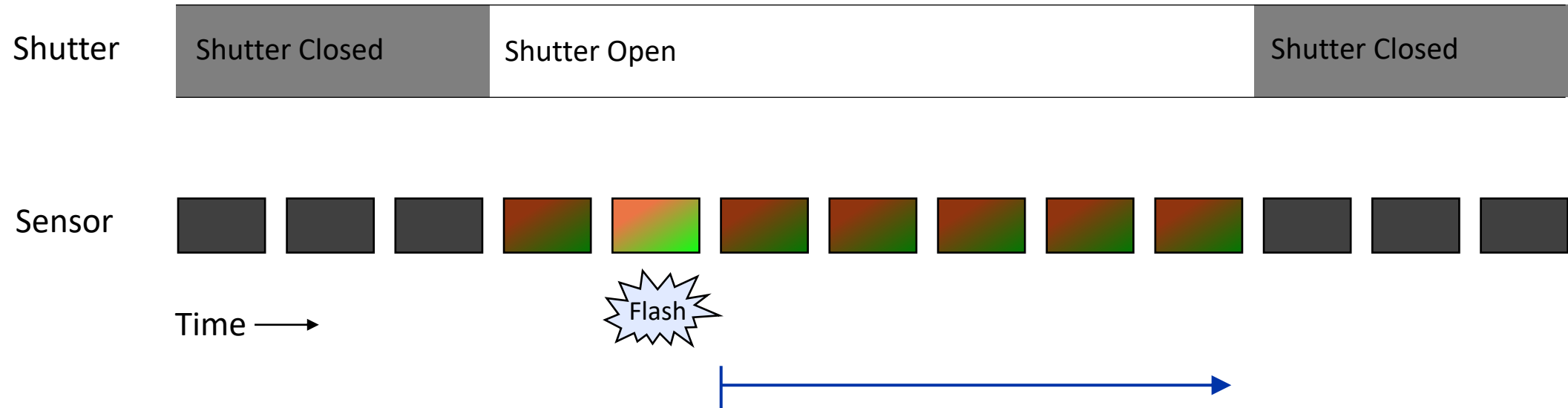
Flash

When you turn on slow synchro, the camera keeps the shutter open after the flash is fired until enough light is captured for a good background exposure.

Let's Look at that side again: Slow Synchro

Dining room light: On
Slow Synchro: Off
Camera picked shutter speed: (1/60 sec)
Flash Direction: 0° (forward)
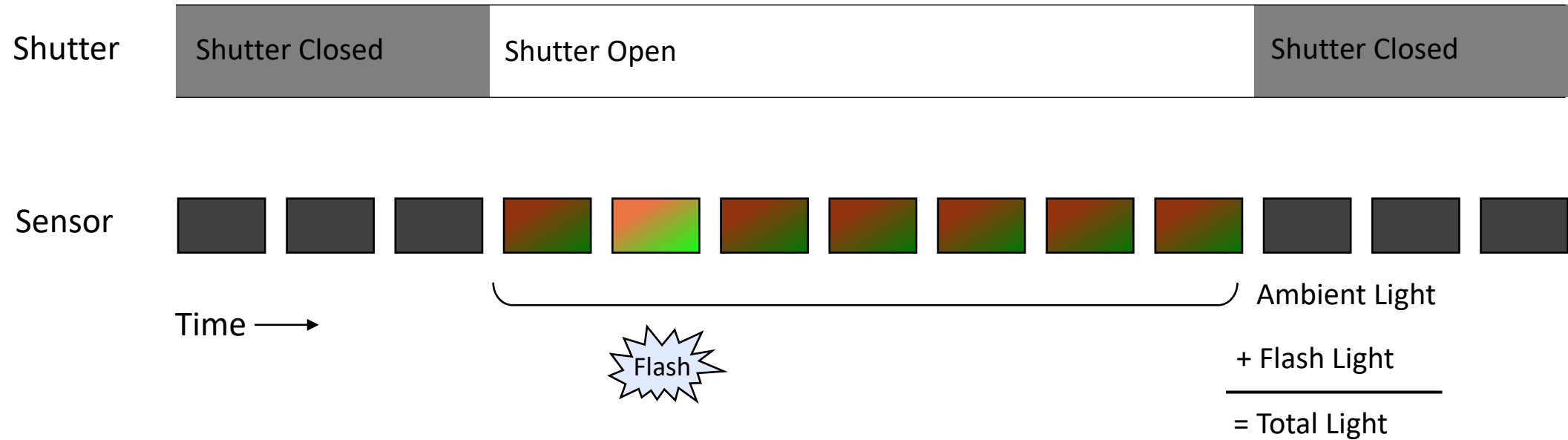Camera Mode: Av, f/8 (Aperture Preferred)
ISO: 200

Dining room light: On
Slow Synchro: On
Camera picked shutter speed: (1/2 sec)
Flash Direction: 0° (forward)
Camera Mode: Av, f/8 (Aperture Preferred)
ISO: 200

Some Notes About Slow Synchro

- The amount of light from the flash doesn't change because the extra exposure time occurs after the flash fires.

- Due to the longer exposure, the contribution of the ceiling light becomes significant.

- The camera is smart about this combination of ambient light and flash light so the ukulele doesn't get over-exposed.

- Although it is subtle, this is called a mixed illuminant scene, meaning different parts of the scene are lit by different colors of light. The top of the ukulele body, which is getting mostly ceiling light, is warmer than the face of the ukulele, which is getting mostly flash light.

- One risk of slow synchro is that the exposures can get pretty long. This can result in motion blur.

Total light = ambient light + flash light

Shutter

| Shutter Closed | Shutter Open | Shutter Closed |

Sensor

Time ⟶

Flash

Ambient Light

+ Flash Light

= Total Light

Things to Remember

- The flash pulse is very fast.

- The flash pulse is much shorter than the exposure time of the shutter.

- Flash pictures are the sum of two pictures: an ambient light picture and a flash picture.

- Changing the shutter speed changes the contribution of ambient light, but does not change the contribution of the flash light to the picture.
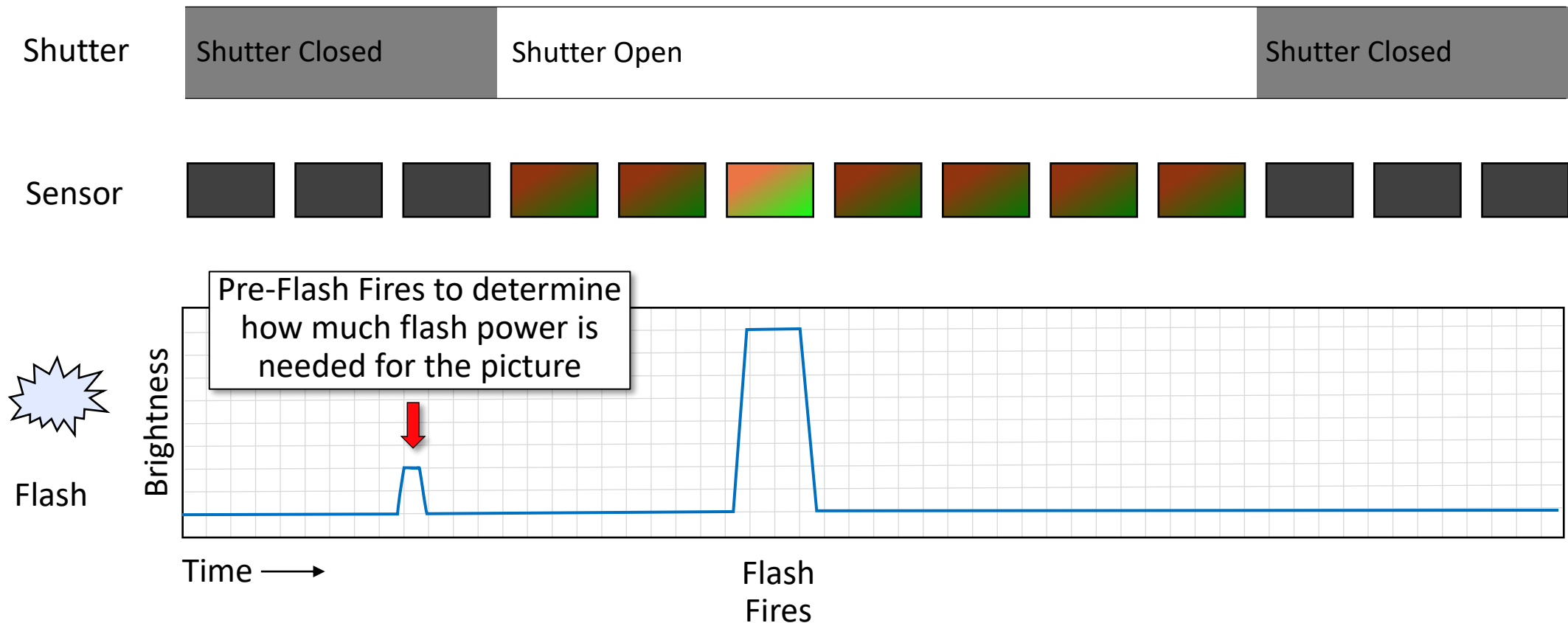
Bouncing Flash Off the Ceiling

Same picture as before

Dining room light is on.
Flash: ETTL (automatic)
Flash Direction: 0° (forward)
Camera Mode: Av, f/8 (Aperture Preferred)
ISO: 200

Dining room light is on.
Flash: ETTL (automatic)
Flash Direction: 90° (straight up)
Camera Mode: Av, f/8 (Aperture Preferred)
ISO: 200

How does the camera know how much flash power to use? It fires a quick pre-flash.

Shutter

| Shutter Closed | Shutter Open | Shutter Closed |

Sensor

Pre-Flash Fires to determine how much flash power is needed for the picture

Flash

Brightness

Time →

Flash Fires

What if you want bounce light and direct light from the flash?

- Many flashes come with a built-in reflector you can pull out.

- Alternately, tape an index card or stiff sheet of white paper to the side of your flash.

- The reflector should go straight up. It should not lean in to the upward facing beam of light.

- For more reflected light forward make the reflector taller or wider.

Comparison of Slow Synchro with Bounce Flash

Slow Synchro

Bounce Flash

Another Approach: Stepping Back from Subject

Same picture as before

Automatic flash lights of subject.
Flash brightness rolls off with distance.
Curtain is receiving 7.1% the flash light of the ukulele.

$$\frac{\text{Distance to guitar}^2}{\text{Distance to wall}^2} = \frac{(40 \text{ inches})^2}{(150 \text{ inches})^2} = 0.071$$

I backed up 5 feet and retook the same picture. Notice the relative brightness of the curtain.
Curtain is receiving 24% the flash light of the ukulele.

$$\frac{\text{Distance to guitar}^2}{\text{Distance to wall}^2} = \frac{(105 \text{ inches})^2}{(215 \text{ inches})^2} = 0.24$$

On the slow synchro picture, remember the slight color imbalance between the flash light and the ceiling light?

On the next slide we'll look at a more extreme example of mixed illumination and how to fix it with a flash filter.

The Canon 600EX-RT comes with a snap-on filter holder and two gel filters – a light yellow filter and a darker yellow filter. The darker filter is shown above.

Bonus: The flash senses the color of the gel filter through a little hole under the flash and tells the camera how to white balance the picture.

Using a Yellow Filter to Match Flash Color to Ceiling Light

Dining room light: on
Slow synchro: off
Flash: ETTL (automatic)
Flash direction: 0° (forward)
Yellow filter on flash: no
Camera mode: Av, f/8
ISO: 200

Dining room light: on
Slow synchro: on
Flash: ETTL (automatic)
Flash direction: 0° (forward)
Yellow filter on flash: no
Camera mode: Av, f/8
ISO: 200

Dining room light: on
Slow synchro: on
Flash: ETTL (automatic)
Flash direction: 0° (forward)
Yellow filter on flash: yes
Camera mode: Av, f/8
ISO: 200

A Third Approach to Addressing Mixel Illuminant: Change the Ambient Light

Left picture: Dining room light on

Right picture: Dining room light off
                      Video light on

Both pictures:

Camera Mode: M
Aperture: f/8
Shutter speed: 1/4
Two flashes, manual power setting
Both flashes had diffusers
Flash 1: left side of figurine
Flash 2: right side of figurine

Things to Remember

- There are several ways to control the balance of ambient light and flash light:

  o Bounce the flash off the ceiling (a powerful flash comes in handy).

  o Turn on Slow Synchro or manually increase the shutter speed.

  o Move back from the subject or move the subject closer to the background.

- If the ambient light and flash light are different colors, there are a few ways to compensate:

  o Use bounce flash so that the whole room receives the same mix of ambient and flash.

  o Put a color filter over the flash.

Flash Exposure Compensation

- Most photographers are familiar with Ev Compensation, which is a camera setting telling the camera to let in less light or more light than the auto-calculated exposure.

- Flash compensation works the same way except only the flash power is varied.

- The Flash compensation setting is adjusted up or down in fractions of a stop, just like Ev Compensation.

- Some cameras also offer flash-exposure-bracketing which works similar to exposure bracketing. Multiple pictures are taken and the flash power is adjusted automatically for each shot.

No Flash

Flash Exposure Compensation -1 stop

Flash Exposure Compensation Off

Flash Exposure Compensation +1 stop

Next we'll step through these at full screen so you can see the differences better.

No Flash

- Strong shadows on right side of face and shirt.

- The shadows can be improved using the Lightroom *Shadows* slider, but the result will look a little flat.

Flash Exposure
Compensation
-1 stop

- Definite improvement in shadows.

- This might be the best of the sequence.

Flash Exposure Compensation Off

- Pretty good, but I'm starting to look like I was pasted into the picture.

Flash Exposure
Compensation
+1 stop

- Definitely too much flash power.

- I look like I was pasted into the picture, which is a common problem with too much flash.

Flash Exposure Compensation: -1 stop

This is such a high-dynamic range scene that we'll want to lower the highlights in Lightroom.

Flash Exposure Compensation: -1 stop

Lightroom Highlights: -100

The bright forehead looks better.

This picture barely looks like a flash shot now – fairly natural.

Flash Exposure Compensation: -1 stop

Lightroom Highlights: -100

Lightroom: I removed the eye glints
            from the flash.

Some people like an off-center glint to make the eyes look more alive. For extra credit, you could add an off-center glint.
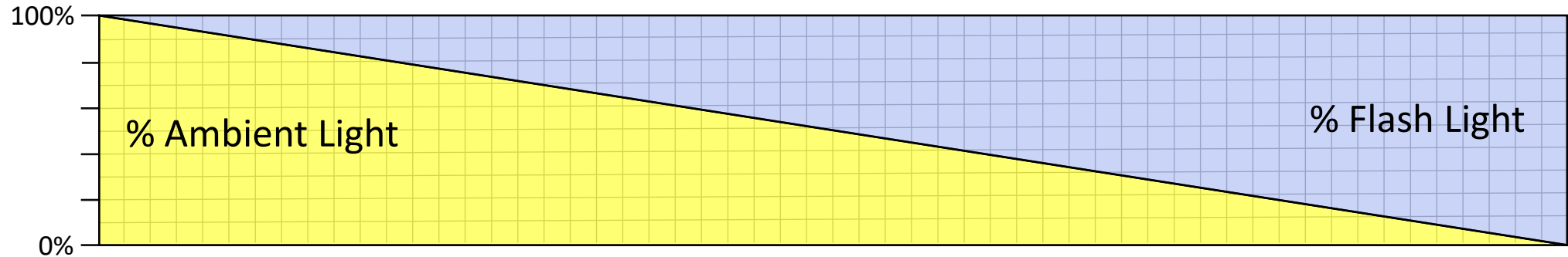
Flash glints in the eyes are something to look for when editing your pictures. If the glints don't look natural, you can remove them or replace them to look natural.
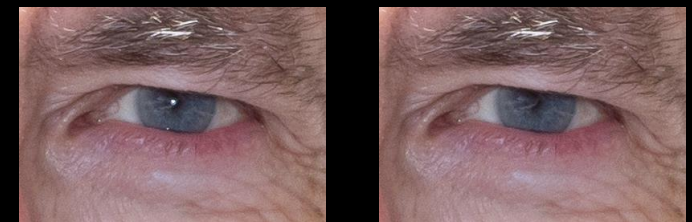
Things to Remember

- The automatic flash control is pretty darn good.

- Getting good lighting when you take the picture is better than trying to brighten shadows in an editing program.

- The goal of fill flash is not to get rid of shadows. Shadows are a natural part of the world we see. The goal of fill flash is to lighten dark shadows to a pleasing, but still natural level.

- Too much flash makes the subject look like they were cut out and pasted into the picture.

Examples of When to Use Different Mixes of Ambient Light and Flash Light.

100%

% Ambient Light

% Flash Light

0%

Outdoor on cloudy day

Indoor where flash would be distracting to other people

Outdoor on cloudy day:
Brighten foreground subject to draw attention.

Outdoor with bright sun:
Fill in shadows.

Outdoor with subject in shade and background behind subject in full sun.
Lighten subject

Indoor with subject in front of bright window
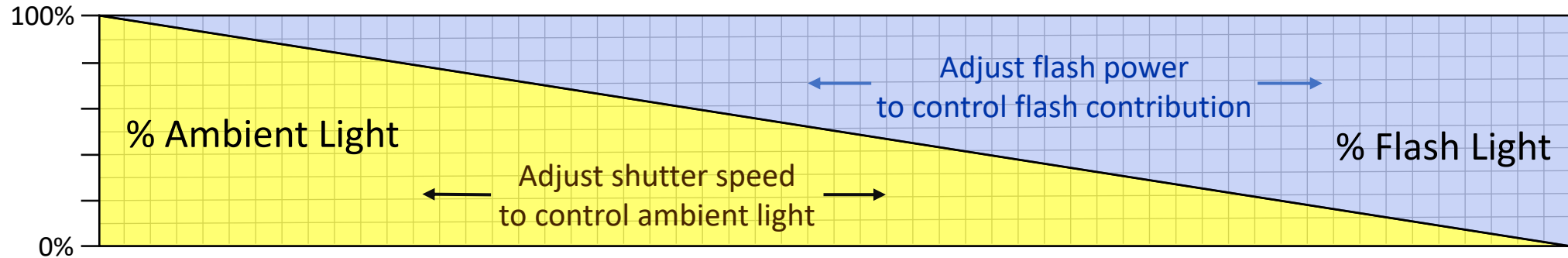*Lighten subject*

General indoor photography:
Bounce flash off ceiling to light the whole room.

Studio portraiture:
Control every aspect of the light color, angle, softness, brightness, hairlight, background.

High speed photography
Freeze a moving subject

How to Control the Relative Mix of Ambient and Flash Light.

100%

% Ambient Light

Adjust flash power
to control flash contribution

% Flash Light

Adjust shutter speed
to control ambient light

0%

Shutter Speed: Effects ambient light *but not flash.*

- o   Turn on slow sync. Camera will pick longer exposure times

- o   Manually adjust shutter speed

Flash Power: Effects flash *but not ambient light.*

- o   Adjust flash compensation   ⚡±0

- o   Manually adjust flash power

ISO: Effects ambient and flash equally

Aperture: Effects ambient and flash equally

Choosing the mix of flash/ambient light can be an aesthetic choice.

Shutter Speed 1/8th sec   1/20th sec   1/60th sec   1/200th sec

These pictures show different amounts of ambient light with the same flash power.

The amount of ambient light was controlled using the shutter speed.

As mentioned earlier, because the flash pulse is so much faster than the shutter, *changing the shutter speed does not change the contribution of the flash*.

# Rear (2nd) Curtain Sync for Capturing Trails

- Works best with long exposure times – 1/30th sec to ½ sec.

- Experiment with settings to get the best ratio of flash to ambient.

- Exposure for this picture was around 1/10 second. I threw about 60 balls to get the shot the way I wanted it.

- The original trail for this shot looked yellow because the ambient light was a different color than the flash. I changed the ambient lights. Also, the original lighting had some flicker which showed up as a non-uniform trail.
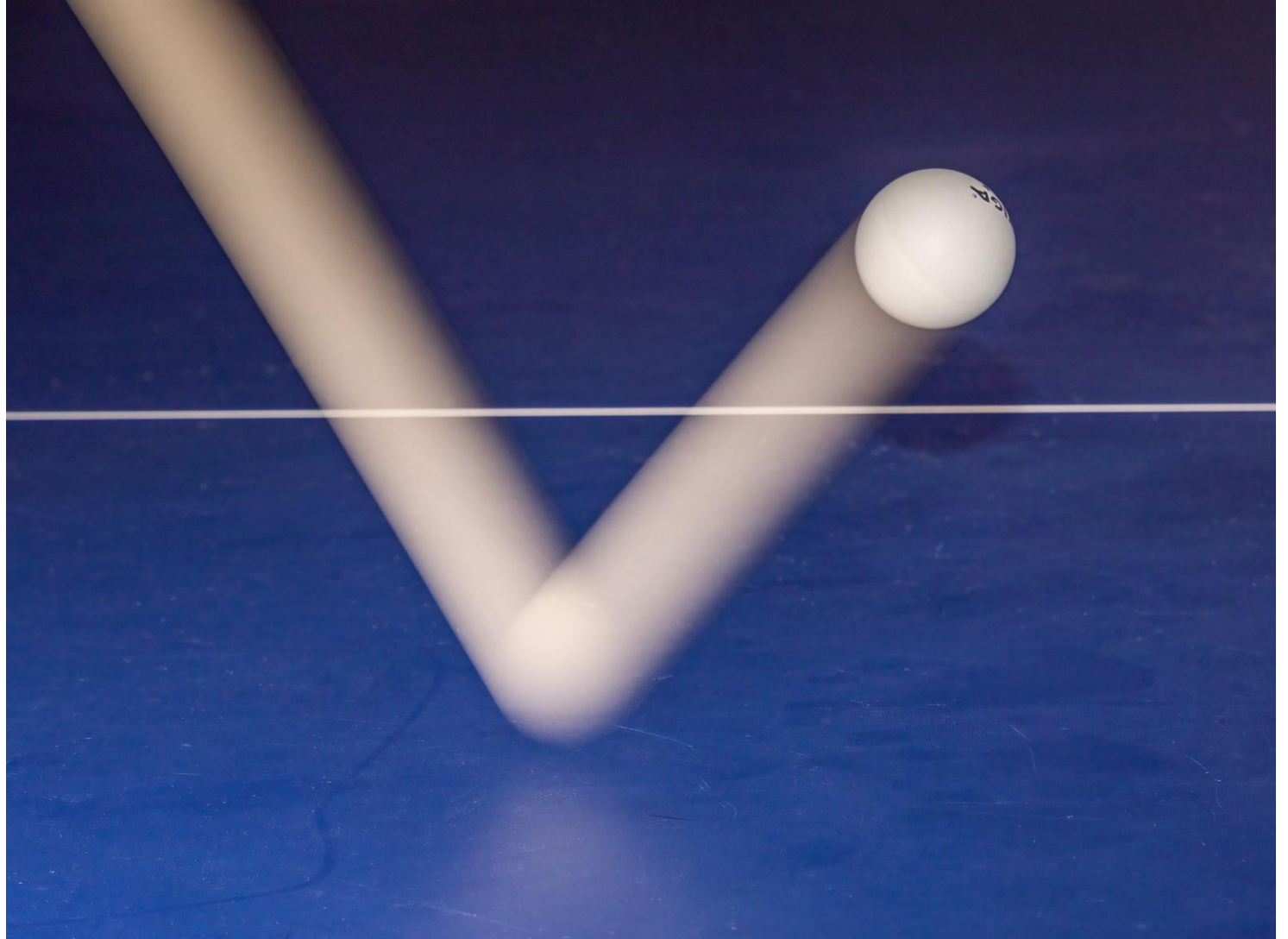
Front (1st) Curtain Sync (Default)
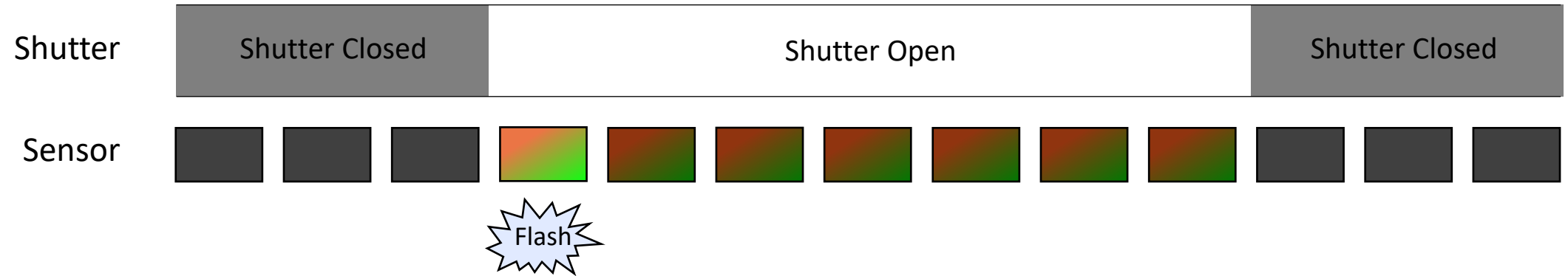
Rear (2nd) Curtain Sync: Used to capture a trail behind a moving subject.

Time ⟶
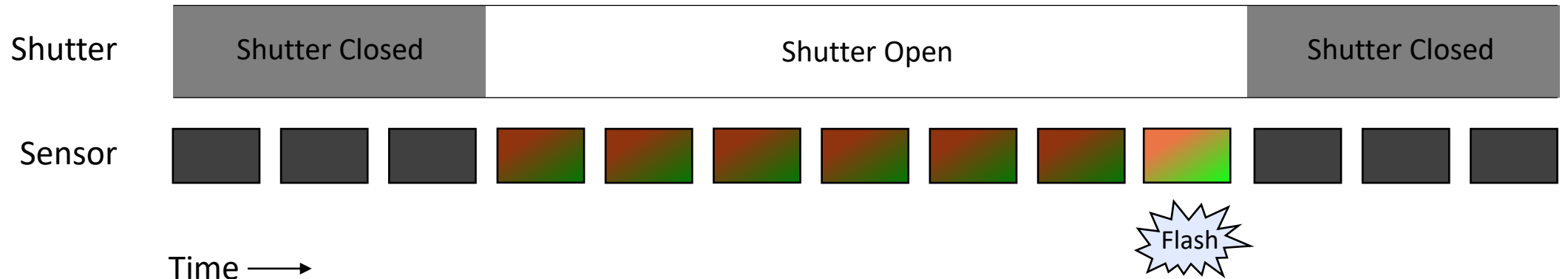
Shutter Sync Speed and High Speed Sync

The next few slides explain two topics that confuse many photographers.

You don't have to understand all the details, but if you can remember a few of the concepts it will help you down the road.
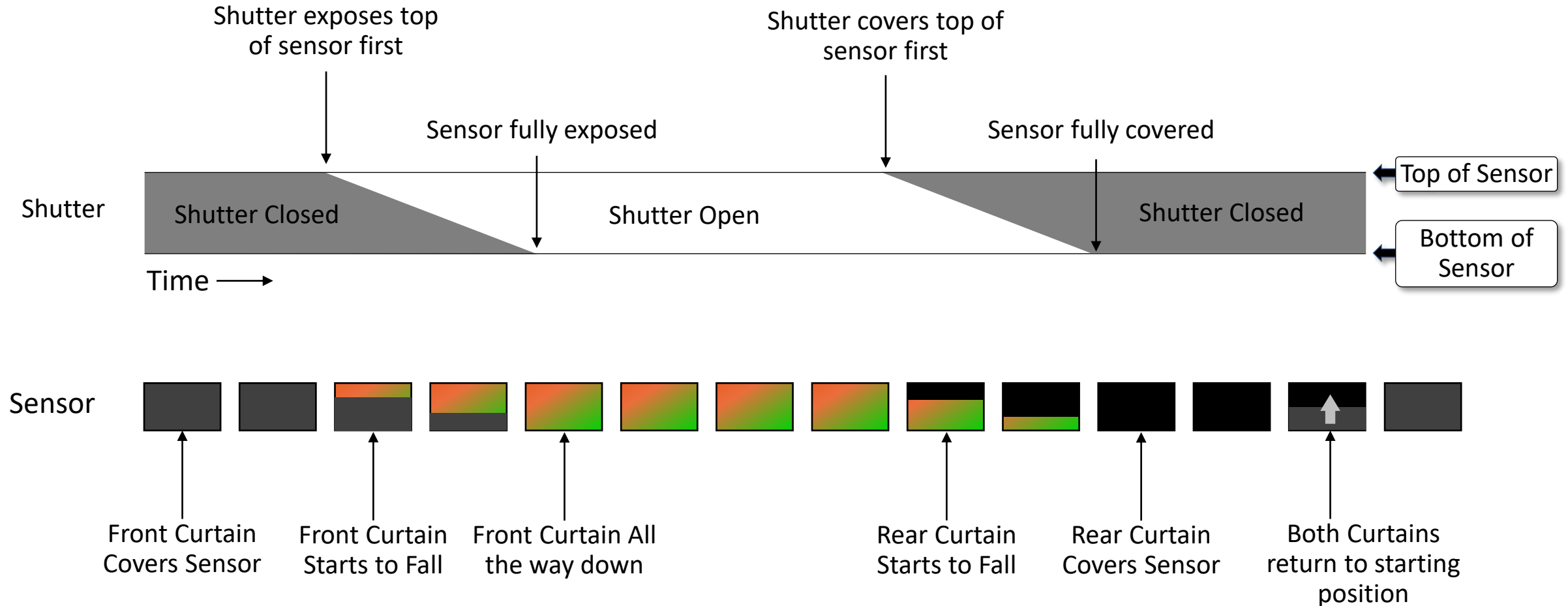
There is a summary slide at the end of what you need to remember.

How Shutters Work

- It takes time for a mechanical shutter to open and close.

- To achieve high shutter speeds, the shutter is made of two parts – a front (1st) curtain and rear (2nd) curtain.

- The front curtain falls first, *exposing* the sensor from the top down.

- The rear curtain falls next, *covering up* the sensor from the top down.

- This is sometimes called a rolling shutter because the top of the sensor is exposed before the bottom of the sensor.

- Electronic shutters and mechanical shutters both behave this way.

○ *An electronic shutter is a feature of the sensor and a mechanical shutter is a physical thing in the camera.*

○ *Electronic shutters are nice because they don't shake the camera, but an electronic rear curtain can allow a small amount of stray light onto the sensor.*

○ *Either curtain can be electronic or mechanical. The combinations available for the front and rear curtains are E-E, E-M, and M-M.*

Action of the Front and Rear Curtains

Long vs. Short Exposure

Long Exposure

Shutter

| Shutter Closed | Shutter Open | Shutter Closed |

Sensor

Short Exposure

Shutter

| Shutter Closed | Shutter Closed |
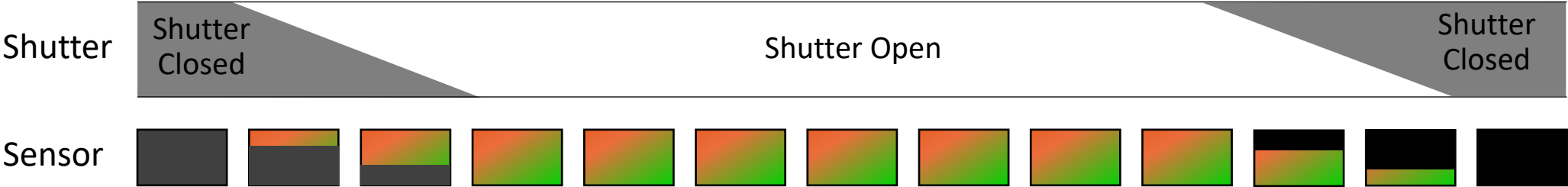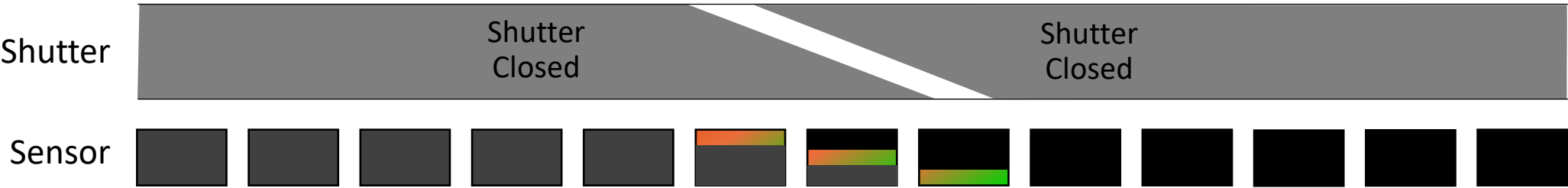
Sensor

The flash can only fire when the shutter is fully open

Flash Can Fire Here

Shutter

Shutter Closed

Shutter Open

Shutter Closed

Exposure Time

Sensor

If the flash fires here, only the top of the image will receive light.

If the flash fires here, only the bottom of the image will receive light.
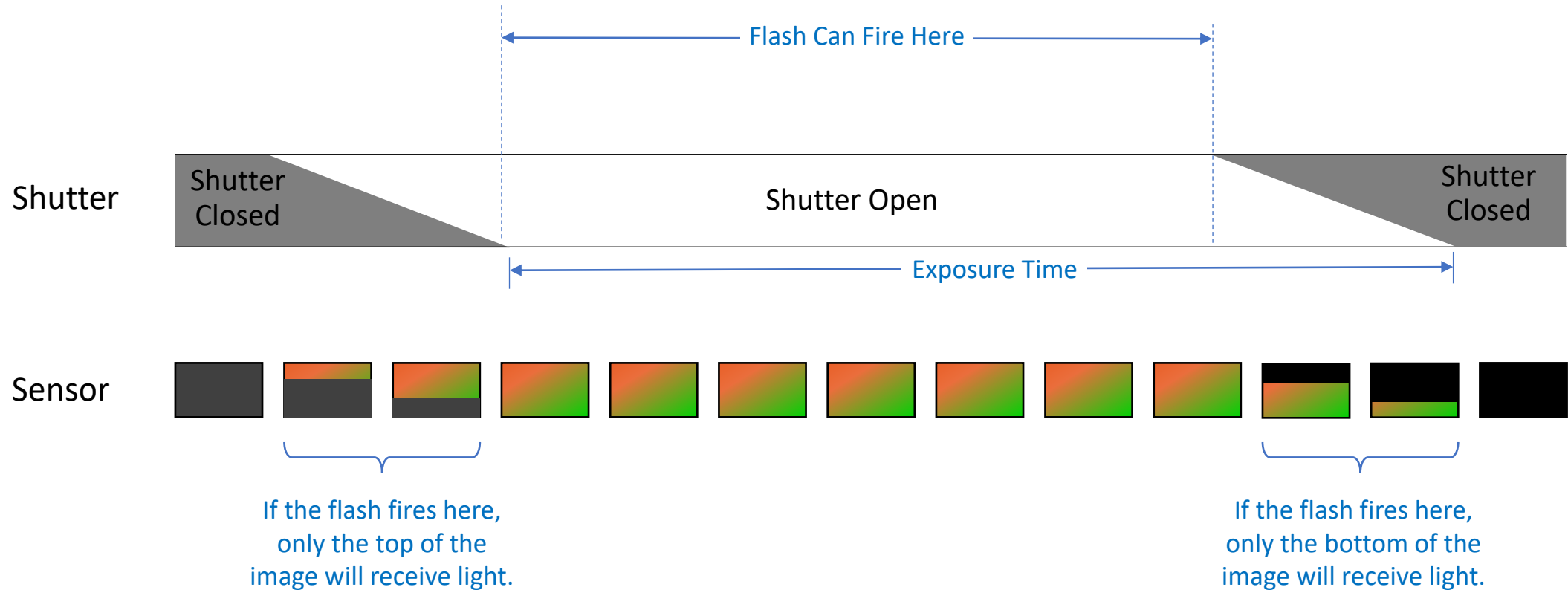
If the exposure time is too fast, there is no time the flash can fire and expose all of the sensor.

Exposure Time (e.g. 1/1000th sec)

Shutter

Shutter Closed

Shutter Closed

Sensor
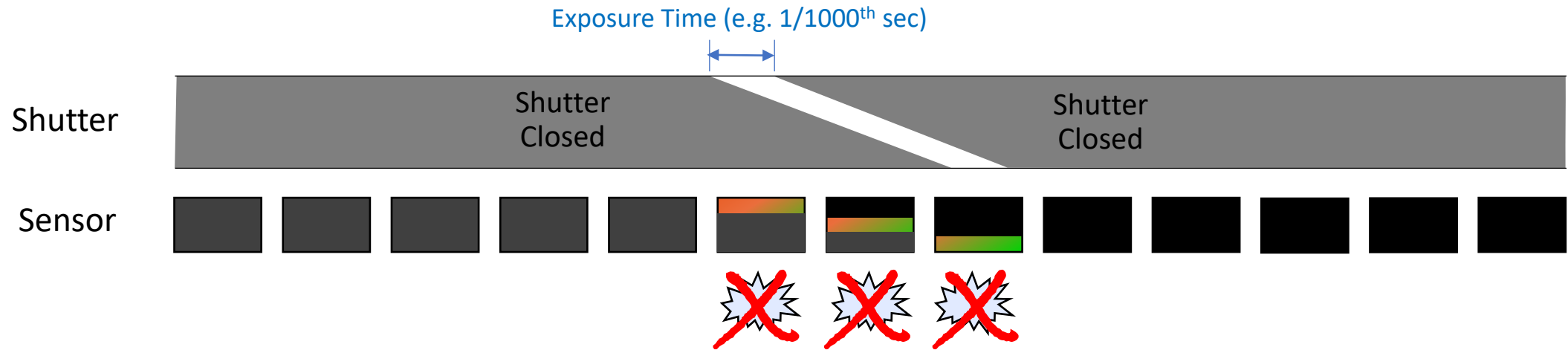
- The fastest shutter speed allowed for a single flash pulse is called the *shutter sync speed,* typically 1/200th sec or 1/250th sec.

- When the flash is enabled, most cameras limit the fastest exposure time to the shutter sync speed.

High Speed Sync (HSS) Allows Faster Shutter Speeds

Flash Fires Many Times
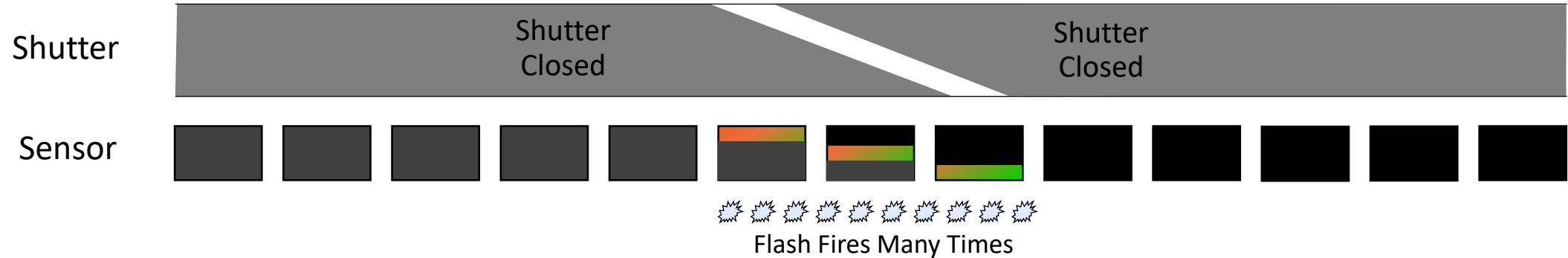
- High Speed Sync produces a series of very fast flashes (e.g. 40,000 flashes/second) starting when the front curtain first opens and ending when the rear curtain finishes closing.
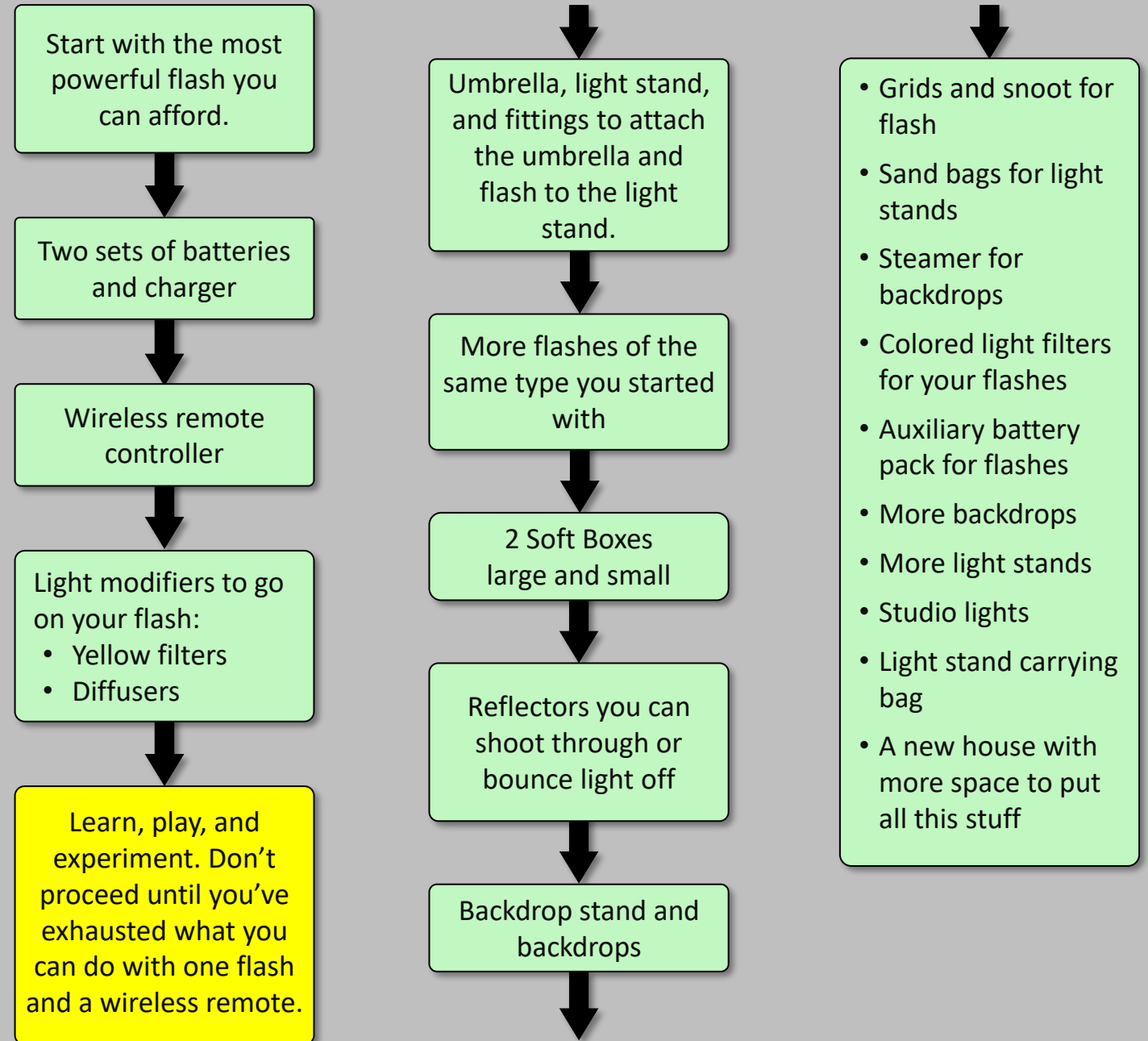
- This allows flash pictures with shutter speeds up to the fastest shutter speed of the camera, for example 1/8000 sec.

Things to Remember

- *Shutter sync speed* is the fastest shutter speed that works with a flash in normal firing. It is usually 1/200th sec or 1/250th sec.

- If you want a faster shutter speed than the *shutter sync speed*, set the flash to *High Speed Sync (HSS)*.

- HSS is useful for daytime flash pictures where you need a fast shutter speed, for example 1/500th or 1/1000th of a second.

- HSS downsides: the battery drains faster, flash cycle times are longer, and the brighter flash can startle people and pets.

What order should you buy flash gear?

Column 1:

Start with the most powerful flash you can afford.

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Two sets of batteries and charger

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Wireless remote controller

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Light modifiers to go on your flash:
- Yellow filters
- Diffusers

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Learn, play, and experiment. Don't proceed until you've exhausted what you can do with one flash and a wireless remote.

Column 2:

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Umbrella, light stand, and fittings to attach the umbrella and flash to the light stand.

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More flashes of the same type you started with

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2 Soft Boxes large and small

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Reflectors you can shoot through or bounce light off

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Backdrop stand and backdrops

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Column 3:

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- Grids and snoot for flash
- Sand bags for light stands
- Steamer for backdrops
- Colored light filters for your flashes
- Auxiliary battery pack for flashes
- More backdrops
- More light stands
- Studio lights
- Light stand carrying bag
- A new house with more space to put all this stuff

Teasers for a possible future presentation:

Light Modifiers and Accessories for your flash

Flash Modifiers

There are a plethora of light modifiers available for flash photography.

pleth·o·ra /ˈpleTHərə/ an excessive quantity of something

Modifiers do one of 4 things:

1. Spread the light out so it's coming from a larger, more uniform area. This provides gentler light with softer shadows.
   - Diffusers
   - Reflectors
2. Optically focus the light so it's concentrated in a narrower beam or spread out to a wider beam.
3. Block the light so it doesn't spill places you don't want it.
4. Alter the color of the light.

Modifiers can be further described by whether they
- Are built in to the flash
- Attach to the flash
- Go on a light stand, with the flash pointing at them (umbrella) or positioned inside them (soft box).
- Are hand held

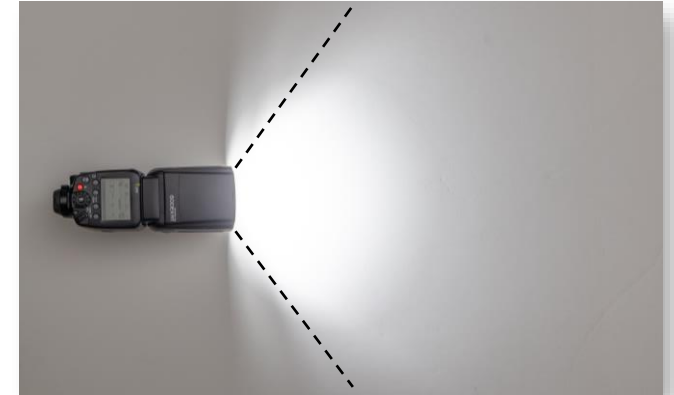# Built In Flash Modifiers in the Canon 600EX-RT

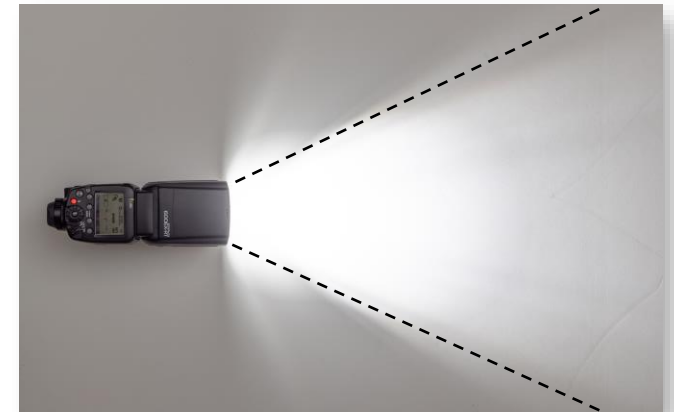
Wide Angle Lens Partially Deployed

Wide Angle Lens In Place

Built-In Reflector

Gives a combined effect of ceiling bounce light plus some direct light.

Zoom set to 20mm

Zoom set to 200mm

Modifiers that Attach to the Flash

GoBo – project a narrow beam of light that doesn't spill onto unwanted things

Snoot – projects a very narrow beam of light

Fresnel lens – projects flash a long distance in a narrow beam for bird and wildlife photography

Diffusers – soften shadows by having light come from a wider area.

Beauty dish – a special type of reflector / diffuser

Warming filters allow flash to match warm color indoor lighting (2700K, 3000K), sunset lighting, etc.

Color filters – assorted colors are useful for lighting backgrounds or objects other than the subject.

Modifiers That Go On Light Stands

Reflectors

Soft Boxes

- Multiple sizes
- 1-4 flashes can fit in some models

Umbrellas

- Many sizes
- Translucent and opaque
- Fire flash at them or through them

Flash Accessories

Wireless Trigger – get a radio trigger of the same brand as your flashes.

Light Stands
- Like a tripod only lighter and taller.
- Like a tripod, available in many sizes.
- Extra mounting attachments – ¼", 3/8" and round shaft.
- If you have a lot of light stands, consider a light stand carrying bag

Saddle Sandbags for light stands
- These are sturdy empty bags you fill with rocks, not sand. Sand is messy.
- Useful if working around kids, in crowded spaces, outdoors in wind, or if your clumsy.

External Battery
- Provide faster cycle times and longer shooting sessions.
- Hangs from tripod.

Using Multiple Flashes

- If you are only controlling one flash with a wireless remote, things are straightforward – the remote has the same controls as the back of the flash.

- If you are controlling multiple flashes with a wireless remote, things get more complicated because there are multiple ways to adjust the relative power of the flashes. Canon's A:B:C paradigm has so many permutations that I find it easier to manually adjust the absolute power of each group.

- Channels and Groups: A channel is just the radio channel you are using to control your flashes. Your wireless controller and your flashes should be on the same channel, which should be different than the channel used by anyone else in the room.

- Each remote flash is assigned to a group. The flash may support 3 groups (older Canon Flashes), or 5 groups (newer Canon flashes), or some other number. The power of each group can be controlled independently of the other groups. All of the flashes assigned to a given group will use the same power.

- I own 5 flashes and to keep things simple, I usually assign one flash to each group (Groups A,B,C,D,E), and now I can independently control the power of each flash.

- An example where I might assign multiple flashes to the same group is if I'm using my big softbox, which will hold up to 4 flashes. I usually put two flashes in that soft box and assign them to the same group, group A. I can now control the brightness of that softbox by only adjusting one thing – Group A power. Different groups can have different modes, too. One group could be set to ETTL (automatic power) and another group could be set to Manual Power.

Things to Remember

- Keys
- Wallet
- Turn off the stove
- Lock the door
- Camera
- Flash