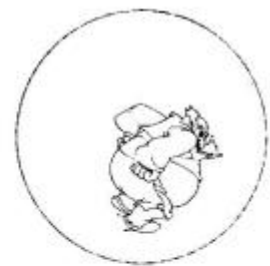Frank Thomas & Ollie Johnston: The Illusion of Life

3. The Principles of Animation

"When we consider a new project, we really study it . . . not just the surface idea, but everything about it."
Walt Disney

A new jargon was heard around the studio. Words like "aiming" and "overlapping" and "pose to pose" suggested that certain animation procedures gradually had been isolated and named. Verbs turned into nouns overnight, as, for example, when the suggestion, "Why don't you stretch him out more?" became "Get more stretch on him." "Wow! Look at the squash on that drawing!" did not mean that a vegetable had splattered the artwork; it indicated that some animator had successfully shown a character in a flattened posture.

Some of this terminology was just assigning new meanings to familiar and convenient words. "Doing" a scene could mean acting out the intended movements, making exploratory drawings, or actually animating it; and once it was "done," the scene moved on to the next department. Layouts were done, backgrounds were done, recording was done, and, eventually, the whole picture had been done. Mixed in with these terms were the new names and phrases with more obscure meanings.

The animators continued to search for better methods of relating drawings to each other and had found a few ways that seemed to produce a predictable result. They could not expect success every time, but these special techniques of drawing a character in motion did offer some security. As each of these processes acquired a name, it was analyzed and perfected and talked about, and when new artists joined the staff

they were taught these practices as if they were the rules of the trade. To everyone's surprise, they became the fundamental principles of animation:

1. Squash and Stretch
2. Anticipation
3. Staging
4. Straight Ahead Action and Pose to Pose
5. Follow Through and Overlapping Action
6. Slow In and Slow Out
7. Arcs
8. Secondary Action
9. Timing
10. Exaggeration
11. Solid Drawing
12. Appeal

1. Squash and Stretch

The principle is based on observation that only stiff objects remain inert during motion, while objects that are not stiff, although retaining overall volume, tend to change shape in an extent that depends on inertia and elasticity of the different parts of the moving object.
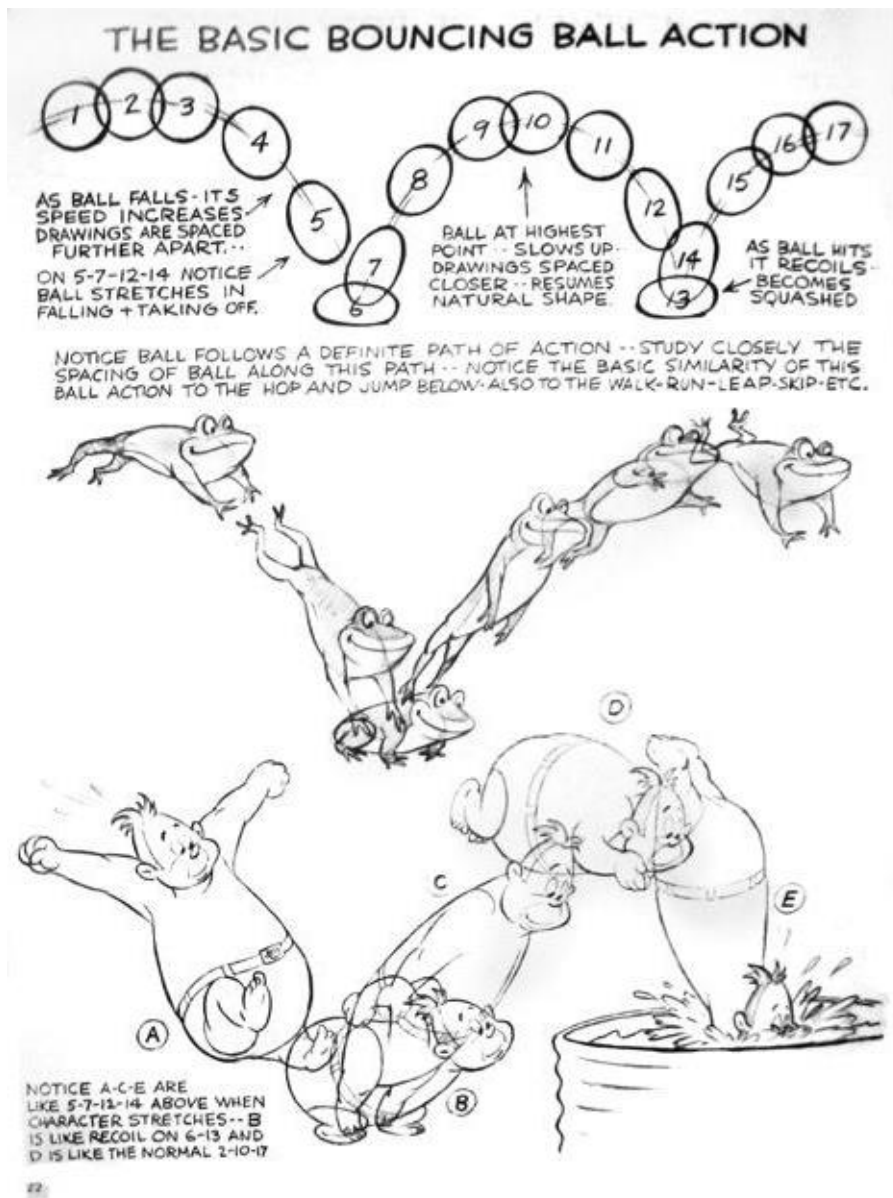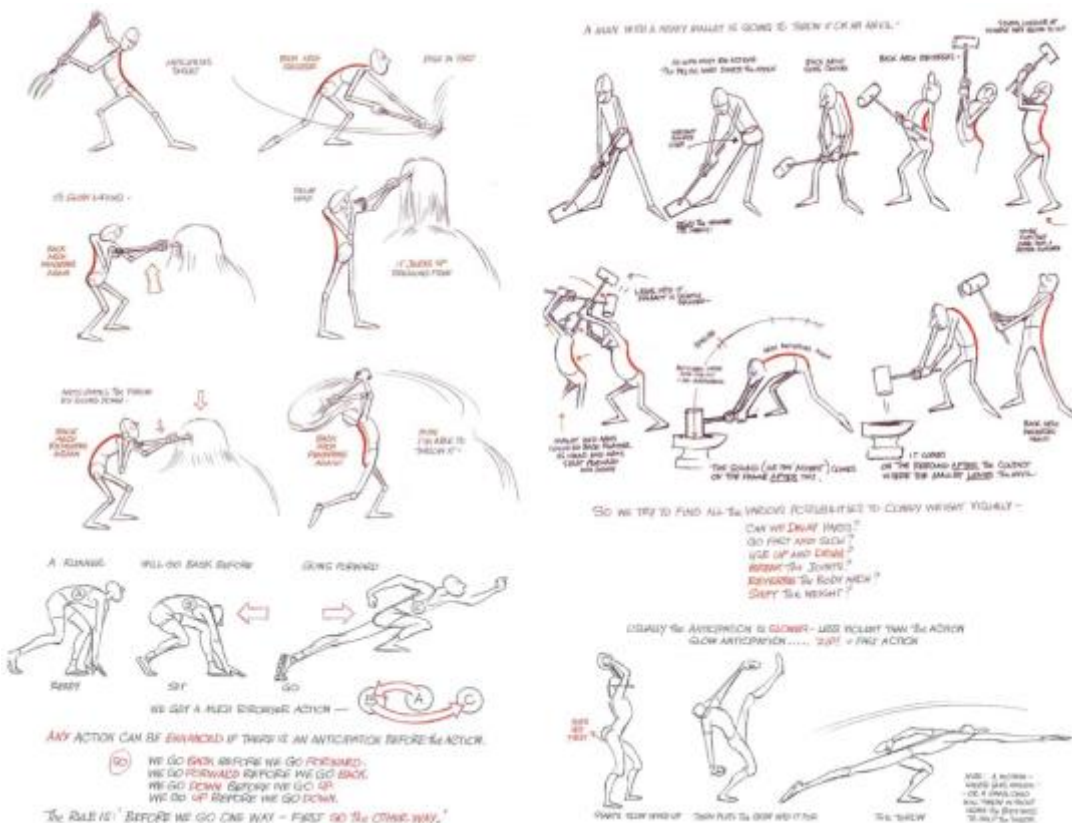

Picture by Preston Blair

2. Anticipation

Real-world actions don't start immediately. An action in an animation occurs in three steps:

1. Set up for the action
2. The action
3. Follow through on the action

The setup is *anticipation*, which is typically a movement in the opposite direction (contrary movement) to the action.

3.Staging

Staging is the presentation of an idea so that it is clear. This idea can be an action, a personality, an expression, or a mood. The key idea is that the idea is made clear to the viewer.

An important objective of staging is to lead the viewers eye to where the action will occur so that they do not miss anything. This means that only one idea at a time occur, or else the viewers may be looking at the wrong thing. So, the main object should be contrasted in some way with the rest of the scene. A good example is motion, since the eye is drawn to motion in an otherwise still scene. In a scene with everything moving, the eye is drawn to a still object.

COMPOSITION · STAGING · DRAMA

THE **DRAMA** PORTRAYED BY THE COMPOSITION FIRST CATCHES THE EYE, AND THEN DIRECTS THE EYE TO THE **CENTER OF INTEREST** BY VARIOUS DEVICES. AS SHOWN ON PAGE 178, THE CHARACTERS MAY BEND FORWARD AND LOOK AT IT, OR THE ABSTRACT DESIGN MAY POINT AT IT, INTERSECT IT, FRAME IT, CIRCLE IT, OR BEND AROUND IT (JUST AS PARENTHESES DO). THE CHARACTER IS ACCENTED BY COLOR DIFFERENCE, CONTRAST, OR TONE; IT IS CLEAR OF DETRACTING DETAIL (SEE DUCK ABOVE) AND ISOLATED; AND IT MAY ALSO BALANCE THE COMPOSITION IN IMPORTANCE.

COMPOSITIONS CAN BALANCE LIKE A SCALE WITH EQUAL WEIGHTS (AREAS), OR AS A BALANCE OF INTEREST. ANY SMALL, ISOLATED OBJECT OF GREAT IMPORTANCE CAN BALANCE A HUGE OBJECT.

CHARACTERS ARE FIT AND WOVEN TOGETHER IN A GROUP WITH RHYTHM LINES, STRAIGHT LINES THAT ALIGN, AND AREAS THAT FIT IN PATTERNS.

THE ALIGNMENT OF CHARACTER ABSTRACT LINES CREATES CIRCULAR AND CURVED RHYTHM LINES AND THE HORIZONTALS, VERTICALS, AND DIAGONALS.

THE VIEWER'S EYE LEVEL IS IMPORTANT WHEN HE LOOKS AT GRANDEUR OR BIG MONSTERS FROM A WORM'S-EYE VIEW, OR WHEN HE LOOKS DOWN AT SMALL THINGS.

APPRECIATE THE **VALUE OF SILHOUETTES** TO DEFINE AND CLEARLY TELL THE STORY IN TWO DIMENSIONS; EVEN IN GROUPS THEY DEFINE ALL ALONE (AS SHOWN ON PAGE 178).

Picture by Preston Blair

4. Straight Ahead Action and Pose to Pose

These are two different ways to animate an action. The straight-ahead technique means to animate your action from drawing 1 to the end in sequence order. The pose-to-pose technique is a bit more intricate as it means to draw the key poses first (often the beginning and end drawing of the action and some other key moment between. Once the key poses are done, the breakdown and inbetween drawings are added to fill the rest of the animation. Smoke, water and other fluid elements are often animated using the straight-ahead technique. Actions that require tight timing and structure are often animated with the pose-to-pose technique. This method helps maintain a solid structure and preserve the volume. Sometimes, when using the straight-ahead technique, it may be difficult to calculate where the action will end up and the final drawing may be out of proportion and not where it should be.

Animation
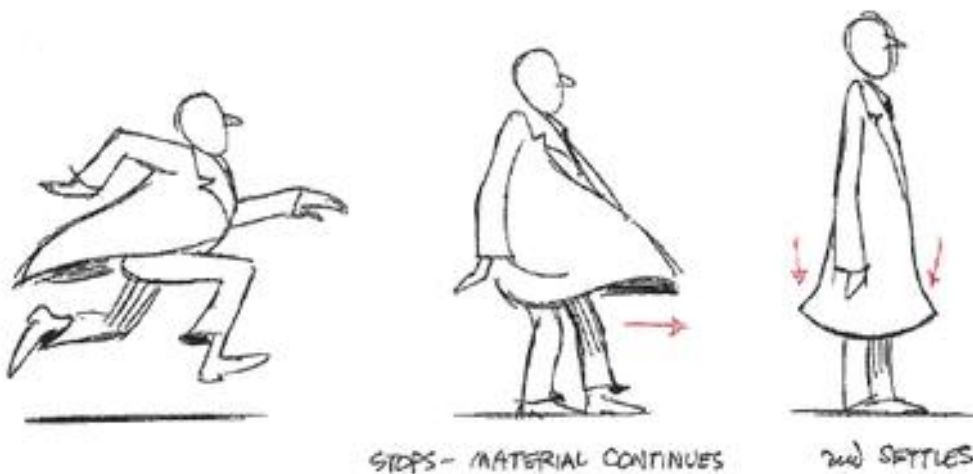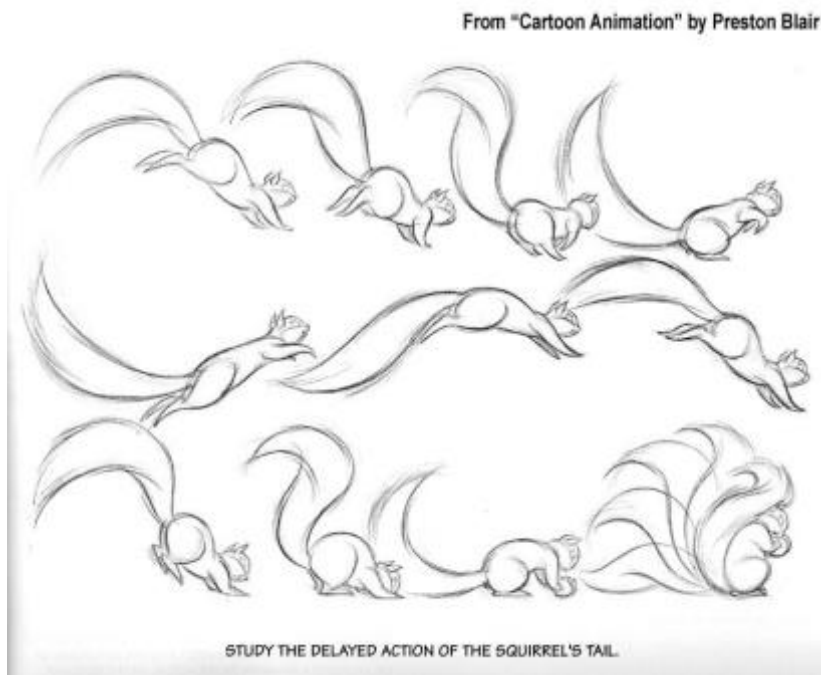
(c) Walt Disney Company, from "The Illusion of Life"

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.

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.

From "Cartoon Animation" by Preston Blair

STUDY THE DELAYED ACTION OF THE SQUIRREL'S TAIL.

STOPS - MATERIAL CONTINUES   and SETTLES

6. Slow in and Slow out

The movement of the human body, and most other objects, needs time to accelerate and slow down. For this reason, animation looks more realistic if it has more drawings near the beginning and end of an action, emphasizing the extreme poses, and fewer in the middle.
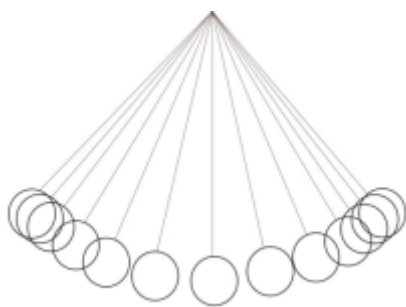
7. Arcs

Most natural action tends to follow an arched trajector, and animation should adhere to this principle by following implied "arcs" for greater realism. This technique can be applied to a moving limb by rotating a joint, or a thrown object moving along a parabolic trajectory. The exception is mechanical movement, which typically moves in straight lines
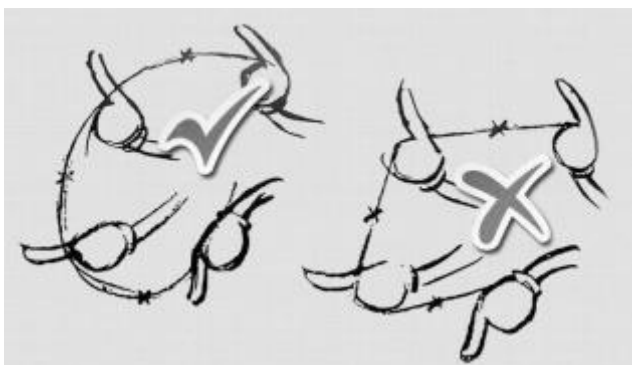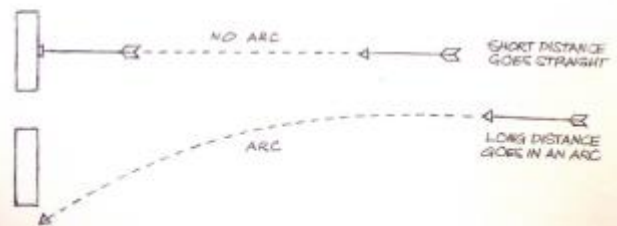
8. Secondary Action

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 their arms or keep them in their pockets, speak or whistle, or express emotions through facial expressions. The important thing about secondary actions is that they emphasize, rather than take attention away from the main action.


9. Timing

Timing refers to the number of drawings or frames for a given action, which translates to the speed of the action on film
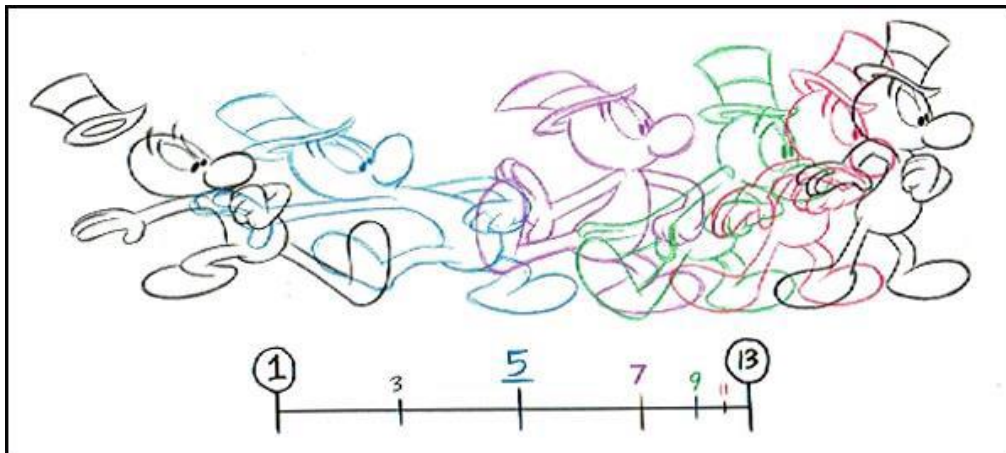
10. Exaggeration

Exaggeration is s an effect especially useful for animation, as animated motions that strive for a perfect imitation of reality can look static and dull. The level of exaggeration depends on whether one seeks realism or a particular style, like a caricature or the style of a specific artist.
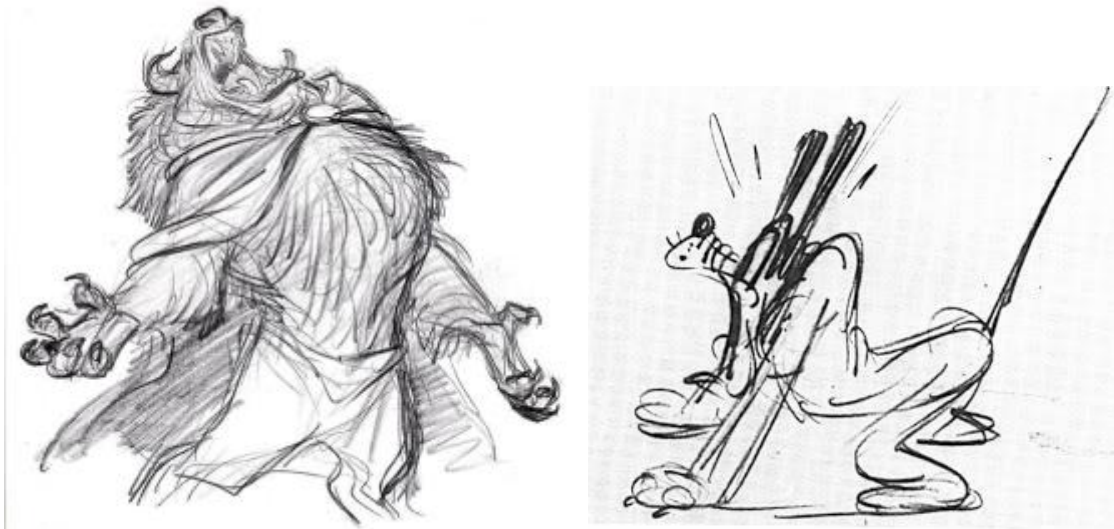
11. Solid Drawing

The principle of solid drawing means taking into account forms in three-dimensional space, or giving them volume and weight.
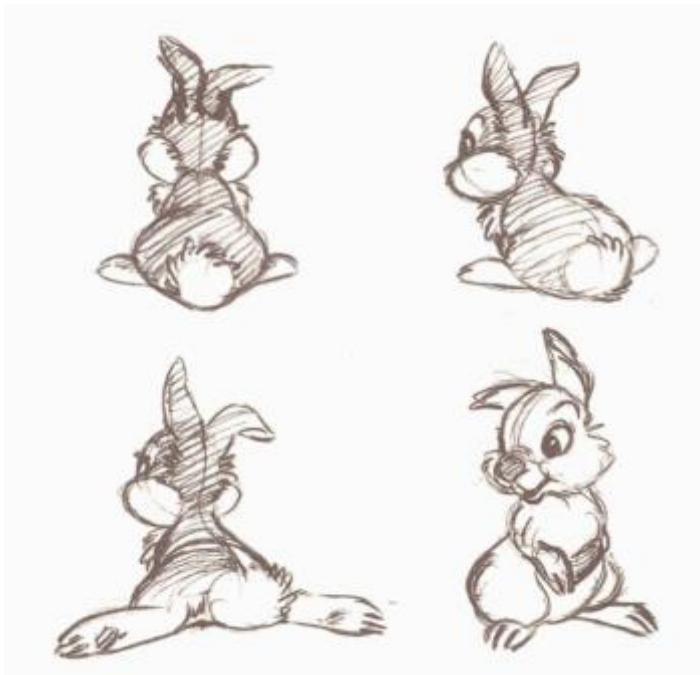
12. Appeal

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.