Character Animation

- Krazy Kat Goes A-Wooing (1916)
- Three Little Pigs – 1933 © Walt Disney
Disney Animators

- Sent to special drawing classes to get past standard cartoon formulas.
- Studied models in motion and live films.
- Studied actions over and over.
- The analysis of action became important to the development of animation.
Fundamental Principles

- Squash and Stretch
- Timing
- Anticipation
- Staging
- Follow Through
- Pose-to-Pose

- Slow In / Out
- Arcs
- Exaggeration
- Secondary Action
- Appeal
Squash and Stretch

- Movement changes object’s shape.
- The amount defines rigidity.
- Must preserve volume.
- On a face, it connects different parts.

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Timing

- Speed of action gives meaning to motion.
- Defines weight and/or intent of actor.
- Realistic behavior more important than looks.

Timing: Effect of Longer Action

Character turns his head and raises the chin slightly. How does the number of frames influence interpretation? (from few frames to many frames)

- has been hit by a tremendous force.
- has been hit by a rolling pin.
- has a nervous tic or a spasm.
- is dodging a rolling pin.
- is giving a crisp order “Move!”
- is more friendly “Over here”.
- sees a nice car.
- tries to take a look at something.
- searches for tea on a shelf.
- appraises thoughtfully.
- stretches a sore muscle.

Action in Three Parts

- An action occurs in three parts:
  - Preparation ➔ Anticipation
  - Action proper ➔ Staging
  - Termination ➔ Follow-Through
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Anticipation

- Anticipation provides:
  - Natural muscular anatomy
  - Device to catch audience’s eye (will they see it?)
  - Direction of audience attention

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Staging

- Present an idea so it is **unmistakably clear**.
- **One idea** seen at a time.
- Object of interest should **contrast with scene**.
  - Sometimes ensured with silhouette.

"Look at this, now look at this, then look at this..."
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Follow-Through

- Action **seldom** terminates with a sudden stop.
- They often **carry past termination** point.
- Lead part **initiates** motion, other parts follow.
- Lead part stops, other parts stop later.
- E.g. the eyes lead the head, which leads body.
- Sequences of actions should **overlap** (co-articulation).
Pose-to-Pose

- The method of creating frames:
  - "Straight-ahead" let's animator do one drawing after another from a starting point
    - Slightly zany look for scrambling actions
  - "Pose-to-Pose" let's animator first pose character into key poses and then fill in between.
- Digital animation mostly done "Pose-to-Pose" through hierarchical posing of limbs (layered).

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Slow In / Out

- More time spent at the beginning and at the end of an action.
- Initially done because animators wanted audiences to see the action better.
- Achieved expressive "spirited results".
Slow In / Out

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Arcs
- Action paths are always arcs.
  - Based on swinging limbs and thrown object trajectories.
- Achieved with splines.
- Separate motion paths from timing arcs.
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Exaggeration

- Make the essence of an idea bigger.
- Provide a "ground" for comparison in scene.

If he is angry, make him furious.

Ralph A. De Stefano

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Secondary Action

- New actions can **result from an action**.
- Can be **subtle effects** (e.g. Luxor's cord)
- Might still need **staging** or it gets lost.

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Appeal

- **Live action** actors have charisma.
- **Animated** characters have appeal.
- Avoid "sameness", "stiffness" and "mirrors".
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Tying it all together

- Consistent personality
  - An underlying personal story ties all the actions together into a believable whole.
  - The actions are merely a view into the inner world of the character.

3D Animation Basics
Preparing a Model: Skeletal Rigging

Joint Animation

Joint Animation
Motion Graphs