

# THE PRINCIPLES OF ANIMATION

- The most hilarious comedy is always based on things actual
- Your characters should always appear to be motivating themselves, to be acting from internal forces. Your characters should never look like someone is pulling their strings.
- Only do one thing at a time: one of the most important rules of theater.
- As one part of the body arrives at the stopping point, others may still be in movement; an arm or hand may continue its action even after the body is in its pose. In order to put over the attitude clearly, the head, chest, and shoulders might all stop together, since that is the part the audience should see. Then a few frames later, the rest of the parts would settle into their final position, possibly not all at the same time.

## SQUASH & STRETCH-

**Squash** is used to show the effects of rapid deceleration and of energy expended to compress the shape of an object. **Stretch** is used to show rapid acceleration and of energy expended to lengthen the shape of an object.

To maintain the visual volume of an object, squash and stretch are usually synchronized on tangent axes. That is, **if an object stretches in one axis, it must also squash in the other axes to maintain its original volume.** This particular rule can be broken for extreme cartoon-style effects, but it's usually more effective when simply exaggerated.

## ANTICIPATION-

**Anticipation is an action in one direction intended to prepare the audience for a much larger action in the opposite direction.** Before a man runs, he crouches low, gathering himself like a spring, or, the reverse, he draws back in the opposite direction, raising his shoulders and one leg, as he aims himself at the place of next activity. Before someone reaches to grab an object, he first raises his arms as he stares at the article, broadcasting the fact that he is going to do something with that particular object.

**If a man is to put his hand in his pocket to get a sandwich for lunch, the whole body must relate to that hand and to the pocket. when the hand is aimed, it must be "out in the clear" so everyone can see it and anticipate what is going to happen.** The head cannot be looking off somewhere else-- the important action is him reaching into his pocket.

## FOLLOW THROUGH-

Follow-through is almost exactly like anticipation, but on the other end of the action. **If your characters are to appear to have mass, they must overshoot the goal a little, then bounce back to it.**

## SECONDARY ACTION-

When a character has loose parts or appendages that are not held rigidly to the main body, these parts must demonstrate to the audience that they also have mass and energy of their own. **A hound's floppy ears, for example, will continue to drag behind after the dog begins to run, and after the dog stops, the ears will flop forward under their own inertia.** The ears motion is a secondary action. The movement of each must be timed carefully so it will have the correct feeling of weight, and it must continue to follow through the pattern of action in a believable way, no matter how broadly it is cartooned.

## OVERLAPPING ACTION-

**When a character has appendages that are not held rigidly to the main body, but are still driven by their own volition,** these appendages must demonstrate to the audience that they have mass, energy and motivation of their own. A hound's tail, for example, will tend to drag behind after the dog begins to run, and after the dog stops, the tail will tend to flop forward under its own inertia. Unlike the ears, however, the tail has its own bone and muscle structure. Instead of simply following the dictates of gravity and inertia, the tail will wag, lift or droop in addition to its inherited secondary actions. The tail will never move on precisely the same frame as the dog's hips, so the tail's action overlaps the hips and the tail's aggregate motion is therefore an overlapping action. Overlapping action can precede the main action as well as follow it. Secondary action, as the name implies, can only second, or follow, the main action.

## EASE IN AND EASE OUT-

Objects in the real world can't abruptly change from standing still to moving very fast. **Any object that has mass needs a little time to get up to speed. The more mass, the longer the acceleration, the more energy is required.** The same is true for slowing down, changing direction, or distorting the object's shape.

In animation, a gradual change that leads into an action is called an ease-in. Coming out of an action gradually is called an ease-out. The precise timing of an ease tells the audience just how massive the object is and how much energy it is using to perform the action.

## SNAP-

Snap is the animator's term for **action that is quick, lively, and full of energy.** Use splines to add quicker action to an object, called snap.

## EXAGGERATION-

If a character is sad, make him sadder; bright, make him brighter; worried, more worried; wild make him wilder. Push everything to the extreme, don't be scared to push it.

## TIMING-

If the overall pattern contains accents and surprises, **contrasts of smooth flowing actions with short, jerky moves, and unexpected timing**, the whole thing becomes a delight to watch.

## STAGING-

**The presentation of an idea so that it is completely and unmistakably clear.**

An action is staged so that it is understood, a personality so that it is recognizable, an expression so that it can be seen, a mood so that it will affect the audience. Each is communicating to the fullest extent with the viewers when it is properly staged. Is the scene funnier in a long shot where everything can be seen or in a close-up featuring the personality?

## MOVING HOLDS-

A moving hold is **a series of tiny, subtle motions that mimic the behavior of a real living creature**. Your audience perceives these clues unconsciously and automatically accepts the illusion that the animated character is alive. Example: scaling the chest for breathing.

## ARCS-

Straight line movement is an illusion. The movement of most living creatures will follow a slightly circular path. **Any simple projectile-- whether bullet, spacecraft, or Olympic high-jumper-- moves in an arc**, defined by its velocity, mass, the force of gravity, and the resistance of the air. Over a short distance, the trajectory may appear flat, but it is actually a curve. Generally, the slower the movement, the more pronounced the curve.

## APPEAL-

Anything that a person likes to see, a quality of charm, pleasing design, simplicity, communication, and magnetism. **A weak or complicated action that is hard to read lacks appeal**. Poor design, clumsy shapes, awkward moves, all are low on appeal. Only simple and direct attitudes make good animation, without good poses we have little appeal.

## STRAIGHT AHEAD ACTION VS. POSE TO POSE-

There are two main approaches to animation: **Straight ahead action-** the animator literally works straight ahead from his first drawing in the scene. He does one drawing after another, getting new ideas as he goes along, until he reaches the end of the scene. **Pose to Pose-** The animator plans his action, and draws only the essential Key drawings, exaggerating the poses as much as possible. The inbetweener later added the inbetween frames.