Master the 12 Principles of Animation

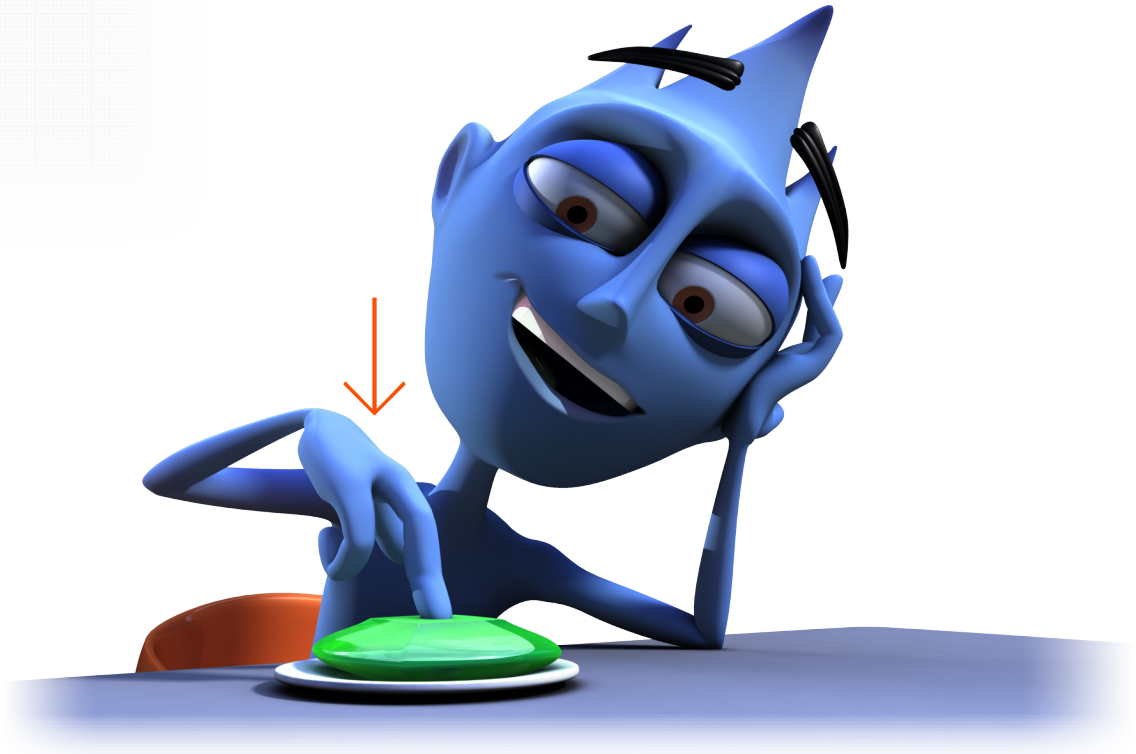
The 12 principles of animation are the most crucial techniques you must master as an animator. Created by the pioneers of animation Frank Thomas and Ollie Johnston, and first introduced in The Illusion of Life: Disney Animation. These 12 principles should be your ultimate guide for creating appealing and realistic character animations.

Explore the 12 principles and start mastering them in your own work to create captivating animations. If you ever get stumped on a principle or your animation needs some help, use this as a reference.

#1 Timing and Spacing

Timing and spacing in animation is what gives objects and characters the illusion of moving within the laws of physics. Timing refers to the number of frames in-between two poses. For example, if a ball travels from screen left to screen right in 24 frames that would be the timing, it takes 24 frames (or one second if you're working within the film rate of 24 frames per second) for the ball to reach the other side of the screen.

The spacing refers to how those individual frames are placed. Using the previous example the spacing would be how the ball is positioned in the other 23 frames. If the spacing is close together, the object moves slower, if the spacing is further apart the object moves faster.



#2 Squash and Stretch

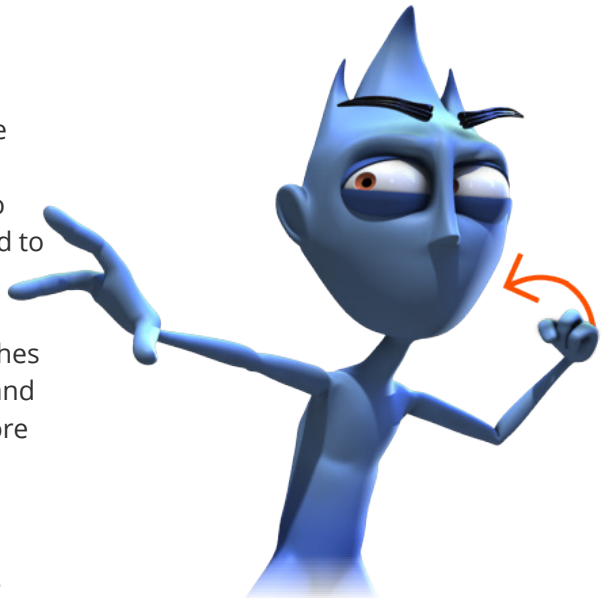
Squash and Stretch is what gives flexibility to objects. There is a lot of squash and stretch happening in real life that you may not notice; in animation this effect can be exaggerated. For instance, there is a lot of squash and stretch that occurs in the face when someone speaks, because the face is a very flexible area.

The easiest way to understand how squash and stretch works is to look at a bouncing ball. As the ball starts to fall and picks up speed, the ball will stretch out just before impact, and as the ball impacts the ground, it squashes, and as it takes off again it stretches.

Squash and stretch can be implemented in many different areas of animation, like the eyes during a blink or when someone gets surprised or scared, their face squashes down, and stretches. Squash and stretch is a great principle to utilize to exaggerate animations and add more appeal to a movement.

#3 Anticipation

Anticipation is used in animation to set the audience up for an action that is about to happen. Not only is anticipation needed to prepare the audience, but it's also required to sell believable movements.

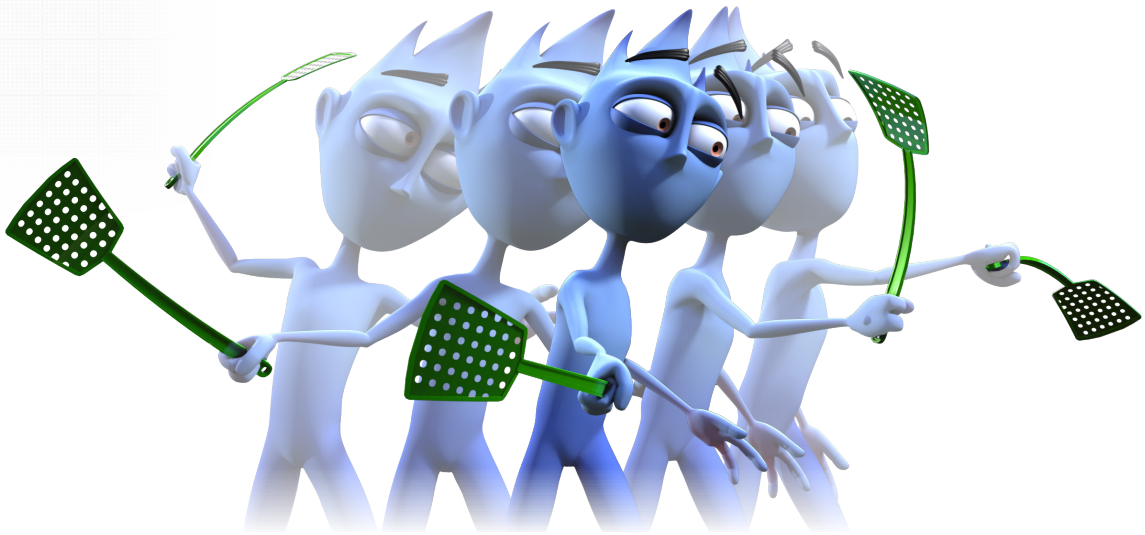


For example, before a baseball player pitches they first need to move their entire body and arm back to gain enough energy, and before a parkour enthusiast leaps of a ledge they first must bend their knees to prepare for the jump. Imagine if these actions had no anticipation, they would not be believable.

#4 Ease-In and Ease-Out

As any object or person moves or comes to a stop there needs to be a time for acceleration and deceleration. Without ease in and ease out (or slow in slow out), movements become very unnatural and robotic. For example, as a car starts from a stop it doesn't just reach full speed in an instant, it first must accelerate and gain speed. As it comes to a stop it doesn't go from sixty to zero in the blink of an eye, if it did, it would not be realistic. Instead, it slowly decelerates until it reaches a complete stop.

The same must be accomplished in an animation, and the easiest way to accomplish ease in and ease out is to utilize the principle of spacing. As a character stands up from a sitting position the spacing will be closer together at the start, so they ease into the movement, and as they stand up, they will ease out of the movement. Without this acceleration and deceleration of actions everything would be very abrupt and jarring.



#5 Follow Through and Overlapping Action

Follow through and overlapping action can be considered two different principles, but they're still closely related.

Follow through is the idea that individual body parts will continue moving after the character has come to a stop. For example, as a character comes to a stop from a walk, every part of the body won't stop at the exact same time, instead, the arms may continue forward before coming to a settle. This could also be articles of clothing that continue to move as the character comes to a stop.

Overlapping action is very similar in that it means different parts of the body will move at different times. For example, if a character raises their arm up to wave, the shoulder will move first, and then the arm, and the elbow and hand may lag behind a few frames. You may have also heard this referred to as "drag" or "lead and follow" You can even see an example of overlapping action in something like a blade of grass, the base moves first, and the rest of the grass follows behind at different rates, giving you that waving motion.

In real life everything moves and different speeds and at different moments in time, and that is why follow through and overlapping action is so important for capturing realistic and fluid movement.

#6 Arcs

Everything in real-life typically moves in some type of arcing motion, and in animation you should adhere to this principle of arcs to ensure your animation is smooth and moves in a realistic way.

The only time something would move in a perfectly straight line is if you're trying to animate a robot, because it's unnatural for people to move in straight lines.

For example, if a character is turning their head, they will dip their head down during the turn creating an arcing motion. You also want to ensure the more subtle things move in arcs as well, for example the tips of the toes should move in rounded arcing motions as the character walks.

#7 Exaggeration

Exaggeration is used to push movements further to add more appeal to an action. Exaggeration can be used to create extremely cartoony movements, or incorporated with a little more restrain to more realistic actions. Whether it's for a stylized animation or realistic, exaggeration should be implemented to some degree.

If you have a realistic animation, you can use exaggeration to make a more readable or fun movement while staying true to reality. For example, if a character is preparing to jump off a diving board, you can push them down just a little bit further before they leap off. You can also use exaggeration in the timing as wall to enhance different movements or help to sell the weight of a character.

#8 Solid Drawing

In 2D animation solid drawing is about creating accurate drawings with volume and weight, and thinking about the balance and anatomy in a pose. With 3D animation, animators are less likely to rely on their drawings, but the idea of solid drawing is just as important.

With solid drawing you need to think about how you pose out your 3D character rig, ensuring there is correct balance and weight in the pose, as well as a clear silhouette. You also want to avoid what is called "twinning," which basically means the pose you have created is mirrored across to the other side.

#9 Appeal

This principle can really come down to adding more appeal in many different areas of your animation, like appeal in posing. However, the most obvious example is appeal in the character design, you want to have a character that the audience can connect or relate to. A complicated or confusing character design can lack appeal.

You can find areas on the character to push and exaggerate to create a more unique character design that will stick out in the audience's memory. For example, simply exaggerating the jaw of the character or pushing the youthfulness in the eyes can help create more appeal.

#10 Straight Ahead Action and Pose to Pose

Straight ahead and pose to pose refers to the two different techniques for how you go about animating. With straight ahead it's very spontaneous and more of a linear approach. You'll create each pose or drawing of the animation one after the other.

With pose to pose it's much more methodical and planned out, with just the most important poses required to properly tell the action. For example, you could approach a jump with just four poses, the character standing, crouched, in the air, and back on the ground. It allows you to work much simpler, and ensure the posing and timing is correct before adding more detail.

#11 Secondary Action

Secondary action refers to creating actions that emphasize or support the main action of the animation; it can breathe more life into an animation and create a more convincing performance.

It's important to remember that the secondary action should typically be something subtle that doesn't detract from the main action happening, and can be thought of as almost a subconscious action. For example, a character talking to another character in a waiting room, the two of them talking would be the main action, and if that character began tapping their fingers nervously, that would be the secondary action.

A character walking down the street while whistling could be another example of secondary action or a person leaning up against a wall talking to some people at school, the main action is the character leaning against the wall and talking, and then putting in an action of them crossing their arms would be the secondary action.

#12 Staging

Staging is how you go about setting up your scene, from the placement of the characters to the background and foreground elements and how the camera angle is set up. The purpose of staging is to make the message of the animation unmistakably clear to the viewer. This could be ensuring the camera is set up in a way to communicate the characters expression clearly, or setting up two different characters so that both of them are easily viewed from the specific angle.

You want to keep focus on the purpose of the shot and what you want to communicate so the audience doesn't become confused.

Now that you know the meaning and purpose behind each principle be sure to implement these 12 key principles into all your animations, and you'll be sure to create stunning work!

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