Principles of Animation

Disney's *Twelve Basic Principles of Animation* is a set of principles of animation introduced by the Disney animators - Ollie Johnston and Frank Thomas in their 1981 book "The Illusion of Life: Disney Animation. These principles came as a result of reflection about their practice and through Disney's desire to devise a way of animating that seemed more 'real' in terms of how things moved, and how that movement might be used to express character and personality.

The main purpose of the principles was to produce an illusion of characters adhering to the basic laws of physics, but they also dealt with more abstract issues, such as emotional timing and character appeal.

The book and some of its principles have been adopted by some traditional studios, and have been referred to by some as the "Bible of animation." In 1999 the book was voted number one of the "best animation books of all time" in an online poll. Though originally intended to apply to traditional, hand-drawn animation, the principles still have great relevance for today's more prevalent computer animation.

Character animation is about an artist bringing a character to life. It isn't rotoscoping or blindly copying motion. It isn't using raw motion capture or other automated techniques to make something simply move. In much the same way tracing isn't really drawing, animation requires the artist to interpret and create something that is more than the original. The below principles are the foundation upon which good character animation lies. With practice, patience and perseverance ones animation skills will improve.

The Principles of Animation are as follows:-

- **Squash and Stretch**
- **Timing**
- **Anticipation**
- **Staging**
- **Follow Through and Overlapping Action**
- **Straight Ahead Action and Pose-To-Pose Action**
- **Slow In and Out**
- **Arcs**
- **Exaggeration**
- **Secondary Action**
- **Appeal**
- **Strong Drawing**

1. **Squash and Stretch**

The most important principle is "squash and stretch", the purpose of which is to give a sense of weight and flexibility to drawn objects. It can be applied to simple objects, like a bouncing ball, or more complex constructions, like the musculature of a human face. Taken to an extreme point, a figure stretched or squashed to an exaggerated degree can have a comical effect. In realistic animation, however, the most important aspect of this principle is the fact that an object's volume *does not* change when squashed or stretched. If the length of a ball is stretched vertically, its width (in three dimensions, also its depth) needs to contract correspondingly horizontally.
Rigidity
When an object moves, its movement indicates the rigidity of the object. Many real world objects have little flexibility, such as furniture, however most organic objects have some level of flexibility in their shape. Take for example a bouncing ball. A rubber ball bounces higher and squashes more upon impact than a hard league ball. The ease with which an object squashes and stretches defines the rigidity of the material making up an object.

Volume
When a person smiles, the shape of the face is determined by the movement of muscles underneath a layer of skin. During a smile, though the head seems to increase in size, with the widening of the mouth and jaw, it does not. The object is simply displacing its matter into the stretched shape. The most important rule to squash and stretch is that no matter how squashed or stretched out an object gets, its volume remains constant.

Guidelines
The squashed position depicts the form either flattened out by an external pressure or constricted by its own power. The stretched position always shows the same form in a very extended condition.

One very important rule of squash and stretch is that volume should always remain consistent. In the bouncing ball example above, when the ball squashes it scales down in addition to expanding outwards, thus retaining the same volume. Similarly, it becomes narrower when stretching. Though it is used many times just for comedic effect, squash and stretch generally makes animation look more natural, alive, and interesting. Note the difference between the two jumping mice loops below. The one without deformation looks stiff, whereas the one that uses this principle is more organic and alive.

Squash and stretch is not just limited to the deformation of organic bodies. Its basic concept carries on to all forms of posing and motion. The drawings below represent the major poses of a jump. The character's
body parts barely deform if at all. Instead the squash is represented by the crouch in the Anticipation and Recovery poses, and the stretch is contained in the Jump and Fall poses.

2. **Timing**

Timing refers to the number of drawings or frames for a given action, which translates to the speed of the action on film. On a purely physical level, correct timing makes objects appear to obey the laws of physics; for instance, an object's weight determines how it reacts to an impetus, like a push. Timing is critical for establishing a character's mood, emotion, and reaction. It can also be a device to communicate aspects of a character's personality. *Timing*, or the speed of an action, is an important principle because it gives meaning to movement. The speed of an action defines how well the idea will be read to the audience.

**Weight**
Timing can also define the weight of an object. Two similar objects can appear to be vastly different weights by manipulating timing alone.

For example, if you were to hit a croquet ball and a balloon with a mallet, the result would be two different actions. The croquet ball would require more force to place it into motion, would go farther, and need more force to stop it. On the other hand, the balloon would require far less force to send it flying, and because of its low mass and weight, it wouldn't travel as far, and would require less force to stop it.

**Scaling Properties**
Timing can also contribute to size and scale of an object or character. A larger character has more mass, more weight and more inertia than a tiny character, therefore it moves slower. In contrast, a tiny character has less mass, weight, and inertia, therefore its movements are quicker.

**Determining Emotion**
Timing plays an essential role in illustrating the emotional state of an object or character. It is the varying
speed of the characters movements that indicate whether a character is lethargic, excited, nervous, or relaxed.

Expertise in timing comes best with experience and personal experimentation, using the trial and error method in refining technique. The basics are: more drawings between poses slow and smooth the action. Fewer drawings make the action faster and crisper. A variety of slow and fast timing within a scene adds texture and interest to the movement. Most animation is done on twos (one drawing photographed on two frames of film) or on ones (one drawing photographed on each frame of film). Twos are used most of the time, and ones are used during camera moves such as trucks, pans and occasionally for subtle and quick dialogue animation. Also, there is timing in the acting of a character to establish mood, emotion, and reaction to another character or to a situation. Studying movement of actors and performers on stage and in films is useful when animating human or animal characters. This frame by frame examination of film footage will aid you in understanding timing for animation. This is a great way to learn from the others.

Timing is the essence of animation. The speed at which something moves gives a sense of what the object is, the weight of an object, and why it is moving. Something like an eyeblink can be fast or slow. If it’s fast, a character will seem alert and awake. If it’s slow the character may seem tired and lethargic.

**J. Lesseter’s example. Head that turns left and right.**

- Head turns back and forth really slow: it may seem as if the character is stretching his neck (lots of in between frames).
- A bit faster it can be seen as saying "no" (a few in between frames).
- Really fast, and the character is reacting to getting hit by a baseball bat (almost none in between frames).

### 3. Anticipation

An action can be divided into three phases: **preparation for the action, the action itself, and termination.** **Anticipation** is the preparation, and it tends to be the longest and most important part of an action. It helps set up what a character is about to do and directs attention to where the movement will take place, so that once the action happens the viewer will better understand what is going on. Anticipation in its most basic form is an action that takes place in the opposite direction of the main action. Some common examples are the wind-up for a pitch and the crouch before a jump.

**Anticipation** is used to prepare the audience for an action, and to make the action appear more realistic. A dancer jumping off the floor has to bend his knees first; a golfer making a swing has to swing the club back first. The technique can also be used for less physical actions, such as a character looking off-screen to anticipate someone’s arrival, or attention focusing on an object that a character is about to pick up.

**Anticipation: A baseball player making a** pitch** prepares for**
**the action by moving his arm back.** An action occurs in three parts: the preparation for the action, the action itself, and the termination of the action. *Anticipation* is the preparation for the action. Anticipation is an effective tool for indicating what is about to happen.

![Action Diagram]

**Indicating Speed**

Take the swing of a bat. If the bat is swung far back, one expects the ball to fly far and away upon contact, or the batter to fall over from the power of the swing. If the bat is only pulled slightly back, we expect a ground ball, or a pop fly with very little distance. The amount of anticipation used considerably affects the speed of the action which follows it. If the audience isn't properly prepared for a fast action, they may miss it completely. The anticipating action must be made larger or the action slower.

**Directing Attention**

Anticipation can also be used to direct the audience's attention. A character looking off screen and reacting provides the audience with a cue to where an important action is about to happen.

**Revealing**

In addition, Anticipation could be used to indicate what a character is about to do. When a person is about to steal something, their eyes shift up and down the grocery aisle, looking for security, and then at the item they wish to take. This action gives the audience an opportunity to see what the thief will take before he acts.

**Rules are made...**

Anticipation could also be used to mislead the audience. When a person goes to lift a large object, their body bends over more and they widen their stance. The anticipated action would be a struggle to raise the object off the ground, however the action could result in the objects flying off of the ground and the person falling over from the miscalculation.

4. **Staging**

Staging is presenting an action or item so that it is easily understood. An action is staged so that it is understood; a personality is staged so that it is recognizable; an expression so that it can be seen; a mood so that it will affect the audience. In general, it is important that action is presented one item at a time. If too much is going on the audience will be unsure what to look at and the action will be "upstaged". With characters, it is important to really think about whether or not each pose for an action adequately and correctly reads to the audience. You should also make sure no two parts of a character contradict each other (unless it’s intended). For example if you’re staging a sad pose you may have the character hunched...
over with his arms hanging at his sides and a high camera angle...but if you give him this big grin on his face it won't fit with the rest of the pose.

Staging multiple characters is also an important issue. Generally you want to always make sure you know where the audience is looking within the shot. Background characters must be animated such that they are still "alive", but not so much that they steal the viewer's attention from the main action. Staging like this is also related to a lot of directing and editing principles.

This principle is akin to staging as it is known in theatre and film. Its purpose is to direct the audience's attention, and make it clear what is of greatest importance in a scene; Johnston and Thomas defined it as "the presentation of any idea so that it is completely and unmistakably clear", whether that idea is an action, a personality, an expression or a mood. This can be done by various means, such as the placement of a character in the frame, the use of light and shadow, and the angle and position of the camera. The essence of this principle is keeping focus on what is relevant, and avoiding unnecessary detail.

A pose or action should clearly communicate to the audience the attitude, mood, reaction or idea of the character as it relates to the story and continuity of the story line. The effective use of long, medium, or close up shots, as well as camera angles also helps in telling the story. There is a limited amount of time in a film, so each sequence, scene and frame of film must relate to the overall story. Do not confuse the audience with too many actions at once. Use one action clearly stated to get the idea across, unless you are animating a scene that is to depict clutter and confusion. Staging directs the audience's attention to the story or idea being told. Care must be taken in background design so it isn't obscuring the animation or competing with it due to excess detail behind the animation. Background and animation should work together as a pictorial unit in a scene.

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

**Readability**
An action is staged so that it is understood. To stage an idea clearly, the audience's eye must be led to exactly where it needs to be at the right moment. It is important that when staging an action, that only one idea be seen by the audience at a time.

For example, in a scene with plenty of action, the audience's eye will be drawn to an object at rest. Conversely, in a still shot, the eye will be drawn to the item in motion. The animator is saying, in effect, "Look at this, now look at this, and now look at this."

**Personality**
A personality is staged so that it is recognizable; an expression so that it can be seen;: A shy child would turn their eyes down, and slightly rotate their upper body away for the gaze of another child. The child's actions reveal the fact that he is shy. When staging a personality, it is useful to use characteristics that clearly define the character.

**Mood**
A mood is staged so that it will affect the audience. The tight composition of dark trees in a dense forest, leaning in toward a scared youth; eyes glowing from within the thick; hurried breathing filling the air; the child's eye wide open. All of these elements have been clearly staged to inspire fear.
5. Follow through and Overlapping Action

Follow Through
While anticipation is the preparation of an action, **follow through is the termination of an action**. Actions rarely come to a sudden and complete stop, but are generally carried past their termination point. 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.

Initiation
In figure movement, actions of the parts are not simultaneous, some parts initiate moves, while others follow. For example, the wrist leads the hand and fingers in a gesture.

Weight and Drag
Appendages or loose parts of a character or object will drag behind the leading part of the object. Then as the object comes to a stop, the looser parts continue to move taking longer to settle down and stop. Weight of the appendages dictates the speed with which they follow the lead, heavier objects drag farther behind. The lighter the object the smaller the drag and the quicker the stop.

Overlapping Action
Slight variations in the timing and speed of loose parts makes objects seem more natural. This **overlapping action** makes the objects and movement more interesting. An action should never be brought to a complete stop before starting another action. Overlapping maintains a continual flow between whole phrases of actions.

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 is a general heading for two closely related techniques which help to render movement more realistically, and help to give the impression that characters follow the **laws of physics**, including the **principle of inertia**. "Follow through" means that loosely tied parts of a body should continue moving after the character has stopped and the parts should keep moving beyond the point where the character stopped to be "pulled back" only subsequently towards the **center of mass** and/or exhibiting various degrees of **oscillation damping**. "Overlapping action" is the tendency for parts of the body to move at different rates (an arm will move on different timing of the head and so on). A third related technique is "drag", where a character starts to move and parts of him take a few frames to catch up. These parts can be inanimate objects like clothing or the antenna on a car, or parts of the body, such as arms or hair. On the human body, the torso is the core, with arms, legs, head and hair appendices that
normally follow the torso's movement. Body parts with much tissue, such as large stomachs and breasts, or the loose skin on a dog, are more prone to independent movement than bonier body parts. Again, exaggerated use of the technique can produce a comical effect, while more realistic animation must time the actions exactly, to produce a convincing result.

The "moving hold" animates between similar key frames, even characters sitting still can display some sort of movement, such as the torso moving in and out with breathing.

**Overlapping action** is the idea that parts of a character don't move all at the once or one at a time; they start and end moving at different times, resulting in overlap. This not only applies to how a character's individual limbs move in relation to the rest of their body, but to how broader actions blend into a sequence of movements. Animation that utilizes this principle will look more fluid and alive since it is more natural for actions to flow into each other than to happen one by one.

For overlap on individual parts of a character, generally one part leads the primary motion while other attached limbs and appendages follow. Take a look at the two examples below of a raised arm being lowered. The upper arm leads the movement in both cases, however in the example to the right the forearm lags behind the upper arm and the hand lags behind the forearm. Also notice that the upper arm reaches its end position first, followed by the forearm, which is then followed by the hand. The key attribute is that each part only follows the movement of their parent limb. They do not move in parallel and do not end their movement at the same time like in the example to the left.

Coupled with overlapping action is **follow-through**. When a leading part ceases motion, attached parts will continue moving until they, too, settle to a stop. This is similar to how long hair on a runner who has just come to an abrupt halt might move. Follow-through also more broadly describes the continuing motion in the third and final "termination" phase of an action. For example, when a baseball leaves a pitcher's hand, the main part of the pitcher's motion is done but they must still follow through with their continued momentum before completely finishing the action.

Watch the jump below for an example of both overlap and follow-through. Pay attention to how the tail moves. Even after the character has recovered from the jump the tail continues to settle from the impact. Here the tail is also an example of the secondary action principle. The tail is not necessary for the animation to work, but it supports the main action.

6. **Straight Ahead Action and Pose to Pose**

There are two different animation methods to consider: **pose to pose** and **straight ahead**.

Pose to pose animation involves defining a set of "key" poses which represent the extremes of a particular action. The ball from the graph editor exercise is an example of this. Each time it reaches the highest point of a bounce and each time it hits the ground is a key pose. After the main poses are set, additional poses (referred to as "in-betweens" or "break-downs") are added to further define the motion. Though in the
graph editor exercise you modified tangents to change how long the ball stayed in the air and how fast it moved upon bouncing, these things could have also been specified by creating in-betweens.

Straight ahead animation is more freeform. After the first frame is defined, subsequent frames are completed one at a time until the entire animation is finished. This can result in some interesting and fluid motion. Though the general workflow we use for 3D animation is pose to pose, there are times when frame-by-frame straight ahead animation is quite useful (especially in the final polishing stage of motion). For example, the overlapping action on the character’s tail in the above clip was fine tuned using straight ahead animation.

"Straight ahead action" means drawing out a scene frame by frame from beginning to end, while "pose to pose" involves starting with drawing a few key frames, and then filling in the intervals later. "Straight ahead action" creates a more fluid, dynamic illusion of movement, and is better for producing realistic action sequences. On the other hand, it is hard to maintain proportions, and to create exact, convincing poses along the way. "Pose to pose" works better for dramatic or emotional scenes, where composition and relation to the surroundings are of greater importance. A combination of the two techniques is often used.

Computer animation removes the problems of proportion related to "straight ahead action" drawing; however, "pose to pose" is still used for computer animation, because of the advantages it brings in composition. The use of computers facilitates this method, as computers can fill in the missing sequences in between poses automatically. It is, however, still important to oversee this process and apply the other principles discussed.

**Straight Ahead Action**

*Straight ahead action* is so called because an animator literally works straight ahead from the first drawing in the scene. This process usually produces drawings and action that have a fresh and slightly zany look, because the whole process is kept very creative. Straight ahead action is used for wild, scrambling actions where spontaneity is important.

**Pose-To-Pose Action**

In *pose-to-pose* animation, the animator plans his action, figuring out just what drawings will be needed to animate the scene. Pose-to-pose is used for animation that requires good acting, where poses and timing are important.

**Relevance in CGI**

Pose-to-pose action is an important tool in computer animation. Objects are built in a hierarchy, where each layer of the hierarchy has an associated transformation. Animation is then built up one transformation at a time from one pose to the next. For example, when animating a person walking, you would first set the pose position for the hips at the start of the motion, then you would adjust the hip translation for the end of the action. Then building upon this original pose, you would transform other objects in the model, until you had traversed the hierarchy. All of your actions must be well thought out, and the timing and poses planned so that even in the early stages, the action is clear.

**7. Slow ins and Slow out**

As action starts, we have 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. For a gag action, we may omit some slow-out or slow-ins for shock appeal or the surprise element. This will give more snap to the scene.

_Slow in and out_ deals with the spacing of the inbetween drawings between the extreme poses.

![Image of non-linear interpolation]

Interpolation

By default, interpolation of an objects inbetween positions between extreme poses are evenly spaced, and graphed as a straight line from one value to another. "Slowing out"(_ease out_) of one pose, then "slowing in" to the next pose generate inbetweens clustered on either end of the distance between the extremes, with less inbetweens toward the center. When graphed, an ease in and out is graphed as a spline from one pose to the next.

**Speed**

Eases can be used to create acceleration and deceleration. As a ball bounces, it accelerates and decelerates. When you drop the ball, it gains speed as it approaches the ground. After the impact on the ground it bounces and begins to loose speed as it reaches the apex of its bounce. The graph of the balls acceleration would show an increasing distance between the balls positions as it came closer to the ground. Similarly, the graph of the balls bounce off the ground would indicate a decreasing distance between the balls positions as it reaches the apex.

![Image of overshoooting and tangency]

**Tangency**

With this type of spline interpolation, it is common to have spline overshooting at extreme poses when there is a large change in value between them over a small number of frames. Tangency handles can be used to manipulate the tension of the spline, reducing the overshooting and achieving the desired inbetween.

One common problem in beginning animation is character motion that tends to start, stop, or change directions abruptly, resulting in robotic movement. An easy way to fix this is to use the _ease in and out_ animation principle (also referred to as "slow in and out"). A natural example of this principle can be seen in the pendulum below. As gravity overtakes the pendulum it begins to slow down to a brief stop, until it begins accelerating again in the opposite direction.

The concept of gradual acceleration and deceleration in the pendulum example is useful to keep in mind when timing out character animation. Even in small doses of two or three frames, easing in and out of poses where appropriate will aid in creating smoother motion, reducing the mechanical start/stop feel that can sometimes creep into animation.
8. Arcs

All actions, with few exceptions (such as the animation of a mechanical device), follow an arc or slightly circular path. This is especially true of the human figure and the action of animals. Arcs give animation a more natural action and better flow. Think of natural movements in the terms of a pendulum swinging. All arm movement, head turns and even eye movements are executed on an arc.

Expressive Motion
The visual path of action from one extreme to another is always described by an arc. In nature, arcs are the most economical routes by which a form can move from one position to another. Such arcs are used extensively in animation, since they create motion that is more expressive and less stiff than action along a straight path.

Relevance in CGI
In Computer Animation, motion is usually represented in a timeline view using splines (arcs). The arcs represent the values of an object’s parameters at a specific moment in time. The method used for calculating interpolated keyframe values determines the characteristic of the arc (motion). A linear interpolation creates motion that is rather dull and stiff. While a spline interpolation creates motion that is more expressive.

9. Exaggeration

Exaggeration is an effect especially useful for animation, as perfect imitation of reality can look static and dull in cartoons. The level of exaggeration depends on whether one seeks realism or a particular style, like a caricature or the style of an artist. The classical definition of exaggeration, employed by Disney, was to remain true to reality, just presenting it in a wilder, more extreme form. Other forms of exaggeration can involve the supernatural or surreal, alterations in the physical features of a character, or elements in the storyline itself. It is important to employ a certain level of restraint when using exaggeration; if a scene contains several elements, there should be a balance in how those elements are exaggerated in relation to each other, to avoid confusing or overawing the viewer.

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Exaggeration is not extreme distortion of a drawing or extremely broad, violent action all the time. It's like a caricature of facial features, expressions, poses, attitudes and actions. Action traced from live action film can be accurate, but stiff and mechanical. In feature animation, a character must move more broadly to look natural. The same is true of facial expressions, but the action should not be as broad as in a short cartoon style. Exaggeration in a walk or an eye movement or even a head turn will give your film more appeal. Use good taste and common sense to keep from becoming too theatrical and excessively animated. *Exaggeration* can be used in animation with great results.

**Essence**
However the key to proper use of exaggeration lies in exploring the essence of the action or idea, understanding the reason for it, 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. If he is angry, make him furious.

**Balance**
A scene has many components to it including design, action, objects and emotion. Exaggeration of every element in a scene creates a feeling of uneasiness in your audience. Everything is distorted and unrealistic. Find a balance in your scene. Allow your audience a grounds for comparison of the exaggeration and by so doing, the whole scene will remain very realistic to them.

**10. Secondary Action**
Adding secondary actions to the main action gives a scene more life, and can help to support the main action. A person walking can simultaneously swing his arms or keep them in his pockets, he can speak or whistle, or he can express emotions through facial expressions. The important thing about secondary actions is that they emphasize, rather than take attention away from, the main action. If the latter is the case, those actions are better left out. In the case of facial expressions, during a dramatic movement these will often go unnoticed. In these cases it is better to include them at the beginning and the end of the movement, rather than during.

This action adds to and enriches the main action and adds more dimension to the character animation, supplementing and/or re-enforcing the main action. Example: A character is angrily walking toward another character. The walk is forceful, aggressive, and forward leaning. The leg action is just short of a stomping walk. The secondary action is a few strong gestures of the arms working with the walk. Also, the possibility of dialogue being delivered at the same time with tilts and turns of the head to accentuate the walk and dialogue, but not so much as to distract from the walk action. All of these actions should work together in support of one another. Think of the walk as the primary action and arm swings, head bounce and all other actions of the body as secondary or supporting action.

A *secondary action* is an action that results directly from another action. Secondary actions are important in heightening interest and adding a realistic complexity to the animation.
The secondary action of Luxo Jr’s forward motion is the rippling of his power cord.

Conflict
If a secondary action conflicts with, becomes more interesting, or dominates in any way, it is either the wrong choice or is staged improperly.

Facial Animation Dangers
Generally, in facial animation, the movement is a secondary action, subordinate to the bodies movement. The danger with facial animation isn’t that it will dominate the scene, but that it will not be seen. The change in expression should happen before or after a move, changes in the middle of a major move will mostly likely go unnoticed.

11. Appeal

Appeal in a cartoon character corresponds to what would be called charisma in an actor. A character who is appealing is not necessarily sympathetic – villains or monsters can also be appealing – the important thing is that the viewer feels the character is real and interesting. There are several tricks for making a character connect better with the audience; for likable characters a symmetrical or particularly baby-like face tends to be effective. A complicated or hard to read face will lack appeal, it may more accurately be described as 'captivation' in the composition of the pose, or the character design.

Appeal means anything that a person likes to see. This can be quality of charm, design, simplicity, communication or magnetism. Appeal can be gained by correctly utilizing other principles such as exaggeration in design, avoiding symmetry, using overlapping action, and others. One should strive to avoid weak or awkward design, shapes and motion. It’s important to note that appeal doesn't necessarily mean good vs. evil. For example, in Disney's animated classic "Peter Pan", Captain Hook is an evil character, but most people would agree that his character and design has appeal. The same goes for Hopper in "A Bug's Life". Even though he's mean and nasty, his design and characterization/personality still has a lot of 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. Over the years, the artists have learned that to produce a feature there was a need for story continuity, character development and a higher quality of artwork throughout the entire production. Like all forms of storytelling, the feature has to appeal to the mind as well as to the eye. Where the live action actor has charisma, the animated character has appeal.

Quality
Audiences like to see a quality of charm, pleasing design, simplicity, communication, or magnetism. A weak drawing or design lacks appeal. A design that is complicated or hard to read lacks appeal. Clumsy shapes and awkward moves all have low appeal.

The image on the left is not an appealing design, while the characters on the right rock.
Posing
In creating an appealing pose for a character, one thing to avoid is called "twins", where both arms and both legs are in the same position, doing the same thing. This creates a stiff pose that is unappealing. Vary the parts of the body a bit, including the facial features, makes a character more appealing.

12. Solid Drawing: The basic principles of drawing form, weight, volume solidity and the illusion of three dimension apply to animation as it does to academic drawing. The way you draw cartoons, you draw in the classical sense, using pencil sketches and drawings for reproduction of life. You transform these into color and movement giving the characters the illusion of three-and four-dimensional life. Three dimensional is movement in space. The fourth dimension is movement in time.

The principle of solid drawing means taking into account forms in three-dimensional space, giving them volume and weight. The animator needs to be a skilled draughtsman and has to understand the basics of three-dimensional shapes, anatomy, weight, balance, light and shadow, etc. For the classical animator, this involved taking art classes and doing sketches from life. One thing in particular that Johnston and Thomas warned against was creating "twins": characters whose left and right sides mirrored each other, and looked lifeless. Modern-day computer animators draw less because of the facilities computers give them, yet their work benefits greatly from a basic understanding of animation principles, and their additions to basic computer animation.