

# Camera, Lighting, Audio & Post Basics

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## Basics of Cinematography

### Introduction

Cinematography is the primary language of the motion picture. It is a visual language, and when learned and practiced it is a wonderful means of effortless and seamless experiential communication that engages every sense and emotion, yet remains invisible, rarely drawing attention to itself.

A motion picture is primarily visual, and an understanding of the basics of shot selection, camera movement and sequence structure is as important as the understanding of story itself.

This language is made up of simple building blocks, like words, vocabulary that when strung together into sequences form deep emotional connections to your characters and events.

The ONLY means your audience has to experience your story is through a single camera lens. Therefore, where you choose to place that lens, frame your subject, and follow action directly affects the story your audience are experiencing. You may have a story in your mind, you've written it, but your audience has no connection to your inner thoughts, they cannot read your mind. You have to take them on a journey of discovery. This visual language is the only thing that can make sure your audience experiences the story you intend them to.

Every shot must be designed, deliberate and intentional. No shot is accidental, what a shot chooses to reveal to the audience must be carefully planned and mapped out in a storyboard.

### Basic Shots

There are three basic shots, and everything else, from choice of shot angle to camera movement are modifiers to these shots that effect how the audience perceives and experiences what you are showing them. These are the Wide Shot (WS), the Medium Shot (MS) and the Close Up (CU), I've separated out the Extreme Close Up (XCU) and Insert Shot, although they can be thought of as sub-types of Close Up shot for the purpose of simplification.

#### The Wide Shot

Wide shots are used to create a sense of context, usually by placing or revealing a subject within a larger environment for a particular scene. This establishes a foundational layer of understanding for the audience.

It can be a grand large scale establishing shot, emphasizing a sweeping location around a subject (making them appear small), or it can be simply a room, or even a couch in a room where a discussion is about to take place. The size of the location doesn't matter, but a wide shot will show your subject, or subjects within all, or at least a large part of their location.

You only give the audience what they need. If the action of a entire scene is set around a dining room table, your wide shot doesn't necessarily need to show the entire dining room and adjoining kitchen, unless that information is important to the scene (such as

action will spill from the table into this adjoining space), or perhaps it is necessary to establish where this scene is taking place in relation to a space you are setting up for the next scene. Show what you need to show, what you choose to frame must be deliberate and meaningful.

### **The Medium Shot**

The medium shot is more personal, it's clearly about the subject more than what's happening around them. For example a medium shot is the most basic building block of the over the shoulder "tick tock" between two people conversing at a table.

A medium shot can also be a two shot, close enough to frame a couple from the waist up, or a subject climbing out of a car.

A medium shot is comfortable. It mimics what the audience would naturally see with their eyes if they were within normal distance of the action.

### **The Close Up**

The close up is very personal, it is a subject speaking intensely or a dialogue or emotional reaction that needs to be emphasized.

### **Extreme Close Up**

The extreme close up is an extension of the close up, it can be used to make the audience feel uncomfortably close to a subject.

### **Insert Shots**

An insert shot is an important cut-away or detail shot of a subject picking something up, or handing something to someone. It is something specific you want to show the audience.

### **Low Angle**

A low angle shot can be any of the types of shot, but shot from below, in that the camera is angled upwards toward the subject. This gives the subject a towering or dominating appearance. For example in a scene where a office worker is sitting at a desk and his mean boss stands over him, the shot of the boss would be taken from the perspective of the sitting employee, from below, this would be a low angle shot.

The audience would immediately associate certain ideas about the boss, that he is oppressive.

A wide shot (establishing shot) of a large corporate skyscraper from the road would be a low angle shot, perhaps emphasizing the oppressive nature of the corporation.

### **High Angle**

A high angle shot is the opposite of a low angle shot, and is used to make the subject appear small and insignificant. In the example given, the shot of the employee from the boss' perspective above him would be a high angle shot.

This would give the audience a impression that the employee is being oppressed, perhaps they might sympathize with him, this could be setting up a tension between these two characters that comes to define the story.

If the employee and boss were on equal or friendly terms, the employee might stand up, and the shots of them both would be at eye level. The choice of how to frame this interaction is all about what you are communicating about the subjects and their relationship with each other.

If not particularly high, or low angle, the basic axis of any shot is at the eye level of your subject.

## Camera Movement

### Pan & Tilt

Moving the camera's lens up or down while keeping its horizontal axis constant. Nod your head up and down - this is tilting.

Moving the camera lens to one side or another. Look to your left, then look to your right - that's panning.

### Pedestal

Moving the camera up or down without changing its vertical or horizontal axis. A camera operator can do two types of pedestals: pedestal up means "move the camera up;" pedestal down means "move the camera down." You are not tilting the lens up, rather you are moving the entire camera up. Imagine your camera is on a tripod and you're raising or lowering the tripod head (this is exactly where the term comes from). This movement requires a crane or jib arm.

### Dolly

Motion towards or motion from. The phrase dolly-in means step towards the subject with the camera, while dolly-out means to step backwards with the camera, keeping the focal length constant. A dolly is usually a large, heavy wheeled platform that runs on precisely leveled tracks, tracks can be straight or curved sections, assembled as long as needed for the shot.

### Truck

Trucking is like a dolly shot and utilizes the same equipment, but it involves motion left or right. Truck left means "move the camera physically to the left while maintaining its perpendicular relationship." This is not to be confused with a pan, where the camera remains firmly on its axis while the lens turns to one direction or the other. You might truck left to stay with a pedestrian as she walks down a street.

### Stabilized (Steadicam or Gimbal)

A stabilized free moving shot gives the impression of floating through space, unattached. Two means of stabilizing a free moving shot are a Steadicam or more recently electronically stabilized gimbals. Steadicam equipment has been used for decades, whereas gimbals have traditionally been mechanical (gyroscopic), large, heavy and used for helicopter and aerial work physically mounted to the aircraft. Today's gimbal stabilizers are compact, lightweight, easily held and operated by one person, or two if remote secondary camera movement is needed. Such Gimbals are often found mounted under radio controlled drones but are also hand held stabilizers.

### Hand Held

The camera is held by hand, or given the appearance of being hand-held, and in many cases shots are limited to what one photographer could have accomplished with one camera. "Shaky cam" is often employed to give a film sequence an ad hoc or documentary film feel. It suggests unprepared, unrehearsed filming of reality, and can provide a sense of dynamics, immersion, instability or nervousness.

## Framing and Composition

Composition rules and conventions are older than cinema and photography. Most of the concepts in this page have been used for hundreds of years in painting.

### Aspect Ratio

Aspect ratio is the ratio of your frame height to width. It can have a considerable impact on the overall style and aesthetic of your film as well as your framing and composition.

The most common aspect ratio for cinema is “CinemaScope” or “Scope” which these days refers generally to any aspect ratios of 2.35:1, 2.39:1 or 2.40:1.

The standard for HD and Ultra HD television is an aspect ratio of 1.78:1 (or 16:9), termed “Widescreen”.

### Lead Room

If a character is looking frame left, then he should be positioned frame right. This makes the framing comfortable because the subject is looking at the open space in front of him. This open space is called lead room or lead space.



The Lead Room is the space in front of where the actors are looking. In this shot from *Butch Cassidy and the Sundance Kid* (1969), the lead room is on the left side of the frame.

### Rule of Thirds

Another basic composition notion is the Rule of Thirds. To follow it, you have to imagine the frame with two vertical lines and two horizontal lines, thus creating three vertical sections of the same dimensions and three vertical sections also of the same size.

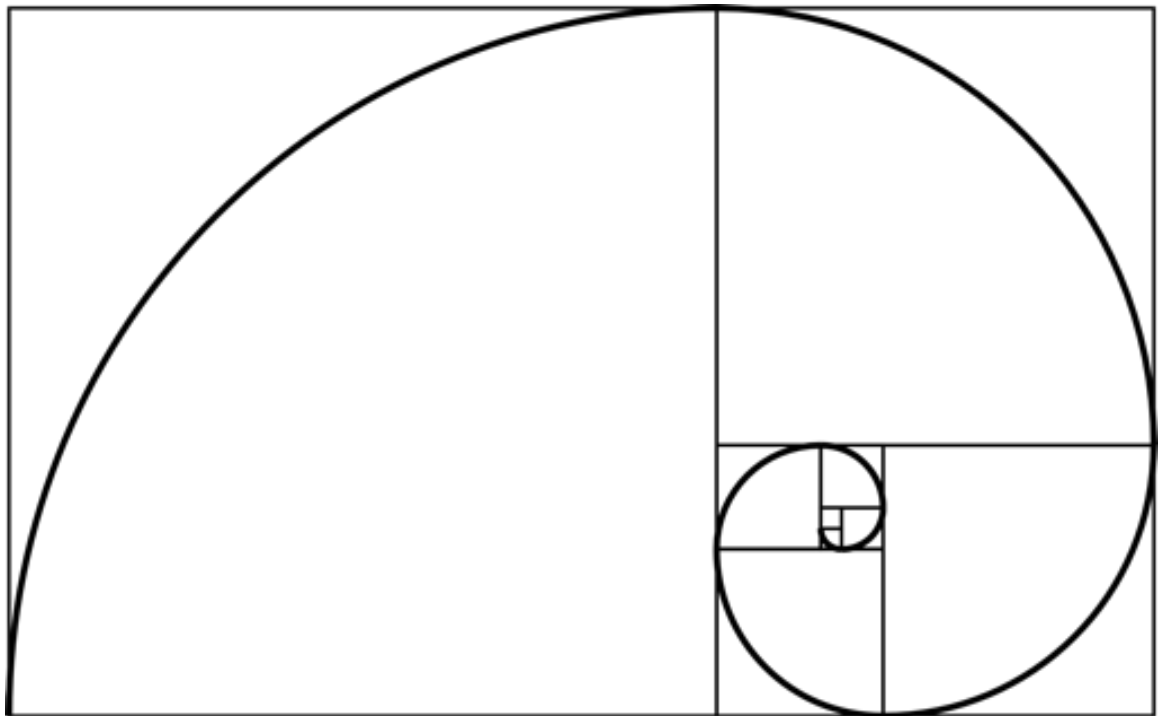


Example of Rule of Thirds in *Rear Window* (1954).

The intersections of the lines are points of interest, where important objects are placed in the screen. These points of interest are comfortable to the eye, thus the middle portion of the frame are sometimes kept “empty” or clear.

#### The Golden Mean

Another rule that takes this further to create astonishingly balanced and beautiful compositions is what is known as The Golden Mean or The Golden Ratio, a ratio which is very prevalent in nature and natural proportional relationships.





With practice and experience, this kind of composition comes naturally and automatically when framing a shot. Many artists with a natural sense of composition will frame to these rules without even knowing they are doing it.

### Static Composition

Compositions with the majority of lines being horizontal and/or vertical are called Static Composition. In theory, horizontal and vertical lines are somewhat soothing, calm, and tranquil.



In a Static Composition, most of the lines are horizontal and vertical. This shot from *Hero* (2002) also illustrates a symmetric composition.

Notice how the the Emperor is not framed at any of the intersections of the Rule of Thirds. He is right in the midsection of the frame. The symmetry of the shot communicates the perfection of the palace and intensifies the situation. It is as though only a sacred or regal place could be so symmetrically perfect such as this.

### Dynamic Composition

When a composition has many diagonal lines it is called Dynamic Composition. The dynamism or excitement comes from the fact the diagonals are somewhat unsettling (as opposed to a static compositions that communicate peace and tranquility).



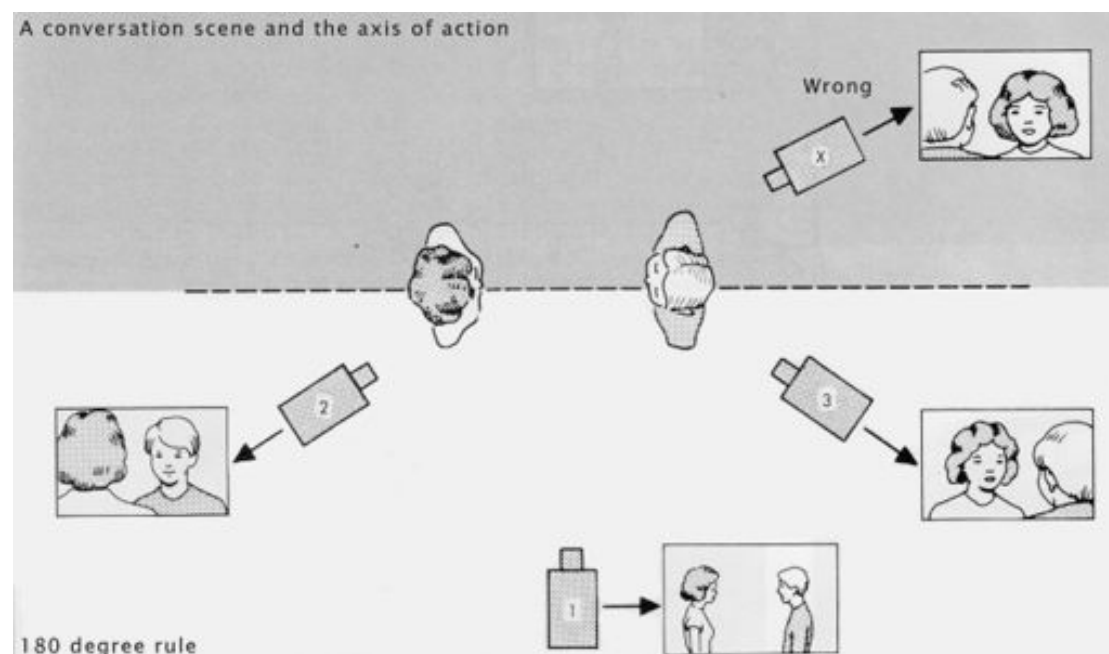
An overhead angle makes this a Dynamic Composition. Notice the predominance of diagonals on both the floor and wall. *Final Flight of the Osiris* (2003)

As shown in the example above, one easy way to make shots dynamic is with an ultra high camera angle looking down at the subject. Depending on how camera is positioned, the natural lines of the environment will look diagonal.

## 180 Degree Rule

The 180-degree rule of shooting and editing keeps the camera on one side of the action. As a matter of convention, the camera stays on one side of the axis of action throughout a scene; this keeps characters grounded compositionally on a particular side of the screen or frame, and keeps them looking at one another when only one character is seen onscreen at a time.

The technique allows for an expansion of the frame into the unseen space offscreen. It is referred to as a rule because the camera, when shooting two actors, must not cross over the axis of action; if it does, it risks giving the impression that the actors' positions in the scene have been reversed.



## Sequences

Sequences are the primary building blocks of scenes, and are constructed from individual shots. There are a few rules to planning sequences that are easy to understand and follow.

### Opening Shot

A Sequence will usually either begin with a wide shot establishing the subject and location, or it can begin with a close-up where the subject is introduced first, with the intention that the location will be revealed in a subsequent wide shot.

The subject may already be in the frame, or may enter the frame either by physically moving into a static composition, or by means of camera movement, such as a pan, tilt, or trucking shot.

### Shot Order

No two shots of the same type from the same angle should ever be cut together. So you can't cut from a medium shot to another medium shot from the same general angle or position. This results in a jump cut.

Instead sequences are constructed to progress from WS to MS to CU, or from CU to MS to WS. A WS can cut directly to a CU or CU to WS in some cases depending on the action involved.

A MS can cut to a MS if the angle or camera position changes substantially, such as in two over the shoulder shots of a conversation at a table.

A sequence that is made entirely from a single shot will be designed to follow these rules in planning the path of the camera movement and action within the scene.

## Blocking

Blocking was originally a theater term that refers to the positioning and movement of the actors in the stage. In cinema, camera and lights are added to the equation.

Blocking is an essential part of scene and sequence design, storyboarding and rehearsal as it is essential that the actors and camera operators know how they will move on the set and how the scene will be lit.

This is all decided in pre-production so that principal photography runs like clockwork. A film set should be a well oiled machine, everything decided well in advance.

Sketching floor plans are a good way to see the overhead layout of a scene with actors and camera positions. Floor plans are quite convenient when shooting a scene with an elaborate setup with many actors and movements but are important for very simple scenes also.

Floor plans are often sketched before shots are decided and storyboarded. It allows a sequence of shots to be virtually edited together long before anything is shot, and changes are easiest to make at this stage. Once a scene is shot, it's often impossible to re-shoot to cover up any mistakes caused by lack of planning.

## Lenses

### Focal Length and Field of View

A camera lens focuses an image onto a camera sensor, or traditionally, a frame of motion picture film. There are a few types of lenses categorized by focal length. Focal length is the internal distance between the optical centre of the lens and the focal plane. The longer this distance, the smaller the angle of view (or more magnified). The shorter this distance, the wider the angle of view (less magnified).

A lens focal length is measured in millimeters.

Wide Angle: 10mm – 35mm

Normal Angle: 35mm – 70mm

Medium Telephoto: 70mm – 135mm

Telephoto: 135mm – 300mm+

### Prime Lenses

Prime lenses have a fixed focal length, wider aperture and are often preferred over zoom lenses.

### Zoom Lenses

Zoom lenses have a variable focal length, typically less wide aperture, used for convenience of having any focal length available without swapping prime lenses.

Zoom lenses are rarely used to change focal length within a shot. You will hardly ever see this in any film.

## Focus

Focus is incredibly important, a sharp image is critical and a soft or out of focus shot will never make it into the edit. Selective focus is the primary tool for directing a viewers attention through the action within a shot.

## Depth of Field

Depth of field is used to describe how wide or narrow the area of focus is. A shallow, or narrow depth of field is a defining factor of the “cinematic” look or style, as opposed to the very wide depth of field typical of the television or video style.

## Pulling Focus

Pulling focus is the art of precisely maintaining focus on a subject when the distance between the camera and subject is variable, or when focus needs to shift from one subject to another at different distances from the camera.

This is why cinema lenses are always fully manual lenses. There are no automatic cinema lenses and no such thing as auto-focus in professional cinematography.

A follow focus is used to provide precision focus control and a means of marking specific focus points that have been measured and set up before camera rolls.

# Camera

## Introduction

In order to get the best results from any digital cinema or digital video camera, I’ve outlined some basic knowledge you need to be familiar with and able to use correctly.

## Camera Settings

These are the basic camera (and lens) settings to check before you shoot.

### Frame Rate

The most common frame rate for theatrical cinema is 24fps, however other frame rates are possible and conversions for different television standards is common. Choosing a base frame rate of 24p or 25p will suit most deliverables for cinema and PAL television standard countries. Conversion for NTSC countries is possible.

For special slow motion sequences you may choose to shoot at higher frame rates if your camera offers them. Most slow motion is shot between 120fps and 240fps.

### White Balance

The white balance is set to tell the camera what light color temperature to consider as “true” white in your scene. Many types of light source can appear white to the human eye because our brains automatically adjust, however a camera must be told if the color of the light in your scene is warm (yellow) or cold (blue).

Color temperature is measured in absolute degrees Kelvin, and is the color associated with the wavelength of light emitted by an ideal black body at the corresponding surface temperature. The sun or a typical tungsten filament light bulb more or less approximate a ideal black body.

1,700K: Match flame, low pressure sodium lamps.

1,850K: Candle flame, sunset / sunrise.

2,700-3,300K: Incandescent lamps.  
3000K: Soft (or Warm) White compact fluorescent lamps.  
3,200K: Studio lamps, photo floods.  
3,350K: Studio "CP" light.  
4,100 – 4,150K: Moonlight.  
5000K: Horizon daylight.  
5000K: Tubular fluorescent lamps or cool white/daylight compact fluorescent lamps.  
5,500-6000K: Vertical daylight, electronic flash.  
6,200K: Xenon short-arc lamp.  
6,500K: Daylight, overcast.  
6,500-10,500K: LCD or CRT screen.  
15,000 – 27,000K – Clear blue poleward sky.

## Aperture

Aperture is actually part of the lens, not the camera, but it is essential to understand how it relates to exposure and depth of field.

A aperture is a hole or opening, and in a lens this is the iris, which is a variable, mechanical opening allowing more or less light to pass through to the sensor. This directly affects the image exposure.

Aperture is measured in increments called f-stops, or in cinema, T-stops which are more accurate as they are corrected for light lost in the lens due to absorbance and reflectance. F-stops express the ratio of focal length to apparent lens aperture. In practice f-stops have discrete values: f/1.0, f/1.4, f/2.0, f/2.8, f/4.0, f/5.6, f/8.0, f/11.0, f/16.0, f/22.0

Reducing the f-stop of a lens (increasing it's aperture) has three effects:

- \* more light goes through the lens, increasing the **exposure**;
- \* the **depth of field** decreases, making the background more blurred;
- \* the overall **sharpness** of the image decreases, and chromatic aberration is enhanced.

The third effect is the primary reason most lenses perform best with the aperture slightly off its widest f-stop. For instance, a f/1.4 lens will actually produce its best image with aperture between f/2.8 and f/8.0.

## Shutter Speed / Shutter Angle

Shutter speed, like aperture, affects your exposure. Two things happen in the camera that determine how much light you are recording. Firstly is how much light the lens is letting in, and secondly is how long your sensor is exposed to that light.

In cinema, the standard shutter speed is half the frame rate. So if your frame rate is 24fps, your base shutter speed would be 1/48<sup>th</sup> second, or 180 degree shutter angle (180 degrees is half of 360 degrees).

In comparison to still photography, 1/48<sup>th</sup> second shutter speed is slow, but it allows just enough motion blur to make normal camera movements look smooth enough.

There are three main reasons for changing shutter speed. The first is to reduce or increase motion blur, the second is to increase or decrease exposure (but motion blur will always be affected), and thirdly is to compensate for the flicker of light sources running on a voltage frequency that is out of phase with your recording frame rate.

## ISO

ISO is an approximate measurement of a sensor's light sensitivity. A digital sensor ISO is fixed and cannot actually be varied. However a digital camera's ISO setting will simulate changing the sensitivity of the sensor by either amplifying or cutting the signal level from the sensor. Pushing an ISO rating above the sensor's native sensitivity will increase digital noise substantially and should be avoided.

## Video Format

The recording video format you choose is of importance when it comes to post production workflow and the overall quality of the image you are recording. Professionals shoot RAW, which means they are using cameras that record the pure unprocessed data directly from the sensor, however this leads to large amounts of data and many budget cameras don't record RAW.

So, when choosing a codec, if you have the choice, record with the least compression possible, at the highest bit rate and best color sampling available.

# Lighting

## Introduction

Lighting is the art of making every shot a visual treat for the senses. It should be your goal to make every shot a masterpiece, every frame a work of art.

This rarely happens with good framing and composition alone. Pointing your camera at a scene lit by whatever light happens to be falling on it does not often make memorable images.

There are exceptions with daylight exteriors, but even then available light needs a little help when it comes to lighting your subjects. This can be as simple as the use of scrims and reflectors, and carefully choosing the right time of day to shoot.

Useful iPhone apps:

Cine Meter II – Light Meter

LightTrac – Sun and shadow calculator

## Contrast Ratio and Dynamic Range

One of the most important concepts to understand in turning your vision for a scene into reality is lighting ratio. The lighting ratio determines overall contrast in your image and is the ratio between your key light, and your fill light.

Applying an understanding of lighting ratio to a particular scene requires knowing the limits of your camera's sensor (dynamic range) and lighting appropriately to make sure you have sufficient detail in your highlights, shadows and the contrast you want to see in the scene. The higher the dynamic range your sensor can capture, the more room you have to accommodate higher lighting ratios, such as in bright sunlight.

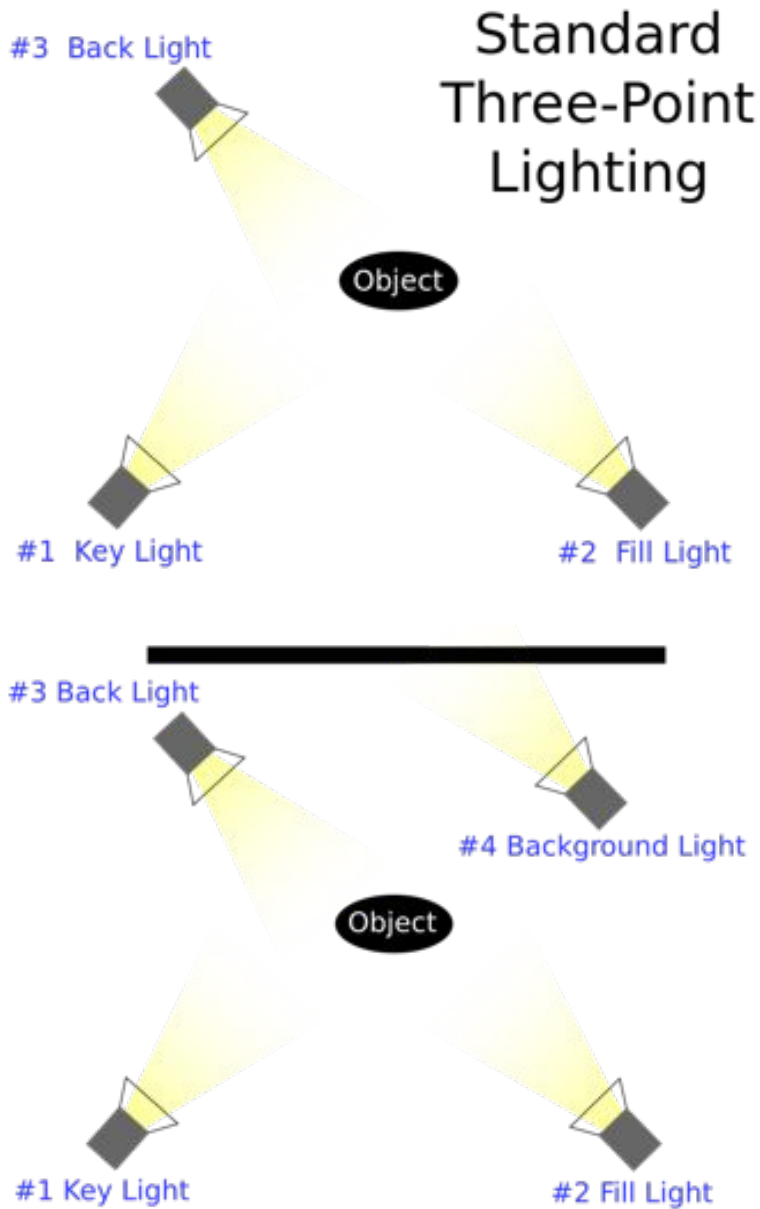
So, your key light determines the brightness of your highlights, the fill light determines the brightness of your shadows. The difference between them is lighting ratio.

## 3 Point Lighting

The first and most important light is the key light – this is usually the brightest and most dominant light of a setup.

Complementing the key is the Fill light, which is placed opposite of the key light to fill in some of the shadows left by the key.

The final light of the three point setup is the back light – this light adds an outline to separate the subject from the background.



The three point lighting setup is the basis of more complex lighting arrangements; there will always be a key light, fill and backlight and the directions of these lights are important when more than one light source is used for any particular purpose. Above is a four point lighting arrangement where a light source for the background has been added, it is from the same direction as the fill, and is in fact boosting apparent ambient light to make sure the background has sufficient detail and isn't lost in the shadows.

The back light however will still separate the subject from the background.

## Soft Fill Light / Hard Back Light



A popular technique in film lighting is to use a soft (diffuse) light source from the front as a fill light and a stronger, more directional light from the back, so that your subject has a hot edge.

Notice also how shallow the depth of field is in this shot, indicating a wide open aperture, which accentuates further the separation of the subject from the background.

### Practicals

Practical lights are any lights that are actually in frame in the scene, such as table lamps, pendant lamps, street lamps, or even a TV which is on, or any light sources that form part of the set design. This is another application where knowing your lighting ratio makes a big difference to the overall balance of your scene. Often bulbs in practical lights are swapped out for bulbs of lower wattage. For instance a 70W incandescent bulb is likely to appear overexposed in relation to everything else, so it may be replaced with a 40W bulb instead. Also keep in mind the color temperature of practical light sources compared to the color temperature of your main set lighting.

Practical lights offer opportunities to add mood, extra highlights, shadows and create depth within the scene.

### High Key

A high key lighting style refers to a low contrast ratio, where the difference in brightness between key light and fill light is low.

### Low Key

A low key lighting style refers to a high contrast ratio where the key light is unmistakably the brightest source of light, and fill light is substantially less bright, or in an extreme case may not even be present if completely black shadow areas are desired.

The classic example of low key lighting is the "Film Noir" style of the 1940's and '50's.



## Soft / Hard Light

The terms “soft” or “hard” light refers to the level of diffusion of the light source. A bare lamp head is a very hard light, producing highlights and shadows with hard well defined edges. Adding a diffusion filter or a scrim in front of the lamp will soften the light, creating softer highlights and shadows.

## Shadows

Creating specific areas or patterns of shadow may add depth and interest to a scene.

Cookies are cutouts of wood, metal, plastic, or anything that cast a patterned shadow – say like a venetian blind pattern. Cookies go between the light fixture and the subject. They’re available commercially in different patterns and it’s easy to make your own.

Very similar are Gobos – short for Go Before Optics. These are cutouts made of metal or glass that go inside the light fixture between a light source and a lens. These can cast a perfectly crisp shadow but require specialized lights that have projection lenses.

## Scrim and Reflectors

A scrim is used as a means to reduce the intensity of a light source without affecting its color temperature, as simply dimming the lamp will change the color of the light. A scrim is made from a fine mesh material stretched over a frame, they can be small or incredibly large.

A reflector can be silver, white or gold and is used to reflect or bounce light from another source in a different direction. A reflector can often be the fill source on a subject by bouncing light from the key light. An effective cheap reflector for this purpose is a board of expanded polystyrene.

## Mixing Colors

Mixing color temperatures is usually something to be avoided because only one color temperature can be considered true “white” in the scene. So any light sources warmer or cooler than the primary color temperature of the scene will appear to have blue or orange tint respectively.

Sometimes however this is used purposely.



The above still frame from Terminator 2 is an example of mixed lighting, this is also an example of a soft fill light from the front and a hot back light but no key light. The lack of key light in the case leaves a prominent shadow area between the fill and back light.

# Audio Recording

## Introduction

Audio recording on set or on location is all about capturing the cleanest audio possible for post production. Often times this is not possible and entire scenes have to be dubbed by the actors later.

Achieving a good separation of sound sources and recording each separately is the key to having the most control and flexibility possible in the audio mix. What you hear in the movie theatre is not what was recorded on set. It is a careful combination of clean dialogue recordings, natural and ambient sound, foley (sounds recorded under controlled circumstances in studio), sound effects and music.

These will all have to be delivered as separate “stems” from the final mix also.

## Equipment

A portable mixer and multi-track recorder are required for professional location sound, and any number of different microphones.

What many low cost cameras don't give you is decent sound recording. The attached microphones just are not equipped to give you anything but basic audio. Even if you purchase an external microphone to plug into the auxiliary jack, you will not be able to get proper placement of the microphone. In other words, the mic is simply pointing the same direction as the camera and from the same distance. This does not allow for control over sound recording.

Instead, you should purchase, rent, or borrow an external digital recorder such as the Zoom H4n / H5. You can even acquire equipment that will turn your iPhone or iPad into a field recorder, such as the RØDE iXY microphone to be used with their field recording apps. By using a field recorder, you can control microphone placement and volume.

## Microphones and Accessories

With the Zoom field recorders, you can use their internal microphones or connect an external one. Depending on your budget, it is recommended that you use a directional shotgun mic and a boom pole. This allows you to move the mic in close to the actors and focus the recording on one particular source. If a professional boom pole is too expensive, simply affix the mic to a standard broom pole to provide you extended reach.

Other accessories you need to be aware of include headphones, XLR cables, and windscreens for your microphone. Properly assess your recording needs in pre-production and see what you can afford to buy. You can get away with certain cheaper alternatives such as using your phone ear buds in place of studio headphones, for instance. Lavalier microphones can be a great replacement for boom mics in certain shooting situations, but they also bring about their own set of problems such as power source and inconsistent recording quality, so research the best microphone to do the job that is needed.

## Scout locations for Audio

During pre-production, do a tech scout at each of your locations to listen for any potential problems you may encounter while recording sound during the shoot. For instance, listen for traffic noise, airplanes, trains, air conditioning, nature sounds, or anything else that might be distracting or problematic in editing. By addressing these

issues in the planning stage, you will prevent wasted hours of filming and headaches in post production.

## Gain

In order to record the best quality of sound, the volume needs to be at the highest level possible without being distorted. Distortion tends to start at around zero decibel, and the optimum level is around -12 dB. This can vary somewhat depending on what the sound is—a scream is naturally going to be higher than a whisper (though keep that scream below 0 dB!).

You should also be wary of volume that is recorded too low. Your noise floor is the smallest measurement of sound and it's where a lot of "garbage noise" exists, so the closer your recording is to that noise floor, the "dirtier" your audio is going to be. Remember that any problems you have recording while on-set need to be fixed in post production, which means that if you have to raise the gain in post in order to hear the actors, you're also going to increase the background noise.

## Microphone Placement

If your microphone is too far away from your actor (such as on your camera shooting at a distance), the sound waves from your source take longer to reach the mic, thereby creating an "empty room" feel. It also forces you to increase the gain and pick up more background noise. Place the mic as close to the performer as possible just out of the frame.

## Room Tone

No matter how careful you are in recording proper levels on each actor for each shot, when you get into the editing room, you're going to have to do clean-up work, which means you may end up with the background audio at various volumes throughout your edit. To solve this problem, record a minute or two of room tone, or just the background noise with no one speaking at each of your locations. This will provide your sound editor an uninterrupted environment onto which to build the dialogue and sound effects and will make your film sound professional.

## Syncing Audio

Even when using a separate recorder, you should make sure your camera is also recording audio. You are not going to actually use the camera audio in your edit. It will be used for syncing purposes. Final Cut Pro X and Adobe Premiere, as well as programs such as PluralEyes, use audio waves from various sources to automatically sync all the elements, including multiple cameras.

You can also use the waveform on the video clips from your camera as a reference to manually sync separately recorded audio if there is no way to automate this process.

## The Slate

The main purpose of the slate is to provide visual information to the editor and to sync sound to picture through use of the clapboard. Even though editing programs may have the ability to match the actual audio waves from numerous files, a clap gives a distinctive sound pattern that makes it easier to sync. And if you end up having to sync manually, it will be a lifesaver as you can visually see when the stick connects with the board and match it with the beginning of the sound of the clap.

As for audio information, you need a camera assistant (or a crew member acting in this capacity) to call out the shot and take numbers. Get in the habit of using proper on-set commands. Your assistant director, who should be running the set, handles this routine:

1. Assistant director: “Quiet on the set/on location” (this notifies everyone that you are ready to film).
2. Assistant director: “Roll sound.”
3. Sound recordist (once audio is being recorded): “Rolling” or “speed.”
4. Camera assistant: “Scene \_\_\_\_ take \_\_\_\_.”
5. Assistant director: “Roll camera.”
6. Camera operator (once camera is recording): “Rolling” or “speed.”
7. Camera assistant: “Marker” (then claps using the slate).
8. Camera operator (when ready to begin filming the action): “Camera set.”
9. Director: “Action.”

### **Be Aware of What Audio Can Be Replaced in Post**

Not all locations will give you prime audio recording options, so there will be times when you might have to do Automatic Dialogue Replacement (ADR, or “looping”), where you bring the actors back during post production to re-record their dialogue by lip syncing to the edited shots. However, this will give you a different sound quality than in your original location. Exteriors and interiors inherently sound dissimilar. Can you get the actors to match their lip movements and emotions exactly? Will the actors be available after the picture is edited? Don’t count on always “fixing it in post,” but rather try to get the cleanest sound on location as possible during principal photography.

### **Treat Audio with Respect**

Finally, as a filmmaker, pay attention to your film’s audio needs as well as the visual ones. Sound design can add a whole other dimension to your final production that complements the cinematography, and approaching it in every stage of production as an important piece of the puzzle will elevate your work. Give it the proper care and attention that you would to lighting, casting, wardrobe, and every other element. Remember that no one notices good sound—it only stands out when it’s done poorly.

# Video Editing

## Introduction

The best directors have a comprehensive understanding of film editing. They plan and direct shots in such a way that they can be cut together smoothly and coherently. For film editors it is a language they live and breathe.

Editing is the final rewrite of the film. Dramatic changes can sometimes be made to the story after it is shot. This can be to fix story problems, make slight adjustments, or perhaps as a result of new ideas that come along during the editing process.

For this reason a final edited sequence in a film can differ substantially from the script and storyboard.

## Compression of Time

One of the most important things to realize is that our experience of time on screen has nothing to do with our experience of time in reality. Our minds have an amazing ability to assume and fill in large amounts of information for us as long as the most relevant and important information is provided within a structured framework of context.

You don't need to shoot and show every step a character takes in many situations. For instance, a school teacher is arriving late to work and meets his class in a state of chaos misbehaving in his absence.

There is no need to show the teacher in every step of his journey from his home to the classroom. We can do the job in just a few shots over the course of less than 30 seconds.

## Structure and Pacing

Remember the rules of planning the shots for a sequence. The same rules apply to editing a sequence. I'll illustrate the above example and add some drama because we couldn't possibly just let the late teacher get to the classroom. Such a scene would have no purpose and add nothing to the story (and would most likely be cut from the film altogether). The compression of time allows us to cut straight from the teacher shutting the door of his home to him entering the classroom at school (probably using a clever cut on the door itself).

### SHOT 1 WS

We open on an exterior WS of the teacher in his driveway frantically searching his pockets for his keys. His briefcase stands on the driveway at his feet.

### SHOT 2 MCU

We cut to an interior MCU (Medium Close Up) inside the car of his keys hanging in the ignition. We see him peering in through the window.

### SHOT 3 MS

Cut to MS at the door of the car as he steps back and looks around at the ground around him. As for editorial pacing, we need to hold on this shot for a few extra seconds (a beat). What is he going to do?

Or

The MCU from inside the car continues as his face disappears from view, wait (a beat) we don't know what's happening, he's gone... when suddenly...

### SHOT 4

He picks up his suitcase and smashes it through the window. This is either a cut from the exterior MS to the interior MCU on the action, or it is a continuous MCU shot from inside. In any case glass flies everywhere.

Now... we don't need to show anything else happening in the driveway! We can cut straight to an interior shot of him driving into the school parking lot. This can be from the passenger seat showing him and the broken window.

Cut to exterior wide shot at his parking space (probably a LA from the ground) as his car corners into the parking space and fills the frame.

Again... we don't need any more than this.

Cut to interior WS of the classroom, the kids are loud and rowdy. Suddenly the door bursts open and the teacher ploughs into the room. He swings his briefcase up onto his desk just as the lock breaks and it flies open, the contents spilling all over his desk.

This sequence would have been planned like this from the script breakdown, storyboarded like this and shot, perhaps with some alternative shots, such as the MS exterior option in the driveway. This gives the editor and director options on how to cut the sequence together, but there was never any reason to shoot the entire car journey, or the teacher walking through the hallways of the school to his classroom.

### Juxtaposition

Juxtaposition is the combination or intercutting of scenes, perhaps taking place concurrently with opposing emotional charge.

An example is In *The Godfather*, a baptism is juxtaposed with scenes of murders.

This is not so much an editing style as something that must be written at the script stage, but sometimes two scenes that were never written or intended to be juxtaposed can be cut later in post in this style.

### Cuts & Transitions – where to use and how to use

Only two types of cut are used in film editing. The straight cut, and the dissolve.

#### Cut

A simple cut is used in any situation where action is continuous in a sequence.

#### Dissolve

A dissolve always represents a shift in time, such as a flashback or a memory.

#### Cut on Action

This is a very common cut, for example a MS cuts to a CU on some action such as a man's hand reaching down to pick up a gun from a table.

#### Cut on Cross-Frame Movement (The Reveal Shot)

If a person in the foreground of your shot moves, or crosses the frame to reveal someone else or something of interest behind them, you can cut to a closer shot of the reveal on the movement.

#### Cut to Empty Frame (Action Enters Frame)

As the description suggests, you can cut from a wide shot of some action to a closer empty frame as the action enters the frame.

### **Cut to Secondary Action (Pan or Tilt to Main Subject)**

This can be a cut from a wider shot to a closer shot of some secondary action, such as the man's hand picking up the gun and then moving the frame up to the man's face with a pan and tilt.

### **Cut in Dialogue**

You can cut in dialogue from a MS to a CU of the subject speaking but the point you choose to cut should be carefully considered. The cut will bring sudden emphasis to what is being said, and this is the reason for such a cut.

### **The Cutaway**

The cutaway or insert shot is a shot of a secondary action, or an object that is important to the sequence, such as a sign that a subject notices.

### **The Montage**

A montage is a sequence of events, usually single shots shown in a sequence representing a much longer period of time. Continuity is not important as a jumpy or slightly erratic feel is usually desired for a montage sequence. An example might be a woman shopping for clothes, we may see a fast cut montage of her coming in and out of a changing room in different outfits.

### **Subtitling / Credits**

Whenever subtitling there will be an option in your editing software to turn on safe area guides. This places all text safely inside the frame ensuring it won't be cut off on any older televisions. However, this is less and less of a concern but the standard of a safe area for text has remained.

### **Media Management**

It is important to carefully manage media that you copy from your camera cards. This should be a folder structure arranged according to scene number and camera number if there is more than one camera.

It is normal to make at least two identical copies of camera media to separate hard drives for safety.

## Color Theory

### Introduction

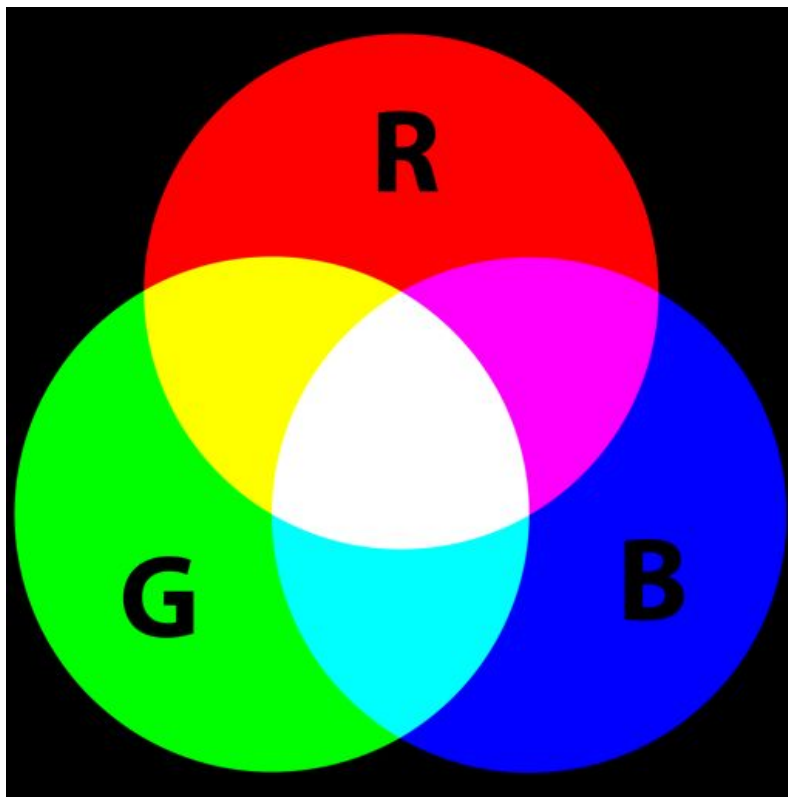
Color is yet another extremely important consideration that spans the whole process of filmmaking from pre-production to production and post production.

Here are some color basics that apply to production design, costume design and post production color grading choices. All of these choices, just like every other decision in any aspect of a film is deliberate and intentional.

Specific combinations of colors will evoke different emotions, may have cultural significance, or some significance to the sub text of the story.

### Primary Colors

All of the visible colors we see are made up of three primary colors. Red, Green and Blue.



### Secondary Colors

Secondary colors are the combinations of each adjoining pair of primary colors. Yellow, Magenta and Cyan.

These colors form the basic points of the color wheel.





# Color Schemes



## Complementary color scheme

Colors that are opposite each other on the color wheel are considered to be complementary colors.

(example: Orange and Blue)



## Rectangle (Tetradic) color scheme

The rectangle or tetradic color scheme uses four colors arranged into two complementary pairs.

(example: Orange, Red, Blue and Green)



## Analogous color scheme

Analogous color schemes use colors that are next to each other on the color wheel.

(example: Green, Blue-Green and Blue)



## Triadic color scheme

A triadic color scheme uses colors that are evenly spaced around the color wheel.

(example: Yellow-Green, Red-Orange and Blue-Violet)



## Square color scheme

The square color scheme is similar to the rectangle, but with all four colors spaced evenly around the color circle.

(example: Yellow, Red-Orange, Violet and Blue-Green)



## Split-Complementary color scheme

The split-complementary color scheme is a variation of the complementary color scheme. In addition to the base color, it uses the two colors adjacent to its complement.

(example: Yellow, Red-Violet and Blue-Violet)

## Color Schemes

A few well known color schemes are the usual basis for designing the color palette of a film, and colors may be consistently used throughout the film, or a few different color combinations may be used to represent specific characters or events, or the overall arc of the story from opening to close. A color may be very closely linked to the underlying theme of the story.

### Complementary Colors

Colors that are opposite each other on the color wheel are considered to be complementary colors.

### Tetradic Colors

Tetradic colors comprise four colors arranged in two complementary pairs.

### Analogous Colors

Analogous colors comprise colors that are next to each other on the color wheel.

### Triadic Colors

Triadic colors comprise three colors evenly spaced around the color wheel.

### Square Colors

Square colors comprise four colors arranged at equal corners of the color wheel.

### Split Complementary Colors

Split-complementary colors are a variation of complementary color. In addition to the base color, it uses the two colors adjacent to its complement.

## Audio/Music/Soundtrack Editing

### Introduction

Audio post production for a film is an intensive and extremely creative process. The process involves designing and creating every aspect of the sound you hear for each and every scene.

### Tracklaying

Sound is laid down in many separated tracks for a film, this separation allows levels to be finely tuned and adjusted, problems to be corrected, and sounds to be placed (and moved) in 3D space.

Tracklaying involves laying down sounds track by track. Following dialogue audio sync and clean up, any number of elements may be brought in scene by scene depending on how a sound designer prefers to work.

Music may be roughly laid in place very early on as it has a huge effect on the emotion and mood of each scene. It may set the stage for the rest of the sound design.

Atmospheric sound effects are brought in, which can be recordings made on location, or sourced from libraries.

Sound effects are added to bring realism to actions within the scene, such as the sound of car doors, car sounds, footsteps etc.

All these sounds are layered into a rich and full bed of sound and mixed to bring the audience right into the middle of the scene.

### **Atmosphere / Foley / Effects**

Foley is the reproduction of everyday sound effects that are added to enhance audio quality. These reproduced sounds can be anything from the swishing of clothing and footsteps to squeaky doors and breaking glass. The best foley art is so well integrated into a film that it goes unnoticed by the audience. It helps to create a sense of reality within a scene. Without these crucial background noises, movies feel unnaturally quiet and uncomfortable.

### **Music Selection and Film Scoring**

Great film scoring can exert more power of the audience than images alone ever can. Selecting music tracks, or composing film scores is another well planned and deliberate process that takes the audience on a emotional journey.

Music choice should reinforce the mood of a particular scene, it can be upbeat and happy, melancholic and sad, pensive and erratic or calm and serene.

### **Juxtaposition**

Juxtaposition in terms of film scoring is choosing music that opposes the emotion of the scene, heightening a very important dramatic moment.

An example is the opening sequence of *Grosse Pointe Blank* (1997) where we witness Martin Blank (John Cusack) taking out a target while we hear "I Can See Clearly Now" by Johnny Nash.

## **Exporting the Film (Format Settings)**

Some useful export settings for your film:

Master – Apple ProRes 422 HQ 1080p (same frame rate as your project – 24/25fps), Stereo Audio.

Online Upload / General Playback – H.264 Apple Quicktime, 1080p (same frame rate as your project – 24/25fps), Stereo Audio.