

**Tools and Program Needed:**



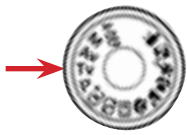
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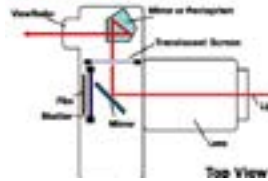
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# Getting To Know Shutter Speeds

## Stopping Action, Jump Shots & Panning



The shutter priority setting (TV on the dial) is a setting to control the amount of light which reaches the camera's SD card. Note: you will be using manual setting.



It is an adjustable opening in camera body allowing light to reach sensor for a specific amount of time.



Shutter speeds are measured in fractions of seconds for the most part.

**60** ▶ A figure without "x" is a fraction of 1/x so 60 is 1/60 sec.

**0"5** ▶ A figure with 0"x is tenths of seconds. So 0"5 is .5 sec. or 5/10 sec. A 0"8 would be 8/10 sec.

**2"** ▶ A figure with x"0 is whole seconds.



▶ The time the more light is allowed through.

▶ The smaller the time the less light is allowed through.

### Targets:

1. Know the basic whole shutter speeds and be able to use them to create images.
2. Understand the relationship shown by the Exposure Triangle.
3. Be able to identify different types of basic camera shutters and advantages.
4. Create images demonstrating how to stop the action of a human moving.
5. Know when to use a tripod based on shutter speed.
6. Know what "hang time" is in relation to capturing action.
7. Students should be able to identify approximate shutter speed while looking at a photograph.
8. Students should understand & be able to correctly use shutter speeds to control movement/action in a photograph.
9. Create photographs showing fast, medium, & slow shutter speeds while maintaining correct exposure.
10. Create images using correct panning technique.
11. Evaluate own work for compositional & technical techniques.
12. Develop critiquing skills by participating and discussing during class group critiques.

Class Web Page

### Shutter Speeds & Movement

<http://www.nclack.k12.or.us/Page/20335>

### Reminder

This PDF form must have **answers typed**.  
Except for exposure data collected while taking photos.

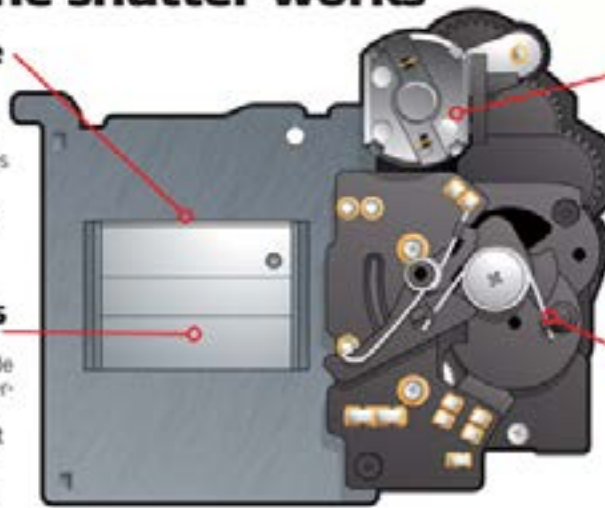
## How the shutter works

### Focal plane

SLRs use what is known as 'vertical-run focal plane' shutters - as the blinds run up and down, and are found just in front of the sensor.

### Twin blinds

The shutter mechanism is made up of two gossamer-thin blinds. One drops open to start the exposure, the second follows to close the opening.



### Motor

The shutter mechanism has its own motor, for firing and cocking the blinds. A separate motor is used for the mirror, which must be raised just before the shutter is fired.

### Longevity

The shutter durability varies considerably from model to model.

www.digitalcameraworld.com



Name:

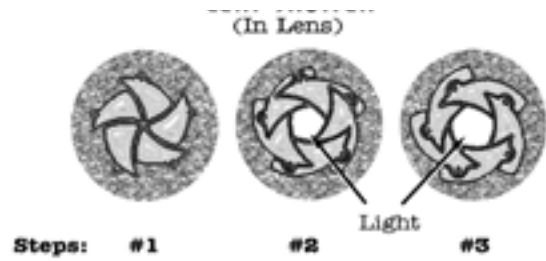
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## Shutter Types

### 1. Leaf Shutter

- Generally located in lens
- Will synchronize with flash at any speed
- Older form of shutter
- Found on larger format cameras (2¼, 645, 4x5, 8x10, etc.)

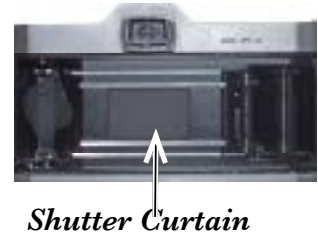
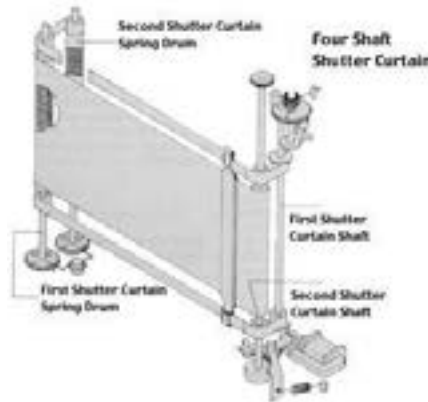
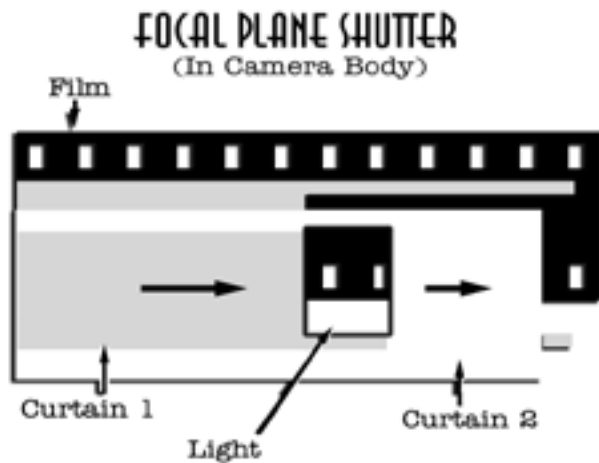


### 2. Focal Plain: Curtain

- Located in body just in front of film on “focal plane,” the point where camera focuses.
- A two curtain which slide past each other allowing light to pass through.
- Will synchronize with flash generally below 60 shutter speed
- Popular in 50's — 90's on 35 mm cameras

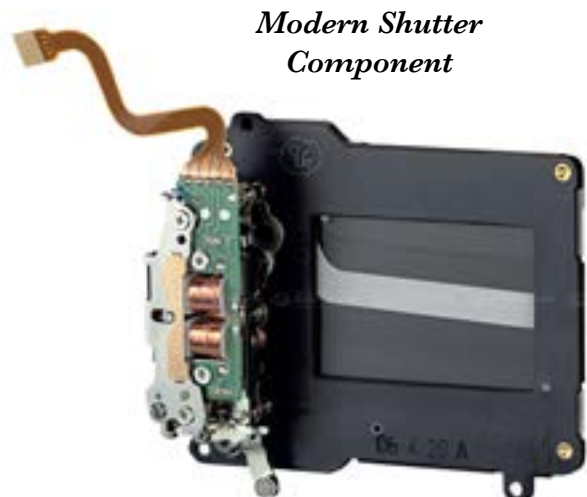
#### Special Focal Plane Note

- ▶ A focal plane is a location in a camera where light is focused by the lens.
- ▶ It is where the film or sensor lies.



### 3. Focal Plain: Metal Leaves

- Usually moves vertically
- Modern design — 1990's to present
- Found on many DSLR cameras



## The Speeds

- ▶ Shutter Speeds are measured in fractions of a second.  
Example:  $\frac{1}{1000}$ ,  $\frac{1}{500}$ ,  $\frac{1}{250}$ ,  $\frac{1}{125}$ ,  $\frac{1}{60}$ ,  $\frac{1}{30}$ ,  $\frac{1}{15}$ ,  $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$
- ▶ Measured in fractions of a second.
- ▶ Some cameras will have shutter speeds of up to 8 seconds.
- ▶ Some cameras will have a “B” (bulb) setting for longer exposures.
- ▶ Most cameras will synchronize with flash at  $\frac{1}{60}$  sec.

*When do I need a tripod?*

- ▶ General rule of thumb is focal length of the lens is the lowest shutter speed you can use.
- ▶ So a lens with a 55mm focal length shutter speed would be  $\frac{1}{60}$  sec.

## Slow Shutter Speeds

30	15	8	4	2	1s	2s	B
----	----	---	---	---	----	----	---

- Lower (slower) numbers let more light into camera.
- Slower shutter speeds show motion.
- Never hand-hold camera below 60.
- Use tripod for shutter speeds under 60.
- Use cable or remote release when using tripod.

## Fast Shutter Speeds

2000	1000	500	250	125	60
------	------	-----	-----	-----	----

- Higher (faster) numbers use less light.
- Faster shutter speeds stop motion.
- Always use 250 or greater to stop human action.
- Use over 500 for sport shots if possible
- Wait for peak of “hang time.”

Name:

Period:

Date:



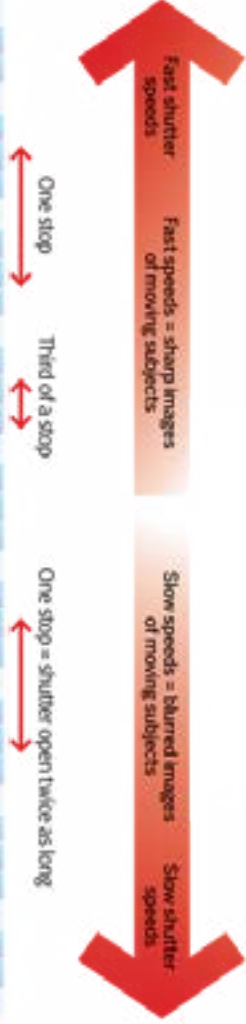
## Only Use Whole Shutter Speeds For this class

www.photoplusmag.com

### Making sense of the speed scale

Canon SLRs give you the choice of two different shutter speed scales – one with half-stop steps, the other with third-stop steps (see Step by Step, below). Each step along the full stop scale represents a doubling (or halving) of the amount of light reaching the sensor.

Full stops	1/2 stops	1/3rd stops
1/4000	1/4000	1/4000
	1/3000	1/3200
		1/2500
1/2000	1/2000	1/2000
	1/1500	1/1500
		1/1250
1/1000	1/1000	1/1000
	1/750	1/800
		1/640
1/500	1/500	1/500
	1/350	1/400
		1/320
1/250	1/250	1/250
	1/180	1/200
		1/180
1/125	1/125	1/125
	1/90	1/100
		1/80
1/60	1/60	1/60
	1/45	1/50
		1/40
1/30	1/30	1/30
	1/20	1/25
		1/20
1/15	1/15	1/15

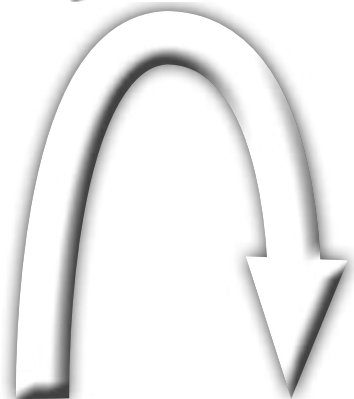


### Hang Time & Photography

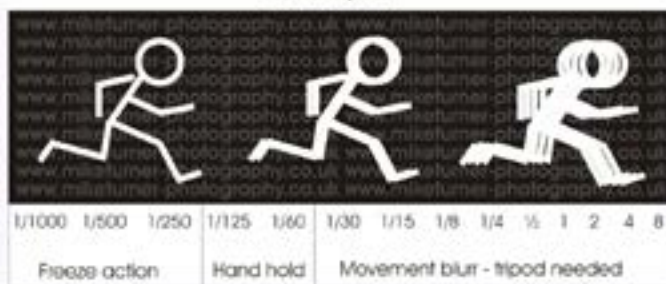
- ☆ When someone jumps they can appear suspended in mid air at the high point of a jump.
- ☆ This illusion is a result of projectile motion.
- ☆ Projectile motion simply states, when thrown into the air, an object, or in this case a person, will spend the majority of the time at the top of the throw.
- ☆ The higher someone jumps, the greater the hang time.
- ☆ A photographer can take advantage of this “moment” to take an image using a slightly slower shutter speed like a 250th instead of a 500th of a second.



No longer going up & not yet coming down



How different shutter speeds generally look when capturing human movement.





**FIRST OF A NEW SERIES TO COLLECT**

## Digital CHEAT SHEET Camera

Find the right shutter speed for every situation!

SHUTTER SPEED	TYPICALLY USED FOR...
1/4000 sec	Freezing extremely fast movement
1/2000 sec	Freezing birds in flight
1/1000 sec	Freezing motorcycles, cars and other fast vehicles
1/500 sec	Freezing mountain bikes, runners and athletes
1/250 sec	Freezing slow-moving animals or people walking
1/125 sec	Panning motorcycles, cars and other fast vehicles
1/60 sec	Panning mountain bikes close to the camera
1/30 sec	Panning fast-moving cyclists at a distance
1/15 sec	Panning runners, kids or moving animals
1/8 sec	Blurring fast-flowing water close to the camera
1/4 sec	Blurring people walking
1/2 sec	Blurring slow-moving water
1 sec or slower	'Milky' water effects

**Learn the lingo: Panning**  
Lets you add motion blur while keeping your main subject sharp. Track the subject with your camera, pivoting from your hips.

**HOW TO ADJUST SHUTTER SPEED**

**Use Shutter Priority mode**  
Select S or Tv on your camera's top dial or menu, then adjust shutter speed with the relevant dial (check your manual). You can go down to around 30 secs for traffic trails.

**Set the right ISO**  
To access slower shutter speeds, use the lowest ISO setting (usually ISO100). If you need a fast shutter speed, you may need a higher ISO, such as ISO400 or above.

## Camera Panning

- ☆ Watch videos on class web page "Shutter Speeds & Movement" at <http://www.nclack.k12.or.us/Page/20335>.
- ☆ Panning is when the photographer stays in one place but rotates the camera along the same plane of the subject movement following the subject's motion.
- ☆ The photographer is located perpendicular (at right angles) to the subject's direction of movement.
- ☆ It is important to match the camera's movement with the speed of the subject and practice is important.
- ☆ Anticipate the course and direction before the subject approaches guesstimating location where subject will pass and set focus there.
- ☆ Images are best if the photographer waits to release the shutter just before the horizontal "hang time" when the subject is directly in front of them.
- ☆ Continue to turn and match speed after releasing the shutter for better outcome.
- ☆ This results in the subject and camera moving together allowing a **slightly slower shutter speed** to be used, like a 60th instead of a 125th of a second to capture a bicyclist.
- ☆ This technique is used to suggest motion while separating the subject from other elements in the frame.
- ☆ The resulting image will have a **blurred background with a clear main subject**.
- ☆ Since camera and subject were moving together the subject seems not to have been moving while the **background appears to have movement (blur)**.

**Moving subjects**  
Shutter speed choice becomes more important when you photograph moving objects. The quicker the subject is moving, the faster the shutter speed you need to freeze the subject. Go for a slower speed and the moving elements will appear blurred - but get the right degree of blur and your shot can look great.

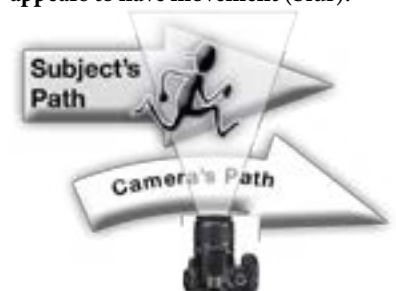
**1/250 sec**  
Exposure: 1/250 sec at f/8, ISO200

**1/60 sec**  
Exposure: 1/60 sec at f/3.6, ISO200

**1/30 sec**  
Exposure: 1/30 sec at f/1.8, ISO200

**1/15 sec**  
Exposure: 1/15 sec at f/2, ISO200

**1/5 sec**  
Exposure: 1/5 sec at f/2.8, ISO200



Name:

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Go to class web site, and watch videos on shutter speeds then answer the following questions.

1. What are the advantages and disadvantages of these shutter speeds?

Speed	Advantage	Disadvantage
<i>Fast</i>		
<i>Medium</i>		
<i>Slow</i>		

2. How does light change when...	+/- stops amount	Change: list the amount of change
<i>a. Going from 60 to 125 shutter speed?</i>		
<i>b. Going from 15 to 4 shutter speed?</i>		
<i>c. Going from 1,000 to 250 shutter speed?</i>		
<i>d. Going from 124 to 1,000 shutter speed?</i>		

3. What kind of things are good to photograph at these shutter speeds? Look on page 5

<i>1,000</i>	
<i>250</i>	
<i>125</i>	
<i>60</i>	
<i>15</i>	
<i>2min.</i>	

4. What does a quote mark in the shutter speed denote? Example: 0"8 or 2" See page 1

5. Go to class web site, and watch two videos on panning then draw a diagram of the panning motion. Also check out page 5

6. Draw a diagram of hang time which explains how it applies to photography and shutter speeds. Also check out page 5

## How to take the photos:

1. Use **manual mode** for all your photos.
2. Set your camera's white balance to the **daylight setting** (sun mode).
3. Remember to keep sun at photographer's back.
4. Set shutter speed and adjust *f*/stop (and ISO if needed) to achieve correct exposure.
5. Do not use a flash or tripod for any of these photos.
6. Some photos will be blurry.
1. Remember to record what you are doing at the time you are taking the photos.
7. You will be taking a series of photos all photos are to have these characteristics.
  - a. Start all photos with an ISO 400 (outdoor) setting for light meter reading. Adjust ISO only as last resort (example: indoors and there is not enough light) Do not change ISO after taking first photo of series.
  - b. Show a human in all photos.
8. Take a series of photos at the following shutter speeds with people doing four different activities;
  - a.  $\frac{1}{1,000}$  sec.,
  - b.  $\frac{1}{250}$  sec. ,
  - c.  $\frac{1}{60}$  sec.,
  - d.  $\frac{1}{30}$  sec.,
  - e.  $\frac{1}{15}$  sec.
9. The activities your subjects are to do are: (Practice several times to get it right before taking photos. It takes lots of practice!)
  - a. Jump up and down in front of camera
  - b. Jump sideways across front of camera
  - c. Dance in front of camera
  - d. Pan while having someone run across in front of camera
  - e. A person standing still
10. Then take five photos demonstrating you can **stop action** using what you learned. These can have the same or different shutter speeds (be sure to record what you use), but have different subjects which demonstrate you can correctly stop or blur action. **Subjects do not have to be human for this set**, so have fun. You can photograph running water, moving cars, moving animals,. **Remember, the key is to demonstrate you can control movement.** Remember to record what you are doing at the time you are taking the photos.
11. You will have taken 30 photos when you are done.

## Purpose:

- To explore the uses of shutter speeds by stopping action, showing blur and panning.
- To understand the triangular relationship between ISO, shutter speed and *f*/stop.
- To demonstrate how different shutter speeds effect the look of specific human movement.

## Subject:

A human doing an activity.



## What To Turn In:

- 30 digital images on server
- Place in class folder the following stapled together:
  - a. Completed assignment worksheet
  - b. 1 contact sheet, 30 images with exposures written on each image.
  - c. 6 printouts
    - i. Best example of each type (write type and exposure on each image)
    - ii. Label best overall exposure
  - d. Your favorite photo
  - e. Rubric

Name:

Period:

Date:



### Jumping Toward Camera

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
		1,000	
		250	
		60	
		30	
		15	



### Jumping Perpendicular to Camera

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
		1,000	
		250	
		60	
		30	
		15	





## Dancing in Front of Camera

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
		1,000	
		250	
		60	
		30	
		15	



## Panning Camera (Remember to stay in place while camera follows runner)

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
		1,000	
		250	
		60	
		30	
		15	

Name:

Period:

Date:



Person Standing Front of Camera

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo
		1,000	
		250	
		60	
		30	
		15	



Demonstrate Your Knowledge (Your choice demonstrating your ability to stop action)

Fill out **while** taking the photo

Describe location in detail including weather and light conditions:

ISO	f/stop	Shutter Speed	Comments & Notes, Detail when Taking Photo

Name:

Period:

Date:

**Remember :**

Write in complete sentences.

## Reflection Questions

1. Explain which shutter speeds worked best for panning.
  
2. How does changing the shutter speed effect the Exposure Triangle?
  
3. When would you use panning?
  
4. How did changing the shutter speed effect exposure?

If your ISO setting is 400 and the light meter reads 1/60 @ f/8 then:

- a. Would you change your shutter speed to stop a person dancing?
- b. Would you change your shutter speed to pan a car going by on freeway?
- c. Would you change your shutter speed to stop a person sitting still?
- d. Would you change your shutter speed stop movement in running water?

	Y	N	How would you make that change? New exposure would be...	Why would you make or not make these changes?
a				
b				
c				
d				

Name:

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5. a) What happens to the amount of light when you increase your shutter speed by one?

5. b) What happens to the amount of light when you decrease your shutter speed by one?

6. Which camera settings produced the best final image? Think about how action was stopped or blurred when explaining why you think these settings are the best.

7. If your ISO setting is 800 and the light meter reads  $1/500 @ f/8$  then:

- a. Would you change your shutter speed to **stop** a speeding bicyclist?
- b. Would you change your shutter speed to **pan** a car going by on freeway?
- c. Would you change your shutter speed to stop a person sitting still and show the tree behind the person in focus?
- d. Would you change your shutter speed show movement in running water?

	Y	N	How would you make that change? New exposure would be...	<b>Why</b> would you make or not make these changes?
a				
b				
c				
d				

8. When would you use slower shutter speeds? Give two specific examples of subject matter and shutter speed for each of them. Give explanation and the examples. **An example might be:** A rock @  $1/x$  second.

9. When would you use faster shutter speeds? Give two specific examples of subject matter and shutter speed for each of them. Give explanation and the examples. **An example might be:** A rocket @  $1/x$  second.



Name:

Period:

Date:

10. When must you use a tripod?

11. In your words, what was the hardest part of this assignment for you? Explain why it was hard and how you overcame any difficulties you had.

12. In your words, what was the easiest part of this assignment for you? Explain why it was easy.

13. What did you learn that you did not expect?

14. Why did you pick your favorite photo? What do you like best about it?

15. How does your favorite photo demonstrate what you have learned about shutter speeds?

16. Is there anything else I should know when I grade your project, any special circumstances I should know about?