

# THE ANIMATION PROCESS

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## 1 Storyboards

Over 4,000 storyboard drawings are created as the blueprint for the action and dialog of a feature-length Pixar animated film. They are revised many times during the creative development process.



## 2 Modelling

Pixar's proprietary animation software, Marionette, is used to create three-dimensional computer models of characters, props and sets. These computer models describe the shape of the object as well as the motion controls that the animators use to create movement and expressions.



## 3 Animation

Pixar's proprietary animation software allows Pixar's animators to choreograph the motion in each scene by defining key frames or poses. The computer then automatically creates the "in-between" frames, which the animator can adjust if necessary. Pixar's animators neither draw, nor paint the scenes, as is required in traditional animation.



## 4 Shading

Computer programs that describe surface characteristics, including textures, finishes and colors, are added to every object in the scene. These programs, called "shaders," can simulate a wide variety of appearances, including wood, metal, fabric, glass, hair and skin.



## 5 Lighting

Using "digital lights," every scene is lit in much the same manner as stage lighting. Key, fill and bounce lights and room ambience are all defined and used to enhance the mood and emotion of each scene.



## 6 Rendering

Pixar's RenderMan software "draws" the finished image by computing every pixel of the image from the model, animation, shading, and lighting information. Final rendered images use Pixar's patented motion blur, and each one can take from one to twenty hours of computation time to draw. Once rendered, final images are transferred to film, video or CD-ROM.