Animation Principles

Animation Objectives

- Expressiveness
 - Artistic expression
 - Extremely hard to automate
- Realism
 - Hard to do by hand
 - Easier to automate, but we lose control

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Goals of expressive animation

Make characters move in convincing way to communicate personality and mood

- Walt Disney developed a number of principles
- Computer graphics animators have adapted them to 3D animation

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Animation principles

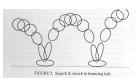
- 1. Squash and stretch
- 2. Staging
- 3. Timing
- 4. Anticipation
- 5. Follow through
- 6. Overlapping action
- 7. Secondary action
- 8. Straight-ahead vs. pose-to-pose vs. blocking
- 9. Slow in, slow out
- 10. Exaggeration
- 11. Appeal

Squash and stretch

Squash: flatten an object or character by pressure or by its own power

Stretch: used to increase the sense of speed and emphasize the squash by contrast

Note: keep volume constant





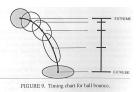
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Staging

- Present the idea so it is unmistakably clear
- Audience can only see one thing at a time
- Useful guide: stage actions in silhouette
- In dialogue, character faces ¾ towards the camera, not right at each other

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Timing



- Timing affects weight:
 - Light object move quickly
 - Heavier objects move more slowly
- Timing can completely change the meaning of an action

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Anticipation

- An action breaks down into:
 - Anticipation
 - Action
 - Reaction
- Anatomical motivation: a muscle must extend before it can contract
- Prepares audience for action so they know what to expect
- Directs audience's attention
- Amount of anticipation can affect perception of speed and weight

Follow through

- Action seldom come to an abrupt stop
- Physical motivation: inertia

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Overlapping action

One part initiates (leads) the move. Others follow in turn.

- Hip leads legs, but eyes often lead the head.
- Loose parts move slower and drag behind.

Overlaps apply to intentions. Example: settling into the house at night

- Close the door
- Lock the door
- Tace off the coat

Each action doesn't come to a complete finish before the next starts

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Secondary action

An action that emphasizes the main point, but is secondary to it.









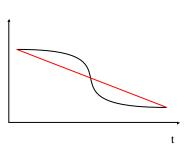
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Straight-ahead vs. pose-to-pose vs. blocking • Straight ahead: proceed from frame to frame without

- Straight ahead: proceed from frame to frame without planning where you want to be in ten frames. Can be wild, spontaneous.
- Pose-to-pose: Define keyframes and "inbetweens".
- Blocking: computer graphics animators adaptation:
 - Start key framing at the top of the hierarchy
 - Refine level by level
 - Keyframes for different parts need not happen at the same time.

Slow in, slow out

• An extreme pose can be emphasized by slowing down as you get to it (and as you leave it)



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Appeal

- The character must interest the viewer.
- It doesn't have to be cute and cuddly.
- Design, simplicity, behavior all affect appeal.
- Note: avoid perfect symmetries
- Example: Luxo, Jr. is made to appear childlike





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Exaggeration

Get to the heart of the idea and emphasize it so the audience can see it.

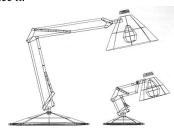


FIGURE 11. Varying the scale of different parts of Dad created the child-like proportions of Luxo Jr.