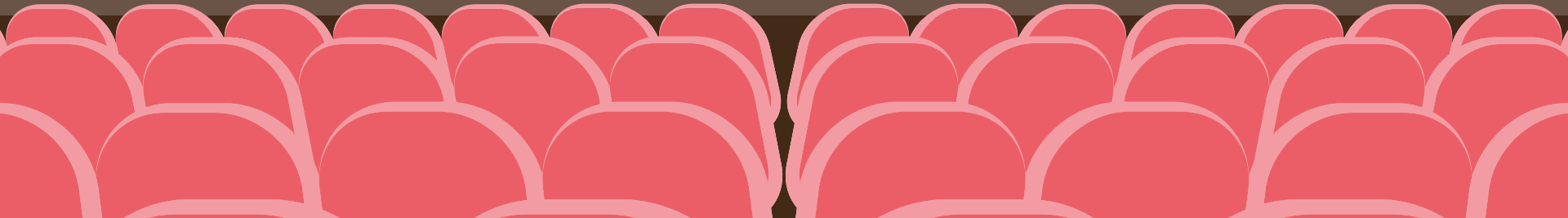


CAMERA & LENS BASICS

Granada High School - Video Productions - Level 1



WHY DO WE NEED TO KNOW THIS?



**2019-2020
UPDATE**

A little bit of history might make you appreciate the advancements in technology. These advancements have brought film making and narrative story telling to a level where you can actually afford to make your own films

SOME JARGON THAT'S IMPORTANT RIGHT NOW

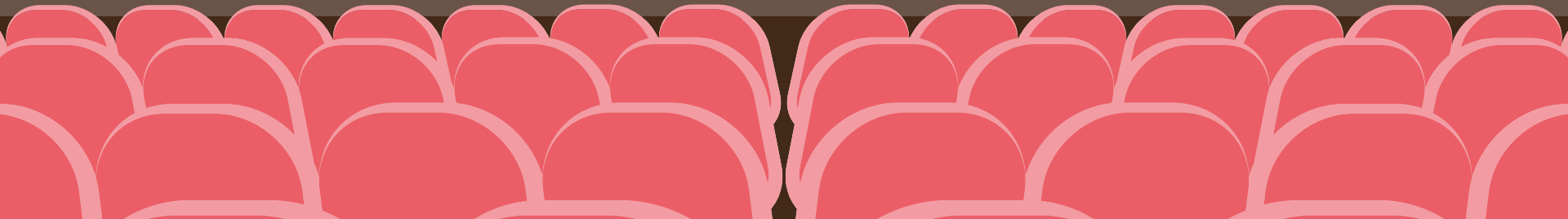
Edit: The process or result of selectively recording video and/or audio onto finished videotape or other media. Typically involves reviewing raw footage and transferring desired segments from master tape(s) onto new tape in a predetermined sequence.

MORE JARGON THAT'S IMPORTANT RIGHT NOW

Depth of Field: The distance between the nearest and the furthest objects that are in acceptable focus.







The background features four spotlights, one in each corner, shining a yellow beam of light towards the center. The beams overlap to create a bright central area where the text is located. The spotlights themselves are dark brown with a yellow ring around the lens.

FORMAT

The size and type of recording medium.

This could be **film** (16mm, 35mm), **tape** (8mm, Mini-DV, 1/2-inch, VHS, etc.),

flash-based (records straight to memory card), **HD-based** (records straight to a Hard Drive), or **Disc-based** (DVD).

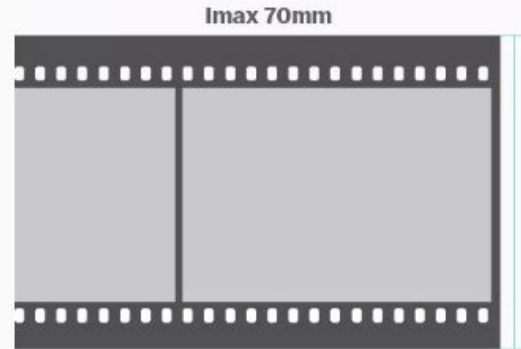
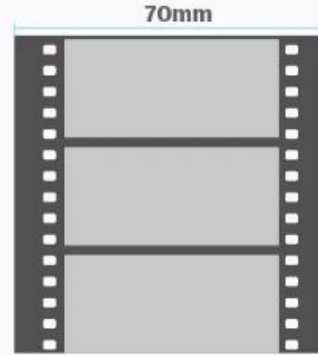
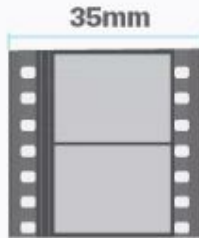
Format also refers to **analog** (records a signal) or **digital** (records in zeros and ones)

FILM FORMATS

Film formats



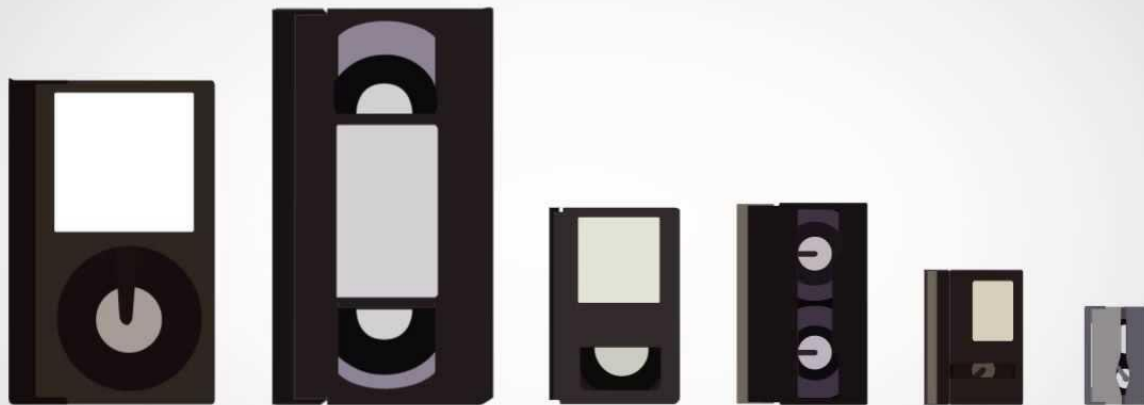
US quarter
for scale



Vox

TAPE FORMATS

Size Comparison



Betamax

VHS/S-VHS

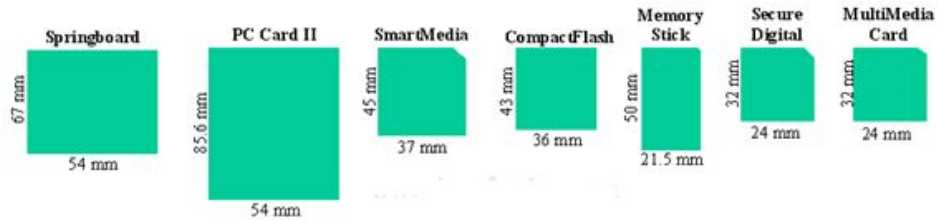
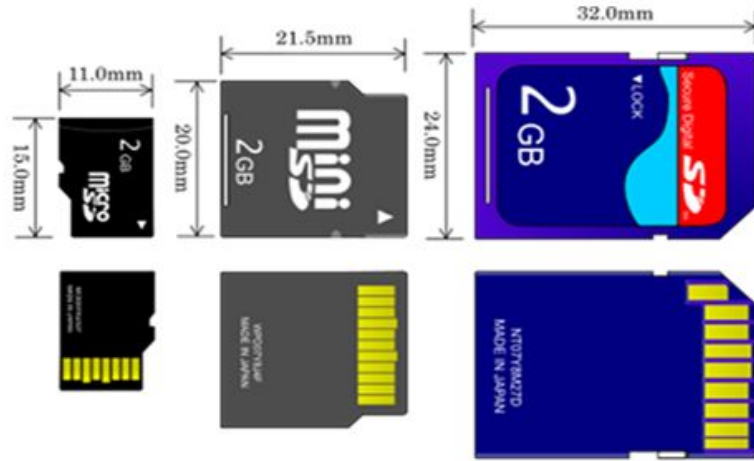
VHS-C

8mm






MiniDV

MicroMV

MEMORY CARDS



MEMORY CARDS

Card Type	 SD	 CF	 CFast	 XQD	 CFexpress (CFE)
Storage	Up to 2TB	Up to 512GB	Up to 512GB	Up to 2TB, possibly higher	Up to 2TB, possibly higher
Read/Write Speeds	50MB/s to 100MB/s common, theoretical limit 312MB/s	90MB/s common, limit 167MB/s	400MB/s to 515MB/s, upper limit 600MB/s	up to 400MB/s, newest card announced 1.4GB/s, *theoretical limit unknown	1GB/s to 8GB/s, *theoretical limit unknown

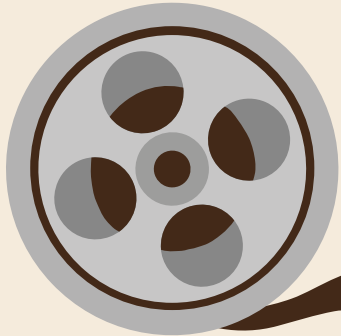
HDD-BASED (HARD DISC DRIVE) CAMERAS



DVD-BASED CAMERAS



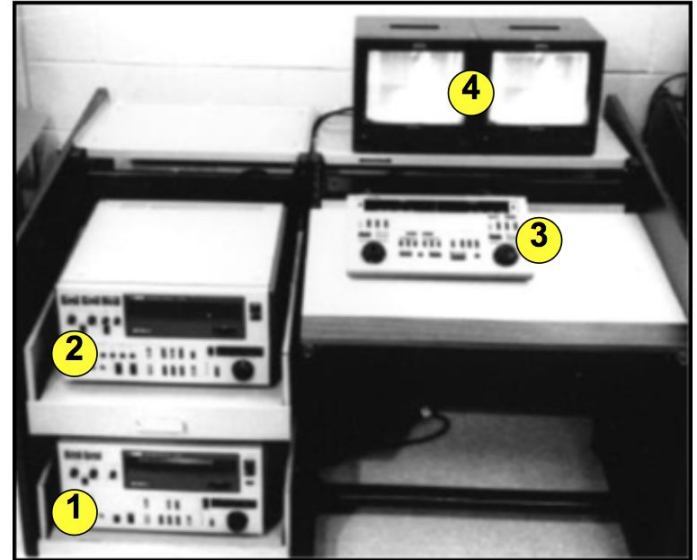
LINEAR EDITING



Linear Editing – “in a straight line.”

- 1 “Play” VCR, for source videotape.
- 2 “Record” VCR. Selected scenes are copied onto videotape using this VCR.
- 3 Editing control unit. A computer that controls both VCRs, setting “start” and “stop” points.
- 4 Monitors for VCRs.

Linear editing system (1987)



NON-LINEAR EDITING



Final Cut Pro

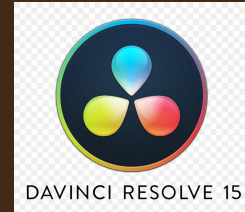
Macintosh OS Only
\$199



Adobe Premiere Pro CC

Adobe Premiere

Windows & Macintosh
OS
\$19.99/month



DaVinci Resolve

Windows, Macintosh, &
Linux OS
Free / \$299 Studio

FINAL CUT PRO



ADOBE PREMIERE

The screenshot displays the Adobe Premiere Pro 2017 interface. At the top, the title bar reads "Adobe Premiere Pro CC 2017 - C:\Users\mwm\pc\Documents\Adobe\Premiere Pro\9.0.360 vr sturf.prproj *". The menu bar includes "File", "Edit", "Clip", "Sequence", "Marker", "Title", "Window", and "Help".

The main workspace is divided into several panels:

- Source Panel (Top Left):** Shows the source clip "Samsung Gear 360.MP4" with a 360-degree fisheye preview.
- Program Panel (Top Right):** Shows the output sequence "Nikon KeyMission 360" with a 1080p HD preview of a lake scene.
- Timeline (Bottom):** Displays a multi-track editing interface with video tracks V1, V2, A1, A2, A3, and an audio track. A clip "Nikon KeyMission 360.MP4 [V]" is visible on the V1 track, and "Samsung Gear 360.MP4 [V]" is on the V2 track. The timecode is 00:00:34:19.
- Media Browser (Bottom Left):** Shows a file tree with folders like "C:\", "D:\", "F:\", and "I:\", and video clips from "Nikon KeyMission 360" and "Samsung Gear 360".

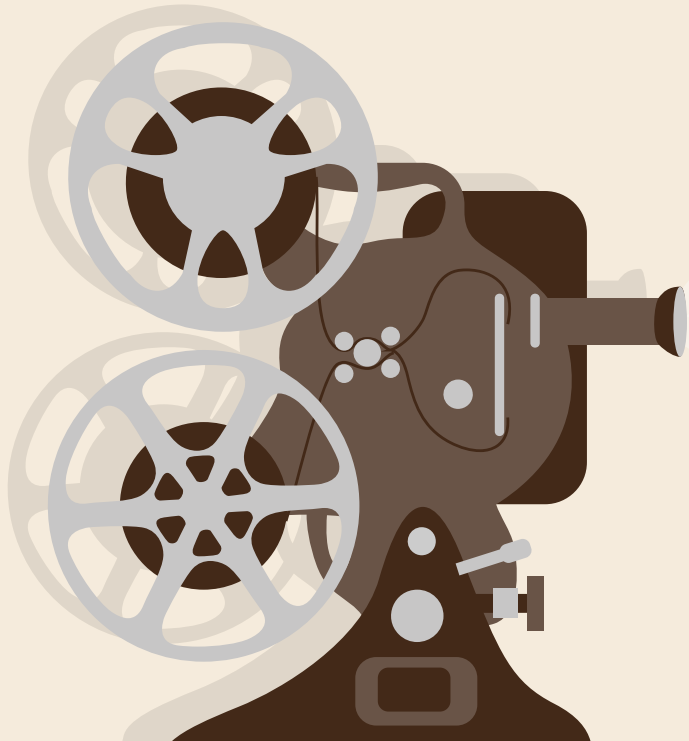
The Windows taskbar at the bottom shows the system time as 3:56 PM on 2/14/2017, along with various application icons including "Ask me anything", "Adobe Premie...", "Preset and cus...", "OODI (F)", "inbox - Ziffdav...", "Snagit Editor ...", "Edit - Mozilla ...", "Adobe Premier...", "Slack - ZDT", and system tray icons.

DAVINCI RESOLVE



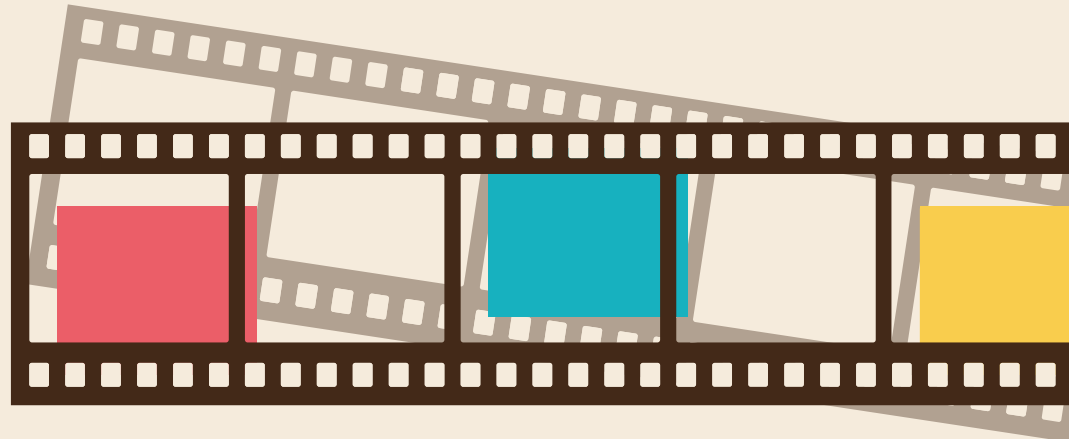
FILM-BASED LINEAR EDITING

The oldest form of editing your movie, but still currently used in the industry as well as some college programs

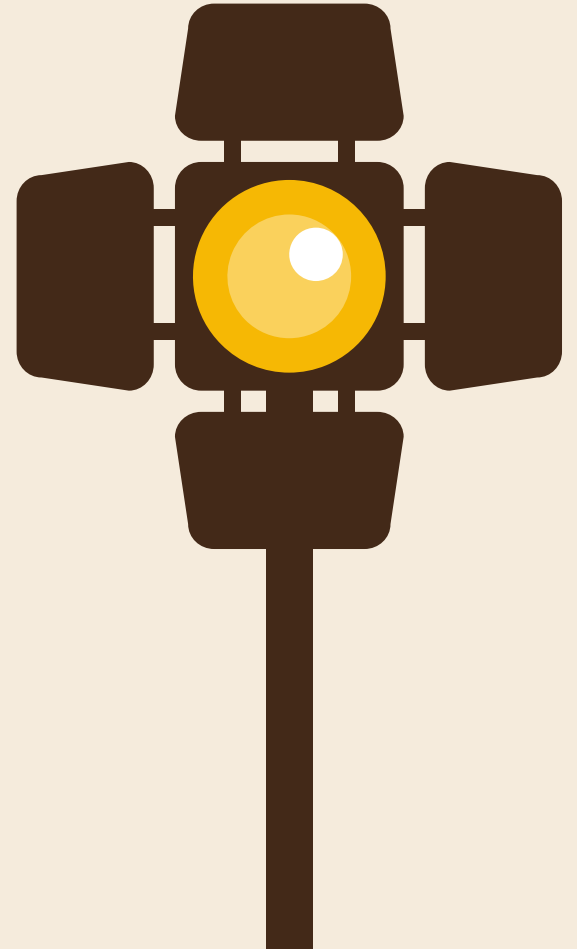


THE CAMERA . . .

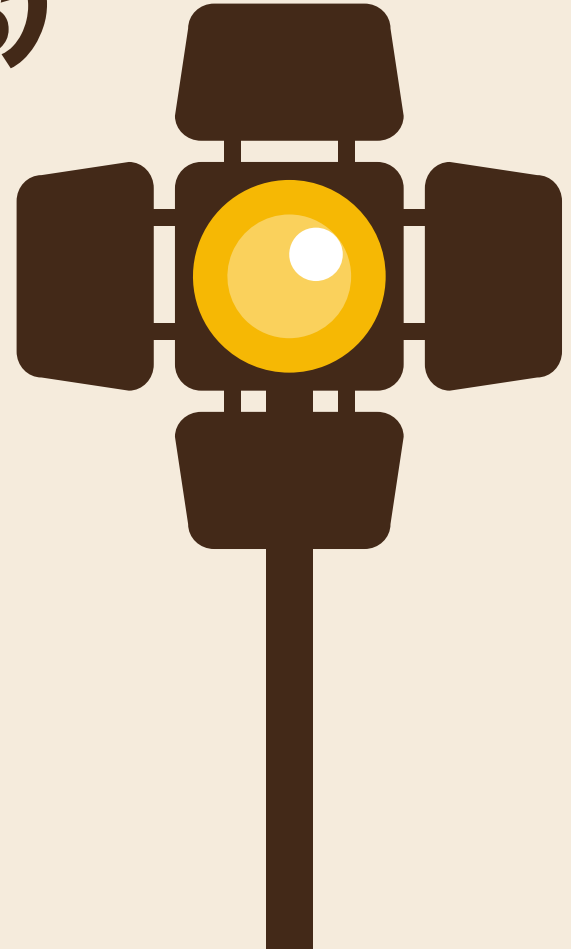
For now, just remember that there are many different reasons that a filmmaker might choose which camera to use. It could be based on quality, style, cost, and/or availability.



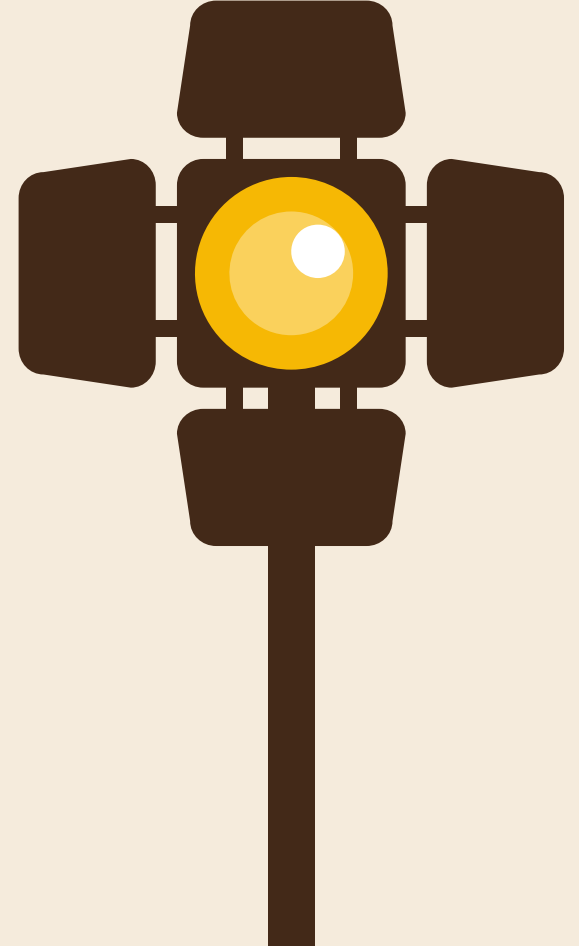
FLIP ULTRA



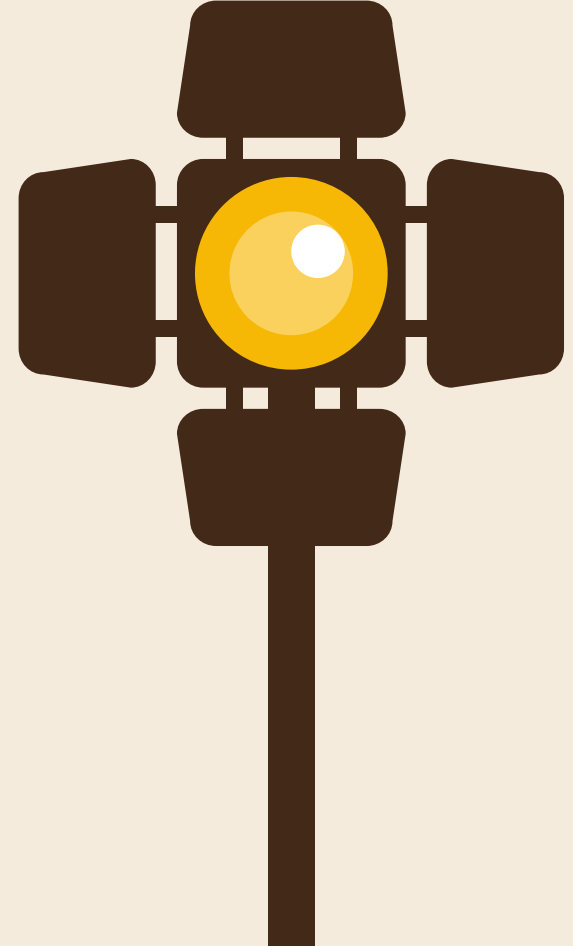
VIVITAR DVR (REPLACING SOME FLIPS)



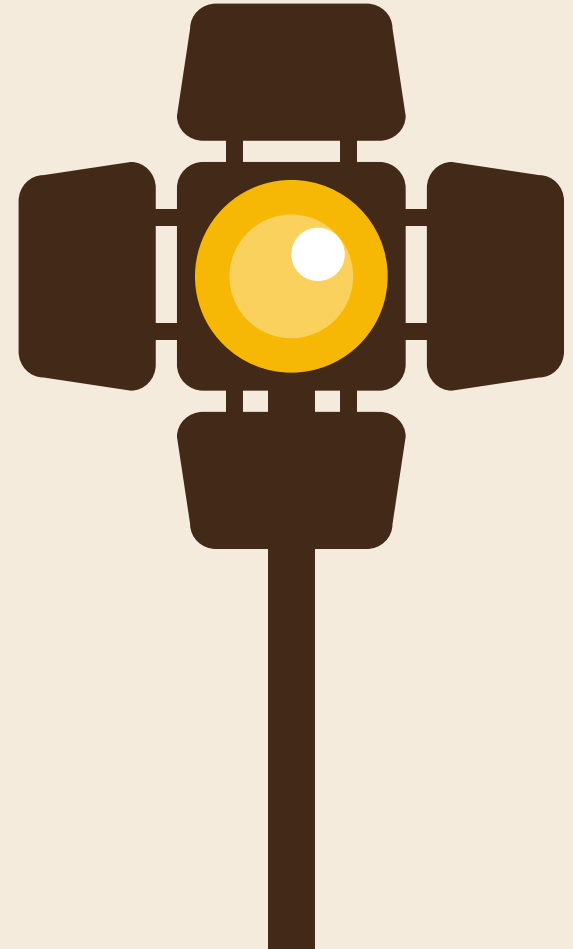
CANON HV20



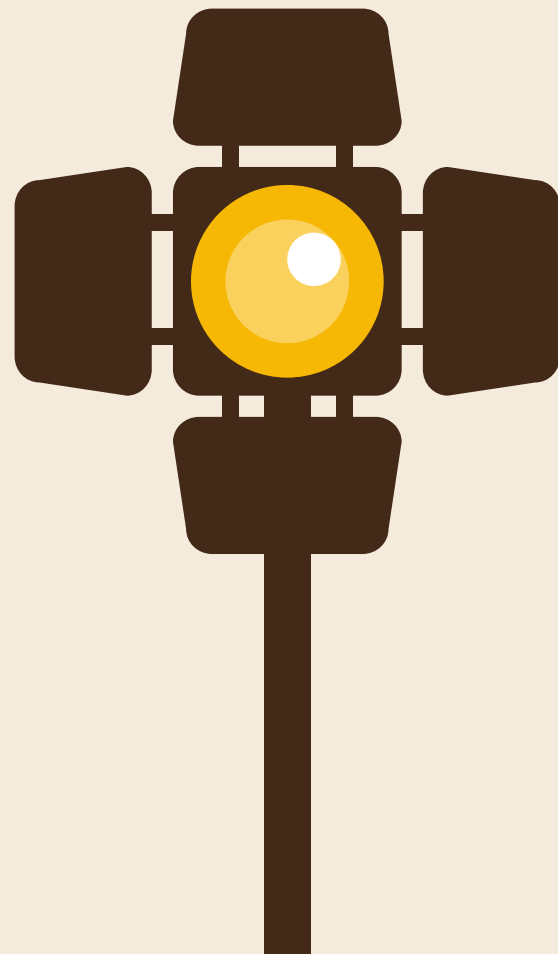
CANON VIXIA HF-R800



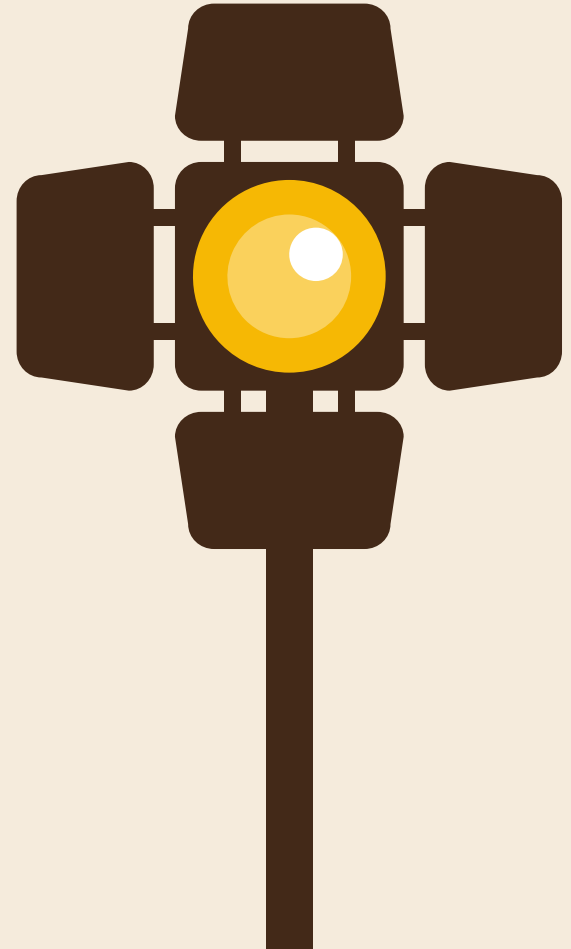
CANON XL-1



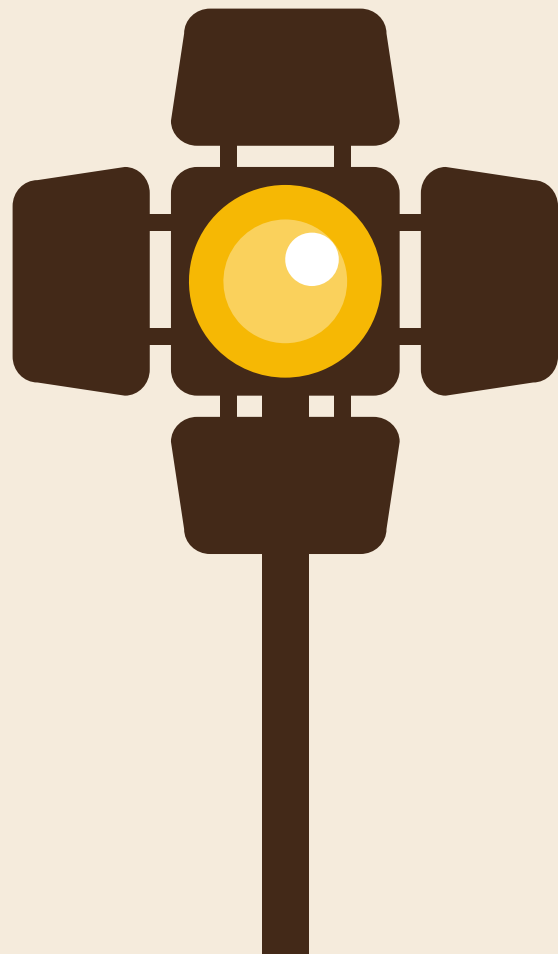
PANASONIC DVX-100



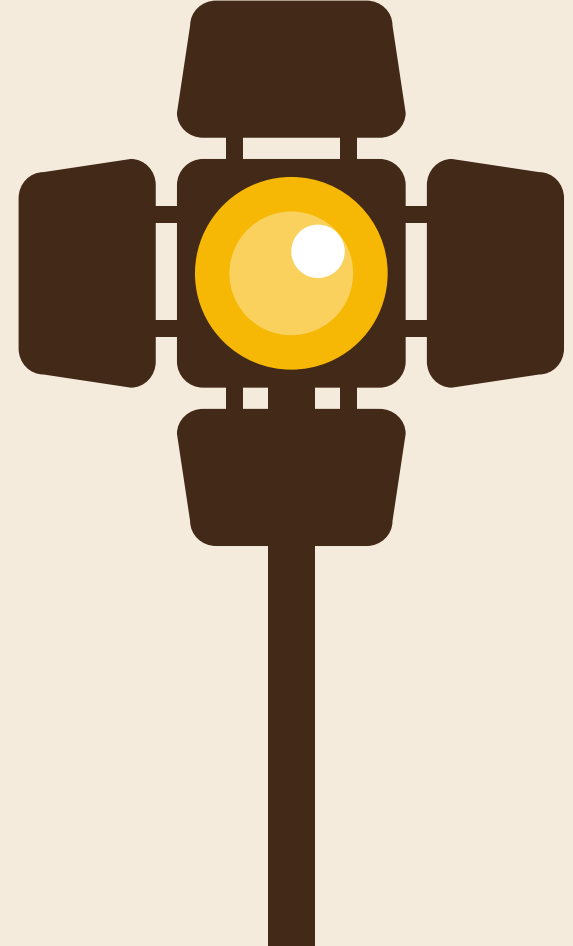
PANASONIC AG DVX200



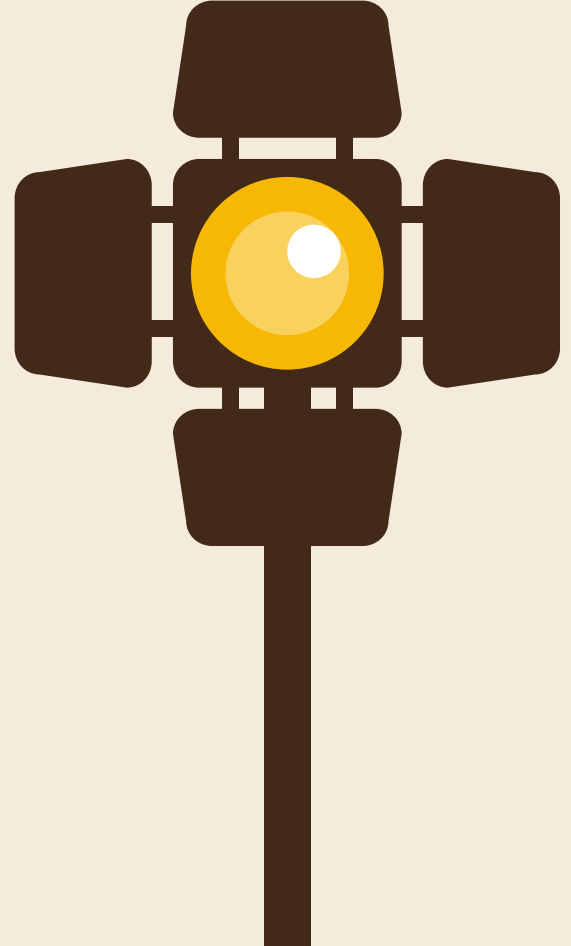
CANON DSLR BODIES



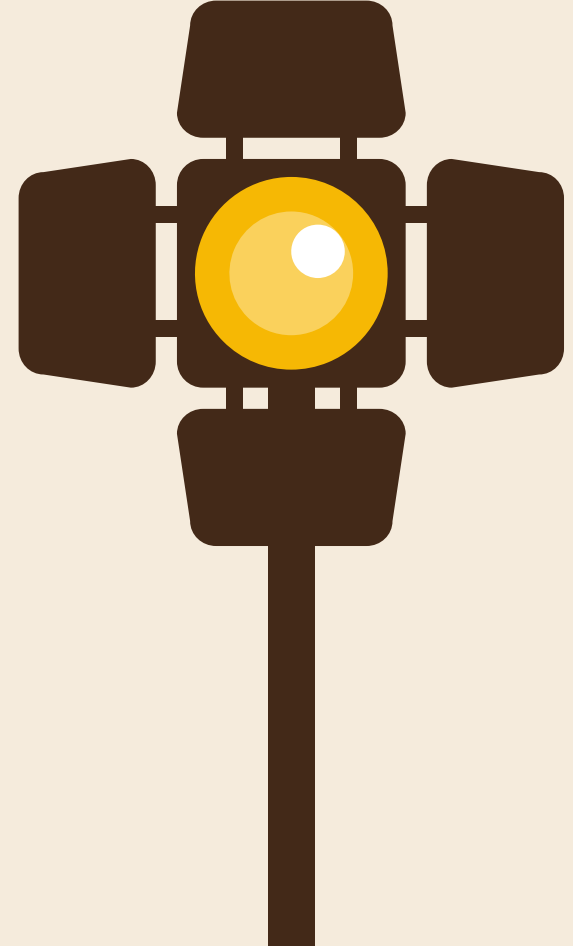
BLACKMAGIC PRODUCTION 4K



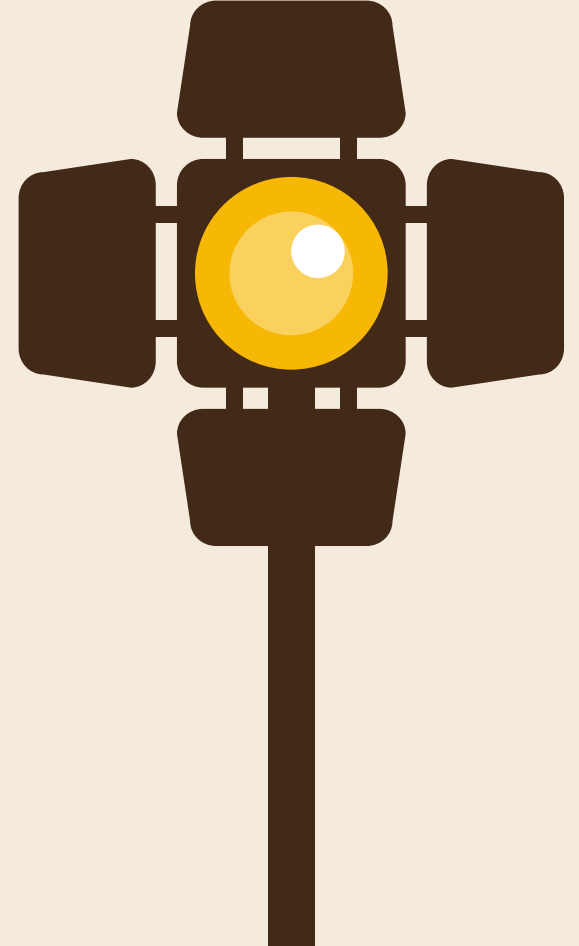
BLACKMAGIC URSA MINI 4K



THIS CAMERA MIGHT SEEM SIMPLE



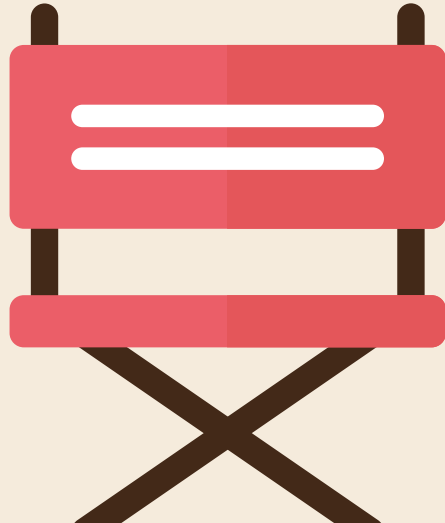
IT'S ALL ABOUT HOW YOU USE IT



EVERY CAMERA MUST HAVE THESE 3 THINGS:

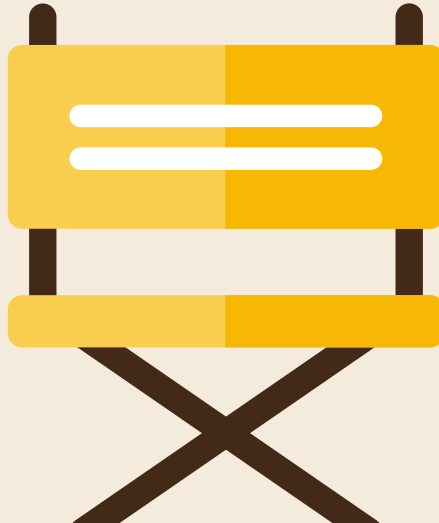
Lens

Allows light in and determines the angle of view. Focuses image onto the pick-up system.



Pick-Up System

Converts an optical image to an electronic signal. Maintains overall constant amount of light.

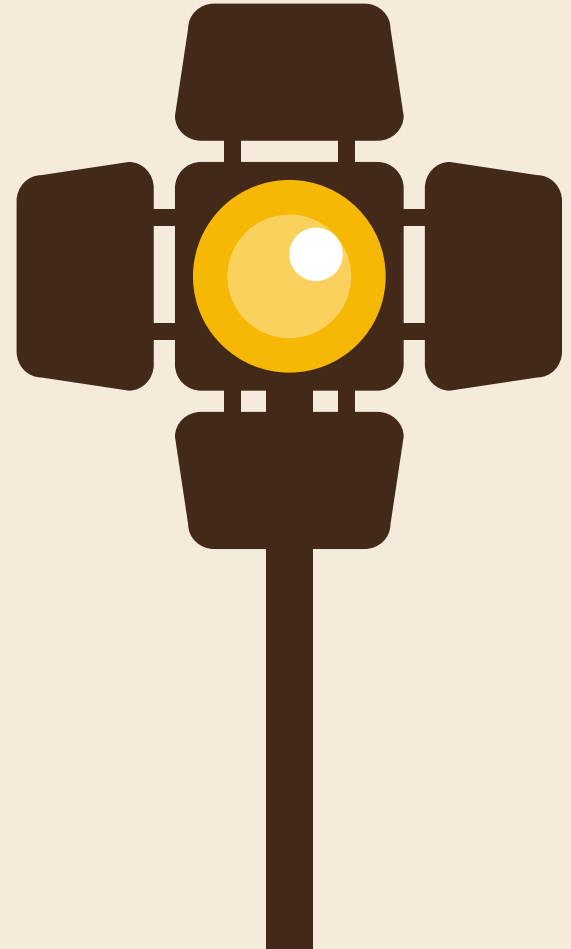


Color Control System

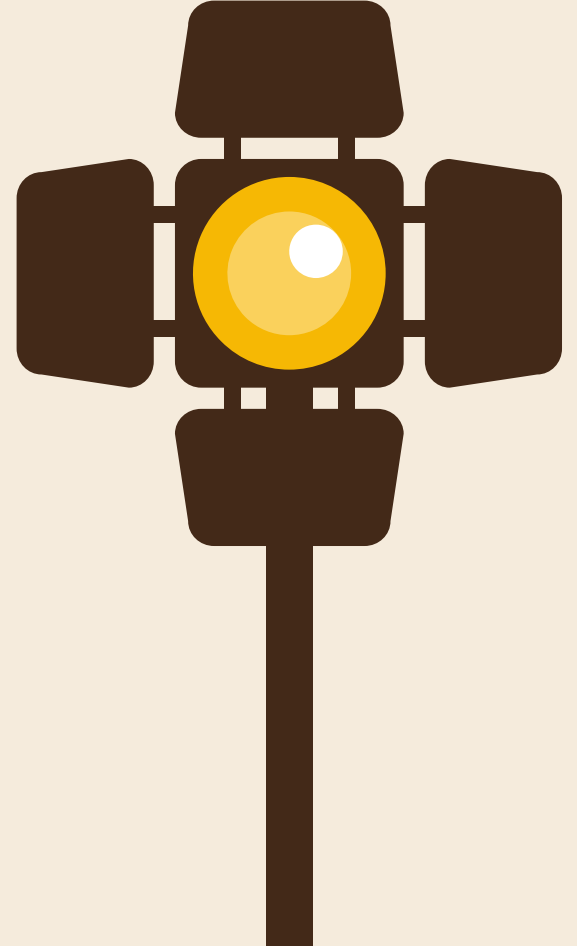
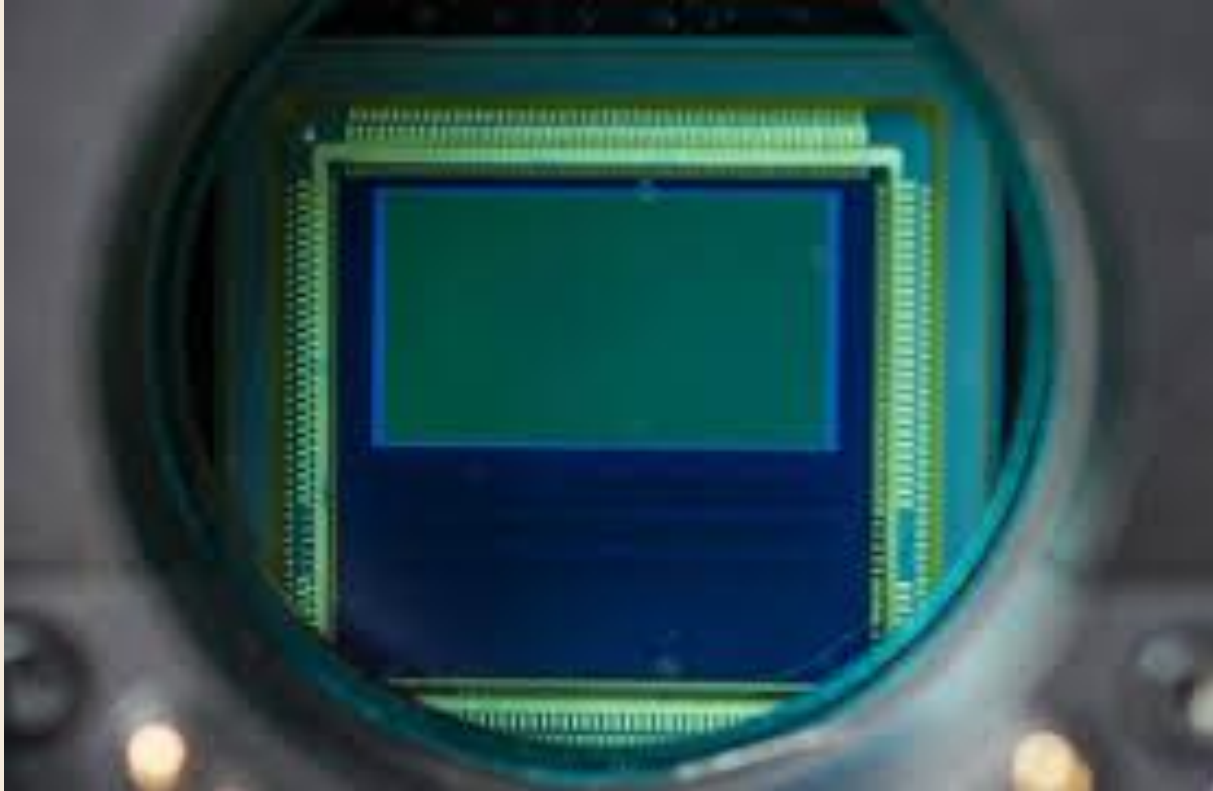
Adjusts (or allows for the adjustment of) white balance & color levels.



BLACKMAGIC PRODUCTION 4K



CMOS SENSOR IN BM PROD 4K



MORE JARGON THAT'S IMPORTANT RIGHT NOW



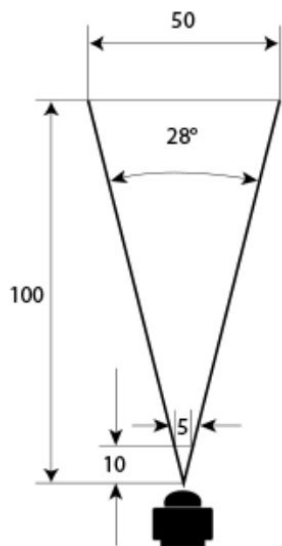
Aperture: The variable opening inside a lens that regulates the amount of light available to the camera. (AKA: iris)

MORE JARGON THAT'S IMPORTANT RIGHT NOW



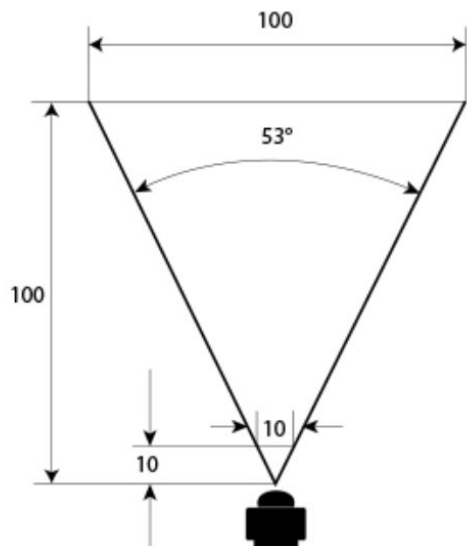
Focal Length: Refers to a lens' field of view (sometimes called “angle of view”, which is the width and height of the area that a particular lens can capture.

LET'S COMPARE THE ANGLE OF VIEW



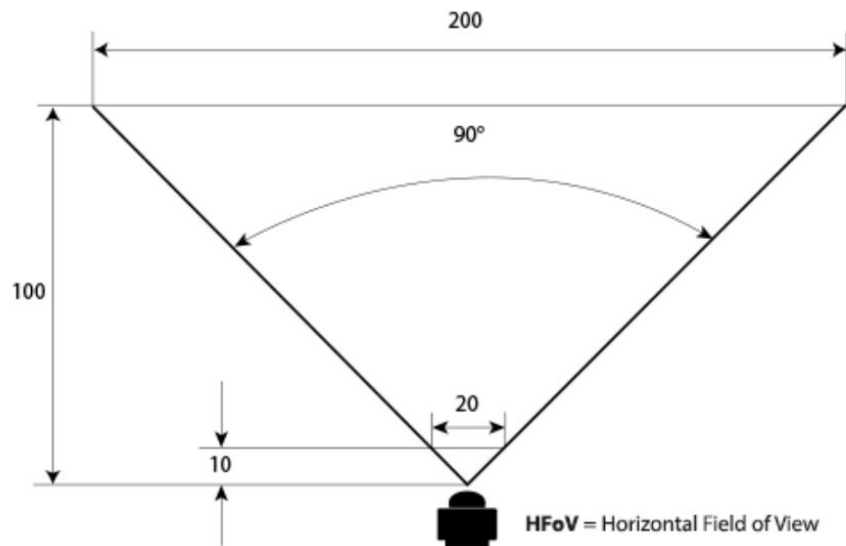
Ex. 2:1 Ratio - 28° HFoV

At 10ft away you would see 5ft from left to right
At 100ft away you would see 50ft from left to right



Ex. 1:1 Ratio - 53° HFoV

At 10ft away you would see 10ft from left to right
At 100ft away you would see 100ft from left to right



Ex. 1:2 Ratio - 90° HFoV

At 10ft away you would see 20ft from left to right
At 100ft away you would see 200ft from left to right

HFoV = Horizontal Field of View

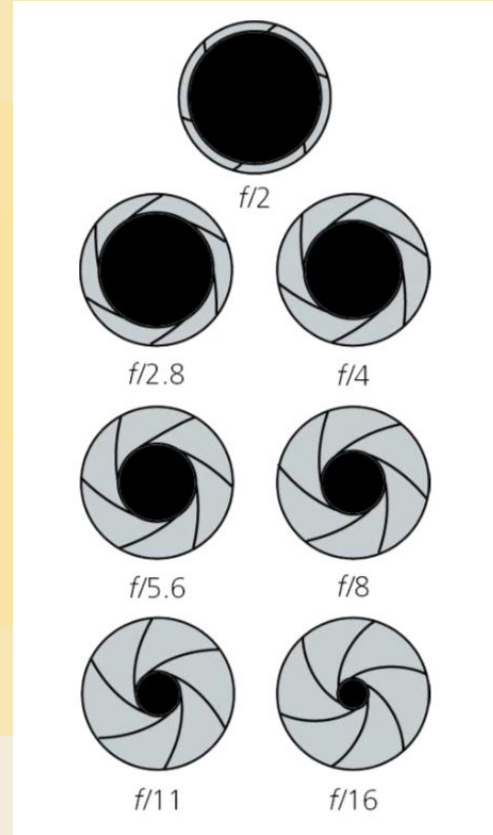
NOW, LET'S LOOK AT LENSES

Aperture: The aperture is the opening in which light is allowed to come in. Normally, the aperture is adjustable so that you can vary the amount of light that comes in and reaches the sensor.



NOW, LET'S LOOK AT LENSES

The f-stop number is determined by the focal length of the lens divided by the diameter of the aperture. The aperture also affects Depth of Field. *Smaller f-stop # equals less depth of field.*



DEPTH OF FIELD CAN CHANGE BASED ON THE APERTURE OF YOUR LENS

Depth of Field at f/1.8



Depth of Field at f/8



Depth of Field at f/22





TYPES OF LENSES

Normal Lens - Field of View about 25°
(typically a 50mm focal length lens)

Wide Angle Lens - Field of View greater
than 25° (18mm - 45mm focal length lens)

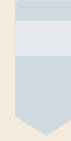
Telephoto Lens - Field of View smaller than
 25° (70mm - 150mm focal length lens)

PROS



NORMAL LENS

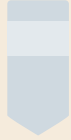
CONS



- **Natural Perspective**
- **Less of the shot will be in focus than with a wide angle lens.**
- **More of the shot will be in focus than with a telephoto lens.**
- **Medium Depth of Field**
- **Smooth/Natural camera movement**

- **Not enough width coverage in tight spaces.**
- **Can't get close enough to the subject because of obstacles**

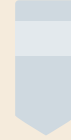
PROS



- Distant subjects brought closer/made larger in the frame.
- Less of the shot is in focus (shallow depth of field)
- Can get closer shots of inaccessible subjects.

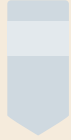
TELEPHOTO LENS

CONS



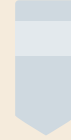
- Space can seem compressed.
- Camera movement is exaggerated.
- Makes hand-holding a camera more difficult due to shakiness.
- Focus is very sensitive due to shallow depth of field.

PROS



WIDE ANGLE LENS

CONS



- Good for cramped areas.
- Makes hand-holding a camera easier due to less shakiness.
- More of the shot is in focus due to deep depth of field.
- Focusing is less critical due to deep depth of field.

- Space can seem exaggerated.
- Can distort a subject's (facial) features.
- Subjects appear smaller or further away in the frame.



01. QUESTIONS ABOUT JARGON

Do you have any questions about the jargon used today?

02. QUESTIONS ABOUT FORMATS

Do you have any questions about media formats?

03. LINEAR VS. NON-LINEAR

Do you have any questions about linear or non-linear editing?

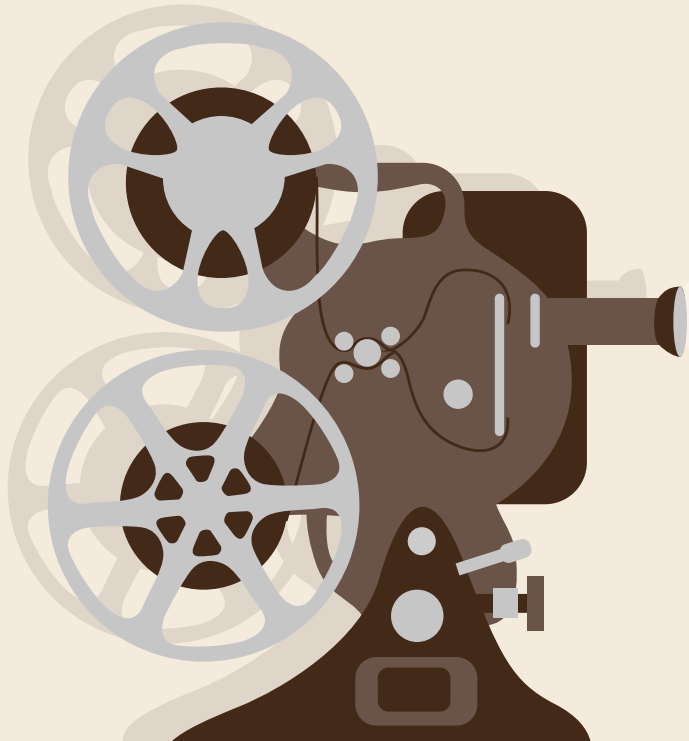
04. CAMERAS & LENSES

Do you have any questions about cameras or lenses?

QUESTIONS

SLIDESHOW BACKGROUND

CREATED BY



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ABOUT US

PW & Mrs. Janda teach Video Productions, Studio Broadcast Productions, and Animation at Granada High School in Livermore, CA.

