Animation

Definition:

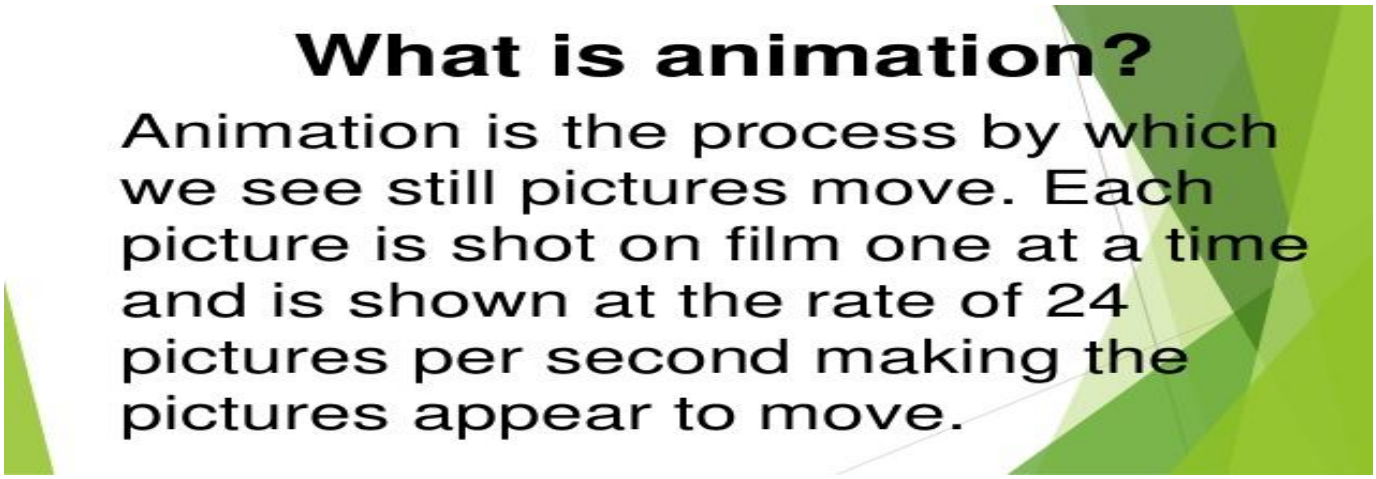
Animation is the process of designing, drawing, making layouts and preparation of photographic sequences which are integrated in the multimedia and gaming products. Animation involves the exploitation and management of still images to generate the illusion of movement. A person who creates animations is called animator. He use various computer technologies to capture the still images and then to animate these in desired sequence.

Animation is a method in which pictures are manipulated to appear as moving images. Animation is the capturing of sequential, static images—drawings or photos of inanimate objects—and playing them in rapid succession to mimic real world motion. If you've ever seen a flip book, you know how it works.

Animation is the illusion of movement created by showing a series of still pictures in rapid succession. In the world of computers, graphics software used to create this effect. A simple animation may be as basic as an animated GIF file like the image shown on this page. A more complex animation could be of a human or alien face in a computer software game or animation of a space battle in a movie.

Animation is the process of making the illusion of motion and change by means of the rapid display of a sequence of static images that minimally differ from each other. The illusion—as in motion pictures in general—is thought to rely on the phi phenomenon. Animators are artists who specialize in the creation of animation.

Animation can be recorded with either analogue media, a flip book, motion picture film, video tape, digital media, including formats with animated GIF, Flash animation and digital video. To display animation, a digital camera, computer, or projector are used along with new technologies that are produced.



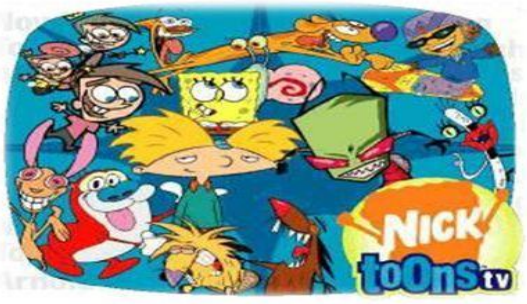
What is Animation?

- 'To animate' literally means to give life to.
- Animating is moving something that cannot move on it's own.
- Animation adds to graphics the dimensions of time, which tremendously increase the potential of transmitting the desired information.
- In order to animate something the animator has to be able to specify directly or indirectly how the 'thing' has to move through time and space.

What is Animation?

- Animation is the quick display of a sequence of images of 2-D artwork or model positions in order to create an illusion of movement.

- It is an optical illusion of motion due to the phenomenon of persistence of vision. This could be anything from a flip book to a motion picture film.

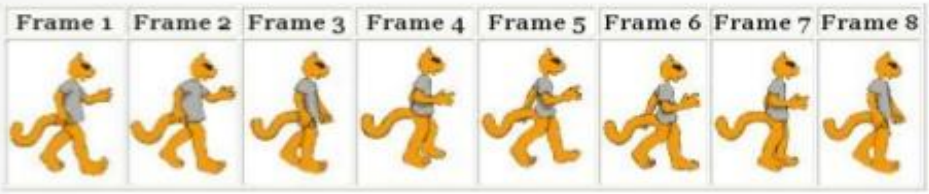


What is Animation?

Animation is the rapid display of a sequence of images of 2-D or 3-D artwork or model positions in order to create an illusion of movement. It is an optical illusion of motion due to the phenomenon of **persistence of vision**. The most common method of presenting animation is as a motion picture or a video.

What is ANIMATION?

- Animation is the rapid display of a sequence of images of 2-D or 3-D artwork or model positions in order to create an illusion of movement.



- Animation is an events
  Each drawing is called a "frame"
  (a snapshot of what's happening at a particular moment)
  Required Frames Per Second FPS:

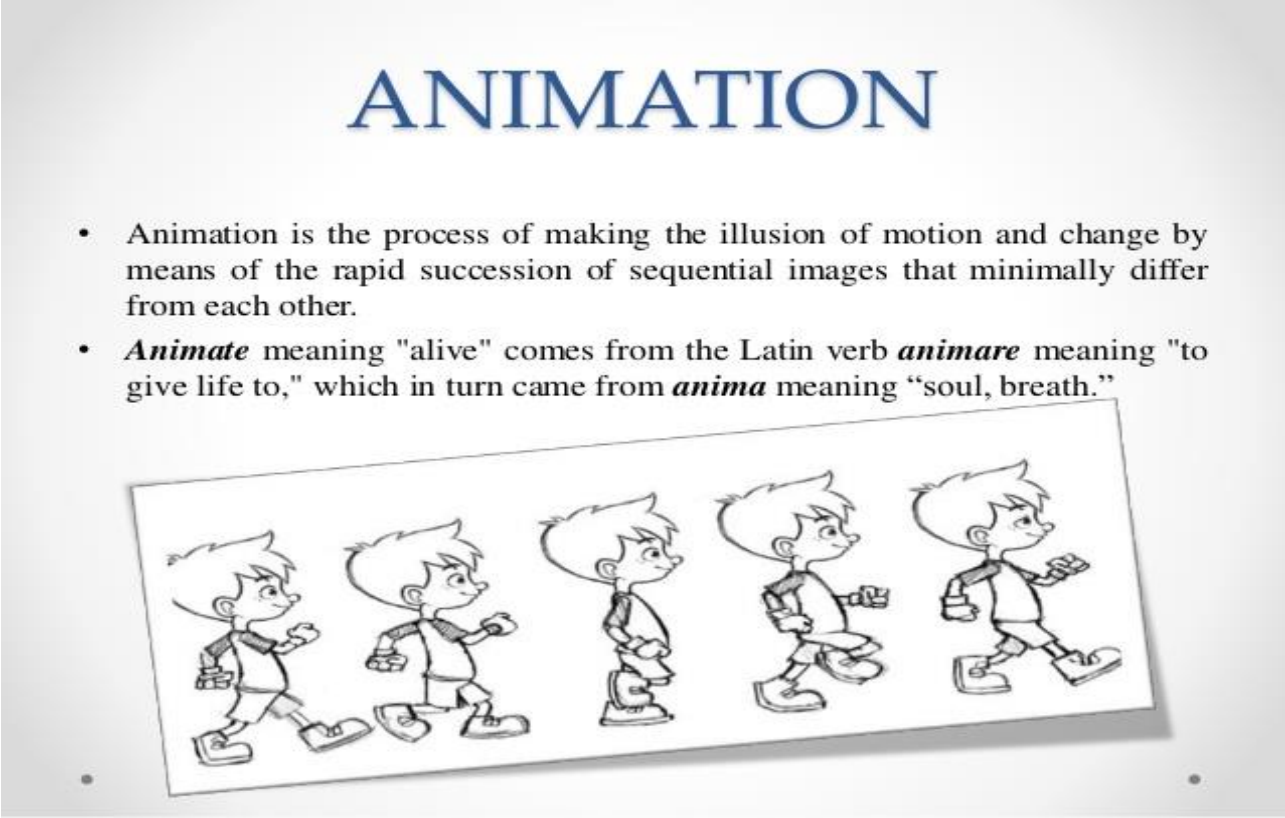


Fig.: Animation

Animation is not the art of making drawings move, but the art of drawing movement. Based on the persistence of vision, animation, like all film, is an illusion of fluid movement, when in fact it is a series of static drawings moving so quickly, twenty-four frames a second that they give the appearance of movement.

The animation is a mixture of imagination, storyline, creativity, and meaning conveyed using storytelling talent that can have 2-D or 3-D effects and characters, based upon the requirements of the people behind such video and their budget. When business houses use animation for their product promotion, these are usually referred to as **explainer videos** or animation videos. These videos are a very crisp and engaging manner of increasing viewership for product promotion. These videos can reach the masses within a short time

span for making the desired impact. Animation videos have been used by almost every industry be it business, education, films, gaming or entertainment, and many more. Due to its extensive and ever-expanding field, animators and animation have gained popularity among masses.

Why is animation important?; Animation is important because it makes us be able to tell stories and communicate emotions and ideas in a unique, easy-to-perceive way that both small children and adults can understand. Animation has helped connect people throughout the world in a way that sometimes writing and live-action films cannot. Today, anyone can pick up a drawing tablet and show their ideas to the world. Drawn figures can be funny, or make something sad or serious have a playful, less intimidating feel to it to make the viewer feel more comfortable. Other times, it allows people to be united by a single passion, such as a fandom, and work on huge projects (called MAPs, which stands for multi animator project) about their interest to make something as high-quality as a professional film, such as The Five Giants [COMPLETE Warrior Cats M.A.P.], regardless of what beliefs and opinions differ. Often, it has simply served as a way to make a heartwarming story that makes you think. Through live-action movies, people can form biases based on appearance and real-life personality of an actor playing a character. But as an animated character, the character feels like their own being.

No matter what the exact use, animation is one of the most powerful creative tool we have, and we should continue to use it as a form of uniting people, no matter their beliefs, biases, or interests.

Animation, while often thought of as a more or less modern medium, has been being used in different forms since 1906! Throughout the last century, we have used it to entertain, as propaganda, and to tell stories that invoke emotion.

The earliest known animated film was made in France in 1906, titled *Humorous Phases of Funny Faces*, and was made from chalk pictures. Since then, other small animations were made, but the first animated cartoon with synchronized was made by Walt Disney in 1928, called *Steamboat Willie*. Many cartoons like this followed, and they were used to entertain viewers with gags and charades of drawn characters. Nine years later, Disney released the first full-length future film, *Snow White*. And in 1993, software for 3D animation was created.

All of these events lead up to the animation and films we see today. From *Spiderman: Into the Spiderverse to* live action movies with CGI, to popular YouTube animators like the animator Jaiden Animations, animation has become a popular form of storytelling that has helped shape the modern world.

If one goes through the market indications, they can take great advantage of the selling propositions where promoting products have larger co-efficient to influence the audience from others. The smarter organizations are already aware of the **importance of animation in business** and the pace at which they are achieving targets owes considerably to this.

Advantages of animation

1. **Increase audience retention rates**– The audience retention rate is the amount of time that the typical visitor spends watching your videos or listening to podcasts or other media on your site.

2. **Get more quality leads.**– If you design a creative video that is interesting and engaging, you may be able to generate more relevant leads for your business.

3. **Increase your return rate.**– If you are looking for a way to increase your return rate, you will want to consider using an animation.

4. **Improve your credibility.**– Credibility is important if you have an online business.

5. **Increase the level of engagement.**– Animations increase interest level and may also improve your audience's ability to recall details from your message.

6. **Increase your ROI.**– Increasing your return on investment is one of your most important goals as a business owner.

7. **Increase customer loyalty.**– If you want to increase your customer loyalty, try using animated video and offering a coupon or some discount for sharing the video with others or for performing some particular action.

8. **Skill and ability Improvement**: The interactive animation takes less time to learn student complex things and makes them enjoy more to learn difficult things. Education and training are higher when information presented via computer animation systems than

traditional classroom lectures. Using an interactive animation will solve the problem of the imagination-skill in education and training. Therefore, the ability to practice new concepts in a risk-free environment improves learners' skills and abilities. Its important to mention that computer animation is also improves the skills and ability of instructors because they will be able to improve and change their way of teaching to be better.

9. **Interactivity**
   Interactivity is a mutual action between the learner, learning system, and learning material. Learners will be faster to learn, and have better attitudes toward learning when using interactive animation especially if the other techniques like audio and video are used.

10. **Engagement**
    Interactive learning with live-action animation, simulation, video, audio, graphics, feedback, expert advice, and questions and answers keep learners interested and reinforces skills. Because it is exciting, challenging, and fun to use, it encourages learners to return to the program again and again and again over! Through continual practice, learning is absorbed and integrated into daily performance.

11. **Flexibility and safety**: A lot of things are dangerous to be carried out in the real-life learning such as experiments in physics and chemistry. Computer animation can offer the following issues:

    - Many experiments cannot be carried out in the classroom because they are dangerous, and yet learners will need these skills in the workplace.
    - Animation programs can represent these dangerous events without the hazards.
    - If the learner were to make a mistake, the experiment can be repeated without injury.
    - Real-life experiences are not readily available, but an animated trip in the past brings the learner some feeling of what it must have been like.
    - The main flexible issue of the animation is to show the non-possible matters in the real-life learning.
    - Learners have more interaction with the content and are thus more likely to assimilate the knowledge, skills and concepts involved (Discovery Learning).

12. **Motivation**
    Since the animation is inspired and interactive way for flexible education and training, learners will be more motivated to learn more and more. Learners will get more skills, which is the main reason to make them more motivated.

13. **Eliminates frustration:** Computer animation is a high-level way to measure the learners' decision making. It can adapt to user's choices and react in different way to

explore what would happen if that case will apply. Computer animation allows learners to measure their abilities to perform a specific task or job without any risk. This will definitely help them to avoid frustration. Besides, the measurement of learner ability could be done for a huge number of learners with highly speed and cheap. This matter could be a critical point for ROI of education and training. Therefore, Learners will not encounter experiments that do not work as a result of faulty apparatus or techniques.

14. **Practicality**: Computer animation is capable of presenting true-to-life situations that learners face every day. Adults are very practical learners—they learn better when faced with real problems that have real consequences. Computer animation allows learners to learn-by-viewing, learn-by-doing or learn-by-coaching. All are effective methods for developing practical skill and increasing information retention.

15. **Consistent**: All learners learn the same principles and skills. Computer-Based Animation typically forces instructional designers to better organize and structure learning materials, and this alone can result in learning advantages.

16. **Immediate Feedback**: Learners will get an immediate feedback from the animation system that will enhance their skills and abilities. During the process of the animation, instructors can open free-discussion among learners, which will effect positively over the entire classroom. Its important to note that the learners' feedback could be useful to improve the animation system itself!

17. **Attracting and holding attention**: Animation is useful when quickly getting and holding an audience's attention is important. For example, when the computer animating used to show invisible phenomena such as chemistry or physics interaction.

18. Showing prototype designs Animation is a dynamic tool for designing objects that do not yet exist in reality. It offers perfect support for: - Architects designing buildings - Engineers envisioning structural designs - Equipment manufacturers building prototypes - Automobile manufacturers creating next year's model.

19. Creating models of data Since animation can be so easily manipulated, it is a good tool for creating three-dimensional models using scientific data. For example, a researcher can create a model of: - A molecule - Ozone thickness based on atmospheric readings - The ocean floor based on sonar readings

20. Showing processes or relationships not usually visible Since animation can show imagined objects in motion, it is ideal for demonstrating processes and relationships that are impossible to observe in reality. For example, geological events like earthquakes or erosion patterns

21. Isolating specific actions in a complex sequence Animation can show motion for part of a complex operation, thus clarifying functions that would otherwise be impossible to isolate and view independently. For example, blood circulating through the body.

22. This is a very user-friendly. It does not need the number of energy users, in this sense, you can sit down to watch the demo, you can read the text and hear the sound.
23. It is a multi-sensory. It uses the senses of many users, while the use of multimedia, such as hearings, see and talk.
24. It is a comprehensive and interactive. Through different media in the process of digital integration. The possibility of interaction easy feedback are greatly increased.
25. It is flexible. Digitalization, this media can easily be changed to adapt to different situations and audiences.
26. It can be used for a variety of audiences, ranging from one person to the whole group.
27. Creative Industries: the creative industries, including advertising, media and news, they use multimedia fun and interactive way to express their thoughts. Organization of advertising agencies and other creative work across a creative way of information, ideas and news. Path information in an interactive visualization of these ideas, multimedia plays a vital role.

OR

1. Increases learning effectiveness
2. Gains and holds attention
3. More appealing
4. Reduces training cost
5. Easy to use
6. Give information to individuals
7. Provides high quality of presentations
8. Multi-sensorial
9. Integrated and interactive
10. Can be used as a wide variety of audience
11. Entertaining and educational

Disadvantages of animation

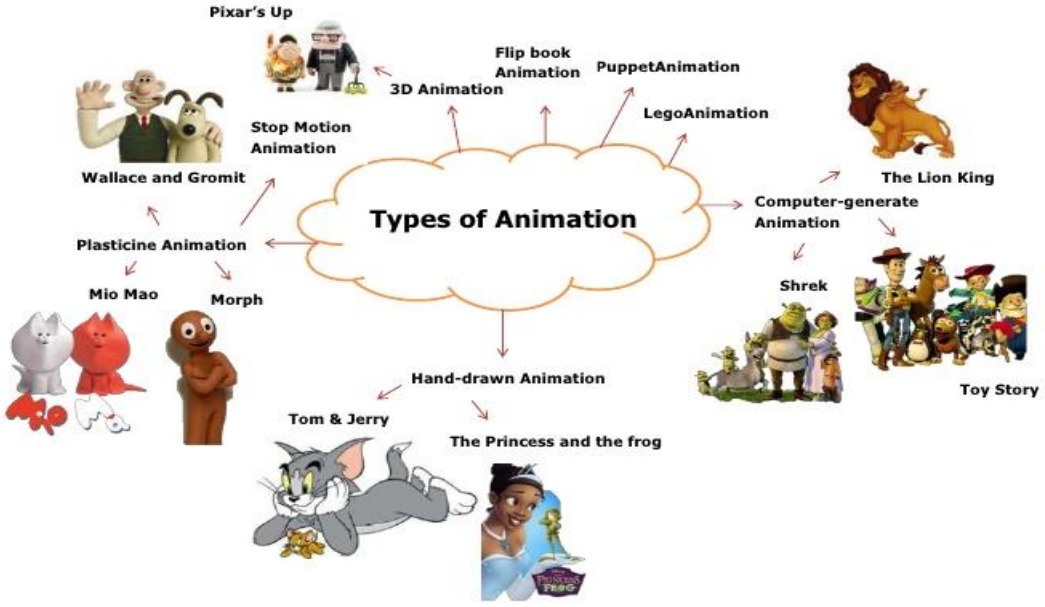
1. **Limited Color Pattern**
   The fact that it only uses a color palette of 256 colors, the animated images created can sometimes look poorer in comparison to other image files. For some instances, images can look slightly pixelated or images that can look blocky.
2. **Editing Is Not Possible**
   Another con when it comes to using animate gifs is that it can't be edited once the animation has already been coded into the actual gif file. So you need to make sure that you have the final image set before getting it in action right away. If you fail to do so, you may have to do the same thing again from the very beginning just to make a minor adjustment to an existing gif file.

3. **Internet Connection Matters**
   Despite the fact that gif files are small in size and should run smoothly once the sequence of still images have been finally coded, some of these animated images can be dependent on Internet speed. So when the connection lags a bit, the images will not load right away and will end up displaying a less desirable version of that file.
4. Takes a lot of effort to create even a basic animation
5. Needs skill in using the animation software such as Flash.
6. Too much animation on a page can be distracting and even annoying - for example too many animated adverts on a page
7. Can take up a lot of bandwidth, so will take too long to show over a slow internet connection
8. Needs the correct 'add-in' to view the file format
9. Expensive
10. Not always ready to configure
11. Requires special hardware
12. Not always compatible
13. Takes time to compile
14. Information overload
15. Misuse and/or overuse
16. Limitations of technology

Types of animation techniques

ANIMATION is nothing more than an optical illusion – a way of tricking our eyes into thinking that lots of static pictures are one moving image. Since the success of sites such as YouTube, simple shorts can be attempted by anyone, and **stop-motion** animations with everyday objects are some of the most popular and artistic videos. If you have tried some simple animation already, an animation course will develop this with more sophisticated materials. The basic processes and techniques are the same for all animation, and because of the wide range of applications, animation graduates are in high demand. So if you are an amateur animator, why not read on to learn more about the **different types of animation**.

1. Traditional animation
2. 2D animation
3. 3D animation
4. Typography Animation
5. Clay animation
6. Sand Animation
7. Flip book Animation
8. Stop-motion animation.



There are different ways of animation that can be used to bring in a better Brand image in front of the target audience. It can help to speed up your sales graph elevation and maintaining clients base. Various types of animation techniques involve:-

1) Traditional animation: Traditional animation involved animators drawing by hand for each and every frame. If you love the feel of pencils on a paper, then the traditional approach is very fascinating. Traditional animation is creating the drawings one by one on the frame. 2D animation involves creating numerous drawings then feeding into a plastic cells, hand painting them and create the animated sequence on a painted background image. **Traditional Aniamtion Movies** : Snow White and the Seven Dwarfs, Peter Pan, and Sleeping Beauty, Aladdin.

It is used by advertising companies to screen pre-production of advertisement where several sequential images were drawn by hand and screen to create the illusion of movement.

Traditional animation is sometimes called **hand-drawn animation** or **cel animation** and, for most of the 20th Century, many popular animated films were created this way. It was a lengthy process. Thousands of pictures were drawn entirely by hand on acetate sheets, or cels, with each cel being slightly different from the one before it. Each cel was photographed onto a separate frame of film so that when the filmreel was played, the animation moved. This form of animation could also be combined with live-action video by placing the cels on top of the film.

This technique was popular in the late 80s and early 90s, and was used in films such as *Space Jam* and *Who Framed Roger Rabbit.*

Traditional animation takes a lot of artistic skill and has many different artistic styles: Disney's films are very recognisable and considered quite realistic, whilst Studio Ghibli characters have a distinctive **anime** look. More stylistic drawings were used for many cartoon programmes, such as *The Flintstones*, and the Beatles' *Yellow Submarine* used a pop-art style that was popular at the time it was made. The music video for the song "Take On Me" by A-ha is a good example of another style of traditional animation called **rotoscoping**, which used a live-action recording as a template for animation. In this video, a very simple pencil-sketch style was used.

In fact, any style of art can be turned into animation. Although this traditional animation became unnecessary when digital techniques were invented, some modern animators, such as those who worked on the 2010 film The Illusionist, still choose to use this form.

2. **Simple animations**

Before film was invented, there were early forms of animated pictures. The **zoetrope**, for example, is a wheel with a number of static pictures around the inside so that they appear to move when the wheel spins. **Flipbook animation** is very similar, and places pictures on every page of a book so that it creates an optical illusion when the pages are flipped quickly. Whilst both of these don't need a camera, **object animation** and **chuckimation** involve filming regular inanimate objects, such as Lego or action figures, and animating them using stop-motion or off-camera hand-movement. **Pixilation** uses people as stop-motion characters in a similar way.

3. **Computer Animation**

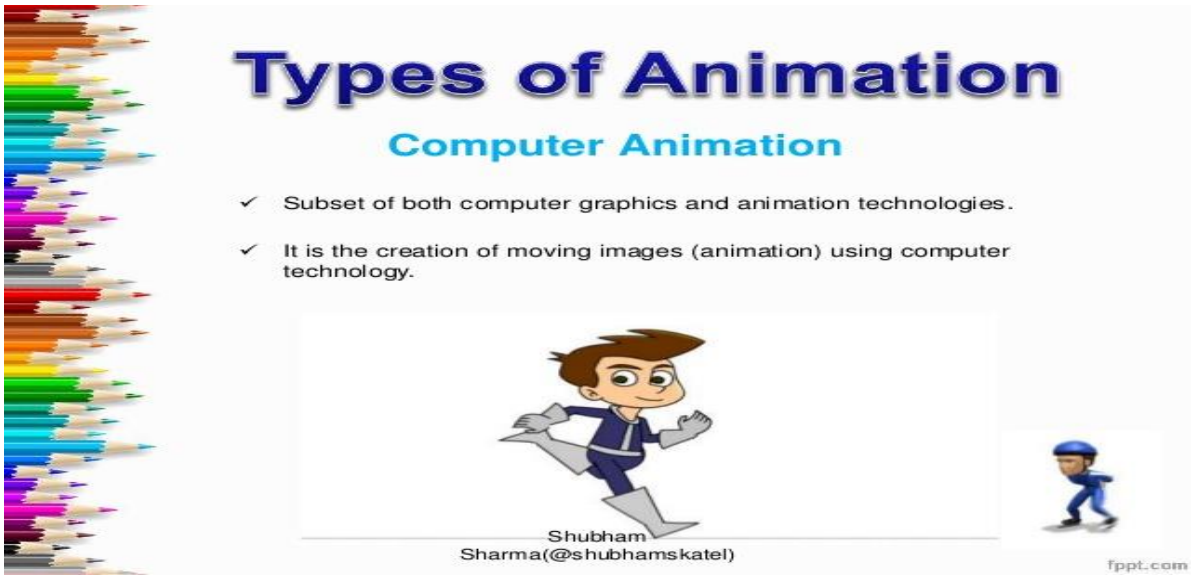
Computer technology revolutionised the animation world. **Computer animation** includes a very wide range of techniques, but in essence is any animation that is created digitally using a

computer. Whilst forms of computer animation have been around since the 1960s, it came into general use in the 1990s when animators began using it alongside traditional animation. It is more controllable and faster than traditional animation and computer animation can be broken down into two main types:

Digital 2D can be created using computer programs such as Flash, After Effects, Cel Action and TV Paint. These programs have varying levels of intricacy – from simple stick-person animation figures, to entire worlds. Just as in traditional animation, 2D animation can use different layers to build up pictures. It can show anything from backgrounds and landscapes, to multiple characters and crowds. Digital 2D animation is not used for artistic purposes as much anymore, due to the lack of depth, but is still used in advertising and desktop publishing. It is also the basis of many graphical user interfaces (GUIs) that you use every day, including Mac OS and Microsoft Windows.

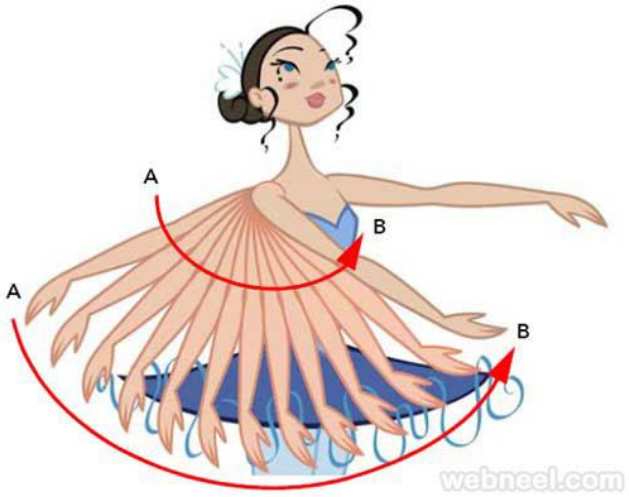
Digital 3D uses programmes such as Maya to create animation with more depth. An animator will often create a very simple version (or **skeleton**) for a digital character (or **Avar)** and build up from this with digital muscles, skin, hair, pores etc. The animator will use **keyframing** to set the Avar's position, just as they would in traditional animation. However, they don't need to do it on every frame, but just key ones – the computer programs then fill in the movement between the key frames to create a full animation. Digital animation can be very realistic, and animators can be very artistically skilled to create a character. Some animators will specialise – for example, **facial animators** just work on the facial movements and speech of a character, rather than the whole thing.

2D, 3D: The famous Mickey Mouse animation was created using the 2d animation technique.The first 2D animation was called Fantasmagorie, it's a short cartoon made by Emile Cohl. It's shot entirely in black and white, the cartoon is all about a simple stick man in live action. The cartoon is 75 seconds long and it took about 700 different drawings to create. This historic animation was released in 1908. During the 1960s many popular cartoons like the Jetsons and the Flintstones were created using 2d animation.



Digital 2D animation

Creating animations in the 2 dimensional space with the help of digital technologies is known as digital 2d animation. You don't need to create digital models, you just need to draw the frames. Create 100s of drawing and animating them to show some kind of movement is technically known as digital 2d animation. Using Adobe flash, animators can limit the number of drawings used, which makes them easier to create digital 2d animation. Small variations like changing the color or frame rate can be changed almost instantly, thus making it easier for the animators to work on.



3 : Digital 3D animation

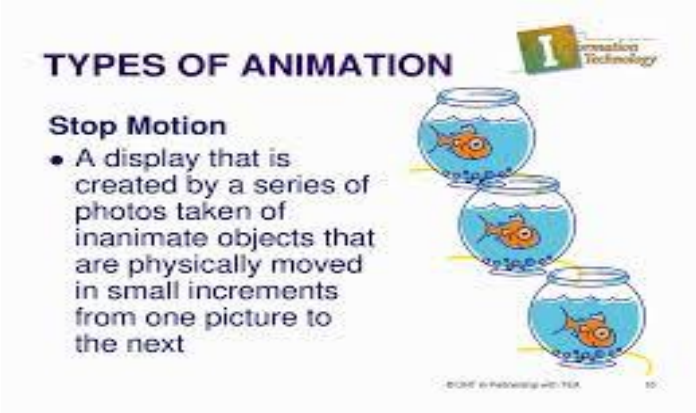
If you are interested in making the unreal characters into a realistic one, then it's Digital 3d animation. Digital 3d animation characters are much faster to create and they are quite popular in the movie making industry. Using a computer software 3d animated images are used to create many short films, full length movies and even tv commercials and a career in digital 3d animation is highly rewarding. Comparing to 2D animation and the traditional approach, 3d animation models are highly realistic.

Motion capture is method used to make 3D digital animation as life-like as possible. An actor will be filmed doing actions, speaking, or even acting full scenes, whilst special sensors on their body and face are 'captured' by a film camera. This is then translated into a digital character, which can be controlled by the animator. This type of digital animation is often used in blockbusters, including *Dawn of the Planet of the Apes* and the new *The Legend of Tarzan* film.

4. **Stop motion:** Have you ever wondered if a piece of stone can walk or talk, well anything is possible in animation? Using frame by frame animation, physical static objects are moved around and during the post production it is shown in a fluid movement. Stop motion animation has been around ever since the evolution of puppets. There were many movies created using the stop motion method, some of the finest examples are "Fun in a bakery shop" created in 1902.Edwin Porter directed "The Teddy Bears," which was one of the earliest stop-motion animation films. The movie is a short sequence of playing teddy bears, just over a minute in length, which took over 50 hours to animate.

Stop-motion is a simple, but time-consuming, form of animation where objects are physically manipulated and filmed frame-by-frame. Stop motion comes in many forms: **Object animation** and **pixilation** can use the stop-motion technique without specialist equipment, but special stop-motion models have often been used for special effects in live-action films. The 1933 *King Kong* film was famous for the stop-motion ape, and the original *Star Wars* films and *The Terminator* used stop-motion models for many of the aliens and machines.

Other forms of stop-motion use artistic materials to create the physical objects. The earliest known animated feature-film used **cut-out animation**, where flat pictures are physically cut out of paper or fabric and animated. The children's show *Charlie and Lola* use a cut-out animation style. Another form of stop-motion uses puppets, such as Tim Burton's animated films. These puppets often have hundreds of interchangeable heads to create lip-movement and facial expressions. **Claymation** is the name given to stop-motion that is made with clay or plasticine figures. Plasticine is easily moved and shaped, so the figures can be moved very carefully and precisely. It takes a long time to create a claymation, as a figure is usually moved about twelve times for every second of film. Aardman Animation's *Chicken Run* is a claymation film, and currently the highest-grossing stop-motion film ever made.



Whilst it is very similar to traditional animation in technique, stop-motion continues to be a popular form of animation, with at least twelve feature-length stop-motions currently in production. Many animators work with stop-motion for artistic reasons, as it is still difficult to recreate stop-motion models digitally.

5. **Working with animation**

Animation is such a wide and versatile subject, there are endless routes you can go into. Artistic variations on the three main styles above are endless: **hydrotechnic** is a form of light animation projected on water, and can be seen in popular events such as the Lumiere festival, whilst **sand animation, paint-on-glass** and **pinscreen animation** use the same principals as stop-motion, but with different materials. If you want to specialise in a particular animation technique, be it digital or physical, you may find you have to do postgraduate studies or on-the-job training. But animation is always changing and developing, and as a course or career there is a lot to keep you interested.

Animation software

Below is a listing of some of the more popular and widely used animation and 3D animation programs.

- **Blender** (Free) - https://www.blender.org/
- **3ds Max** - https://www.autodesk.com/
- **3DPlus** (Free) - http://www.freeserifsoftware.com/
- **Animation:Master** - http://www.hash.com/
- **LightWave 3D** - https://www.newtek.com/
- **Elastic Reality** and **Avid 3D** - http://www.avid.com
- **Maya** - https://www.autodesk.com/products/maya
- **Adobe Animate** -

  http://www.adobe.com/products/animate.html
- **Motion Capture** - http://www.metamotion.com/
- **Poser** - http://poser.smithmicro.com/

- **SOFTIMAGE -**

  https://www.autodesk.com/products/softimage

Principles of Animation

Disney's **twelve basic principles of animation** were introduced by the Disney animators Ollie Johnston and Frank Thomas in their 1981 book *The Illusion of Life: Disney Animation*. But the principles are based on the work of Disney animators from the 1930s onwards, in their quest to produce more realistic animations. The main purpose of these principles was to produce an illusion that cartoon characters adhered to the basic laws of physics, but they also dealt with more abstract issues, such as emotional timing and character appeal.

The book has been referred to by some as the "Bible of animation", and some of its principles have been adopted by traditional studios. In 1999, *The Illusion of Life* was voted the number one "best animation book of all time" in an online poll done by Animation World Network. Though originally intended to apply to traditional, hand-drawn animation, the principles still have great relevance for today's more prevalent computer animation.

The 12 principles of animation

1. Squash and stretch.
2. Anticipation.
3. Staging.
4. Straight ahead action and pose to pose.
5. Follow through and overlapping action.
6. Slow in and slow out.
7. Arc.
8. Secondary action.
9. Timing
10. Exaggeration
11. Solid drawing
12. Appeal

1. Squash and stretch: The squash and stretch principle is considered the most important of the 12 principles of animation. When applied, it gives your animated characters and objects the illusion of gravity, weight, mass and flexibility. Think about how a bouncing rubber ball may react when tossed into the air: the ball stretches when it travels up and down and squishes when it hits the ground.

When using squash and stretch, it's important to keep the object's volume consistent. So when you stretch something it needs to get thinner, and when you squash something it needs to get wider.

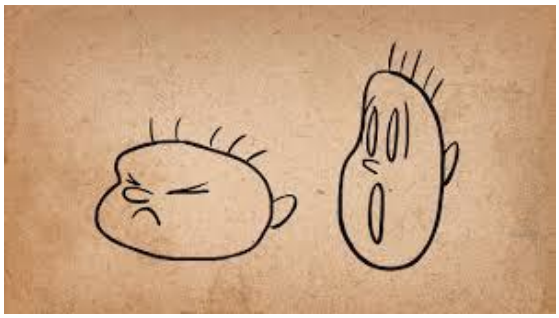


fig: Squash and atretch

2. Anticipation: Anticipation helps to prepare the viewer for what's about to happen. When applied, it has the effect of making the object's action more realistic.

Consider how if might look if you were to jump in the air without bending your knees, or perhaps to throw a ball without first pulling your arm back. It would appear very unnatural (it may not even be possible to jump without bending your knees!). In the same way, animating movements without a flicker of anticipation will also make your motion seem awkward, stale and lifeless.

03. Staging: Staging in animation is a lot like composition in artwork. What we mean by that is, you should use motion to guide the viewer's eye and draw attention to what's important within the scene. Keep the focus on what's important within the scene, and keep the motion of everything else of non-importance to a minimum.

04. Straight ahead action and pose to pose:

There are two ways to handle drawing animation: straight ahead and pose to pose. Each has its own benefits, and the two approaches are often combined. Straight ahead action involves drawing frame-by-frame from start to finish. If you're looking for fluid, realistic movements, straight ahead action is your best bet.

With the pose to pose technique, you draw the beginning frame, the end frame, and a few key frames in-between. Then you go back and complete the rest. This technique gives you a bit more control within the scene and allows you to increase the dramatic effect of the motion.

05. Follow through and overlapping action:

When objects come to a standstill after being in motion, different parts of the object will stop at different rates. Similarly, not everything on an object will move at the same rate. This forms the essence of the fifth of Disney's principles of animation.

If your character is running across the scene, their arms and legs may be moving at a different rate from their head. This is overlapping action. Likewise, when they stop running, their hair will likely continue to move for a few frames before coming to rest – this is follow through. These are important principles to understand if you want your animation to flow realistically.

06. Slow in and slow out:

The best way to understand slow in and slow out is to think about how a car starts up and stops. It will start moving slowly, before gaining momentum and speeding up. The reverse will happen when the car brakes. In animation, this effect is achieved by adding more frames at the beginning and end of an action sequence. Apply this principle to give your objects more life.

07. Arc:

When working in animation, it's best to stick with the laws of physics. Most objects follow an arc or a path when they're moving, and your animations should reflect that arc. For example, when you toss a ball into the air, it follows a natural arc as the effects of the Earth's gravity act upon it.

08. Secondary action:

Secondary actions are used to support or emphasise the main action going on within a scene. Adding secondary actions help add more dimension to your characters and objects.

For instance, the subtle movement of your character's hair as they walk, or perhaps a facial expression or a secondary object reacting to the first. Whatever the case may be, this secondary action should not distract from the primary one.

09. Timing:

For this principle of animation we need to look to the laws of physics again, and apply what we see in the natural world to our animations. In this case, the focus is on timing.

If you move an object more quickly or slowly than it would naturally move in the real world, the effect won't be believable. Using the correct timing allows you to control the mood and the reaction of your characters and objects. That's not to say you can't push things a little (especially if you're creating an imaginary world) – but if you do, be consistent.

10. Exaggeration:

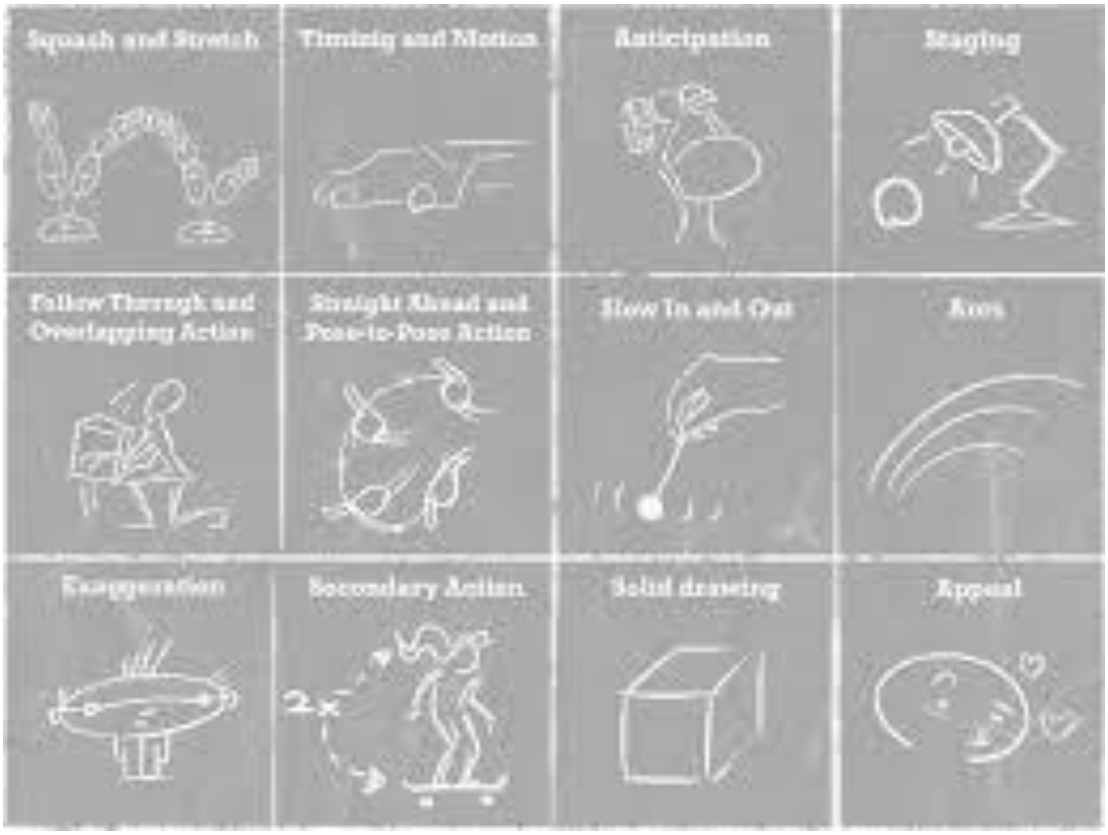
Too much realism can ruin an animation, making it appear static and boring. Instead, add some exaggeration to your characters and objects to make them more dynamic. Find ways to push the limits just beyond what's possible, and your animations will pop.

11. Solid drawing:

You need to understand the basics of drawing. This includes knowing how to draw in three-dimensional space and understanding form and anatomy, weight and volume, and lights and shadows.
While you can push the limits here, too, it's important to remain consistent. If your world has wonky doors and a warped perspective, keep that perspective throughout the entire animation. Otherwise, things will fall apart.

12. Appeal:

Your characters, objects, and the world in which they live need to appeal to the viewer. This includes having an easy-to-read design, solid drawing, and a personality. There is no formula for getting this right, but it starts with strong character development and being able to tell your story through the art of animation.



Benefits of Animated Videos for Your Business

1. Help you stand out from the competition.
2. Boost Conversion Rates.
3. Engage with your customers.
4. Improve SEO.
5. Impress clients at sales meetings and attract attention at events. ...
6. Help clients to understand your product.
7. Save your time and money.
8. Expanding Your Reach.
9. Bring your ideas to life
10. Brand development can be easily promoted through animated videos

Problems and Limitations of Animation

Beyond the problem of split attention mentioned above, psychologist Barbara Tversky and her colleagues have identified four major challenges when people watch and learn from animated graphics (including maps) as compared to the static graphics of the same data:

Attention: In any visually rich display, especially in an animated map where many things can be happening simultaneously, readers are often unsure of where to look (a problem with the maps) or what to do (a problem with the interface). Potential solutions include guided tours, short tutorials, and voice over.

Disappearance: By their very nature animated maps change, often quite dramatically from moment to moment. As a result, there is always the potential that the map reader will miss important information or cues. Because of disappearance (i.e., blink and you miss it), many basic map reading tasks can be very difficult, such as estimating the size of symbols or areas, matching colors to a legend, comparing one symbol to another, or reading text labels.

Complexity: With (1) the astonishing level of computing and video processing power available today in the basic desktop computer, coupled with (2) the equally astonishing size and complexity of digital databases, it is entirely possible to make an animated map that simply overwhelms readers with data and 'saturates' their visual processing. Data filtering tools and techniques that can help us cope with this complexity have been a major avenue of research in GIScience for 20 years now and many journals and international conferences are devoted to this topic.

Confidence: Early testing has shown that while people often like looking at animated maps, they are sometimes less confident of the knowledge they acquire from the animation than from static graphics. In response to this blanket concern, others have pointed out that people have far more exposure and experience using static maps, and thus there is naturally a learning curve to animated maps that needs to be understood (and systematically targeted) before we can conclude they do not work. Moreover, there are obviously some representational tasks for which animated maps are poorly suited (and a static map or table are inherently more efficient) and to test animated maps under those conditions is unfair and not especially informative.

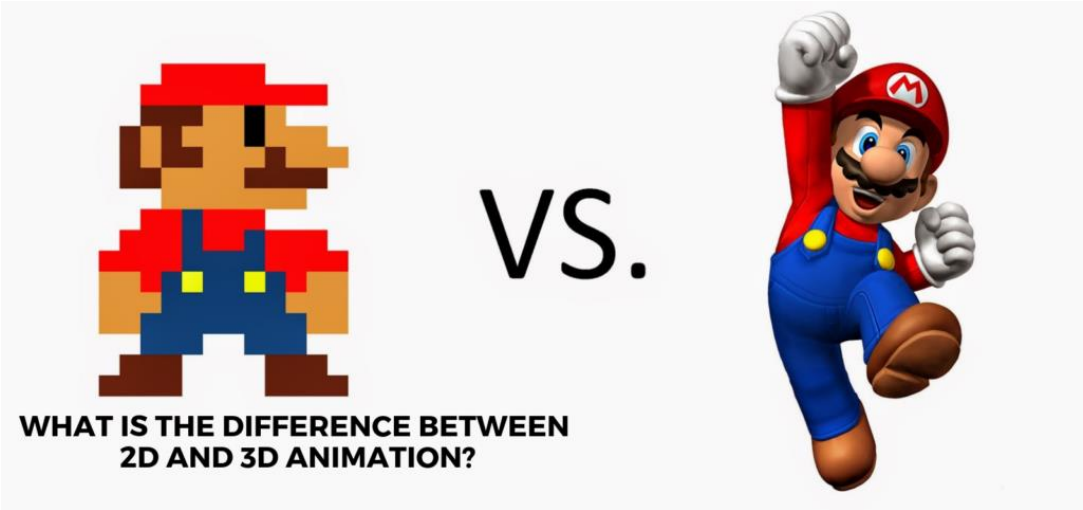
It should be noted that none of these challenges are insurmountable and many graphic design solutions have been proposed (and tested) for each of these, primarily relying on increased and/or new forms of interactivity, better interface controls (e.g., more intuitive, less obtrusive), and a willingness to restrain the design of our animated maps so they respect the cognitive and perceptual limitations of the eye–brain system, such as avoiding well understood limitations in human vision such as optical illusions and 'change blindness'. As a way forward, researcher Sara Fabrikant and her colleagues are doing promising work around the notion of 'visual salience' and understanding how people see/understand map animation in order to increase their effectiveness.

Anecdotally, many cartographers will confess they make animated maps because 'they look cool' and, to their credit, the public seems to enjoy watching these maps. Today, animated maps seem to be all around us, from the weather channel, to NASA press releases about lost planetary probes, to nightly television news stories that begin with an animated map that zooms in from space to some foreign locale, thus, connoting an air of (1) currency, (2) powerful panoptical surveillance, and (3) scientific authority to whatever may follow. What is less clear, however, is simply how useful animated maps are when static alternatives are both easier to make and ponder since they do not change. Research that compares the effectiveness of learning from animated and static maps has been mixed and, thus, academic cartographers have an incomplete answer to even the most basic question: 'For what kinds of map reading tasks are animated maps useful, and when should they be avoided?' This does not mean animated maps should be avoided, but rather, like any form of representation, they have their strengths and weaknesses that researchers are working to understand. Animated maps should not be seen as replacements to static maps, but rather as complimentary. They broaden our representational possibilities especially when data have a temporal component.

Difference between 2D and 3D animation:

2D Animation	3D Animation
2D animation implies that the object is two dimensional.	3D animation implies that the object
2D animation comprises of characters or objects only in height and width. In other words, in X- axis (horizontal dimension) and Y – axis (vertical dimension).	3D animation comprises of objects in height, width, and depth. In other words, characters are going to be more a realistic contrast to 2D characters.
2D animation objects are created by traditional drawing method. Each move of the character has to be created frame by frame with hand-drawing, also called as a cell-animation method. However, today's 2D animators make use of software in developing action sequences. But creating the first action scene has to be created and the tool will generate the rest of the motion sequences automatically.	In 3D animation, everything is going to be done in available computer software. The development consists of several phases or steps such as modelling, texturing, lighting, rigging, rendering etc.
2D animation comes for a less price compared to 3D animation since you only need expert candidates	Well, the cost of 3D animation depends on the money you spent in rendering. You have to shell out for each second; which is why the 3d

who can draw and sketch aptly.	animation course demands more from your pocket. Since the final product has to go through several steps, you gotta have a skilled professional for expected outcome.
2D animation is all about frames.	3D animation is all about movements.
It is not suitable for conceptual drawing as you can only represent in two dimensions.	3D animation is impeccable for conceptual designing as it results in all the three-dimensional views. The software helps the animators to create a detailed character concentrating every possible
2D animation is widely implemented in advertisements, films, cartoon shows, websites, e-learning courses, engineering etcetera.	3D animation is widely used in gaming, movies, medical, biotechnology, aerospace etceter
Examples: The Jungle Book, The Simpsons, Snow White	**Examples: The Incredibles, Toy Story, and Transformers**



History of Animation

The History of Motion Picture

1867
The zoopraxiscope by William Lincoln was the first machine patented in the United States that showed animated pictures or movies. Moving photographs or drawings were watched through a slit in the zoopraxiscope.

1891
The Edison company successfully demonstrated the Kinetoscope, which allowed one person to view moving pictures at a time.

1903
The first silent movie was Produced by Thomas Edison but directed and filmed by Edison Company employee Edwin S. Porter. It was the first narrative movie that told a story.

1930
First film made that used microphones to record the actors while they were being filmed.

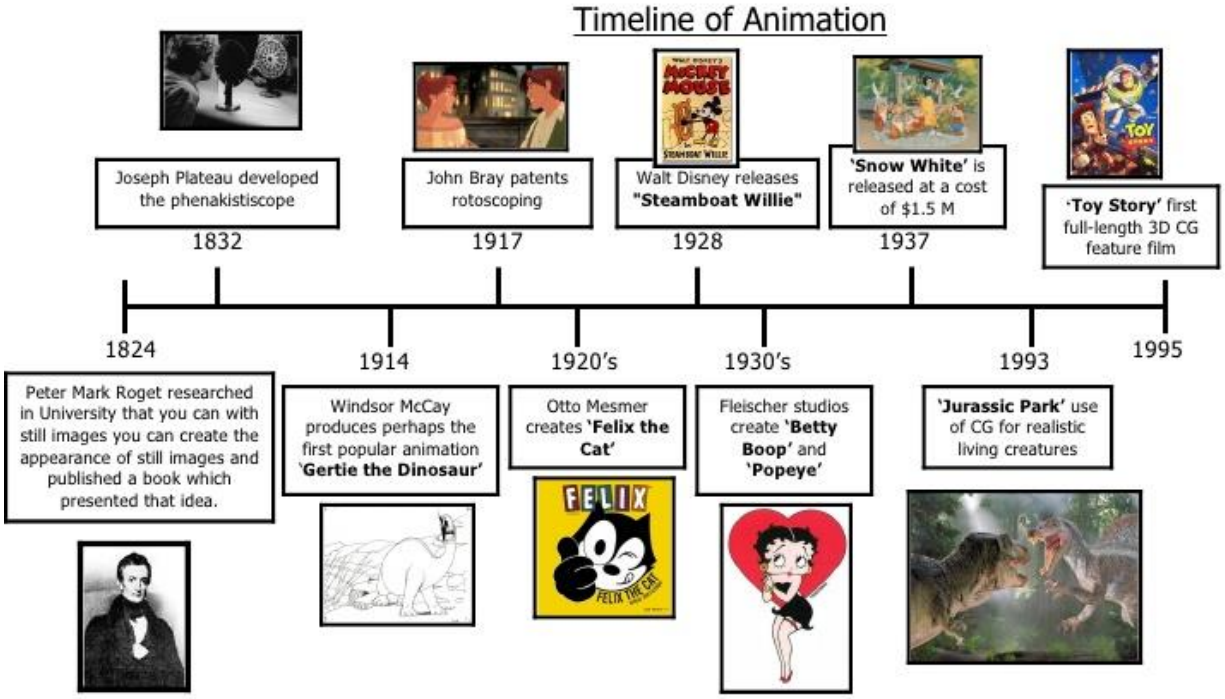
1895
A Frenchman named Louis Lumiere invented a portable motion-picture camera, film processing unit and projector called the Cinematographe, three functions in one invention.

1895
Louis Lumiere and his brother were the first to present projected, moving, photographic, pictures to a paying audience.

1927
The first feature length film with synchronized sound (talkie) was created by Warner Bros' and director Alan Crosland.

2010
High quality movies are made and are able to buy to play at home. Most modern movies are now 3D films.

Or


Timeline of Animation
Joseph Plateau developed the phenakistiscope
1832
John Bray patents rotoscoping
1917
Walt Disney releases "Steamboat Willie"
1928
'Snow White' is released at a cost of $1.5 M
1937
'Toy Story' first full-length 3D CG feature film
1995
1824
Peter Mark Roget researched in University that you can with still images you can create the appearance of still images and published a book which presented that idea.
1914
Windsor McCay produces perhaps the first popular animation 'Gertie the Dinosaur'
1920's
Otto Mesmer creates 'Felix the Cat'
1930's
Fleischer studios create 'Betty Boop' and 'Popeye'
1993
'Jurassic Park' use of CG for realistic living creatures
FELIX
FELIX THE CAT

Or

the history of ANIMATION

2.6 M years ago

MAN STARTED DRAWING FIGURES IN MOTION SINCE THE PALEOLITHIC AGE.

Early 18th century

MANY INSTRUMENTS WERE INVENTED LIKE ZOETROPE TO GIVE AN ILLUSION OF A QUICK ANIMATION.

1911

"THE CAMERAMAN'S REVENGE" PRODUCED BY STAREWICZ IS A PIONEER IN PUPPET ANIMATION MOVIES. THE MOVIE IS DEPICTED USING DEAD INSECTS.

1914

EARL BURD PATENTED THE CEL TECHNIQUE FOR ANIMATION.

1960

"THE FLINTSTONES" WAS THE FIRST ANIMATED SERIES TO APPEAR ON PRIME TIME TELEVISION.

1510

LEONARDO DA VINCI DREW A SEQUENCE OF IMAGES DEPICTING MOVEMENT IN THE ARM, NECK AND CHEST.

1899

AFTER THE INVENTION OF CINEMATOGRAPH, THE FIRST SHORT STOP MOTION MOVIE "THE HUMPTY DUMPTY CIRCUS" WAS PRODUCED.

1914

"GERTIE THE DINOSAUR" IS THE FIRST HAND DRAWN ANIMATED MOVIE, DONE BY WINSOR MC CAY.

1923

ARRIVAL OF DISNEY STUDIOS SLOWLY BEGAN THE GOLDEN AGE OF ANIMATION

1995

"TOY STORY" FROM PIXAR STUDIOS IS THE FIRST CG ANIMATED MOVIE. IT HAS GAINED A SPOT IN ONE OF THE BEST ANIMATED MOVIES.

TOP 5 ANIMATED MOVIES:

WALL.E
TOY STORY 3
HOW TO TRAIN YOUR DRAGON
THE LION KING
TOY STORY

TOP 5 ANIMATED SERIES:

THE SIMPSONS
BATMAN: THE ANIMATED SERIES
LOONEY TUNES
SOUTH PARK
BEAVIS AND BUTT-HEAD

sources:
Wikipedia
IMDB
IGN

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