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COMPETITORS HANDBOOK / MANUEL DES CONCURRENTS

2D 3D CHARACTER COMPUTER ANIMATION

ANIMATION INFORMATISÉE 2D 3D

SECONDARY /
NIVEAUX SECONDAIRE

12 Basic Principles of Animation

Paraphrased from the "Illusion of Life" by Frank Thomas & Ollie Johnston. (pp.47-69) Look these up and read the original version for a complete understanding.

1. SQUASH AND STRETCH

Objects appear to squash and become distorted or flattened by weight or gravity and elongate or stretch when affected by momentum, like a ball compressing as it strikes the floor and expanding at the top of its arc as gravity works against its momentum.

Squash and stretch gives an object weight and flexibility and help breathe life into an animated character or object and give a fluid putty-like quality to an object that helps make inanimate objects seem believable and less rigid. Anything that is alive will stretch and squash to a degree as it moves.

Squash and stretch also gives the illusion of weight and volume to a character as it moves. Our muscles are constantly squashing and stretching with every movement that we make. When a person raises their hand quickly to wave at someone, their hand and fingers appear to stretch out during the transition. Faces deform and stretch when we talk and peoples' soft body parts bodies stretch, bounce, and contract as they walk. Objects can stretch and squash or bend, but they can't change their volume and mass.

2. ANTICIPATION

There are three parts to most actions: the anticipation for an action, the action, and the follow through. Anticipation helps the viewer predict subsequent action, it's movement prepares the audience for a major action the character is about to perform; such as, starting to run, jump or change direction. A man preparing to run fast will crouch down, "gathering like a spring" for the main action. A dancer does not just leap off the floor without preparing for the leap. A pitcher's wind-up or a golfers' back swing are also examples of anticipation.

Anticipation is also a setup for what will happen next, a character looking off-screen to anticipate someone's arrival, or focusing attention on an object that a character is about to pick up are examples of anticipation.

Many animators act out the three parts to the action, the anticipation, action, the follow through to help them make the animation clear.

3. STAGING

Staging directs the audience's attention toward the most important elements in a scene in a way that most effectively tells the story. An action is staged so that it is clearly understood. The audience's eye must be led to exactly where it needs to be at the right moment. It is important that when staging or posing an action, that only one idea be seen by the audience at a time.

The background design shouldn't obscure or compete with the animation and should help form a pictorial unit in a scene. The effective use of long, medium, or close up shots, as well as camera angles should help tell the story, emphasize the key elements of the scene, and clearly communicate the attitude, mood, reaction of the character and provide continuity of the story line.

4. STRAIGHT AHEAD AND POSE TO POSE ANIMATION

There ae two basic ways to animate: Straight ahead and pose to pose. In straight ahead animation the animator starts at the first drawing and continues drawing each frame until end of a scene. In pose to pose animation, the animator creates the key poses for characters and then draws the frames in between the poses (in-betweens) to make the character appear to move from one pose to the next.

Straight ahead animation tends lends itself to spontaneity and freshness and many fast, wild action scenes are done this way. Its downfall is that size, volume, and proportions can be lost.

In pose to pose on the other hand, key drawings or key poses, are done at intervals throughout the scene. The lead animator creates the main poses then turn the posed keys over to his assistant who will complete the animation. The lead animator can do more scenes this way and concentrate on planning the animation. In pose to pose, actions must be well thought out, and the timing and poses planned so that the action is clear to the audience. Many animators combine these two methods.

5. FOLLOW THROUGH AND OVERLAPPING ACTION

When the main body of the character stops all other parts continue to catch up to the main mass of the character, such as arms, long hair, clothing, coat tails or a dress, floppy ears or a long tail (these follow the path of action). Nothing stops all at once. This is follow through. Overlapping action is when the character changes direction while his clothes or hair continues forward. The character is going in a new direction, to be followed, a number of frames later, by his clothes in the new direction. "DRAG," in animation, for example, would be when Goofy starts to run, but his head, ears, upper body, and clothes do not keep up with his legs. In features, this type of action is done more subtly. Example: When Snow White starts to dance, her dress does not begin to move with her immediately but catches up a few frames later. Long hair and animal tail will also be handled in the same manner. Timing becomes critical to the effectiveness of drag and the overlapping action.

Follow Through and Overlapping Action are techniques that can help to make movement appear more realistic.

1. A character's coat or long ears, would keep moving once the figure had stopped moving. The ears, or coat, would "follow through" even after the main action had stopped
2. Different parts of a body may move at different speeds. Therefore, as one part of the body stops, another part (such as an arm), might overlap or follow through the main action, slowly settling to a stop
3. Loose flesh, such as a dog's floppy jowls, might move at a slower speed than the more solid parts of the character. These parts might drag behind the main action.
4. The completion of an action - how the action "follows through" - is often more important than the action itself.
5. The "moving hold". A character might come to a complete halt, but the fleshy parts might follow through the main action in order to convey weight and believability

(Frank Thomas and Ollie Johnston in their authoritative 1981 book on Disney Animation, The Illusion of Life.)

6. SLOW-OUT AND SLOW-IN

Objects don't have consistent velocity; velocity varies at the extremes of an object's motion. As a ball bounces, it accelerates and decelerates. Eases can be used to create the acceleration and deceleration. For example, a bouncing ball moves faster as it approaches or leaves the ground and slower as it approaches leaves its maximum height. The name slow in/slow out comes from having the object or character "slow out" of one pose and "slow in" to the next pose.

This means there are more drawings near the starting pose, one or two in the middle, and more drawings near the next pose. Fewer drawings make the action faster and more drawings make the action slower. Slow-ins and slow-outs soften the action, making it more life-like.

7. ARCS

Few things in life move in a straight line. Most actions tend to follow an arc or slightly circular path or line of action rather than a straight line. Movements without arcs tend to look boring and stifled, while those with arcs appear move realistic and fluid. Arcs in movement give animation a more natural action and better flow. Most actions, arm movements, head turns and even eye movements are executed on an arc much like a pendulum swinging.

8. SECONDARY ACTION

Secondary Action should not be confused with overlapping and follow through but should be seen as **subsidiary actions**. A person walking who simultaneously swings his arms, who speaks whistles, or express emotions through facial expressions is showing secondary actions. A secondary action is something that the character is doing/acting that adds a more realistic and natural feel to the animation that does not distract from the main action
but re-enforces the main action and add interest and complexity to the animation.

*"Often, the one idea being put over in a scene can be fortified by subsidiary actions within the body. A sad figure wipes a tear as he turns away. Someone stunned shakes his head as he gets to his feet. A flustered person puts on his glasses as he regains his composure. When this extra **business** supports the main action, it is called a Secondary Action and is always kept subordinate to the primary action."*

Secondary action or **subsidiary actions** can be Stage Business or character embellishments: Small actions such as smoking, using a fan, pouring a drink, which add dimension to the character, emphasize personality, and sometimes to make the action "more realistic." These are actions that the character does that are not directly related to the character's main movement but add detail, personality and mood.

Having a character involved in some stage business (secondary action) gives you something around which to organize your animation which can add dimension, make the scene more interesting, and help express the character's personality,
.
The Iron Giant has many examples: the way Hogarth pushes the door half open, plays with the phone cord, peeks into the breadbox and the way Annie has to dodge the door, are all examples of secondary action. The simple, unnecessary bit of detail speak volumes about character.

9. TIMING

Timing makes what is happening in the scene clear to the audience. *Timing* helps give both physical and emotional meaning to movement. Timing and spacing describes the speed of every single action, whether it's big or small. Every action you take requires timing, even picking up a phone to send a text message. Every movement that you make in the real-world can be broken down into timing and spacing.

The animator must spend the appropriate amount of time on the anticipation of an action, on the action, and on the reaction to the action. If too much time is spent, then the viewer may lose attention, if too little, then the viewer may not notice or understand the action. More drawings between poses slow and smooth the action. Fewer drawings make the action faster and crisper.

Timing in the character's acting establishes mood, emotion, and the reaction to another character or situation. Timing can also can show the thought process for a character and can be broken down into beats, the smallest subsection of time. Beats from The Gift of the Magi, O.Henry:

1. Della finished her cry and attended to her cheeks with the powder rag.
2. She stood by the window and looked out dully at a grey cat walking a grey fence in a grey backyard.
3. *To-morrow would be Christmas Day, and she had only $1.87 with which to buy Jim a present.*

The best place to look for examples in timing is in real world. After all, the principle of timing and spacing is derived from how people and objects move in the real world.

10. EXAGGERATION

Exaggeration is a great way for an animator to generate the appeal of a character, and to heighten the drama of the scene. Exaggeration, when used effectively, enhances the scene and helps convey the story. Exaggeration can include distortions in facial features, body types, and expressions, the way a character moves, and the character's personality traits.

The key to proper use of exaggeration lies in understanding the essence of the action or idea, so that the audience will also understand it. If a character is sad, make him sadder; if he is bright, make him shine; worried, make him fret, angry, make him furious, if he is cheap, make him stingy.

Exaggeration should be used in a careful and balanced manner, not arbitrarily. Figure out what the desired goal of an action or sequence is and what elements need to be exaggerated. Too much exaggeration creates a feeling of uneasiness in your audience and a lack of focus in the scene. Exaggeration in a character, in the way he walks or moves his eyes or turns his head turn will give your animation more appeal. Use good taste and common sense to keep from becoming too theatrical and excessive.

11. SOLID DRAWING

Solid drawing being able to draw your character from every angle in a believable manner so that the character looks alive with the correct perspective and fore shortening. This essentially means having a mastery and proper understanding of drawing, weight, volume solidity,
construction, perspective, form, anatomy, and the illusion of three dimensions and line control. The better you are able to draw, the more control you will have and the more creative choices you will have.

You drawing gives the characters the illusion of three-and four-dimensional life. Three dimensional is movement in space. The fourth dimension is movement in time.

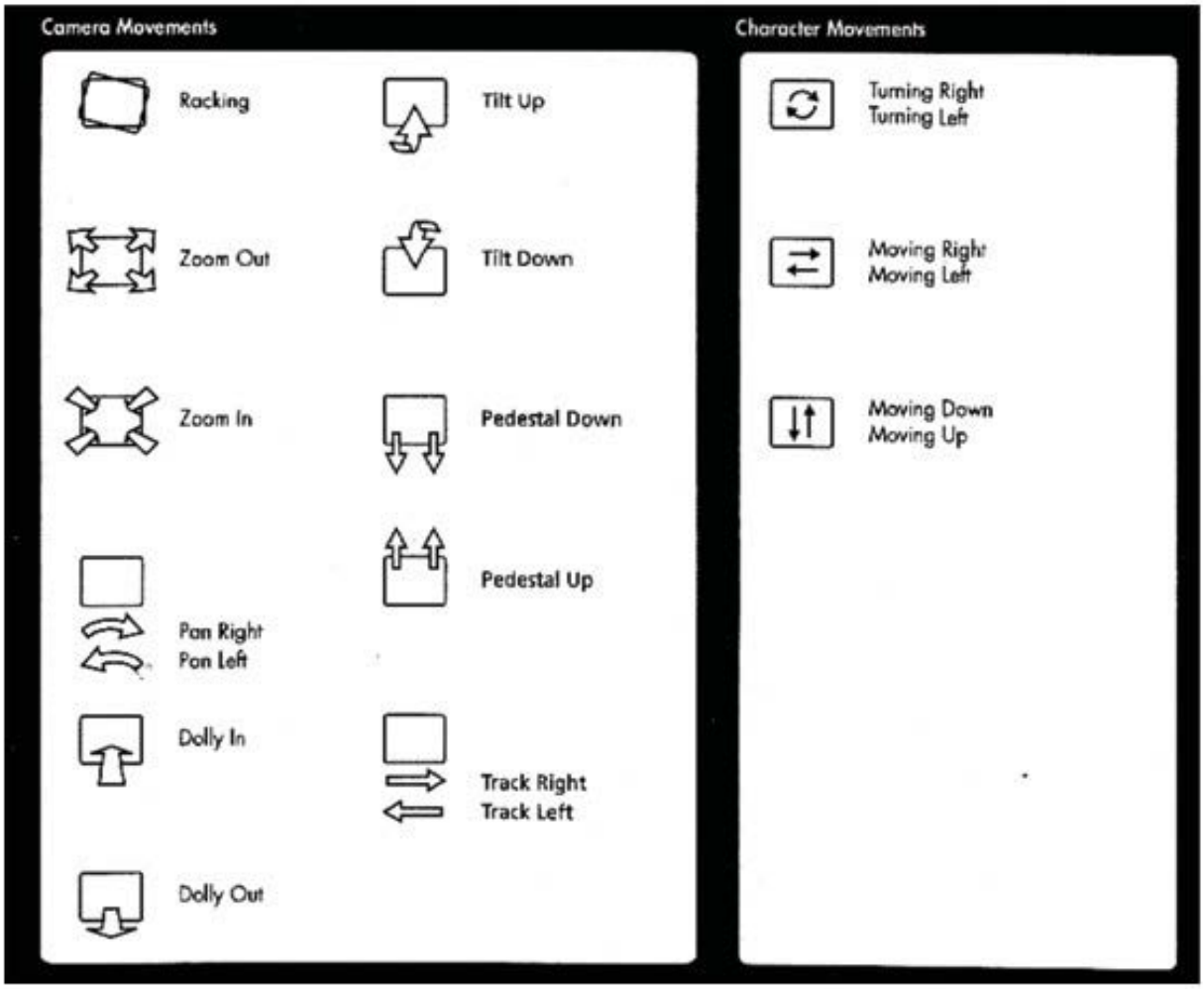
12. APPEAL

A live performer has charisma. An animated character has appeal. Appealing animation does not mean just being cute and cuddly. All characters have to have appeal whether they are heroic, villainous, comic or cute. Appeal, as you will use it, includes an easy to read design, clear drawing, and personality development that will capture and involve the audience's interest.

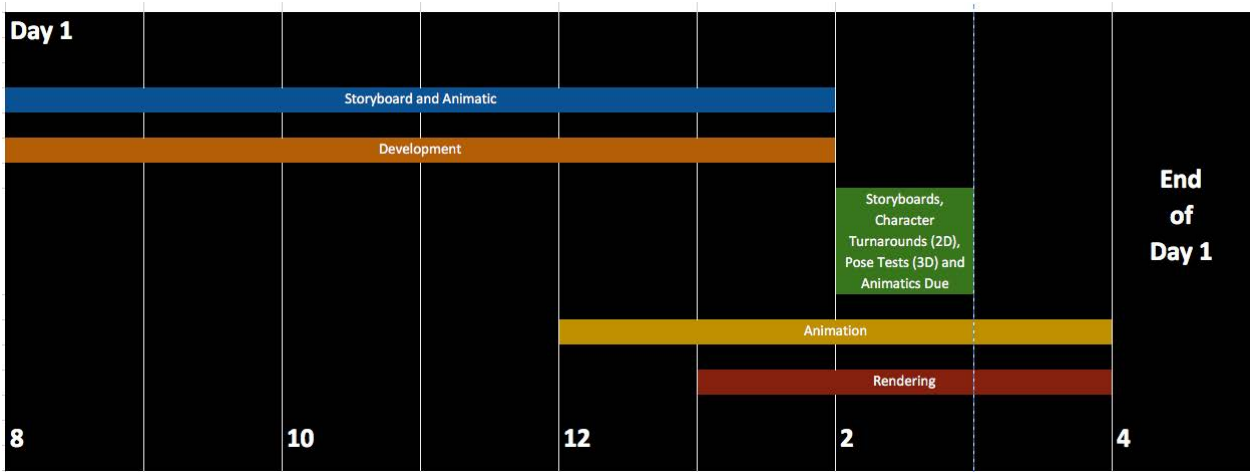
Early cartoons were basically a series of gags strung together on a main theme but over the years, artists have learned that there is a need for story continuity, character development and a higher quality of artwork throughout the entire production. Like all forms of storytelling, animation
has to appeal to the mind as well as to the eye.

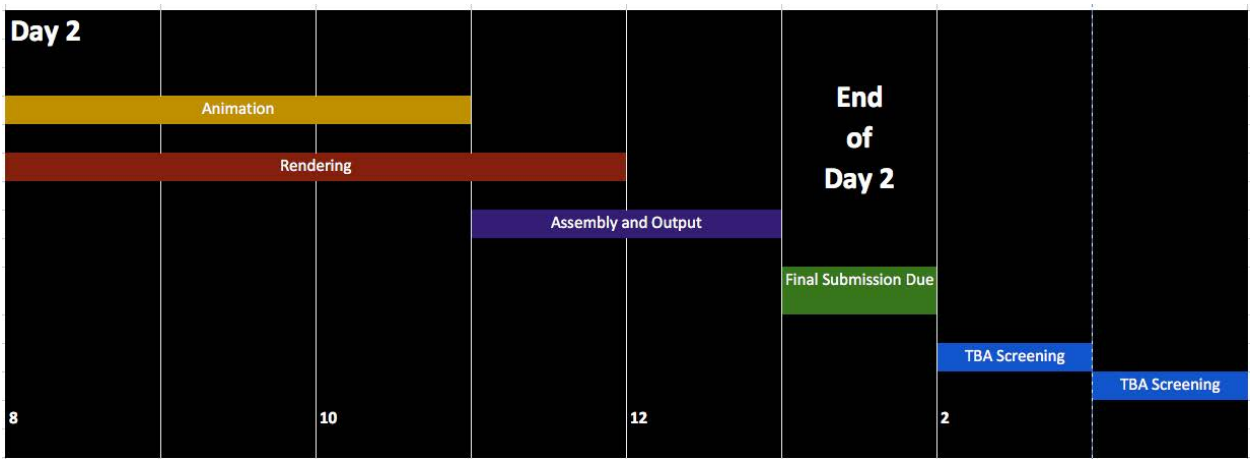
Reference:
http://www.animationtoolworks.com/library/article9.html

Storyboard Symbols:



Critical Path:





Production Pipeline:

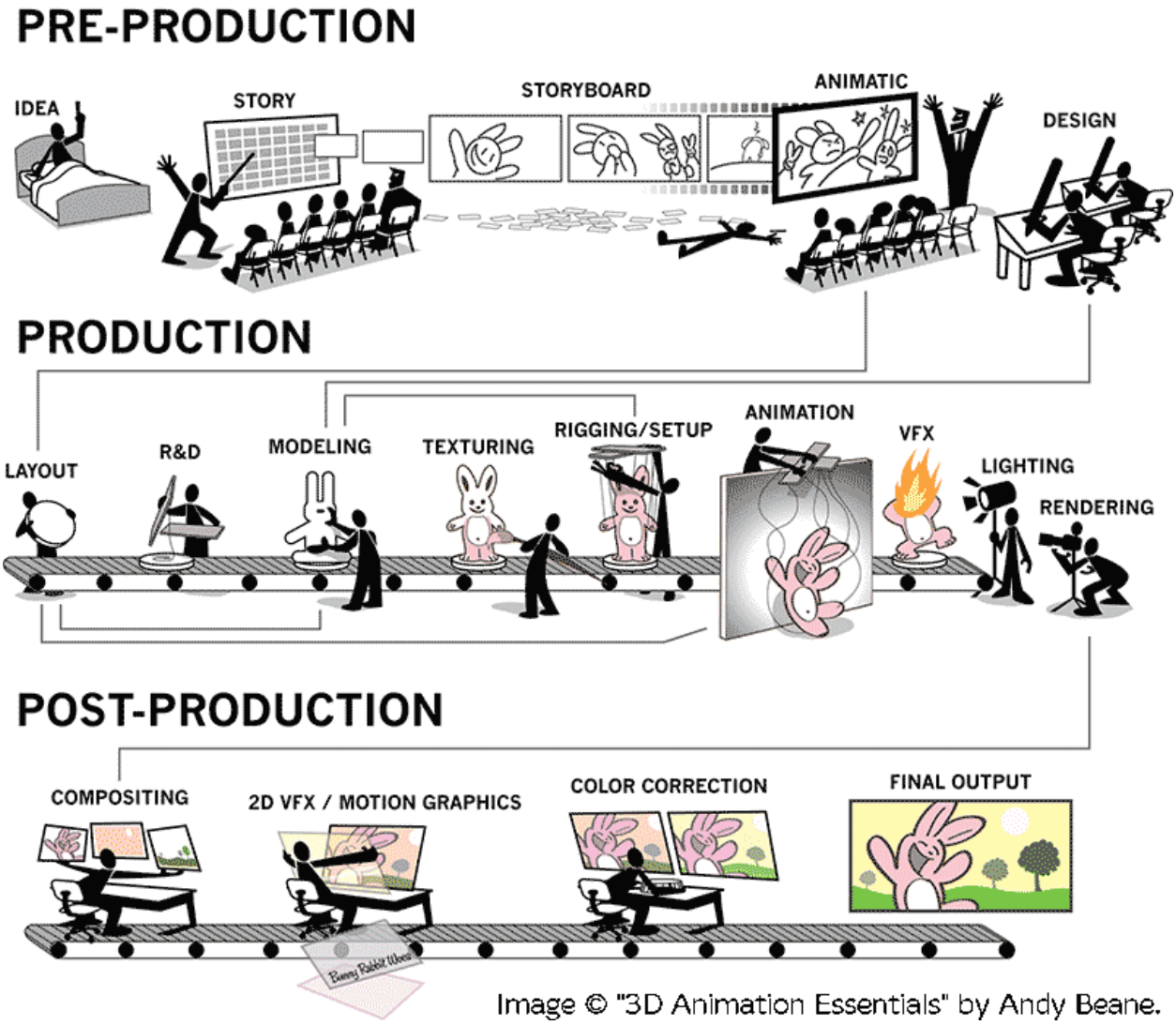
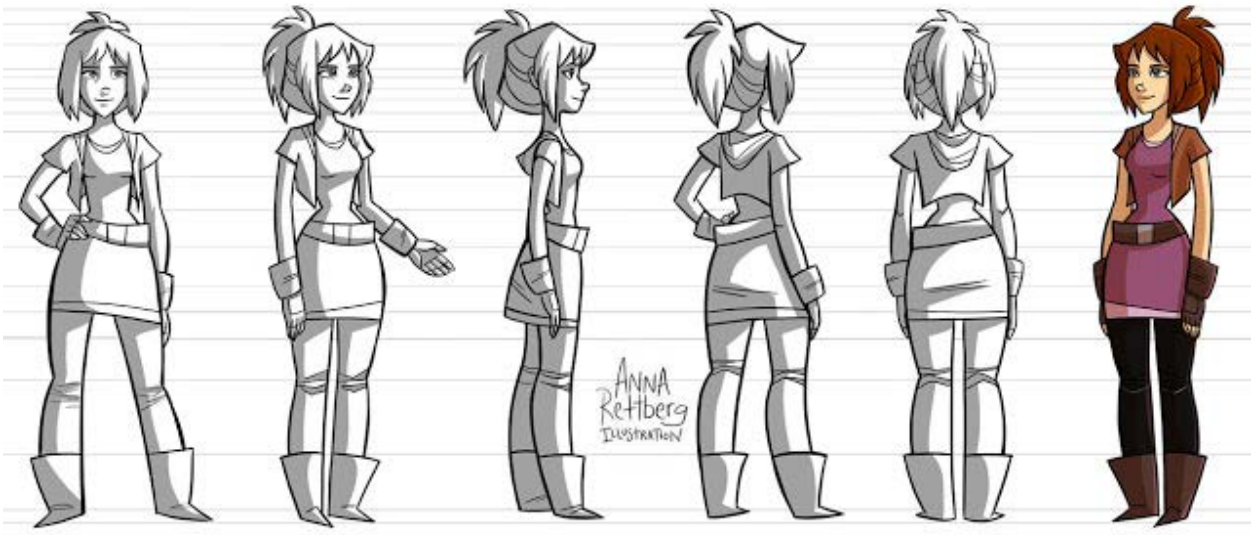
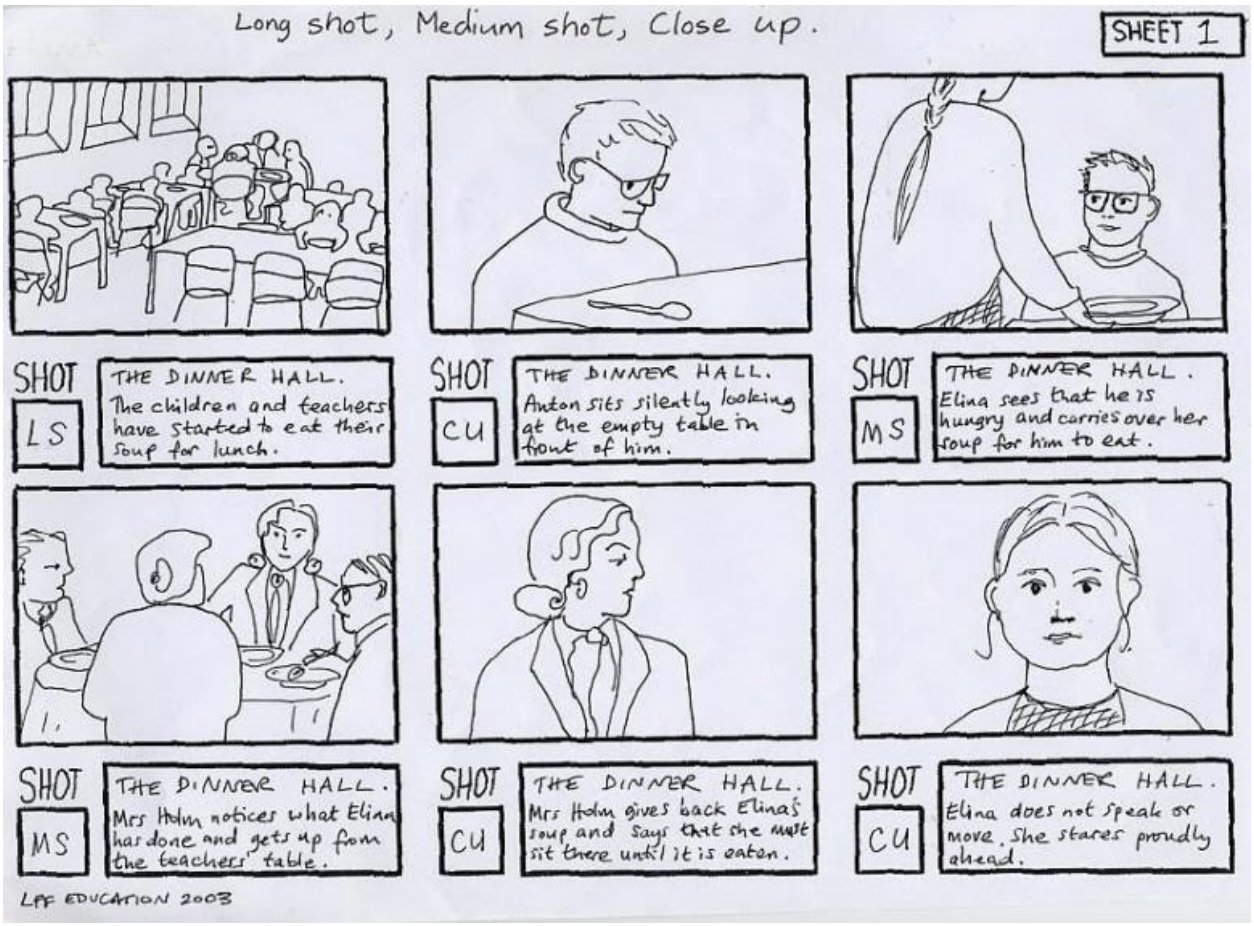


Image © "3D Animation Essentials" by Andy Beane.

Sample Character Turnaround



Storyboard Example



Animatic Example:

An Animatic is a draft version of your animation timed to the music or audio track make to see how your story and timing will work. It is usually produced in a video editing program by importing scanned images and placing them in timed with the audio track. Animatics can also be done for 3D stories by taking poses and screen shots of characters and inserting them into an editing program as above. The term previs or previsualization is sometimes used for 3D games and animation to help visualize complex scenes before production.

https://www.youtube.com/watch?v=D1V-BYWlXAw