

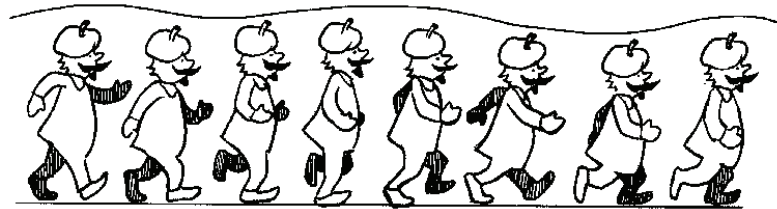
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ANIMATION

Animation:Master is a character animation tool, so it seems likely that you should spend the majority of your time animating characters. Considering that traditional animators must be extremely talented, drawing and painting every single frame, computer animators have it easy. In most cases, a talented animator using a computer can tell more stories with better draftsmanship during their careers. Luckily, all of the animation philosophies developed over the years are still applicable to computer tools. The concepts of follow through, anticipation, and exaggeration apply equally well to what you will be doing here. In fact, traditional character animation books make great references, both for modeling and animation.

TALENT POOL

Animation: Master embraces the concept of a talent pool. The computer can't supply the talent for you but it can allow you to use the talent that is already in the pool, or more importantly, put your talent into a library for later use. As you work on an animation, you will recognize a lot of repetition in your character's facial expressions, gestures, locomotion, and a thousand other activities, just like we do in real-life. By using reusable actions from the talent pool, you can get a great head start, speeding the animation process and increasing the number of stories you can tell during your career.



KEYS TO ANIMATING

Early in animation's history, when superhuman animators first proved that a single person could produce the thousands of drawings necessary to make a cartoon, they used a technique now called "straight ahead animation," where every frame was drawn as a minor adjustment on the previous frame. Though the process is simple to comprehend, it had no timing – it was difficult to know how much time a move would take, and every move flowed evenly into the next. Watch some early (pre 1930) cartoons to see examples.

Modern "keyframe" animation instead requires the animator to time the movement first, draw the frames that are the extremes of the motion, then fill in the in-between frames that make the movement smooth. As keyframe animation developed, master animators adjusted the in-between frames to produce a visual impression of acceleration and deceleration simply by changing the spacing. Other master animators created distinctive styles by exaggerating the acceleration and deceleration and carrying the exaggeration into the keyframes. For example, a character's head may turn so quickly that it snaps back, and probably even distorts the shape.

As you develop as an animator, your own style will emerge. You will become very proficient at certain moves and find yourself adding nuances that make your “look” different and recognizable. However, this is many thousands of frames in your future. For now, learn the basics.

THE 10 ANIMATION INGREDIENTS (UPDATED FOR COMPUTERS)

In animator terms, a talented pencil sketcher is understandably called a good draftsman. The “Nine Old Men” of Disney fame were all good draftsman but they were canonized because they identified the ingredients of animation.

1. Pose to Pose
2. Anticipation and Overshoot
3. Follow Through
4. Exaggeration
5. Timing
6. Balance and Weight
7. Secondary Action
8. Attitude
9. Staging
10. Squash & Stretch

Pose To Pose

This term is taken from a traditional animator’s technique of drawing key poses for the action, each morphing into the next. Computer animation is a little different in that every part of the body can have its own keys on different frames but the concept is the same. For example, an actor is posed holding a ball on the first keyframe, he lifts the ball on the subsequent key, reaches back on the next, and steps forward with his arm ahead throwing the ball on the last keyframe.

Anticipation And Overshoot

If the viewer is watching another part of the screen, it takes about a fifth of a second (6 frames) after a new object moves before the viewer can refocus on that movement. Essentially, the viewer misses the beginning of the movement, so you, as the animator, should make a preliminary movement before the main movement to attract the viewer's attention, called anticipation. These are the clues your character gives the viewer that something is about to happen. An example of anticipation is drawing back a character's foot before a big kick; by the time the viewer is watching, the leg will begin its swing. Other Examples:

- The character's eyes may follow a pestering bee before a swat.
- The camera pans to a flower the character is going to sniff.
- A baseball player winds up for a hit.

Movement that is important to the narrative especially requires anticipation, and for emphasis, the movement should overshoot. An example of overshoot is an arm stretching too far while pointing a finger, then snapping back.

Follow Through

We see the results of follow through all around us in our everyday life. These are the subtle movements caused by the physics of nature. Examples are:

- A character's hair waving after turning his head.
- A rabbit's ears bouncing.
- Coat tails swinging.
- Bug antennas bobbing.
- Cigarette smoke swirling.
- The rebound of a baseball player's bat after the hit.
- Jiggling of a fat belly.

Exaggeration

When clueing the audience that an actor is heavy, it always pays to overdo it. Not meeting the viewer's expectation of weight hurts the story but exaggerating only makes it funny. Most characters are not supposed to be real – that's their charm. Everything about them is meant to entertain the viewer. Exaggerating the character's movements, expressions, and reactions is funny, and a proven device that keeps the audience entertained. For example, a happy character's smile is much too big for their head, and silly characters bob high in the air when they walk. Also, when characters tumble, their arms flail wildly. In a sense, character animation is the art of exaggeration.

Timing

The spacing of key poses determines the amount of time the action will take. Varying the spacing varies the speed, which in turn signals emotion: lethargic, excited, nervous, relaxed, etc.

Animation movement is divided into tenths of seconds. Most natural movement occurs over two tenths of a second (which is 6 frames at 30 frames per second). Computer animation is described by keyframes. The animator establishes the keyframes and the computer calculates and performs the in-between frames.

Keyframe Spacing

1
2
3
4
5
6
7
8
9
10
11

Impression

tremendous force
hit by a frying pan
twitch
dodging the frying pan
crisp order "Move it!"
friendly request "Hurry"
caught attention
casual look
close scrutiny
thoughtful consideration
stretching

EASE

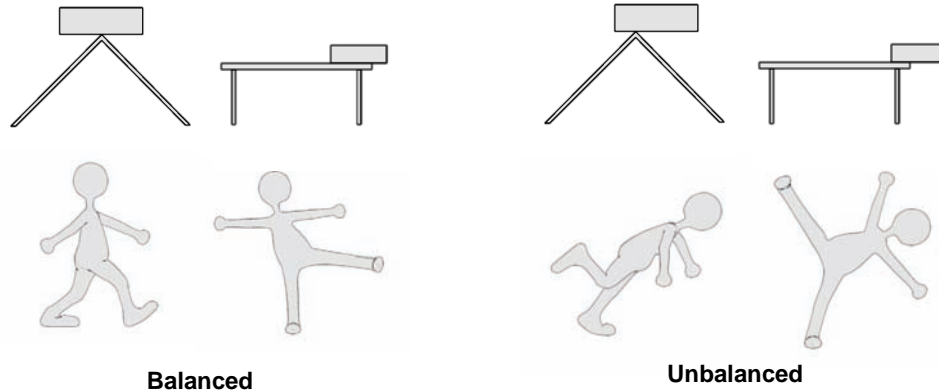
Ease is an animator's term for simulating acceleration and deceleration of movement. It is enough for beginners to know that the computer automatically supplies its own ease to most movement. However, knowledgeable animators can control just how much ease they want by adding extra keyframes.

HOLDS

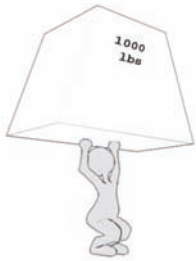
Often a character is not moving at all, called a hold. Holds are an important part of timing, so-much-so that they have evolved their own rules.

- The character must be balanced before holding.
- A look off-screen needs a half-second of hold (15 frames) before cutting to what the character sees.
- Allow two thirds of a second (20 frames) for each word of a title card for reading time.
- The freeze position at the end of a fast throw is held for half a second (15 frames).
- After a character stands up quickly, the pose is held for a third of a second (10 frames) before the next movement.
- A note about setting up for holds; avoid having all parts of a character start or stop at the same time.

Balance and Weight



As humans, we immediately recognize if someone loses their balance and is about to fall over. We intuitively know what is balanced. One of the things that makes animation funny is when it violates these balance expectations BUT, other than a storyline gag, characters **MUST** remain balanced! If a character appears off-balance, yet never falls down, the narrative is ruined because you have confused the viewer's senses. Because of our expectations of what happens when something is out of balance, balance hints of upcoming action. If a character's pelvis is shifted to the right, then his shoulders surely must shift to the left to maintain balance. If the character leans forward and points, he certainly should stretch his other arm behind him to even things up. You should exaggerate weight shifts to accentuate it.



Weight is related to balance. Traditional animators stress weight above all other technical concerns. How much an object weighs is dictated by how much effort is required to move, stop, push, pull, or change its direction. Heavy characters should show a distinct shifting of balance and squashing of their legs as they step, moving slow and deliberately. Also, importantly, thrown objects need to travel along a realistic arc.

Secondary Action

Secondary action supports the main action. These are the little details that show personality. For example, an evil-doer twirling his mustache, or a bookworm taking off her glasses and rubbing her eyes. These little mannerisms add personality to a character. As you become more experienced, the level of secondary action you add to a character will increase. Secondary action is a good way of measuring an animator's skill, so you will want to show off as you improve.

Attitude

Characters express their feelings and emotion through body language: quizzical characters shrug their shoulders; angry characters thrust out their chest; surprised characters throw up their hands. But these obvious examples are not nearly as important as the natural positions a character assumes while listening to a conversation, or the heroic stance of a leader. Every character in a scene needs an appropriate pose or they will appear out-of-place.



Staging

Staging includes photography direction, choreography, and set dressing. Staging should convey the mood even before the characters arrive. There are many staging artifices already built up in moviemaking iconology.

SCENE

Staging includes the scene's ingredients. For example, something scary should be filled with symbols of a spooky situation: an old house, bones, the wind howling.

DEPTH

The subject of any camera shot should stand out from the background, otherwise the audience suffers a glitch in story continuity while they decide what in the scene is important. Centering the shot on the subject is the most important visual clue, including centering of the subject's depth in the scene. Traditional animation has a lack of depth clues so gimmicks such as blurred backgrounds, isolation, and color desaturation were used to provide emphasis. Computer rendering has the advantage that shading and perspective show depth to the audience.

However, if a shot becomes jumbled, use depth-of-field (blurring of objects in front of and behind the subject) and lighting to emphasize depth.

ASYMMETRY

When you animate, make sure both arms or legs are not doing exactly the same thing (or the mirror of the same thing). Also, make all movement in flowing arcs – this makes the character appear natural rather than robotic.

EMOTION

There are several established symbols of emotion in the scene.

- Rear views for dreaming.
- Center on the shadows for suspense.
- Shadows fall onto main character during drama.
- A desperately searching character frequently has his face obscured as he looks around.
- Support the staging. For example, leaf bare trees at night signal terror.
- Painted backgrounds can be used as establishing shots, such as a castle in the distance.
- Effects, such as rain, fire, and fog convey strong preconceived feelings.
- Instead of animating a character, prolong a feeling of activity by moving the camera.
- Off-screen sound effects are the easiest scene builder.
- Sad or quiet scenes are long, with slow camera pans and trucks, and slow moving characters.
- Happy or excited scenes are short with fast cuts and quicker moves of the camera and characters.
- A down shot should be used when there are interesting or important things to identify.

“Even sugar bowls have feelings in the world of fantasy.” Ollie Johnston

EXPRESSION

Rules of thumb

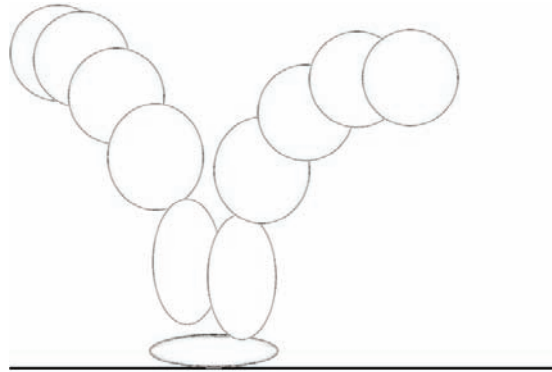
- Change the expression before a fast move
- A character looks down when frowning, up when smiling
- When the character is talking, minimize other facial expressions before or after the dialog.

GROUP MOVEMENT

When more than one character is walking together, modify each one's pace slightly. Also have the spacing between characters change slightly – pull apart, close in again, pass another, or fall behind. This gives life to the group.

ANIMALS

Animals are common in animation and they have their own secrets. Hair clues the audience to an animal's personality: smooth fur is feminine, mussed hair gives an irritable look. Tails show mood: happy dogs wag their tails; scared dogs put their tails between their legs. Ears show an animal's attitude: quizzical, angry, alert. Neck and chest also show attitude – from belligerent chest jutting to friendly leg rubbing.



Squash and Stretch

Actors in real life do not really squash or stretch when they move but it has become a staple in traditional animation because it exaggerates weight, which is considered the most important aspect of realistic movement. Balls squash as they hit the ground, stretch as they rebound: rubber balls squash more than cannonballs. The fact that you can tell if a ball is a rubber ball or a cannonball by a simple animated bounce, demonstrates how influential squash and stretch can be. However, a little bit goes a long way; unless your goal is to animate like the great Tex Avery, don't overdo squash and stretch.