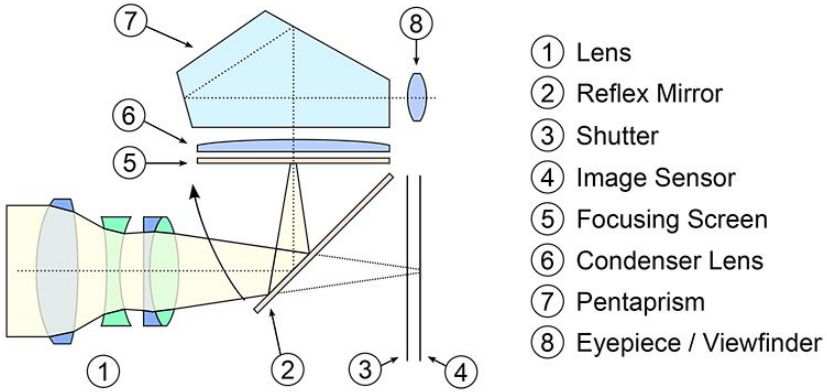
Quick Camera Orientation for Stop-Motion

Presented by your Animation Technicians

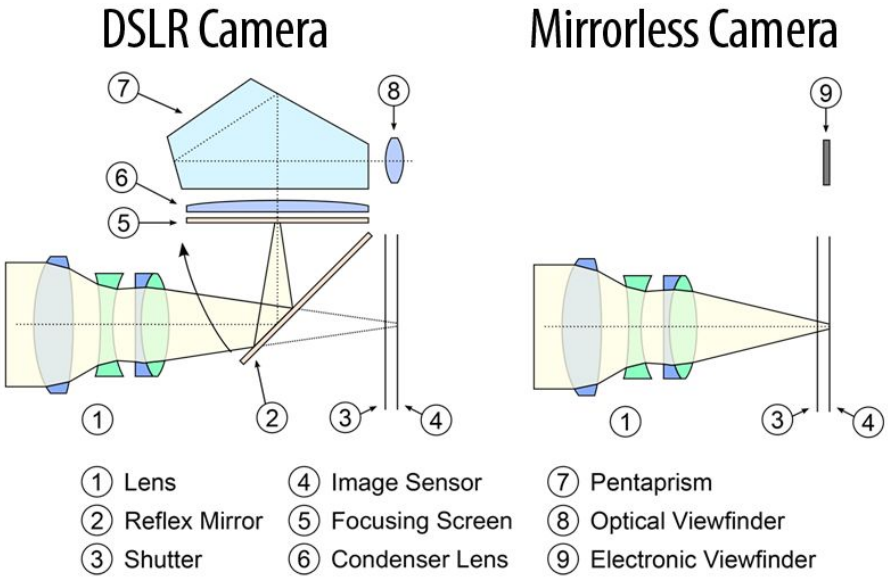
DSLR

- Stands for Digital Single Lens Reflex
- Digital camera uses a mirror at a 45 degree angle (called a reflex mirror) to reflect light passing through the lens into the viewfinder (the eyepiece you look through)
- When taking a photo, the reflex mirror swings upwards, the camera's shutter opens, letting light pass all the way through the lens diaphragm, hitting the image sensor at the back of the camera, which records the image. The shutter closes according to the shutter speed set. Then, the reflex mirror returns to its original 45 degree angle position.
- The camera's processor takes the information from the image sensor and writes it to the camera's memory card in the appropriate file format.



DSLR v.s. Mirrorless

- As the name suggests, mirrorless cameras do not use a mirror to direct light into the viewfinder and instead use an electronic viewfinder which projects what the image sensor “sees”.
- Can be made a lot lighter and more compact than DSLRs.
- Since the digital viewfinder uses the same image sensor as the one used for capturing photos, the image you see in the electronic viewfinder is more accurate to what you actually capture.
- Mirrorless cameras generally perform better than DSLRs when shooting stop-motion animation.



Shutter Speed

- Because your subjects do not move, shutter speed isn't as important as it would be if you were taking pictures of say, an athlete running or something like that.
- Shutter speed is measured in fractions of a second (for example. 1/30 means one thirtieth of a second, 1/20 one twentieth, ½ half of a second, etc.)
- A faster shutter speed means a darker photo, since light has less time to enter the lens of the camera and hit the image sensor.
- Shutter speed/aperture/ISO all must be balanced in order to take a picture that looks good, is well lit, and not blown out (excess glare or white taking up large parts of the image).

Note: consider how shooting immobile objects in stop-motion opens up possibilities to play with shutter speed & aperture

Aperture

- Determines the size of the hole in the camera lens' diaphragm that lets light through.
- The smaller the number, the larger the opening/aperture.
- A large aperture means more light is being let into the lens (think of a pupil getting bigger and smaller when reacting to light, the pupil gets bigger in darkness in order to see in low-light conditions).

Shallow depth of field, shot at f2.8 and a 1/8-second shutter speed.

Wider depth of field, shot at f11 and a 2-second shutter speed.

Depth of Field - Aperture continued

- Determines at what distance from the camera's lens are objects in focus.
- A lower f-stop (bigger opening) and a faster shutter speed produces a shallower depth of field
- A higher f-stop (smaller opening) and slower shutter speed will create a larger depth of field where most things in the frame are in focus
- An aperture in the teens is recommended for stop-motion, since the scale is quite small and the depth of field won't be as intense were the aperture larger (you don't necessarily want your puppets and set to look miniature). This is dependent on the look you want to achieve for your film, however!

Shallow depth of field, shot at f2.8 and a 1/8-second shutter speed.

Wider depth of field, shot at f20 and a 6-second shutter speed.

f4.0

f5.6

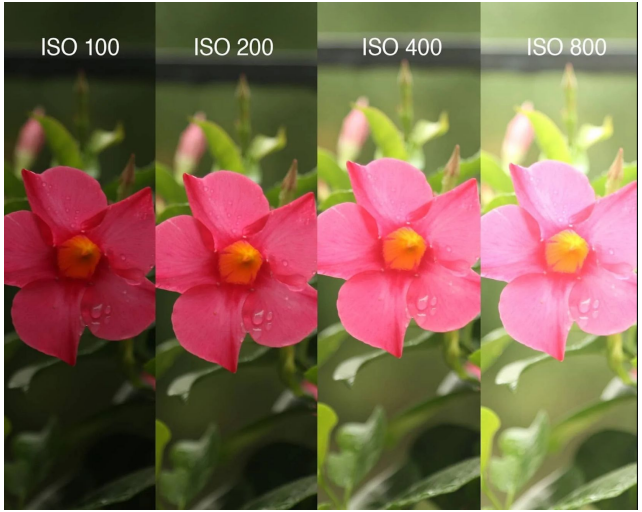
f8.0

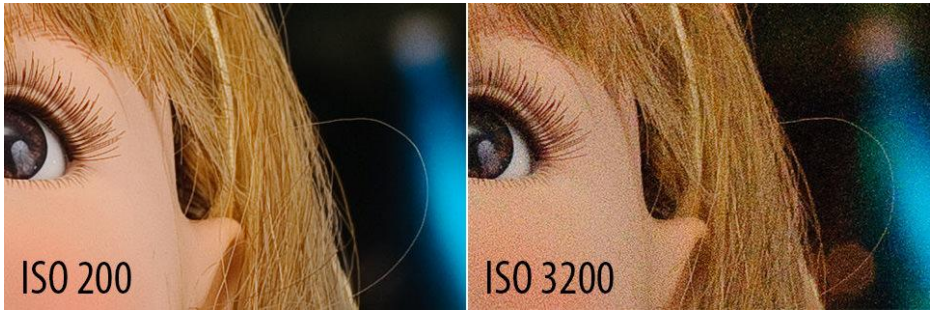
f11

f16

ISO

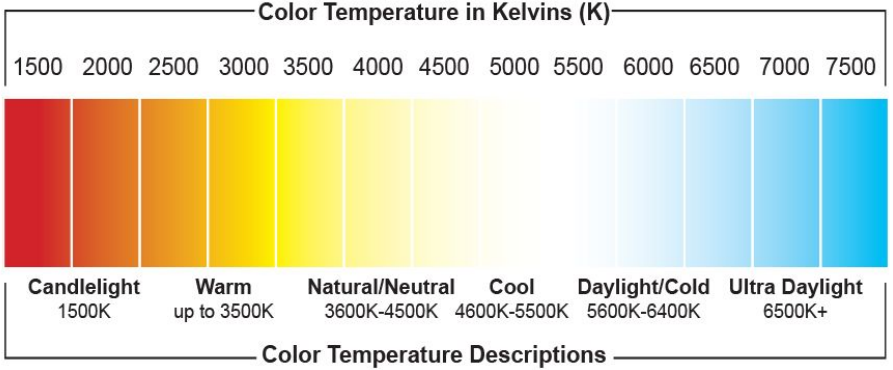
- Concept carried over from the days when cameras used film stock.
- Refers to the sensitivity of the film stock to light. Digital cameras do this virtually now with a sensor, so, a high ISO = more sensitive to light.
- One downfall in older and/or cheaper digital cameras is at high ISOs the picture can look grainy. 100-800 ISO is generally good for stop motion.

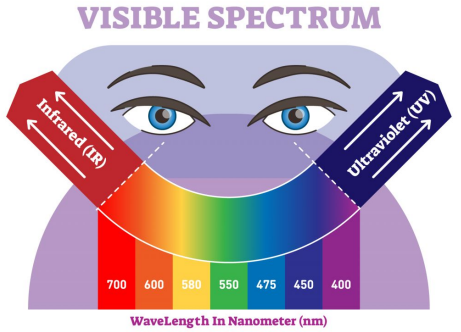




White Balance

- Camera's cannot intuit the colour white like our eyes do, so we must tell the camera what white looks like when using different light sources
- Improperly white-balanced cameras will either create a yellow or blue cast on your photos.
- Yellow being a low temperature light measured in Kelvin, low temp light like candlelight measures around 1,000-2,000k
- Blue being a high temperature light like daylight, which can be anywhere between 5,000-10,000 Kelvin
- Cameras often have preset white balance settings, such as tungsten, overcast, daylight, or fluorescent





We measure the colour spectrum in wavelengths, with red being the "slowest"/longest wavelength and violet being the shortest.

This is why a dim light like candlelight appears reddish orange to a non-white balanced camera, and bright daylight appears blue.

White Balance - continued

Examples of different colour casts created with different white balance settings. For more on colour casts & colour correction click here!

Further reading / articles referenced

- The Advanced Art of Stop-Motion Animation
- ISO, Shutter Speed, Aperture for Beginners
- Understanding Aperture
- Understanding ISO
- Understanding Shutter Speed
- Understanding White Balance
- DragonFrame Frequently Asked Questions
- DragonFrame Video Tutorials