



CHARACTER ANIMATION BOOTCAMP

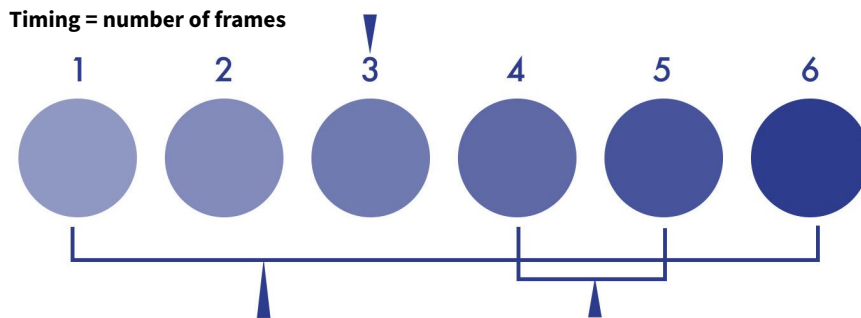
THE 12 PRINCIPLES OF ANIMATION

GET PHYSICAL

Today we're going to explore The 12 Principles of Animation which were developed by the leading Disney animators in the 1930's and documented by two of the greatest of those animators Ollie Johnston and Frank Thomas in their book "The Illusion of Life". These principles brought much greater realism and expression to character animation and are still used by animators today. The 12 Principles achieved this greater realism and expressive movement by being heavily informed by mechanical physics, as well as the arts of theater and film. But because it's so fundamental to creating believable moment, a basic understanding of Newton's 3 laws and mechanical physics is essential for animators!

1 - TIMING

- Timing is the fundamental principle of all animation.
- "Timing" really means the intersection of timing and spacing.



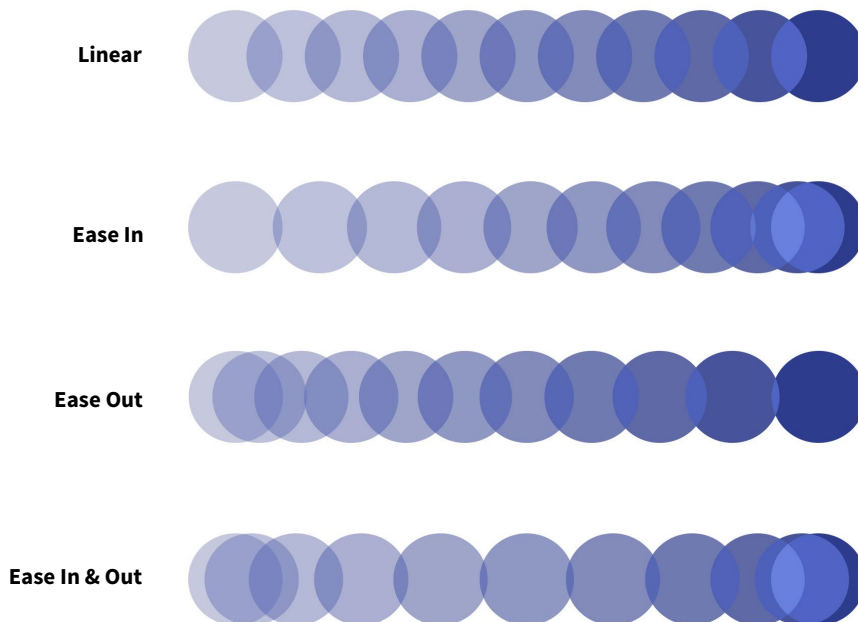
Spacing = distance and/or rate of change between keyframes, or individual frames

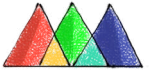
- More frames and/or closer spacing = slower movement
- Less frames and/or wider spacing = faster movement

Timing is what changes "random movement" into "animation" by giving our movement meaning. It can communicate weight, energy, emotion, and story, it's what creates the "illusion of life"!

2 - EASE IN AND EASE OUT

Ease in and out is the gradual speeding up and/or slowing down of movement. Most objects will not start out at full speed or come to a dead stop, so easing is more natural and reflects correct mechanical physics.





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3 - ANTICIPATION

Anticipation is a smaller motion in the opposite direction of the larger movement being animated. If a character jumps off the ground, they have to crouch down first; a character pitching a ball has to “wind up” before a pitch, etc. Anticipation can also be more subtle, such as a character looking at an object before picking it up. Walt Disney used to refer to this as “aiming”, which is another great way to think about “anticipation”.

Anticipation has two big advantages:

- *It's often necessary for correct mechanical physics - (Newton's 3rd law!)*
- *It helps prepare the audience for what's to come, making your animation more clear and communicative.*

ANTICIPATION

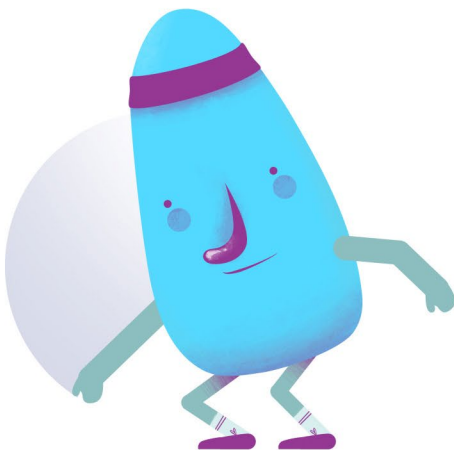


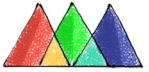
ACTION



4 - ARCS

Most human and animal movement follow arcing paths, as do the trajectory of thrown or projected objects. Rotating limbs arc by design, but because we're often using the position values on controllers in After Effects, rather than directly rotating the limbs, we have to shape the arcs in the motion paths.



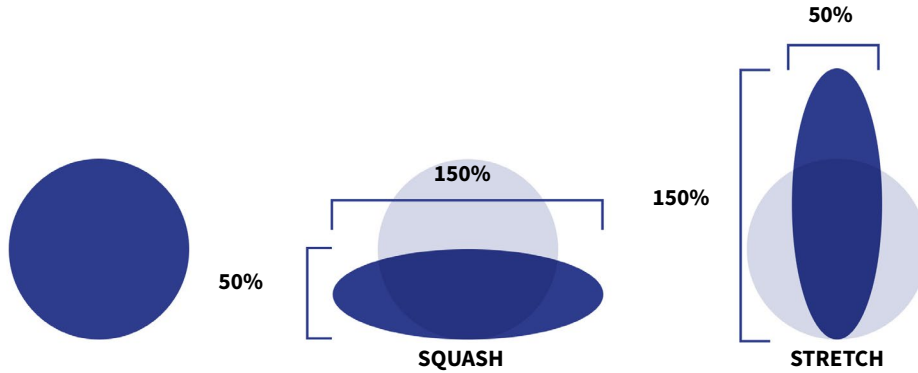


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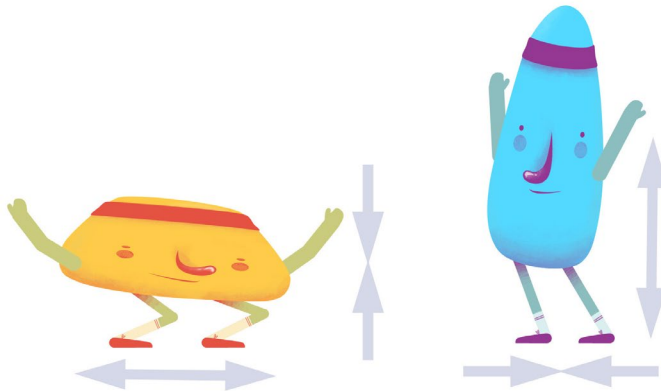
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5 - SQUASH AND STRETCH

Squash and stretch can make objects and characters feel more soft and flexible, and helps communicate weight and the forces at work on the figure. The most important thing to remember about squash and stretch is that the volume of the figure must remain consistent throughout.

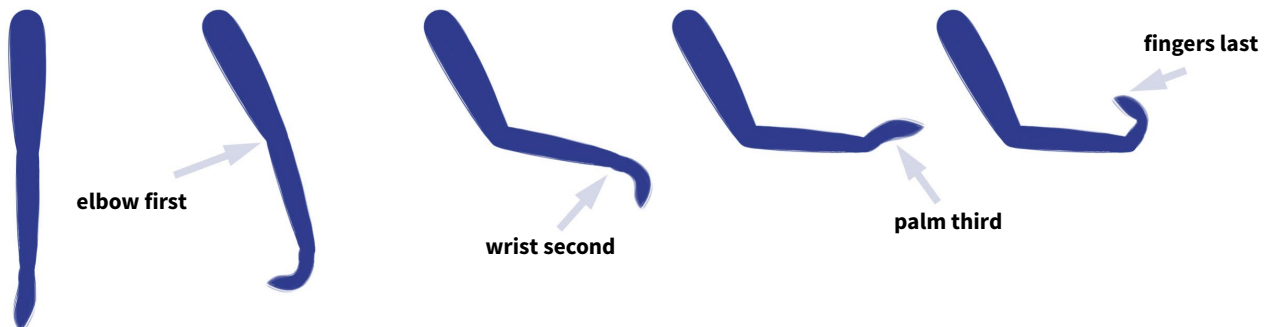


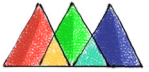
A figure does not have to actually deform to create a sense of squash and stretch. A character in a crouched position will appear “squashed”, and if they stand on their tip-toes with arms outstretched they will feel “stretched”.



6 - OVERLAP AND FOLLOW THROUGH

The different parts of human or animal bodies do not move all at the same time, some parts lead and other parts follow. This creates an offset where the lead (first) part moves, then the next part down the chain follows, then the next, and the next, and so on. When the body comes to rest the “lead” parts arrive first, and the other parts come to rest in sequence. Most human movements begin in the pelvis / hips, but hand gestures are often lead by the wrist, and head movements are often lead by the eyes.





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7 - EXAGGERATION

In character animation we're working with figures and movement that are to one degree or another abstracted, so we need to exaggerate poses and timing to clearly communicate. We always want to try and "push" both our poses and our timing as far as we can to emphasize attitude, emotion, weight, and the forces influencing the figure.

8 - SECONDARY ACTION

Often confused for Overlap and Follow through, Secondary Action is really the layering of one movement on top of another. A simple example would be a laugh where the shoulders bounce up and down while the body rocks back and forth at the same time but at a different speed. A more complex example would be a character walking while flipping a coin or juggling with his hands.

9 - STRAIGHT AHEAD AND POSE TO POSE

Refers to two basic techniques used by traditional animators.

Straight Ahead - The animator starts with the first drawing and works drawing to drawing until the end of the motion.



Pose to Pose - The "key" or "lead" animator draws the "extreme" or "key" drawings or poses at intervals throughout the motion, and the "assistant animator" or "inbetweener" fills in the drawing in between.



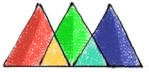
Ultimately because Pose to Pose had the most pros and fewest cons overall, most of those early animators decided on a hybrid technique based largely on a foundation of Pose to Pose animation, but using Straight Ahead techniques to finesse the Pose to Pose base - especially for fluid things like tails, capes, big floppy ears, etc.

10 - STAGING

- "The presentation of any idea so that it is completely and unmistakably clear" - Frank Thomas and Ollie Johnston

Staging is the act of posing the figures and laying out a scene in a way that optimizes how the movement will be seen by an audience. Staging considerations include:

- Good silhouettes on the key poses of characters.
- Optimal angles on figures for the motion being animated.
- Keeping backgrounds from visually competing with figures.
- Good compositions on scenes that lead the viewers eye.



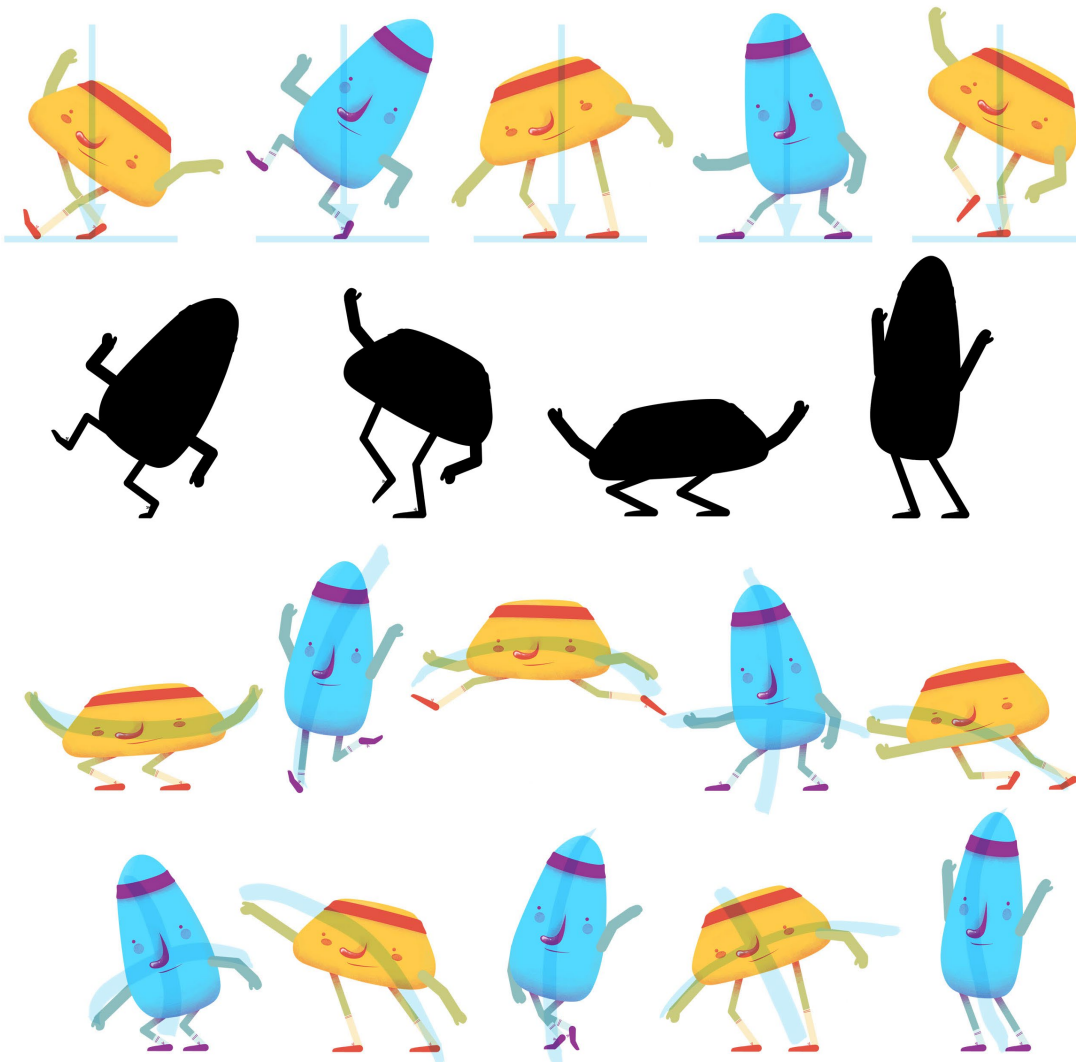
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11 - SOLID DRAWING (OR POSING)

Very specific to hand drawn animation, “Solid Drawing” originally referred to giving the drawings of characters a strong sense of weight and dimension. When working with rigged puppets, we can think of this as “Solid Posing” which we’ve discussed in the “Posing 101” PDF. Remember the following when you’re doing Solid Posing:

- *A strong sense of weight and balance*
- *Clear and attractive silhouettes*
- *Avoiding symmetry*
- *Posing along lines of action*



12 - APPEAL

Appeal is an inherent “charm” or “charisma” in the animation, posing, and/or design of a character. This does not mean “cute”, villains and monsters should have “appeal” too. In terms of animation, appeal has much to do with the performance of a character and how it connects to the audience.