What Is Animation?

The word *animate* comes from the Latin verb *animare*, meaning “to make alive or to fill with breath.” We can take our most childlike dreams or the wackiest worlds we can imagine and bring them to life. In animation we can completely restructure reality. We take drawings, clay, puppets, or forms on a computer screen, and we make them seem so real that we want to believe they’re alive. Pure fantasy seems at home in animation, but for animation to work, the fantasy world must be so true to itself with its own unbroken rules that we are willing to believe it.

Even more than most film, animation is visual. While you’re writing, try to keep a movie running inside your head. Visualize what you’re writing. Keep those characters squashing and stretching, running in the air, morphing into monsters at the drop of an anvil! Make the very basis of your idea visual. Tacking visuals onto an idea that isn’t visual won’t work. Use visual humor—sight *gags*. Watch the old silent comedies, especially those with Charlie Chaplin and Laurel and Hardy. Watch The Three Stooges. Many cartoon writers are also artists, and they begin their thinking by drawing or doodling. The best animation is action, not talking heads. Even though Hanna-Barbera was known for its *limited animation*, Joe Barbera used to tell his artists that if he saw six frames of *storyboard* and the characters were still talking, the staff was in trouble. Start the story with action. Animation must be visual!

Time and space are important elements of animation. The laws of physics don’t apply. A character is squashed flat, and two seconds later he’s as good as new again. He can morph into someone else and do things that a real person couldn’t possibly do. Motion jokes are great! Wile E. Coyote hangs in midair. In animation the audience accepts data quickly. Viewers can register information in just a few *frames*. *Timing* is very important in animation, just as it is in comedy. The pace of gags is quick. Normally, there are more pages in an animation script than there are in a comparable, live-action script, partially because everything moves so fast.

Animation uses extremes—everything is exaggerated. Comedy is taken to its limits. Jokes that seem impossible in live-action are best, although with today’s special effects, there is little that can be done in animation that cannot be done in live-action film as well.
The Production Process

The production process is slightly different at different studios around the world. Even at a specific animation studio, each producer and director has his or her own preferences. Children’s cartoons are produced differently from prime-time animation because of the huge variation in budget. Television shows are not produced the same way as feature films. Direct-to-videos are something of a hybrid of the two. Independent films are made differently from films made at a large corporation. Shorts for the Internet may be completed by one person on a home computer, and games are something else altogether; 2D animation is produced differently from 3D; each country has its own twist on the process. However, because of the demands of the medium, there are similarities, and we can generalize. It’s important for writers to understand how animation is produced so they can write animation that is practical and actually works. Therefore, the production process follows in a general way.

The Script

Usually animation begins with a script. If there is no script, then there is at least some kind of idea in written form—an outline or treatment. In television a one-page written premise is usually submitted for each episode. When a premise is approved, it’s expanded into an outline, and the outline is then expanded into a full script. Some feature films and some of the shorter television cartoons may have no detailed script. Instead, creation takes place primarily during the storyboard process. Writers in the United States receive pay for their outlines and scripts, but premises are submitted on spec in hopes of getting an assignment. Each television series has a story editor who is in charge of this process. The story editor and the writers he hires may be freelancers rather than staff members. The show’s producers or directors in turn hire the story editor.

Producers and directors have approval rights on the finished script. Producer and director are terms with no precise and standard meaning in the United States, and they can be interchangeable or slightly different from studio to studio. Independent producers may deal more with financing and budgets, but producers at the major animation studios may be more directly involved with production. Higher executives at the production company often have script approval rights. Programming executives also have approval rights, as do network censors and any licensing or toy manufacturers that may be involved in the show. If this is a feature, financiers may have approval rights as well.

Recording

About the time the script is finalized, the project is cast. The actors may be given a separate actor’s script for recording. Sometimes they get character designs or a storyboard if they are ready in time. A voice director will probably direct. If this is a prime-time television project, then the director may hold a table read first, but usually there is no advanced rehearsal. At some studios the writer is welcome to attend the recording session. That is far from standard practice, however, and writers who do attend probably will have little or no input on the recording. Some studios still prefer to record all the actors at once for a television project,
as if they were doing a radio play. However, each actor may be recorded separately. This is especially likely if the project is an animated feature. Individual recording sessions make it easier to schedule the actors, work with each actor, move the process along, and fine-tune the timing when it's edited. Recording the actors together allows for interaction that is impossible to get any other way. Executives with approval rights have to approve casting and the final voice recording.

The directors usually work with a composer, who may be brought in early for a feature. Hiring might not be done until later in the process if this is a television show, although some directors bring in a composer early for TV as well.

**The Storyboard**

Storyboard artists take the script and create the first visualization of the story. Often these boards are still a little rough. In television and direct-to-video projects each major action and major pose is drawn within a frame representing the television screen. The dialogue and action are listed underneath each frame. Usually, an animatic or video of these frames is scanned or filmed from the board when it's complete. This animatic, which includes any recorded sound, helps the director see the episode in the rough and helps in timing the cartoon. Executives must approve the final storyboard or animatic.

The storyboard process may take about a year for a feature. The script or treatment will undergo many changes as the visual development progresses. Artists sometimes work in groups on sequences, or a team of a writer and an artist may work together. The development team pitches sequences in meetings and receives feedback for changes. The director and other executives have final approval. Feature storyboard drawings are cleaned up and made into a flipbook. Finally the drawings are scanned or shot, the recorded and available sound is added, and the material is made into a story reel. Any necessary changes discovered during the making of the animatic or story reel are made on the storyboard. The building of the story reel is an ongoing process throughout production. Later breakdowns, then penciled animation, and finally completed animation will be substituted. This workbook of approved elements is usually scanned and available on staff computers and serves as an ongoing blueprint. For CGI features a 3D workbook shows characters in motion in space as well.

**Slugging**

The timing director sets the storyboard’s final timing, and the board is slugged. This does not mean that somebody gets violent and belts it with a left hook! Slugging is a stage when the overall production is timed out, and scenes are allotted a specific amount of time, measured in feet and frames. In television this information is added to the storyboard before it’s photocopied and handed out. An editor conforms the audiotape.

**Character and Prop Design**

After the script has been approved, a copy goes to the production designer or art director. If the project is a television series, then the major and ongoing characters have already been
designed and fine-tuned during development. The approved drawings, as seen from various angles, are compiled into the model sheets (see Figure 1.1). If the ongoing characters have a costume change in this TV episode or feature sequence, or new characters are needed, that must be considered. Each TV episode or feature sequence also requires props that have not been used before. Sometimes the same designers create new characters, costumes, and props; sometimes designers specialize and design either characters or props. New drawings are compiled into model sheets for each specific television episode. The drawings may be designed on paper or modeled in a computer. Approvals are required.

**Background Design**

The production designer or a background designer is responsible for all location designs. In television or direct-to-video layout, artists will design these line drawings (layouts) from the

![Figure 1.1](Ch01.qxd_12/8/04 4:02 PM Page 4)

**Figure 1.1** Bubbles (a) and Buttercup (b) from *The Powerpuff Girls* show off their acting skills on these model sheets. *The Powerpuff Girls* and all related characters and elements are trademarks of Cartoon Network © 2004. A Time Warner Company. All rights reserved.
roughs done by the storyboard artist (see Figure 1.2). Then a background painter will paint a few key backgrounds (especially those for establishing shots) and ship them overseas to be matched by other painters painting additional backgrounds. Very little animation production is done in the United States due to the high costs. In feature production the visual development artists may be working on both story and design at once, making many concept drawings before the final designs are chosen and refined for actual production. Background artists usually paint in the traditional way, but some or all elements can be painted digitally. Digital backgrounds can be changed more easily. Major designs require approval.

Color

Color stylists, who are supervised by the art director, set the color palette for a show. It's important that they choose colors that not only look good together but that will make the characters stand out from the background. Different palettes may be needed for different lighting conditions, such as a wet look, shadowing, bright sunlight, and so on. If the project is CGI, texturing or surface color design is needed. Once again approvals are required.
Figure 1.2  These drawings from *Poncho Puma and His Gang* are essentially background drawings with characters included for presentation and publicity purposes. Notice the use of perspective. *Poncho Puma and His Gang* © 1998 Alvaro A. Arce.
Layout

Layouts are detailed renderings of all the storyboard drawings and breakdowns of some of the action between those drawings. These include drawings for each background underlay, overlay, the start and stop drawings for action for each character, and visual effects. Layout artists further refine each shot, setting camera angles and movements, composition, staging, and lighting. Drawings are made to the proper size and drawn on model (drawn properly). Key layout drawings may be done before a production is shipped overseas, with the remainder done by overseas artists. Or layout may be skipped, basically, by doing detailed drawings at the storyboard stage. Later these can be blown up to the correct size, and elements separated and used as layouts.

Exposure Sheets

The director or sheet timer fills out exposure sheets (X-sheets), using the information found on the audio track. These sheets will be a template or blueprint for the production, frame by frame and layer by layer. The recorded dialogue information is written out frame by frame for the animator, and the basic action from the storyboard is written in as well. If music is important, the beats on the click track are listed.

Animation

The animator receives the dialogue track of his section of the story, a storyboard or work-book that has been timed out, the model sheets, copies of the layouts, and X-sheets. There are boxes on the X-sheets for the animator to fill in with the details, layer by layer, as the animation is being planned. Animation paper, as well as the paper used by the layout artists and background artists, has a series of holes for pegs so that it can be lined up correctly for a camera. For an animated feature, animation pencil tests may be made prior to principal animation to test the gags and the animation. In television and direct-to-video projects, key animators may animate the more important action before it is sent overseas for the major animation to be completed. Animators might be cast to animate certain characters, or they may be assigned certain sequences.

Clean-up artists or assistant animators clean up the rough animation poses drawn by the animator and sketch the key action in between. A breakdown artist or inbetweener may be responsible for the easier poses between those. Visual effects animators animate elements like fire, water, and props. For a feature production where drawings are animated on ones (rather than holding the poses for more than a single frame for a cheaper production), a single minute of film may take over 1,400 drawings. So you see how labor-intensive animation is!

Scene Planning

Scene planners break down each scene with all of its elements and check that the scenes are ready for scanning or shipping. A scene planner will set up all of the elements in the
computer or on a pegged animation disk and make sure that they will work correctly. These professionals have excellent technical knowledge. They check all math and verify that each scene and all the camera moves have been set up in the best way. They will also check that color effects are set up properly for the painters.

Shipping

A production coordinator assembles all the pre-production elements. The coordinator verifies that everything is accounted for, that all information is clear, and that everything is correct before shipping abroad.

Traditional Production

Once all the pre-production elements arrive overseas, the subcontractor finishes the work. Animators, their assistants, and inbetweeners finish the animation. Background painters complete the remainder of the backgrounds. All the paper or computer elements (X-sheets, animation, painted backgrounds) are checked by animation checkers to be sure they are complete and will work properly. Lines must be closed off for digital painting. The drawings are photocopied onto cels or scanned into the computer if they haven’t been scanned already. Traditional painters receive color models, painted onto cels, and stacks of the photocopied cels. They paint each cel with water-based paints on the side that has no raised and photocopied lines. Digital painters recheck for lines that are not closed off and touch their computer screens to fill sections of each drawing with color from their palette. Final checkers check the work again.

If the artwork is digital, the final checker composites the work and makes sure it’s ready for final output. For productions that are more traditional, the work is then shot frame by frame with an animation camera. Backgrounds are placed on a flat bed with pegs to hold them in place. Any underlays are placed on the bottom. The levels of cels are placed on top of the underlay one by one. Overlays are placed on top of that. Then the whole package is shot, replaced with the elements of another frame, and shot again until completion.

CGI Production

CGI productions are a merging of 2D animation and live action. Designs are usually created in 2D first, approved, and sent for modeling in 3D. Characters can be modeled on a computer—often from basic geometric shapes—and the parts fused, or sculptures can be digitized as a wire-frame model. Rigging adds a skeleton to the model. Animators then test movement possibilities. Modeling, rigging, and animation continue until all problems have been resolved. Texture and color are added with emphasis on correct lighting. Software programs also allow actors to be rigged with motion capture sensors, which convert the actor’s movement to animation for a predesigned character.
Locations, sets, or environments are modeled as well. These will also be rough at first, or live-action backgrounds may be added.

A 3D workbook is created in low-resolution, with locations slowly refined. Characters are added to the locations and animation improved. Cinematography elements (camera position, angles, movements, lighting) are added and polished. Principal animation is done after the 3D workbook elements are approved. Refinements are made throughout the process. Once everything has been approved, the final animation focuses on subtleties. Lighting becomes the major focus after animation has been completed in each scene. Working with the technical directors, the effects animators then add visual effects. Along the line some rendering and compositing have been done to see how things are coming along. The full rendering and compositing of all the elements of a scene are not done until the end because fully developed scenes can take a long time to process. Rendered scenes are touched up, checked, and then rendered again for the final completed project.

**Post-Production and Editing**

The overseas studio returns the completed project. The director may require retakes from overseas or have a few minor changes made locally. Today overseas work can be monitored more closely over the Internet while it’s being done so fewer changes will be required once the work is returned. After approval, the editors mix the voice track with ADR, sound effects (Foley effects or effects from a sound effects library), and music tracks (which may be original or also from a library). The tracks are then blended. The videotape is combined with the sound, the opening titles, and the credits. Transitions are added, and this editing is completed in an offline or online assembly. Sometimes a film is generated, and it must be color corrected. The directors, producers, and programming or financing executives view the completed work. Notes are given, changes are made, and retakes are done. Final approvals are given, and a release print is made. The completed project is now ready for delivery.

**Stop-Motion Animation**

Some animators prefer to work with puppets, using clay, a plastic material, or foam. These projects are more like live-action films. Characters must be made, sets built, and lighting rigged. Some people work with paper cutouts, sand, or pinscreens. For stop-motion animation, a digital video or film camera is placed on a tripod so the action can be filmed frame by frame, moving characters, objects, and camera after almost every frame. Computerized motion control equipment is available to make this process easier and more precise.

**Game Production**

Game production is quite different from TV or film production, and different kinds of games are obviously produced differently. The process is too complicated for the scope of this book, but remember that few games have budgets as large as feature films. Technical knowledge is essential for working in that industry.
Student Production

If you are making a student film or video, you’ll abbreviate the traditional production process in a way that makes the best use of your expertise, crew, time, budget, and the equipment available to you. Ask your teacher for guidelines. There are many computer software programs that can help you make a film or video without a huge staff. Flash computer software makes it comparatively easy for you to make a film on a limited budget entirely by yourself. Attempt only what you can effectively produce. The longer the film, the better it should be to hold audience interest.

Other Production Considerations

The size of the budget is a consideration in all animation writing. Feature films made by large companies like Sony or DreamWorks have deep pockets, but their pockets aren’t bottomless, especially in bad times. Smaller film companies work with tighter budgets. Some games have big budgets but not as big as those of a major film. Many game companies make low-budget games. The television industry can do a great deal on a very small budget.

In production, technology is a factor—what can be done and what can’t. The larger companies have invested more in developing and buying high-end software. So it may be possible to produce animation with skin, fur, and water that looks real. It’s conceivable to replicate actual people, but the cost is great, and there are legal issues. It is possible to make multiples of people, trees, or buildings for crowd scenes, forests, or cities. Again, the cost will probably be prohibitive for lower budgets. Software now makes it possible to animate those crowds without the digital actors running into or through each other as they did in earlier days. There have been great strides in computer character animation. Today, nuances in acting can be achieved that were impossible just a few years back, but, again, this comes with a high price tag.

Changes

Anyone who has ever worked at an animation company where at least some production is done on the premises has horror stories about changes to the script or characters after production has already started. If you knew the effect of casual changes on morale, meeting deadlines, and the budget, you would never, ever consider them after production has begun. Remember that even one scene may involve hundreds and hundreds of drawings or images. Because animation is so labor-intensive, even in CGI, scenes in a single episode of a television series might be spread out over many departments and sometimes even over different companies. In a big-budget feature scenes may be spread out over several companies and several continents. Overseas contract companies might suddenly find that they have more work than they can handle at any given time and farm out some of their work to a subcontractor.

Typically, scenes do not go through the pipeline in order. Instead, they go through as fast as possible. So if scene 108 is animated before scene 2 (because it is shorter, easier, or being animated by a faster artist), it moves on ahead to the assistant to clean up, and if that
assistant works quickly, then the scene proceeds ahead to the checking department, and so on in the process. At any given time, scene 108 may be moving faster than scene 2, but scene 2 might catch up later and even pass it. CGI scenes are constantly being improved, but each minor improvement takes time. Of course, scenes are tracked.

Changes can increase costs tremendously. There was a time in television animation where changes were simply not made once production started because of budget concerns. If a change is made in scene 2, it’s likely that changes must be made in other scenes to match the original change. Artists are interrupted. Some scenes are changed and others are forgotten. Suddenly the orderly production process is like a gourmet dish of Eggs Benedict morphing into scrambled eggs with broken shells and a chicken feather poking out the top.

Be sure that the script, storyboard, and designs are in excellent shape before you begin production, even if that means falling behind a week or two (or even a month or two). Allow yourself plenty of time for development before the clock starts ticking.

Preparing for Tomorrow

The world is changing ever more rapidly. Who knows what direction the world will take tomorrow? Animation is now created for all age groups and for many media. The more that you can learn, the better you’ll be able to write and develop for this industry. And you’ll need to continue learning all your life just to keep up. Read about trends, fads, and predictions for the future. Learn to assess what you need to know, and take the responsibility of finding a way to learn it on your own.

Creativity Versus Profit

We all crave a good story well told. Our souls long for something fresh and creative. In school it’s okay to experiment and fail. But let’s consider the animation industry for a moment. The industry wants and needs creative people, but it is first and foremost a business. Business executives don’t like failure! If executives perceive that a choice must be made between creativity, freshness, and art or staying out of bankruptcy and making lots of money, money will win out pretty much every time. If you want to work in the industry and be successful, you need to understand that basic fact. Keeping a job means producing what’s practical and what will bring in money; unfortunately, sometimes creativity gets lost somewhere along the way. Don’t lose your creativity or your love of animation! Try to be creative and remember the audience and the budget for your project. This is a book about it all: learning to write creatively and well, and working successfully in the animation industry.
1. Rent some old silent films like Laurel and Hardy or Charlie Chaplin. What did you learn?

2. Find a story that migrated from a less visual medium (like a book or play) to animation. Compare the story in both mediums. How did it change?

3. Pick a short story and make a list of all the ways you could make it more visual for animation.

4. Watch a couple of children’s cartoons, or watch an animated feature film. How did the writer make the stories and humor visual?

5. Research puppet, clay, or cutout animation. Do any of these techniques interest you enough to use them on a future project?

6. Go to the library or surf the Internet for more on animation production.

7. Diagram the animation production pipeline.

8. Visit an animation studio.

9. Start the initial planning for a student film. What type of animation might you use? Traditional? 3D? Cutout? How will you get all the necessary production steps done in the time you have? Discuss in class.

10. What do you think the animation industry will be like in twenty years? In fifty? What influences might change it? Discuss.