3D Character Animation (part 1)
By Ryan Bird

One of the greatest things about animation is bringing life, expression, and emotion to an otherwise lifeless character. When done correctly, animation can convey a wide range of emotions, helping viewers to invest their time and emotion into what they are watching.

Figure 1 shows an example of a character in a neutral pose and in a pose that is full of expression. The neutral pose is plain, lifeless, and uninteresting, but the expressive pose brings the character to life and helps viewers understand what is going on with the character.

Emotion and Expression

Adding emotion is essential in making a character believable to its audience. Much of a character’s story and feelings is told through its unspoken facial expression and body language. Figure 2 shows a range of facial expressions. These expressions are achieved with very simple shapes. And,
although I have chosen not to label each expression, it’s not difficult to figure out what emotion each of these faces is expressing.

![Figure 2. A range of different expressions using the same face](image)

A lack of appropriate expression can quickly detach an audience from the character and, subsequently, the story. It’s difficult for viewers to invest their time and emotion into a character they don’t believe in.

**Dust Off Those Acting Lessons**

Understanding acting techniques is important when animating. An animated character’s ability to hit appropriate cues and perform good timing depends on the animator’s ability to do the acting for that character.

If you haven’t taken any acting lessons or drama classes, there are other ways to work on your acting skills. One way is to observe the people around you. Study their facial expression and body language. Try to pick up on little things that are going on in their face or body that help bring out
the feelings that they are expressing. It may also be helpful to quickly sketch interesting expressions and poses that you see.

Another helpful way to improve those acting skills is to watch and study the acting done in film, television, and on stage. Good actors are able to display the emotion the audience is intended to feel with just their facial expressions and body language.

One of the main things to look for is subtle differences in common expressions. For example, although some may interpret a smile as happiness, upon closer inspection, variations of a smile can show a wide gamut of emotions.

![Figure 3](image)

**Figure 3.** Three smiling faces, each showing a different emotion

Figure 3 shows three smiling faces. The first face appears to be happy and content. The second face portrays an excited and surprised emotion. The third face shows a more nervous smile, relaying that this character is probably uncomfortable. These are just a few examples of the many variations of a smile. Finding subtle differences within emotions greatly improves acting skills through animation.

**The Face**

A lot of acting and storytelling in animation is done through the face. Body language is important in helping to convey emotion and expression, but the face is generally where the audience focuses to pick up on what feelings and emotions a character is experiencing.

It is important to make sure that the face is expressive and contains the subtle nuances necessary to convey the appropriate emotions. To achieve this, make sure that the character’s face is appropriately set up with a wide range of facial controls. Doing so allows for the tweaking necessary to get just the right expression you need.

The human face contains many muscles that work together to form many different expressions and emotions. These muscles control the eyebrows, eyelids, nose, cheeks, lips, tongue, and chin. However, while animating the face, most of your attention will be spent on the eyes and mouth.
The Eyes

Most of what sells the intended emotion in the face is the eyes. You're probably familiar with the expression, the eyes are the windows to the soul. In animation, this is true, as well. A poorly animated set of eyes can kill the illusion of life in a character.

![Figure 4. A variety of eyes showing different emotions](image)

When I talk about the eyes, I’m not just referring to the eyeballs. The eyebrows and eyelids should also be included and will greatly enhance the role in bringing emotion to the character. In Figure 4, I’ve used only the eye area to convey some common emotions. Notice how the eyelids and eyebrows play a big part in conveying these emotions. Most of the time, I start my facial animation by animating the eyes. If the eyes portray the desired emotion, the mouth will then complement and enhance that work.

The Mouth

In addition to contributing to the overall emotion of a character, one of the mouth's primary roles is to convey speech. Phonemes are the sounds that the mouth produces as part of speech and other verbal expression. When animated properly, phonemes give a character the illusion that he or she is speaking along with a recorded voice or soundtrack. Figure 5 shows a range of mouth shapes for many of the phonemes in the English language. Notice that several mouth shapes are shared between more than one sound.
Figure 5. A range of phonemes, covering the main sounds in the alphabet

When lip-syncing a character’s mouth to a recorded voice or soundtrack, it is important to keep the following points in mind

- **Emotion.** When the character is speaking, what emotion is it experiencing? If the character is happy, add a bit of a smile to the phonemes. If the character is sad, add a slight pout.
- **Intensity.** How much the character’s mouth opens during dialogue determines how intensely the character is speaking. Is the character speaking loudly? softly? in a more normal tone? Loud speaking usually requires that the mouth open wider, while a quieter tone only requires the mouth to open slightly. For example, you could cause a character to grit its teeth while speaking to portray anger.

- **Closed mouth.** One of the mistakes I see with facial animation is when an animator feels that he or she needs to close the character’s mouth after everything it says or whenever the character isn’t speaking. If you watch somebody speak, you’ll notice that a lot of the time, a person will not close his or her mouth all the way immediately after speaking. The mouth eventually closes, but not immediately.

- **Jaw.** I find it helpful to have the jaw working as its own entity, separate from the other phonemes. This allows a character to be able to speak with a clenched jaw or helps the jaw achieve extreme expressions—all while allowing the phonemes to work over top of that movement.

Another thing to note while animating a character’s mouth is that it is not always necessary to capture every letter being spoken. Doing so results in the mouth moving much too quickly and will make that character look more like a broken puppet rather than a believable character. Capturing key sounds in the dialogue allows for more natural-looking mouth animation.

**Don’t Forget the Body**

Body language is a great contributor to helping the face convey the appropriate expression and emotion needed. This is especially important when the face can’t be relied on, like in shots where the character is seen from far away or when the character’s face is obscured or hidden.

As I have watched people in the real world, I’ve noticed that I can tell several things about people just by the way they stand, sit, and walk. Happy people tend to stand tall, sit up straight, and walk with a stride or bounce in their step. Sad people tend to slouch when they stand, hunch over when they sit, and drag their feet while walking slowly. Angry people tend to fold their arms and be very rigid when they stand, lean forward and rock a bit when they sit, and move quickly and stomp when they walk. Figure 6 provides an example of each of these emotions.
Another challenge that comes with the body is weight. When animating a character, it is important to take the character’s size and weight into consideration. A tall, skinny, and slinky character will tend to be a lot lighter on its feet as well as clumsy at times, while a short and chubby character tends to be slower and more weighed down.

**Shoulders/Clavicles**

It seems like the shoulder and clavicle areas are one of the most difficult things to get right in animation. As far as the body goes, they seem to take on their own entity. They need to interact with what the character is doing without being too loose or too rigid.

One of the ways to improve the believability of the shoulders is by the way they interact with the arms. A lot of the time, the shoulders will be guiding the arms. One of the tricks that I use for the shoulders is to animate them with the arms. One of the tricks that I use for the shoulders is to animate them with the arms. Once I have finished that animation, I offset the shoulder and clavicle keys to start a couple of frames before the arm animation. This gives the appearance that the shoulders are leading the arms.

**Hands**

I’ve always felt that hands could be their own character, so much expression and feeling go into the hands. One mistake that I’ve noticed in animation is a lack of animated fingers. Even if the rest of the body is animated well, stiff and lifeless fingers can be very distracting.
Figure 7. Several different examples of hand poses

Figure 7 shows several different hand poses. Having a good understanding of how hands and fingers move helps bring believability to a character. In addition to studying your own hand, many art books and resources provides good examples of how to make hands look interesting and authentic.
Storyboards

Taking all of these points into consideration, it’s time to start putting an animation together. When starting an animation, it’s good practice to begin with a storyboard. Storyboards work like a blue print for an animation. Their main purpose is to lay out what will appear in the animation.

A storyboard can be as simple or complex as desired. It can have as many or as few panels as necessary, as long as it helps portray what you’re trying to convey. Figure 8 shows a simple storyboard that I’ve created to help me with my animation.

Figure 8. A simple storyboard that will be used to create an animation

Although it is possible to create an animation without a storyboard, having one can help solve some potential problems in the beginning stages, such as camera angles, character poses, and timing. Finding and resolving these issues upfront will help save time and frustration down the road, when they can be more difficult to fix.

Creating Key Poses

Once a story has been laid out, it’s time to bring it into a 3D program and begin the animation process. With the character all set up for animation, I can now begin to create some key poses. Creating key poses helps me see how the character will move from one pose to another.

I start out by going to frame 1. I pose the character, using the controls. Once I am happy with the character’s pose for that frame, I select all of the character’s controls and set a key frame. I do this same process for each pose.

During this stage of creating key poses, it is not necessary to nail down the timing. Instead, I set these key poses every 10 frames. Once I like how each key pose looks, I can start to go back and refine the timing by moving the key frames of each pose to the appropriate place in the timeline. It will probably be necessary to go back and tweak the timing until it looks right.
Figure 9. Three key poses that encompass my animation
In Figure 9, I have created three key poses that roughly match the storyboard from Figure 8. Just because there are only a certain number of poses in a storyboard does not mean that the key poses need to be confined to that number. If there is a need or desire to create additional key poses, don’t hesitate to do it.

**Conclusion**

Once the key poses have been set, I am ready to move on to refining the animation. Armed with the knowledge of how to make a character believable by manipulating its face and body to convey the appropriate emotions and expressions, I will be able to tweak and improve my key poses into an animation that is fun and interesting to its audience.

The difference between a good animation and a bad animation depends on your ability to use each of the topics provided here to convey the necessary life, expression, and emotion in your story. When done correctly, the illusion of life is achieved.