

HOW TO LEARN ANATOMY

BY MITCH LEEUWE

YOU'LL LEARN:

- HOW TO START
- CONSTRUCTIONS
- HOW TO APPLY

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HOW TO LEARN ANATOMY

BY MITCH LEEUWE



HI THERE!

Thank you for getting my book about anatomy. Back in the days when I wanted to learn about anatomy I found it very overwhelming. So my goal with this book is to make learning anatomy understandable and accessible for you.

I started out with trying to learn every muscle and bone and I really began to remember all those different parts. But after a while I noticed I forgot a lot of those names and in the end I always had to look up for reference. That's when I started to look for tutorials about anatomy for animation. I found examples where the anatomy was simplified and broken down in understandable formulas and shapes. This made it way more fun and easy to learn. So I started making this book with the idea of putting everything together.

HOW TO APPLY THIS BOOK

Most of the time I'm drawing cartoon characters, these are not hyper realistic. And because of that I'm always focussed on simple shapes first. But even when you want to draw realistic anatomy I think this book can be of some good help. Because these simple shapes will be a good basis before you starting to add all those details and muscles on top of it.

You can use it to learn from or use it for reference when you are drawing a difficult pose. When you are just starting out the best way to learn is to take small steps. Maybe start with copying the drawings inside this book and try to examine all the different parts. Once you get comfortable at copying those drawings you could start looking for photos of people where you can see those muscles. Like a photo from a boxer or a ballerina in a clear pose. Draw those characters and draw the muscles on top of those drawings, try to see how those

muscles work and where they are connected. It takes a lot of time to learn anatomy, so don't get worried that it takes a lot of time to learn.

Try to have fun and enjoy the process. Start with doing each day thirty minutes instead of doing a couple of hours in one go and get frustrated with it. Doing everyday a bit will make a big difference after some period of time. When you have difficulty drawing the shapes, start practising drawing cubes, circles and cylinders. When you can comfortably draw those shapes on paper in 3D, you can basically draw everything. Because with mixing those shapes up you can build any shape you want.

Best,
Mitch Leeuwe

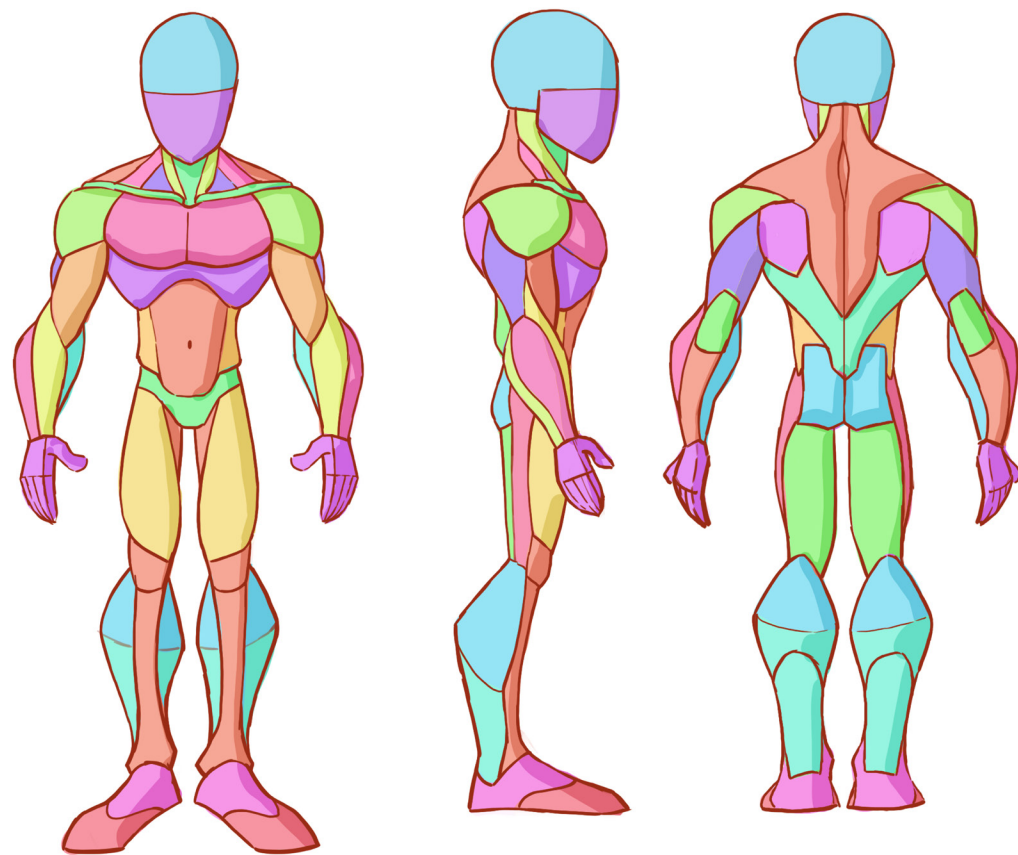


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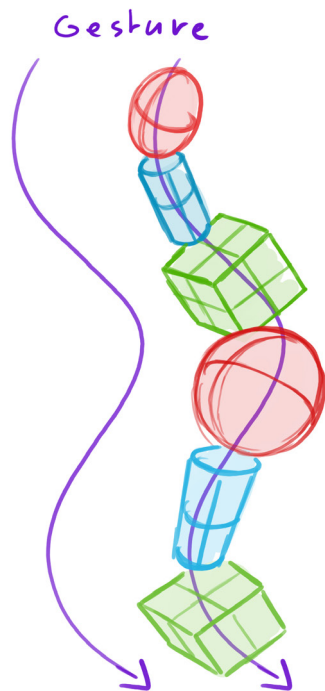
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CONSTRUCTION

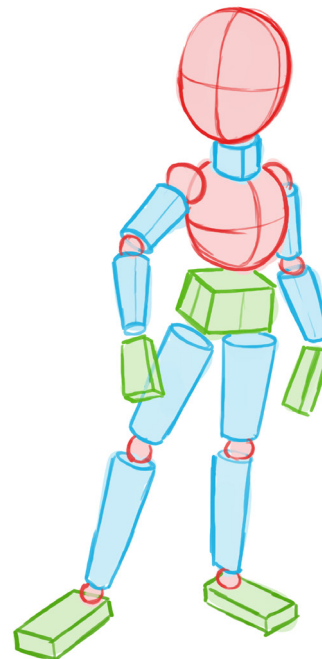
① Start with 3D shapes



② place the shapes on action lines



③ create characters with these shapes



CONSTRUCTION SHAPES

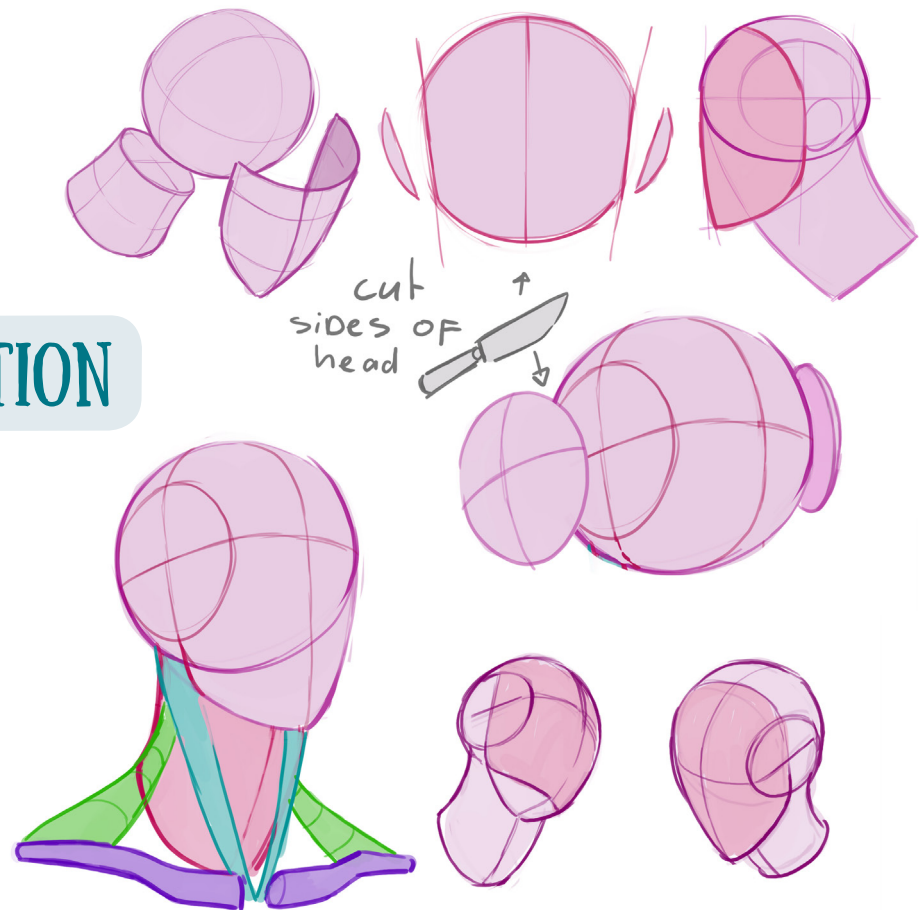
Construction is like the foundation of your character. With a good construction you can create a strong and solid character. You can get started with these steps:

1. For drawing I always use these three kind of shapes. Sphere, cylinder and cube. I do use these shapes because you can build everything with it and they are easy to rotate in 3D. You can stretch these shapes or combine them to make variations.
2. With drawing characters I always use a line of action. Or you can call this the gesture for the character. Here you can also see the benefit of using these 3D shapes. You can let them follow this action line. This is also a great way to practise it. First draw a line in the shape of an S and let those shape follow the action line. This way you get flow and depth in your characters.
3. Here you can see how I use these shapes to draw a character. Drawing your character like this helps it to understand how it moves in 3D. When you first draw your character like this you can add the anatomy on top of it. Starting like this is way easier and lets you focus first on getting the pose, overlap, depth and more right before you start adding all the details.

HEAD CONSTRUCTION

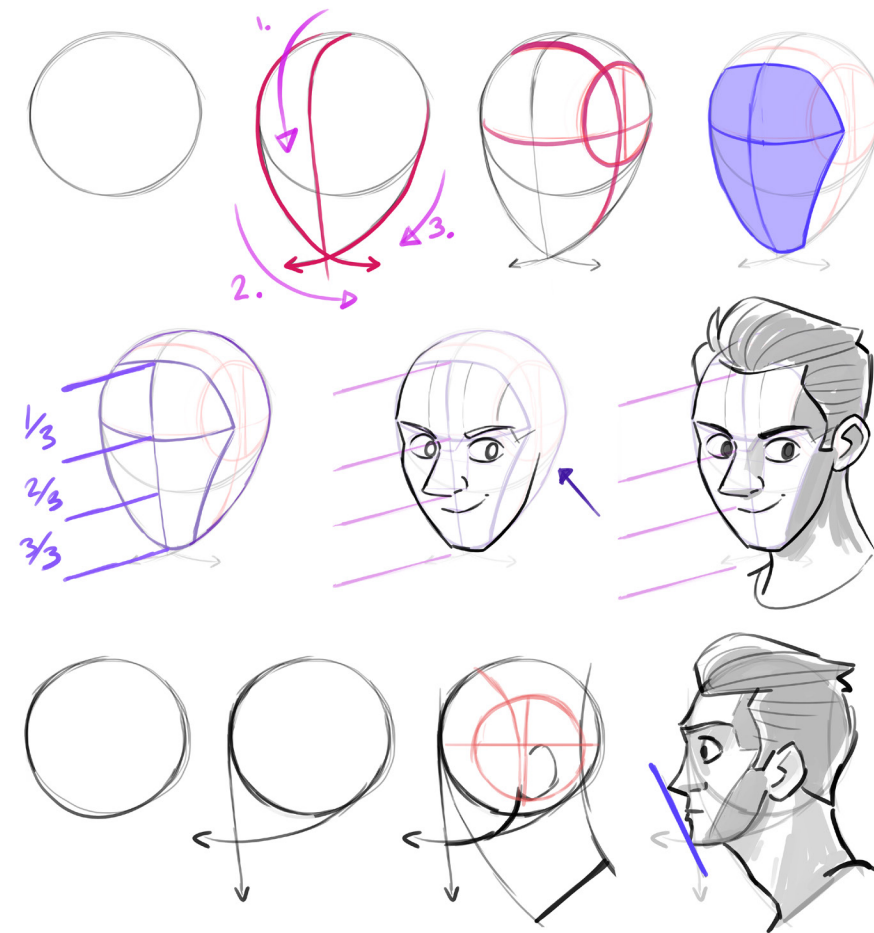
For drawing the head I try to keep it really simple. I break it down in three shapes. A sphere for the cranium, a mask for the face/jaw and a cylinder for the neck.

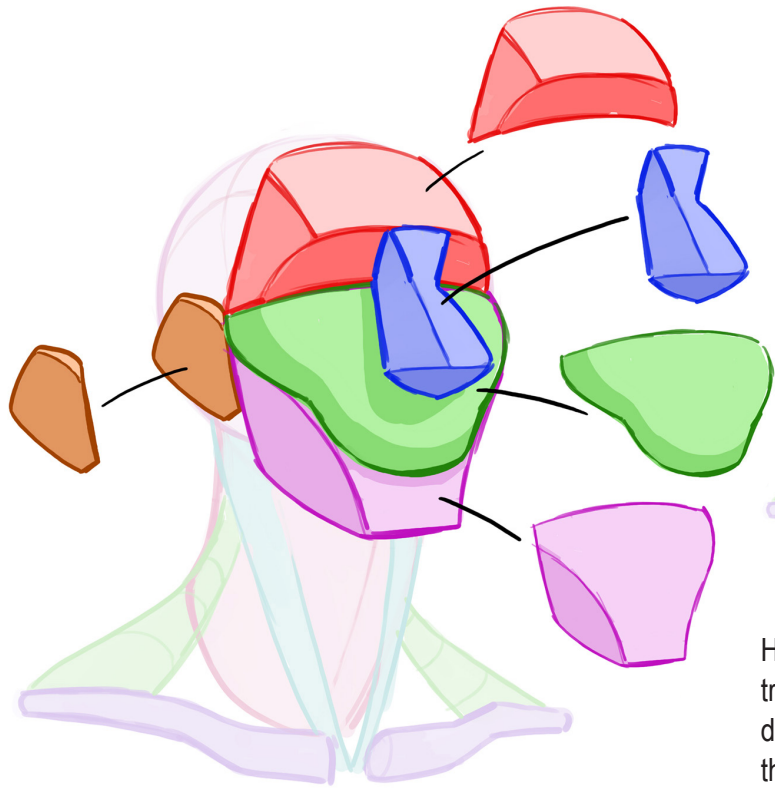
So I start with a sphere for the cranium. With the sphere I cut off two sides with an imaginary knife (see image). For the face I make a mask that I add to the sphere. And as last I use a cylinder as a neck.



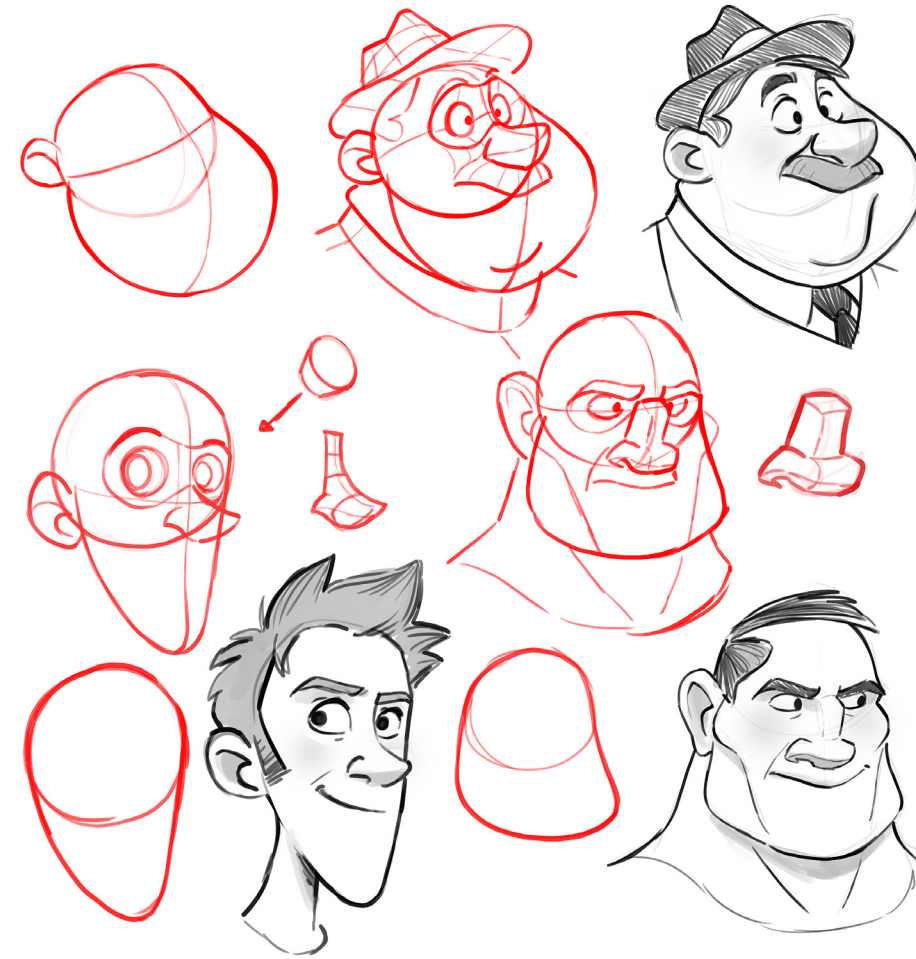
These are the steps I take to draw a head. Using these 1/3 measure steps make it easy to remember and to draw. Using those flow lines in the second step when I add the jaw to the circle helps to get a nice flow in the head shape. I'm using simplified formulas for the head so they are easy to draw and to understand.

This is great for when you are just starting or are only drawing stylized characters. If you want to draw more realistic characters you can use this as a foundation to draw on top of.





Here I show how I draw the anatomy for the face. I really try to keep it simple so it's easy to remember. So breaking down the face in a couple of shapes like in the image on the left. You can play around with the proportions of these shapes to get variations of the head.



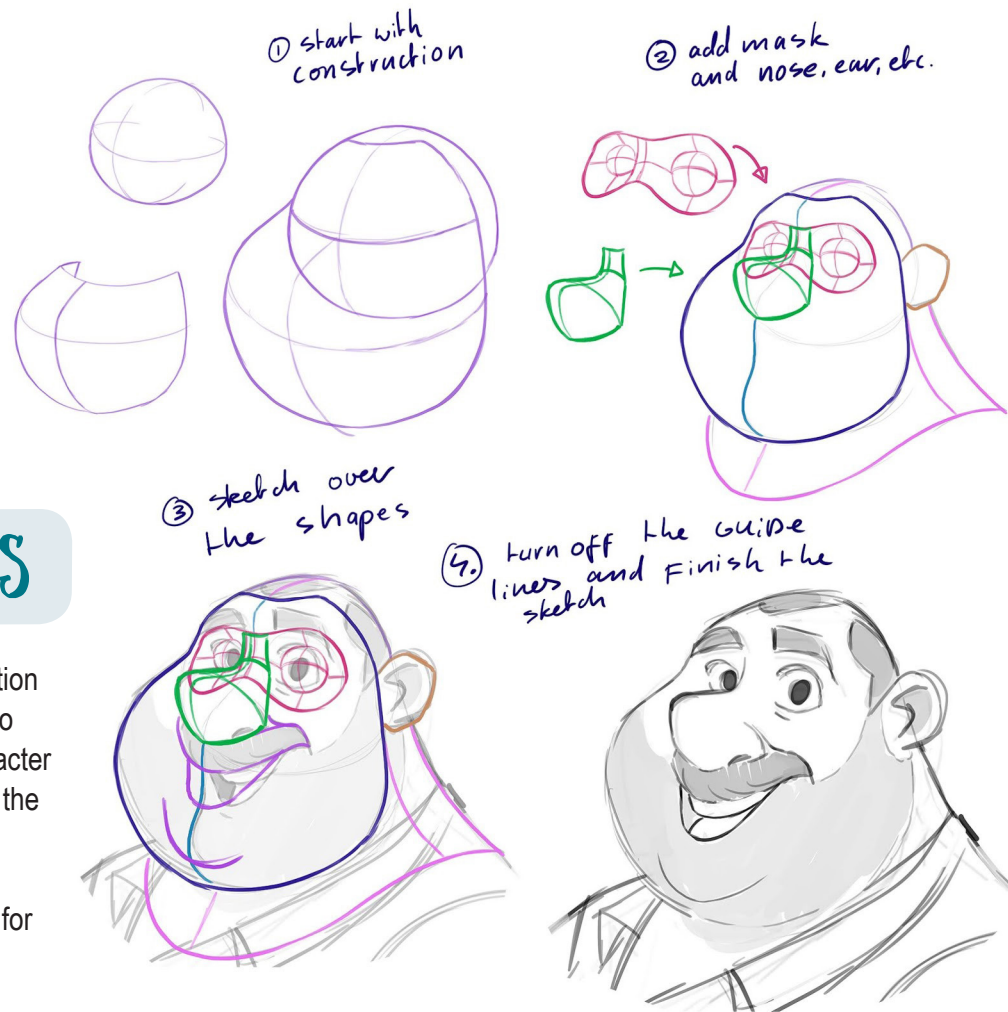
Here I show some variations of the heads. If you look closely you can see I use those basic shapes and change the proportions to make some variations.

FACIAL DETAILS

FACIAL DETAILS

Now that you have a solid construction for your character, the next step is to add some facial details so the character can express himself. The image on the right shows roughly how this works.

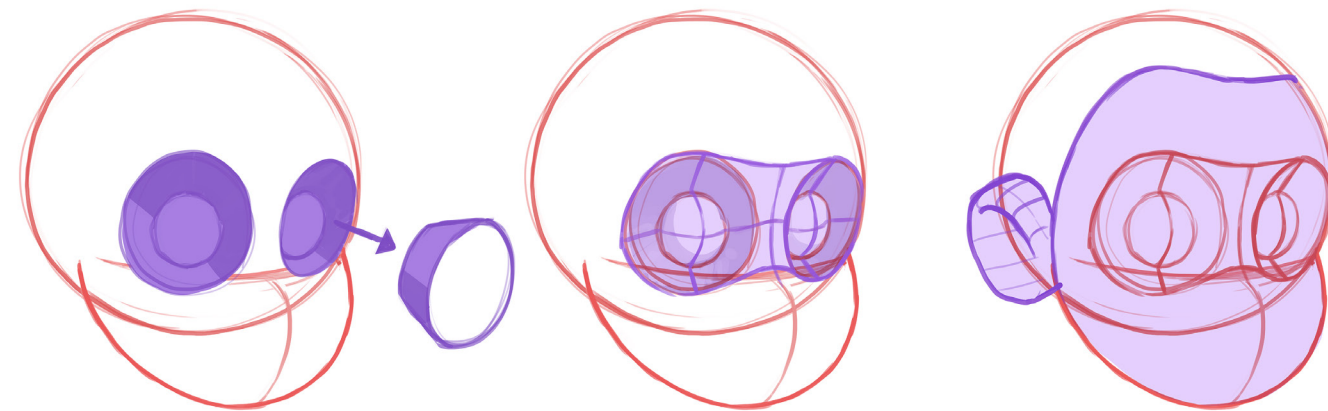
On the next pages I'll go into depth for every element.



POSITION OF THE EYES

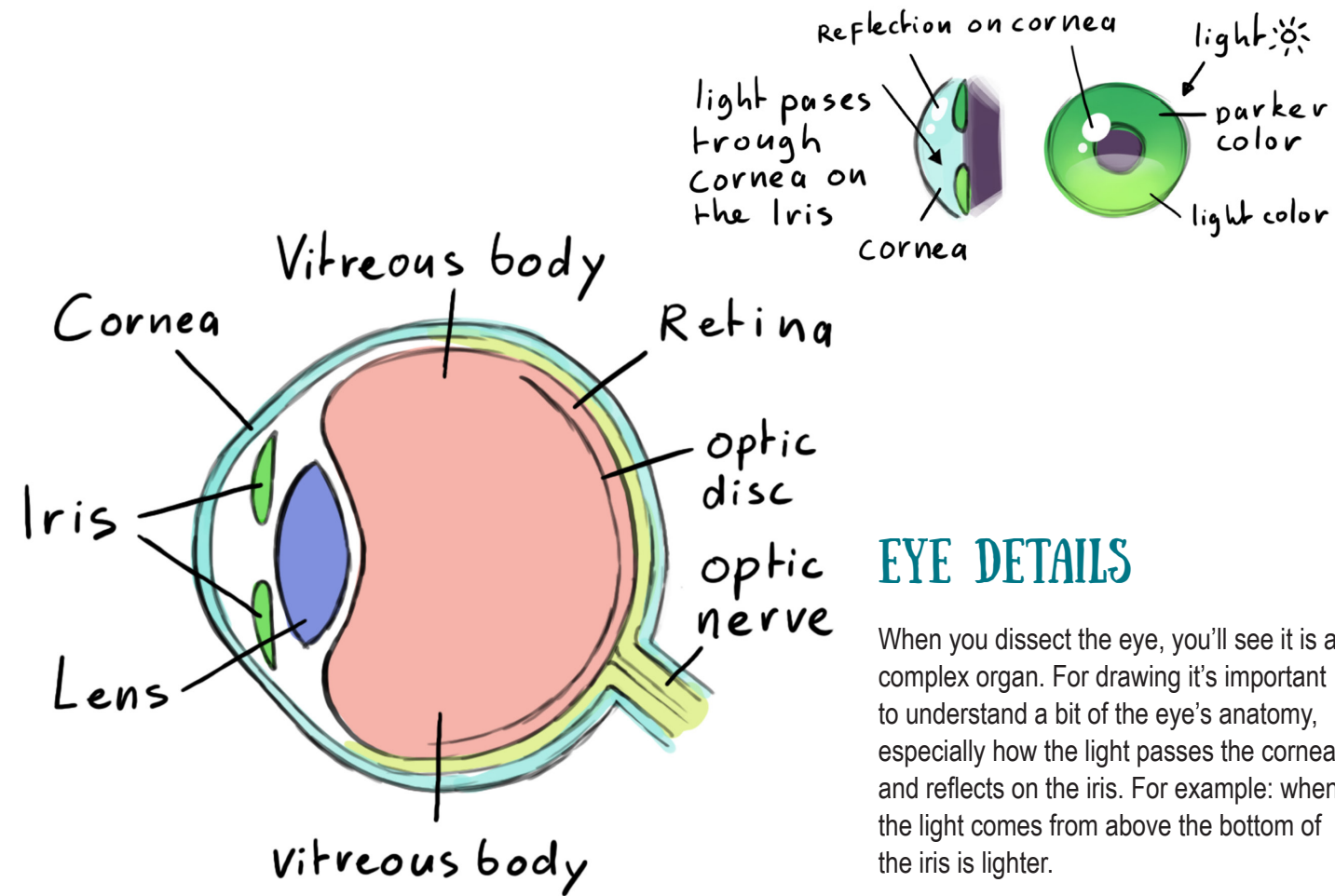
For drawing the eyes I like to think of cupcakes I take out of the head. The eyes are a bit sunken into the skull. This is because the eyes are protected by bones around it. You see that clearly if you look at an actual skull.

Drawing a mask around the eyes helps you to get the right placement of the eyes on the head in perspective. Look for the lines on top of the mask that give it that 3D shape. Try to understand how everything wraps around it.



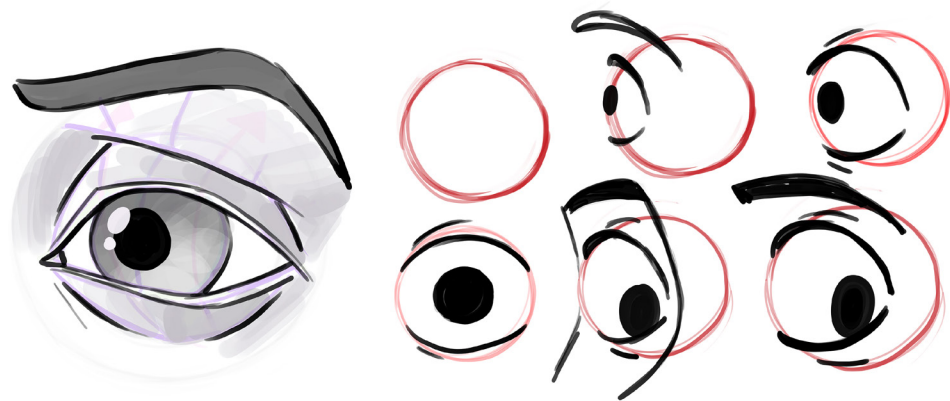
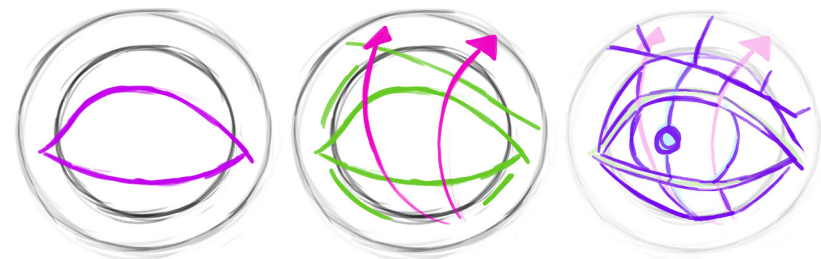
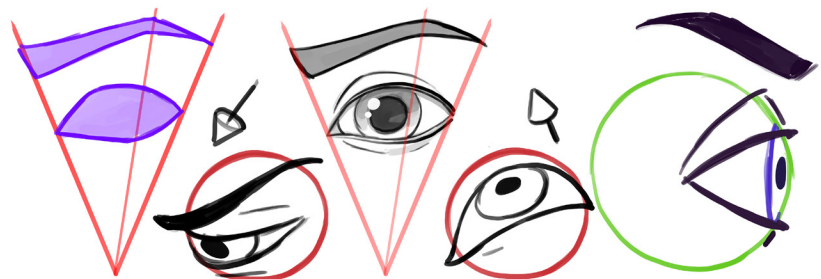


Here is another example of how I draw the eyes inside the head. Showing how the eyes are sunken in into the skull.



EYE DETAILS

When you dissect the eye, you'll see it is a complex organ. For drawing it's important to understand a bit of the eye's anatomy, especially how the light passes the cornea and reflects on the iris. For example: when the light comes from above the bottom of the iris is lighter.



There are different ways to draw the eyes. The most simple way to draw them is to start with a ball and draw the eyelids (upper and down one) on top of it. When you draw the eyelids on top of it try to think how those eyelids follow the shape of the eyeball.

① start with circle



① you only see a fraction of the eye ball



① eyelids follow the eyeball



② sketch details



② eye brow is in front



② eye ball is sunk in



③ add final lines



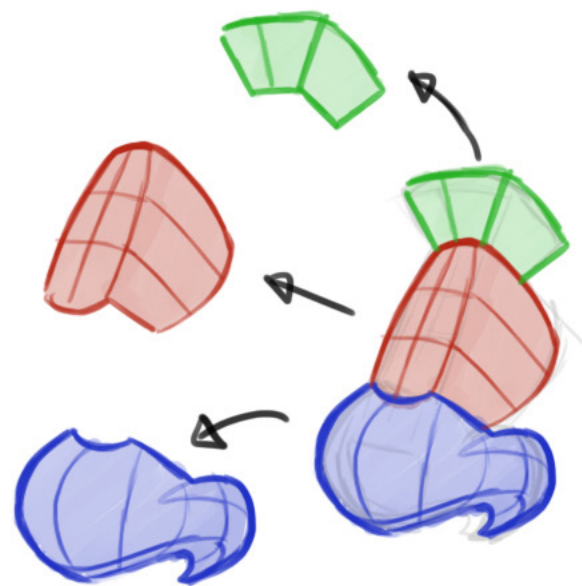
③ notice the shading of the iris



③ notice the side of the head



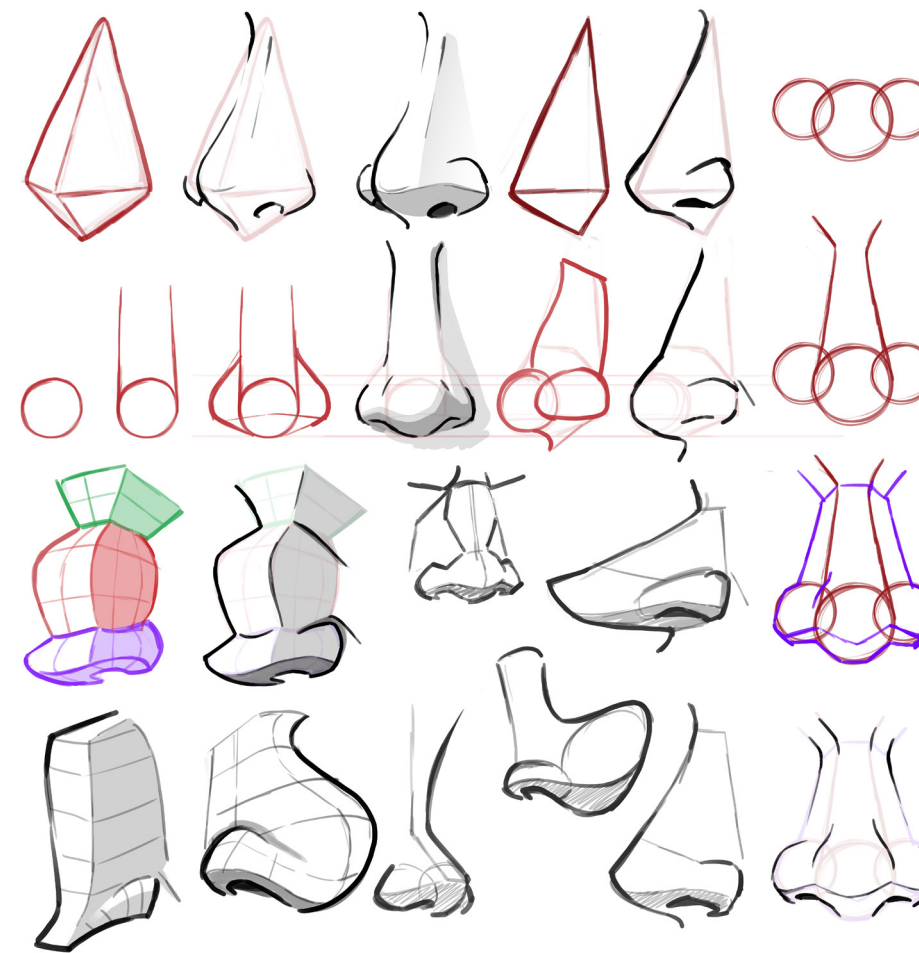
In these three examples I show how you can draw the eye from different perspectives. Notice how little of the actual eyeball you see. The biggest part is inside the head. Also notice how the eyelids wrap around the curvature of the eyeball.



CONSTRUCTION OF THE NOSE

You can draw the nose in a lot of ways. I try to think of it in three parts as you can see in the example above. I can play around with green, red and blue shapes to make a big

variation of noses. On the next page you see the diamond or triangle method I use to draw the nose in difficult angles.

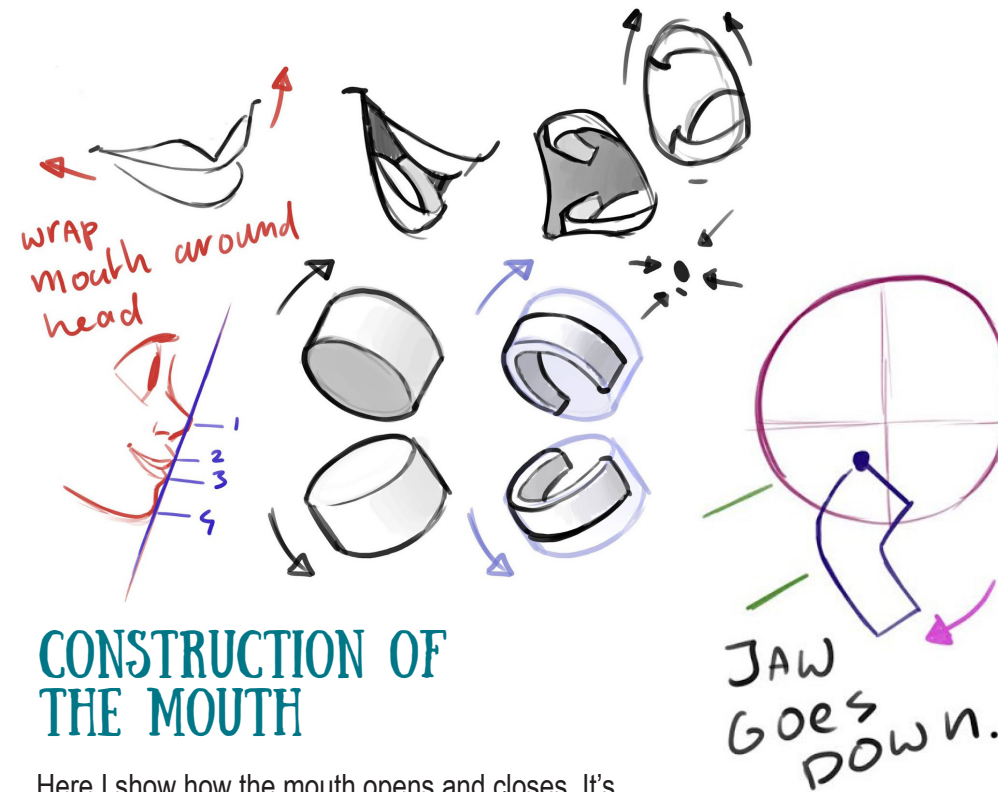
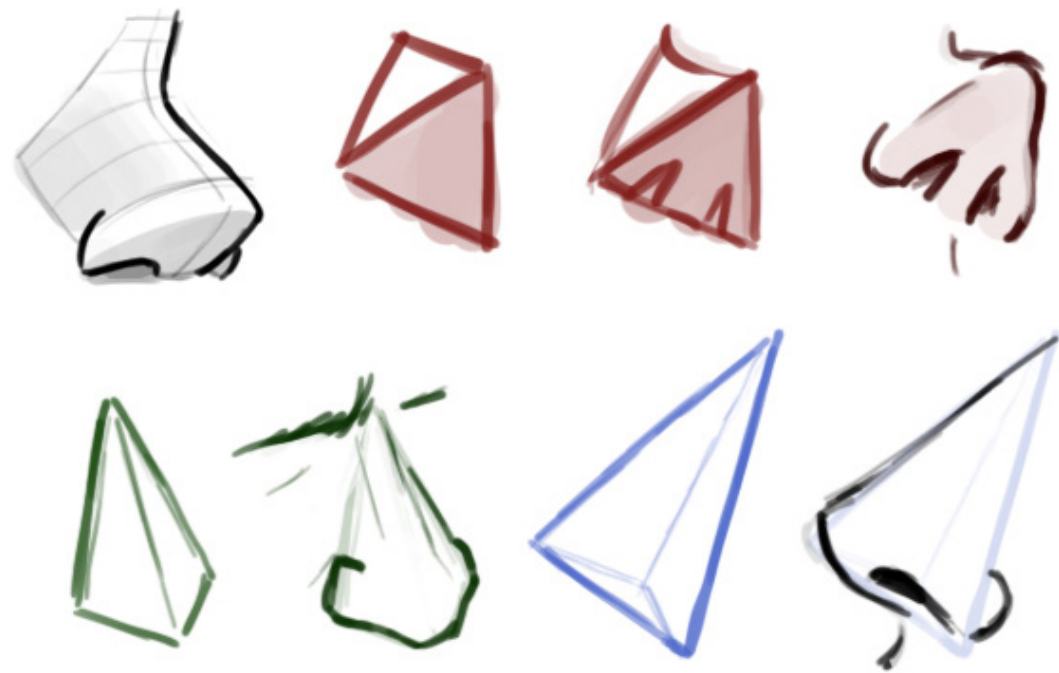


DRAWING THE NOSE

Here is a collection of noses. You can draw the nose endless different ways, I would advice to try out different types of construction so you can explore what suits your character best.

Here I use the prisma shape to draw the nose in difficult angles. This also shows again why using geometric

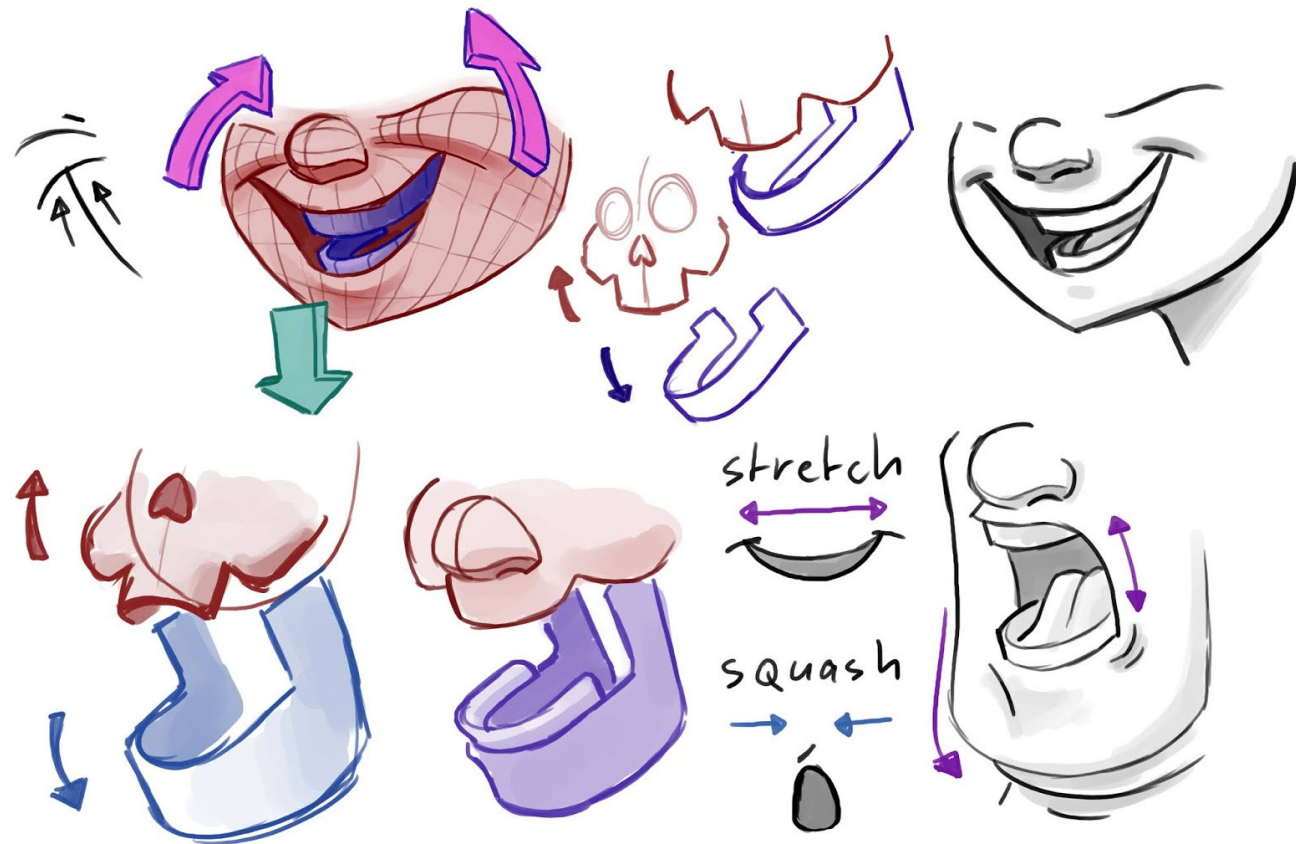
shapes first makes drawing characters way more easy. Start from big to small.



CONSTRUCTION OF THE MOUTH

Here I show how the mouth opens and closes. It's good to realise that the flesh of the mouth is flexible but the teeth are not. Besides that, take notice of the fact that the jaw rotates when it opens, it doesn't simply drop down.





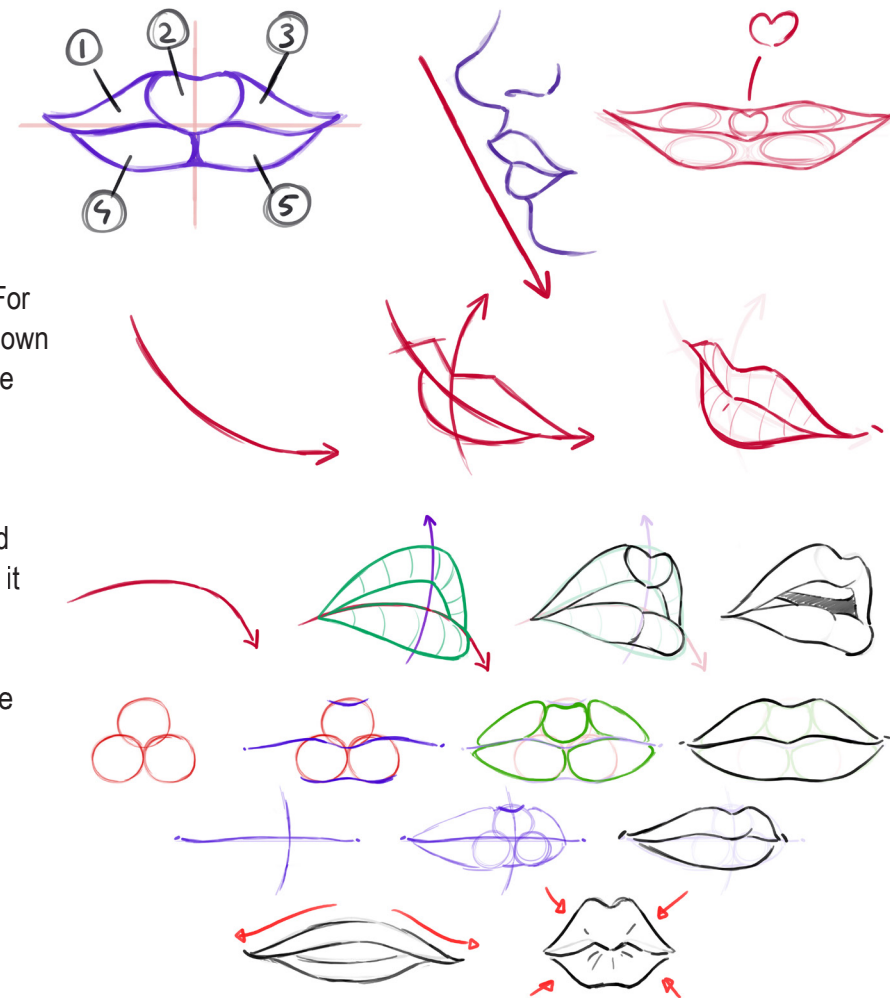
This illustrates how the skin reacts on the movements of the jaws. When the mouth is opened, the skin stretches downwards. When the character smiles, the skin is stretched to the sides and pushes up the cheeks.

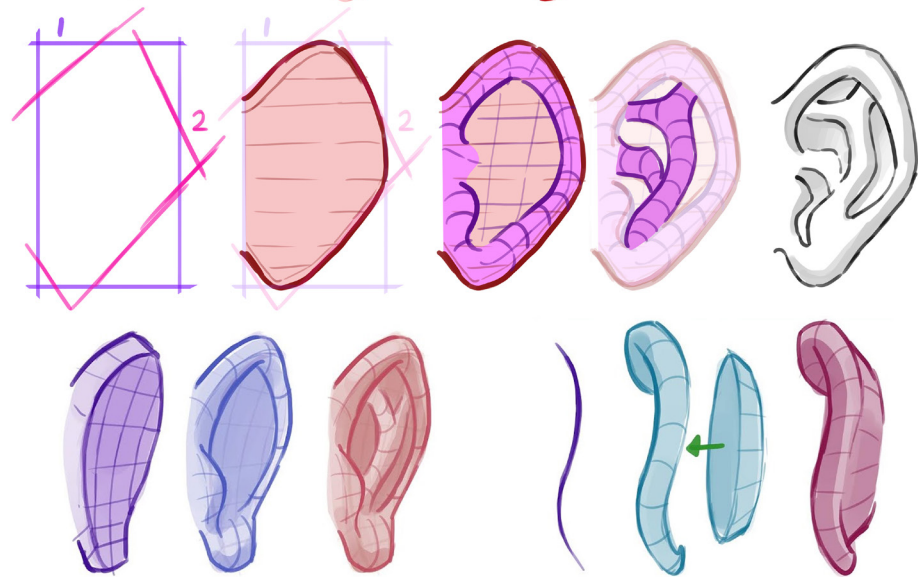
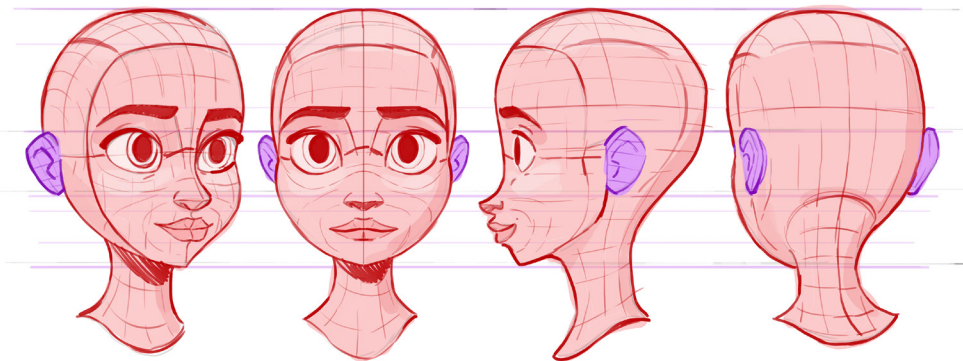
DRAWING THE LIPS

Look in the mirror, your lips have volume! For realistic lips with volume you can break it down into 5 shapes: 3 in the upper lip and 2 in the bottom lip.

To construct the lips, start with drawing a line that wraps around the head. Then build the lips on top of that will help you to make it easier to draw a mouth with lips.

Keep in mind that the mouth is following the shape of the head: it's wrapped around it.





EARS

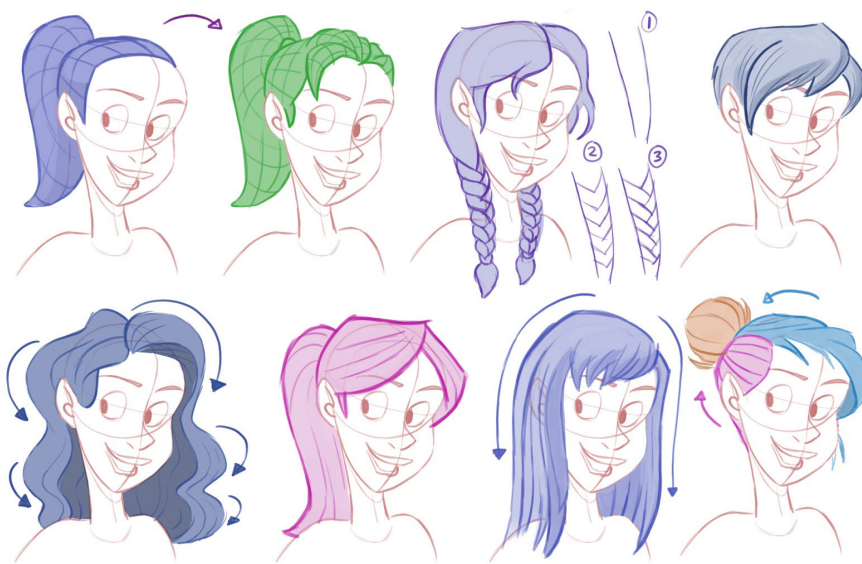
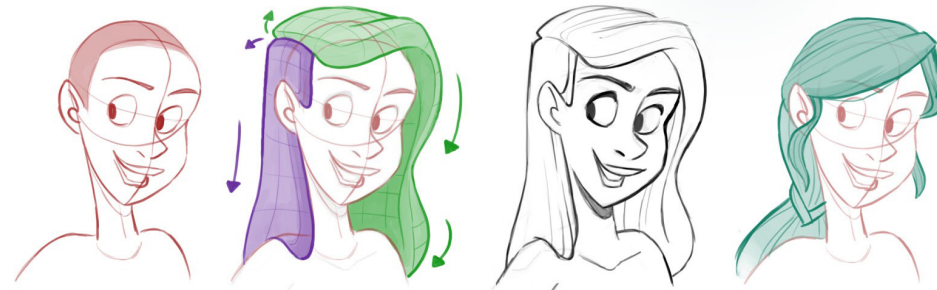
For the placement of the ears you can align it with the eyes and place it where the jaw starts.

To draw ears, start with a big diamond-like shape. Next step is to give it more rounded edges and after that you can add the inner shapes of the ear.

For drawing the backside of the ear you can start with an S line and give that volume.

HAIR

When you draw the hair draw it a bit on top of the skull. The hair always has a some volume. It grows up out of the skull and get's pulled down by gravity.

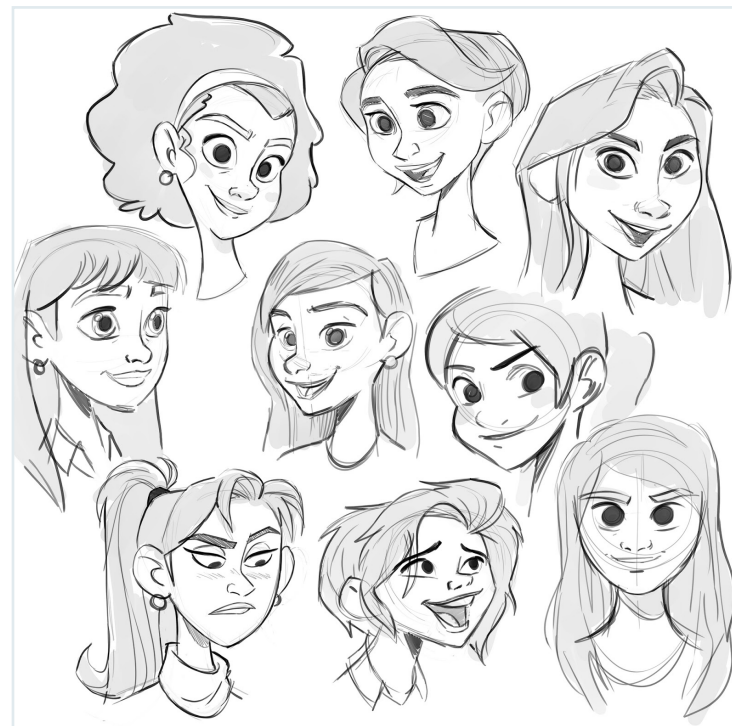
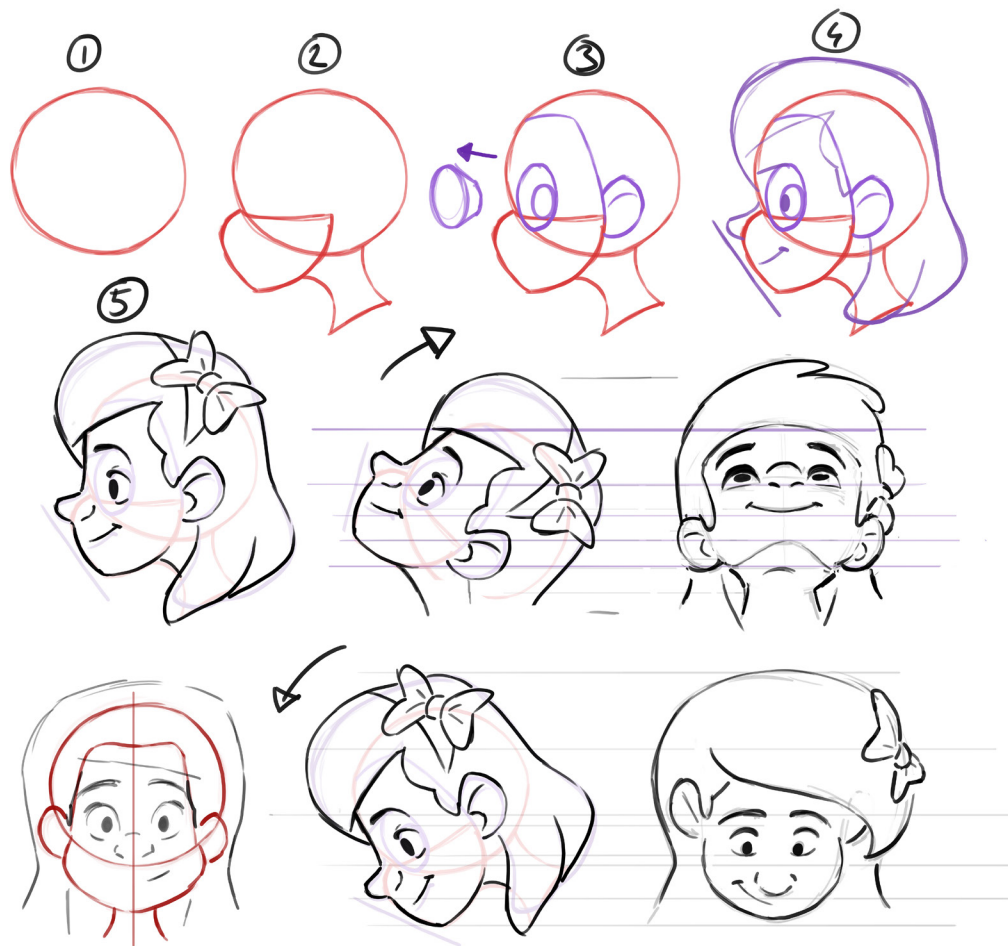


In these examples you can see that I break the hair down in separate big shapes. So always start with big shapes and break it down in smaller shapes.

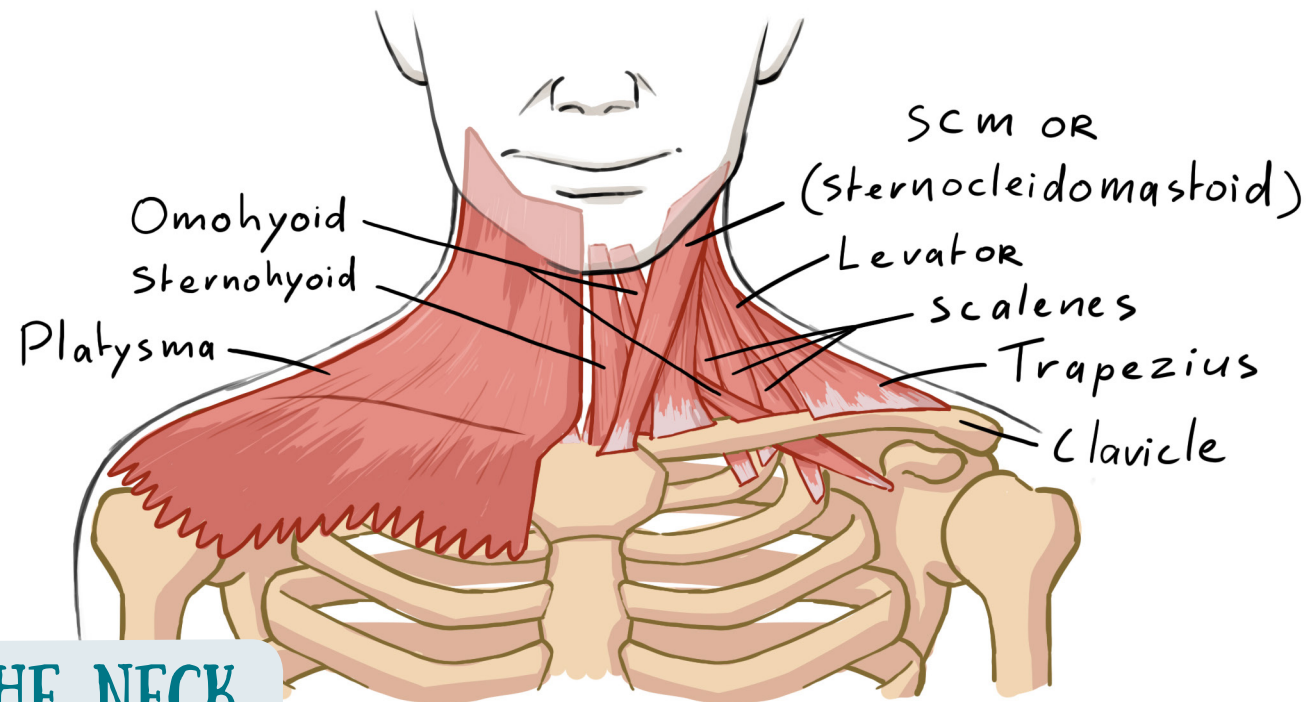
Since hair is not a static object, hair follows through. This means that the hair follows the movement of the character when it moves.

ROTATION OF THE HEAD

Drawing heads from different angles can be difficult. What helps me is to draw it first from the side front. With a little help from perspective lines will this help you to understand how it looks from an other angle.



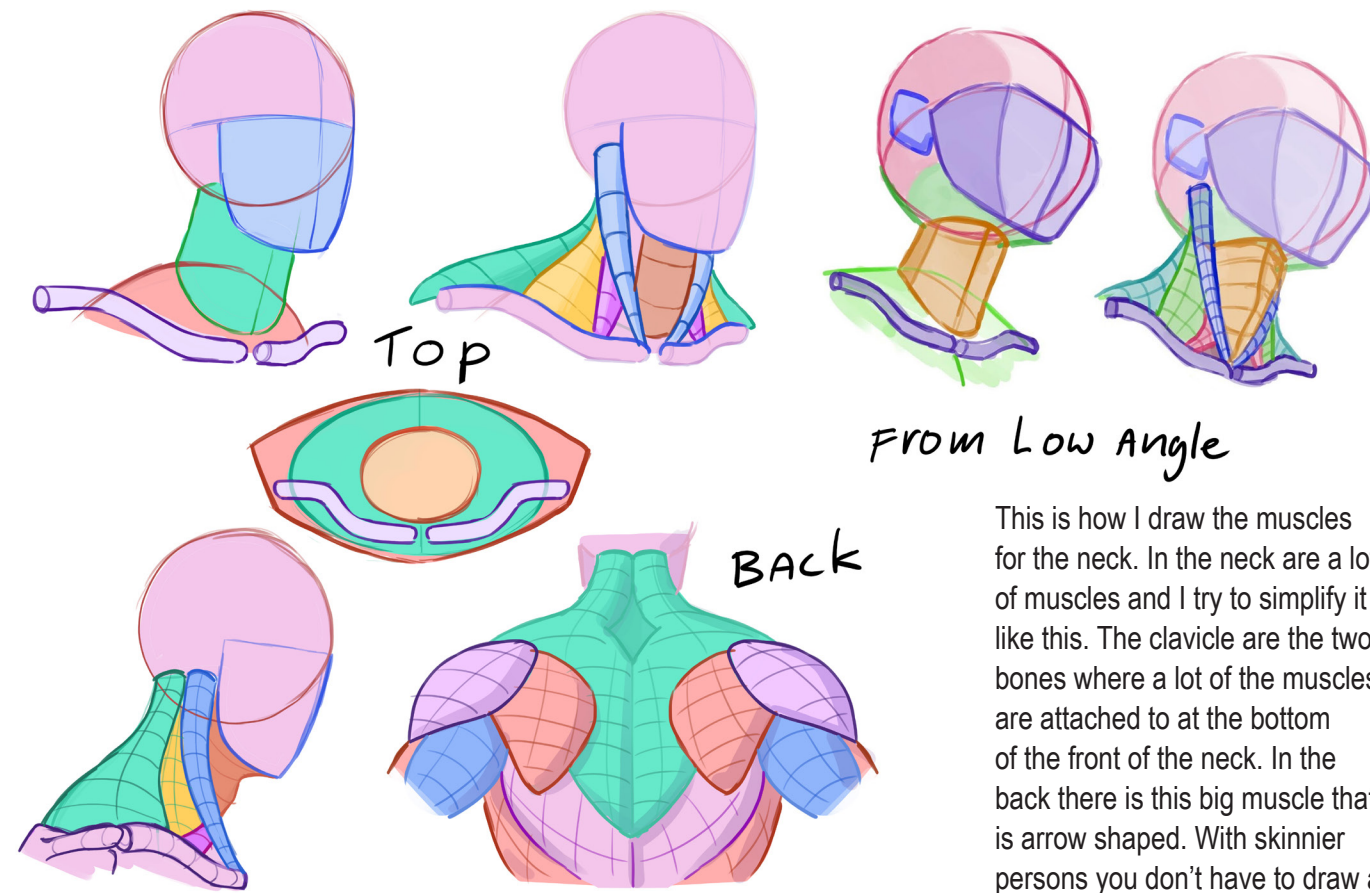
THE TORSO INTO DETAIL



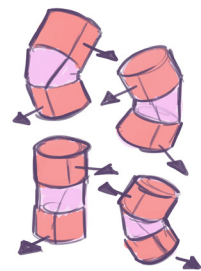
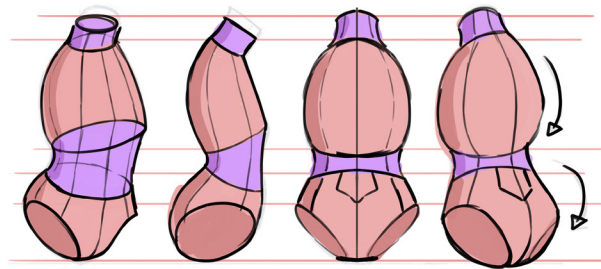
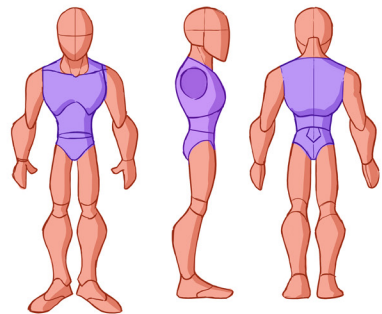
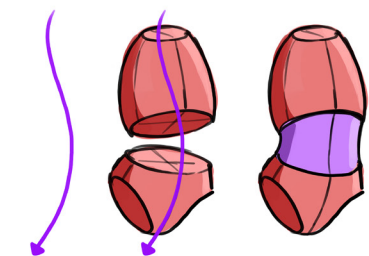
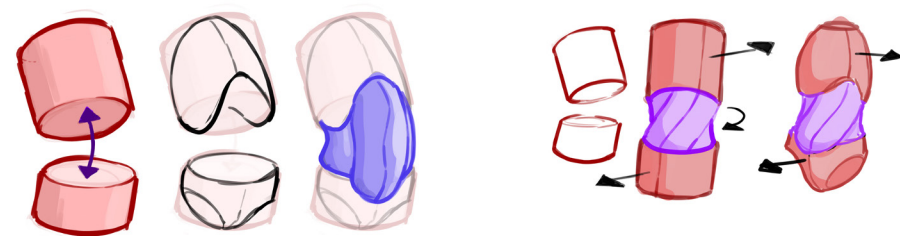
THE NECK

In the neck are a lot of muscles. When you are drawing realistic characters you do see a lot of them. The more muscular a person is the more you muscles you can notice. The Platysma is a big thin muscle that lays on top of all the

other muscles in the neck. When you are drawing stylized characters you don't have to go detailed as this. On the next page you can see a simplified version of these neck muscles.



This is how I draw the muscles for the neck. In the neck are a lot of muscles and I try to simplify it like this. The clavicle are the two bones where a lot of the muscles are attached to at the bottom of the front of the neck. In the back there is this big muscle that is arrow shaped. With skinnier persons you don't have to draw all these muscles.

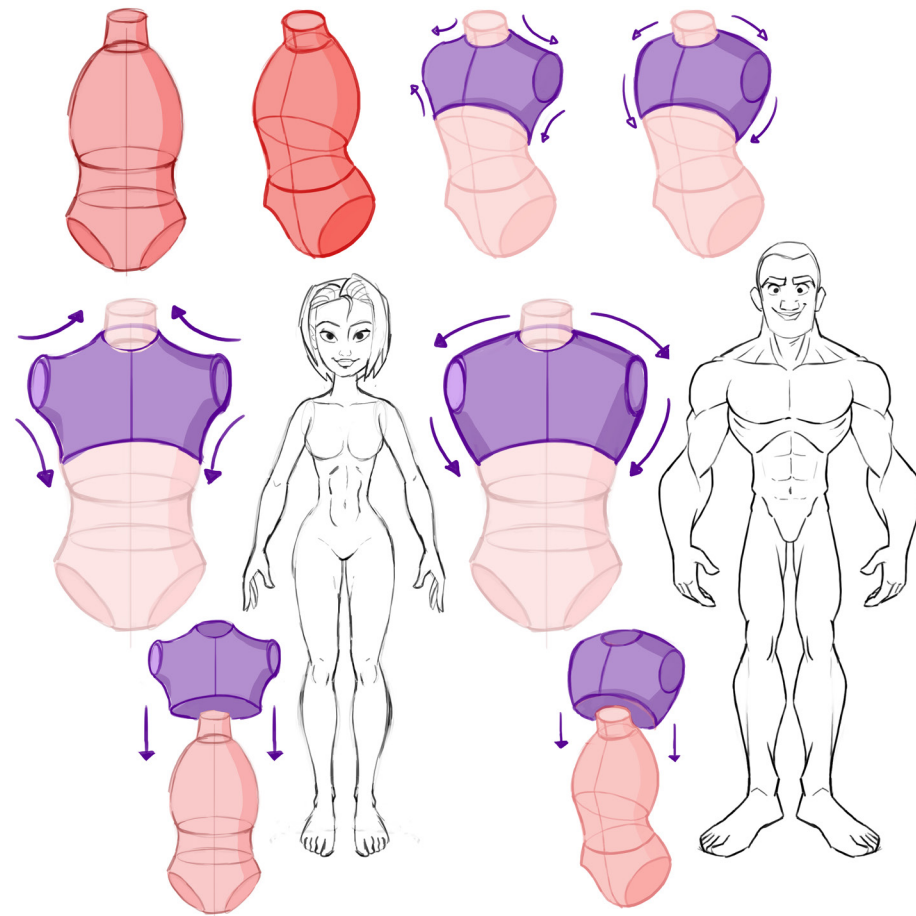


THE TORSO

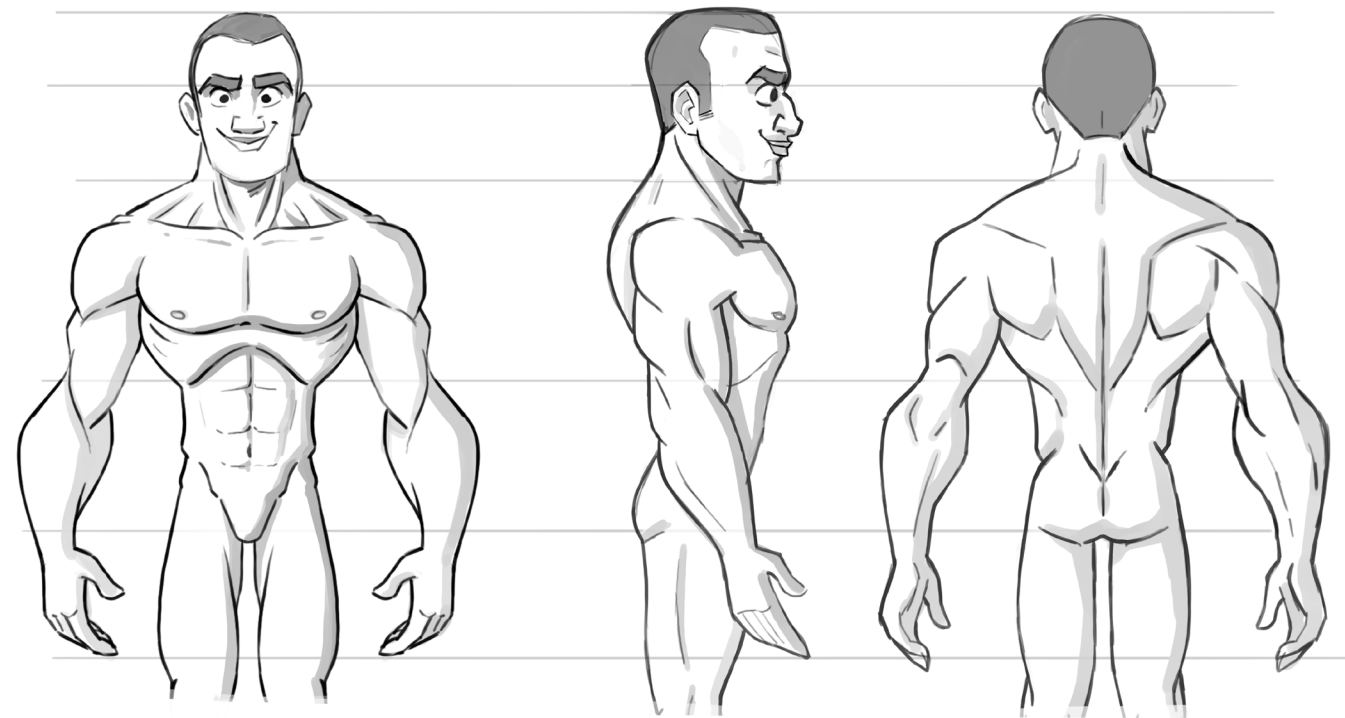
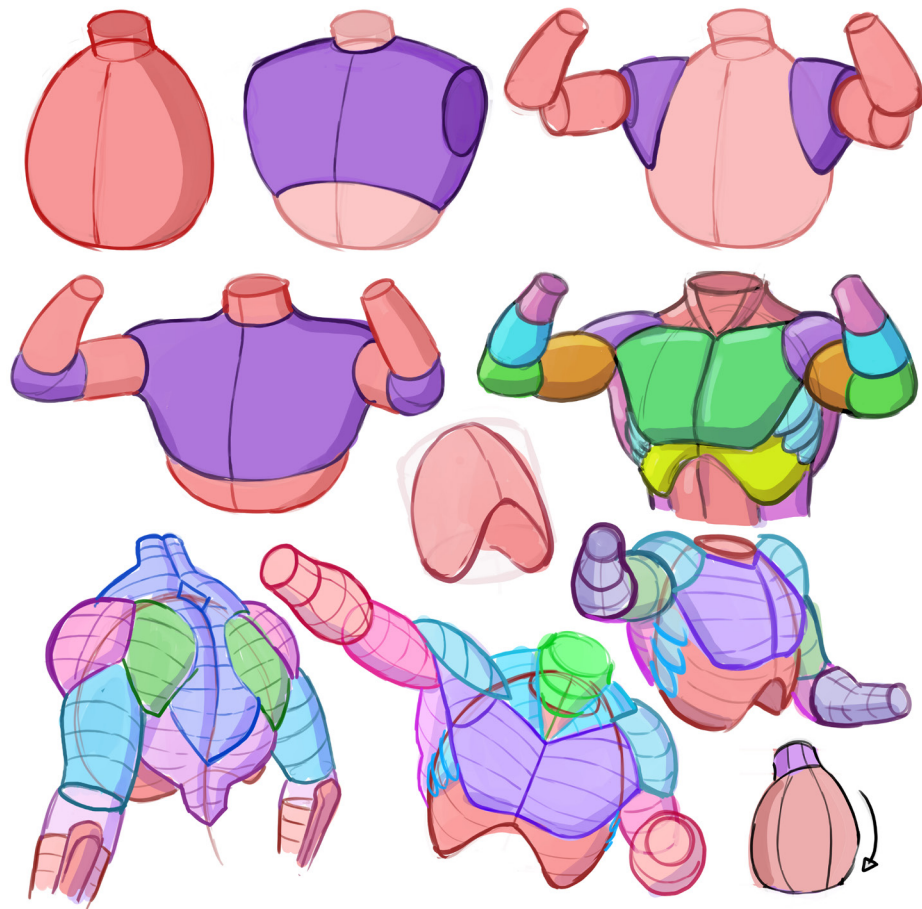
The torso is an important part of the body. It basically consist of three parts. The ribcage, the stomach and the hips. The ribcage and the hips are hard rigid tissue and the middle part, the stomach is soft tissue that can twist.

CHEST

On top of the torso you can add this “vest” as the ribcage or chest. The male version bulges out and the female version goes inwards. This is a super simpliflicated version of the torso and the chest, but it’s perfect as a starting point or to draw clothes on top of it. Because when you are drawing a character with clothes you don’t have to draw all the muscles ofcourse.



On top of those shapes I add these shapes for the shoulders and breast. In these examples you can see where they are attached and how those stretches. It's important to think about that muscles are flexible and bones are rigid.

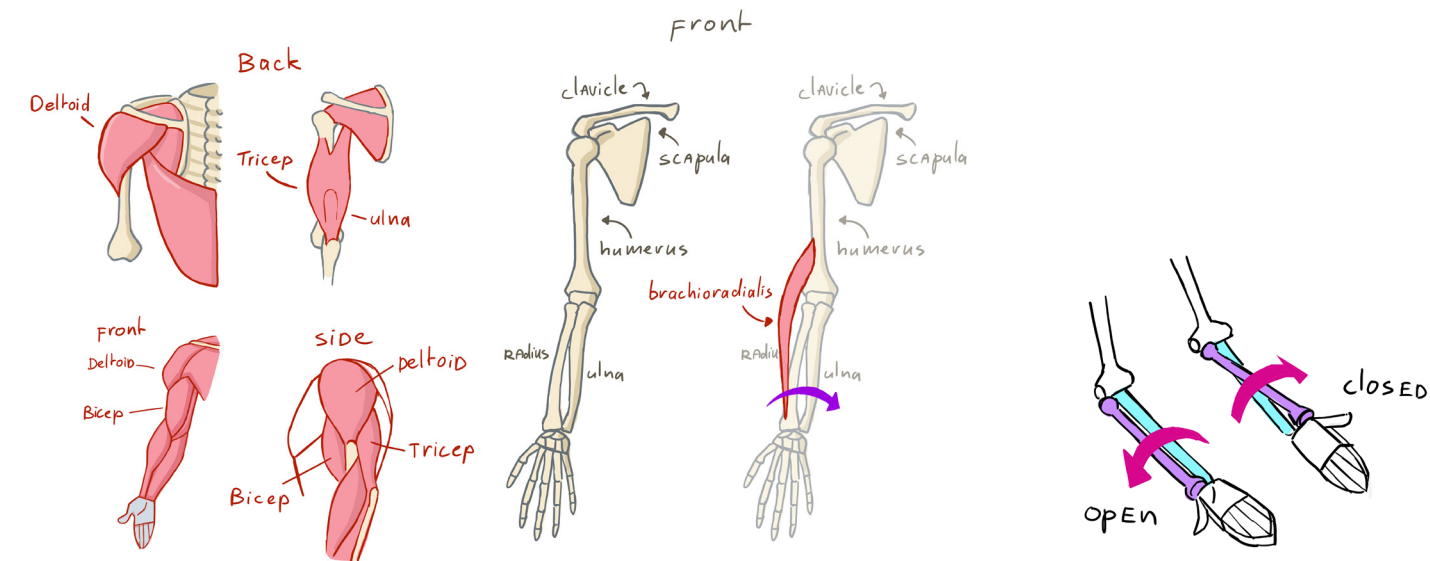
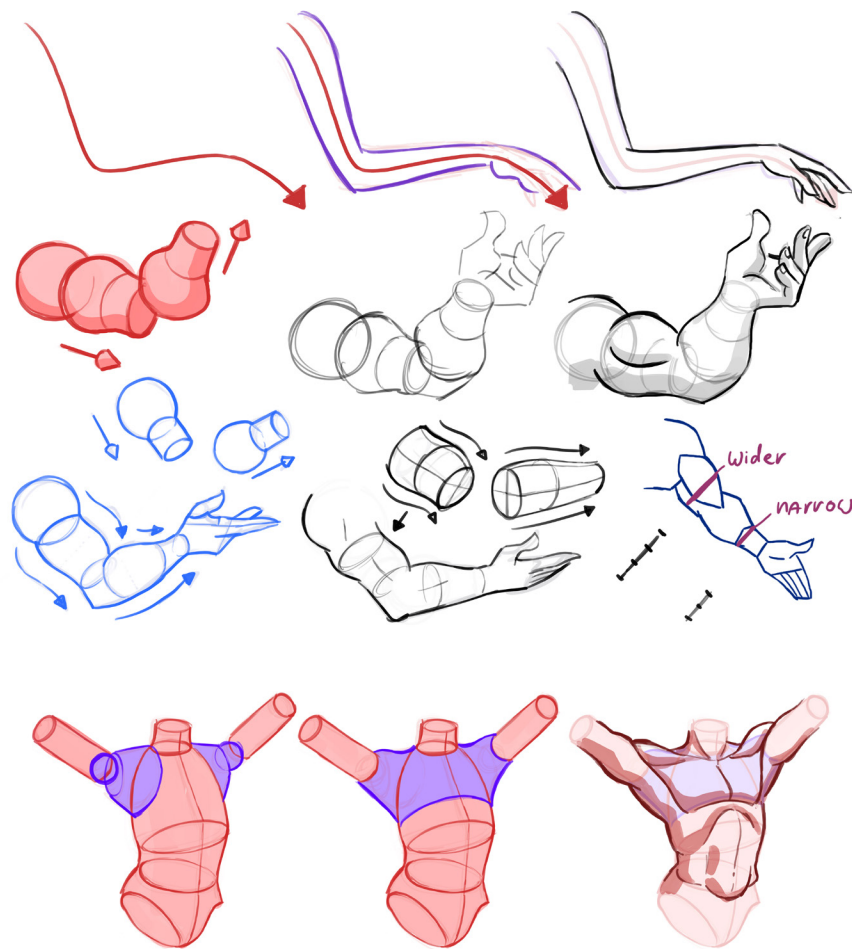


THE ARMS EXPLAINED

THE ARMS

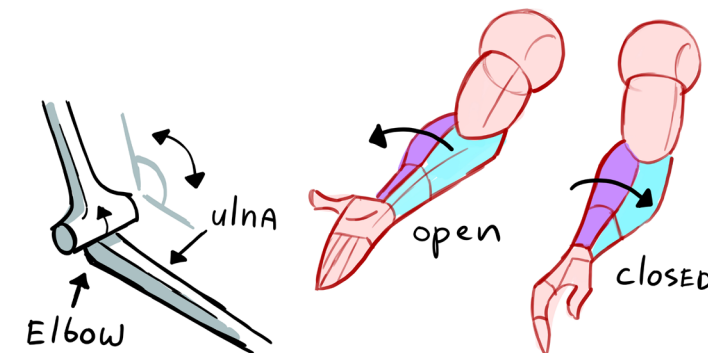
You can draw the arms in a lot of ways. I like to start with a flowing gesture line, or action line. So for the arm **post** I first draw this flowing line and add lines outside of it. The arm is the widest at the top or shoulder and the most narrow at the wrist. When I drew these first lines I add these geometric shapes and after that I add the muscles.

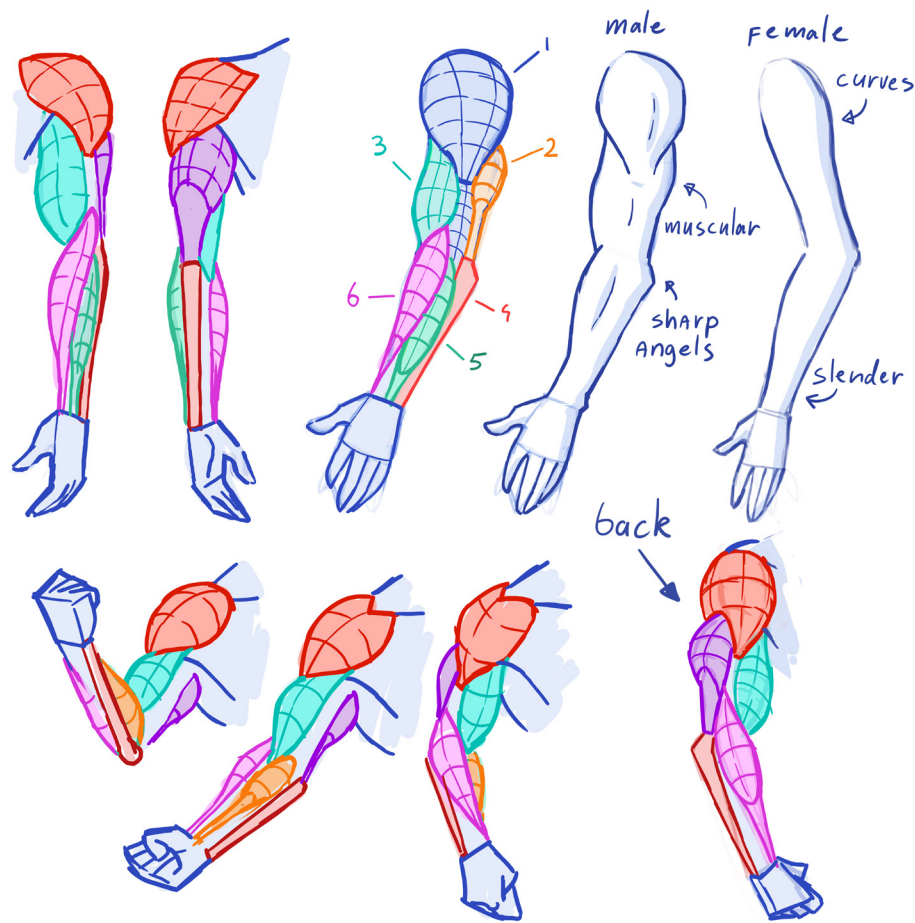
The arms are of course connected to the shoulders.



BONES OF THE ARM

On the arm are a lot of muscles and I break them down like this. The trickiest part of the arm is the under arm because it can rotate. The radius rotates around the ulna attached to the humerus. I don't try to remember all the names of the bones and the muscles but remembering the radius helps to remind me where the bone is that rotates around the ulna.



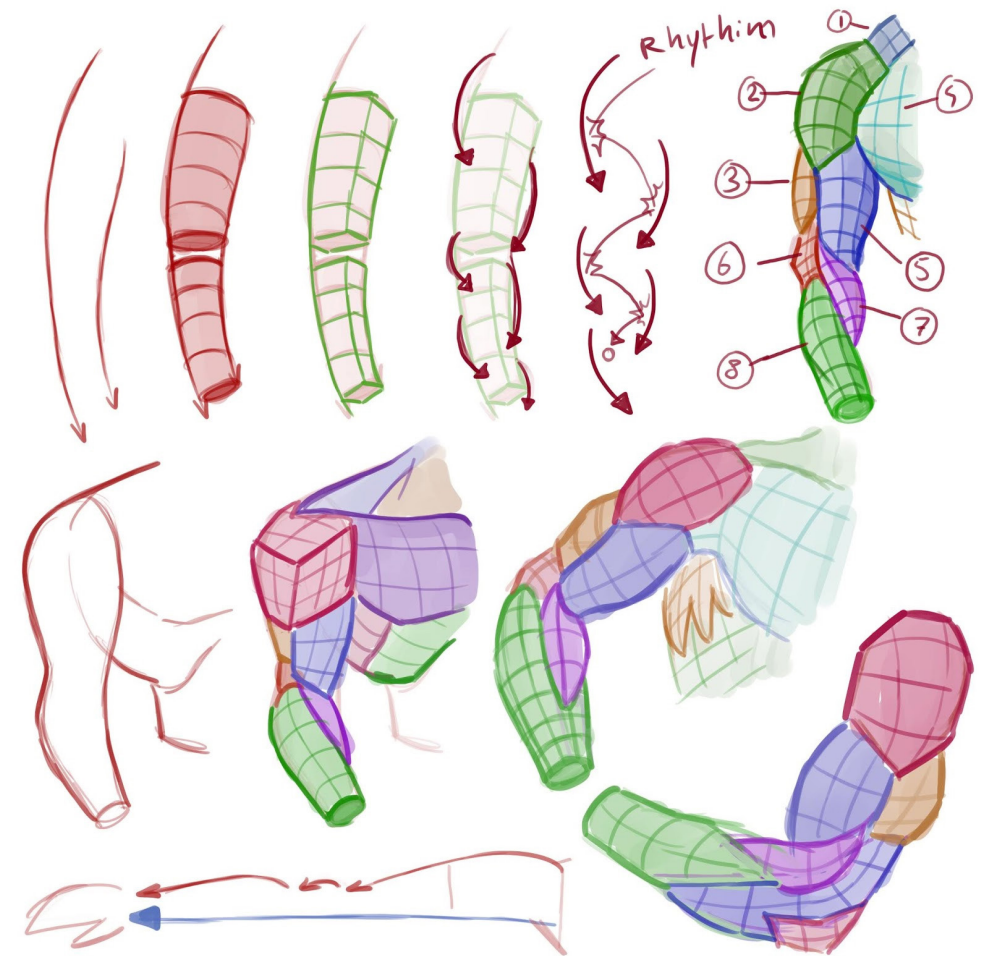


ARM MUSCLES

Here is a breakdown of the muscles in the arm. It can be quite tricky because the underarm can rotate. Simplifying the muscles in these shapes can help with overcoming this challenge. Also think about how your muscles stretches and squishes.

CONSTRUCTION OF THE ARM

Here I show some steps to better understand how to draw the arm. I think you need to try all these different approaches to get a good grasp about drawing the muscles of the arm. Also keep experimenting to figure out what you like the most for each situation. For example the difference about drawing a skinny arm or a strong muscular arm.



HANDS

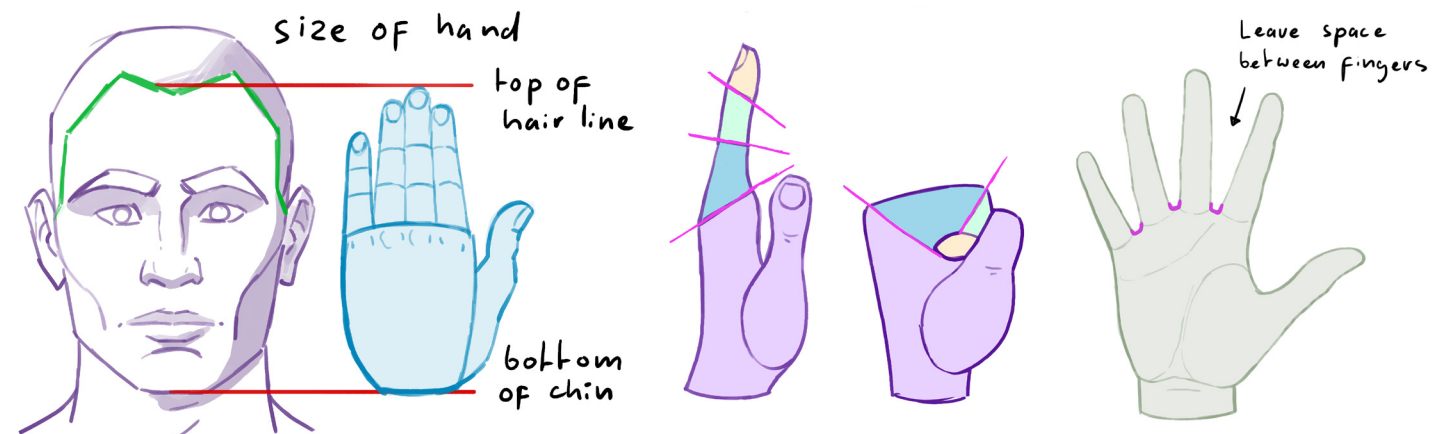
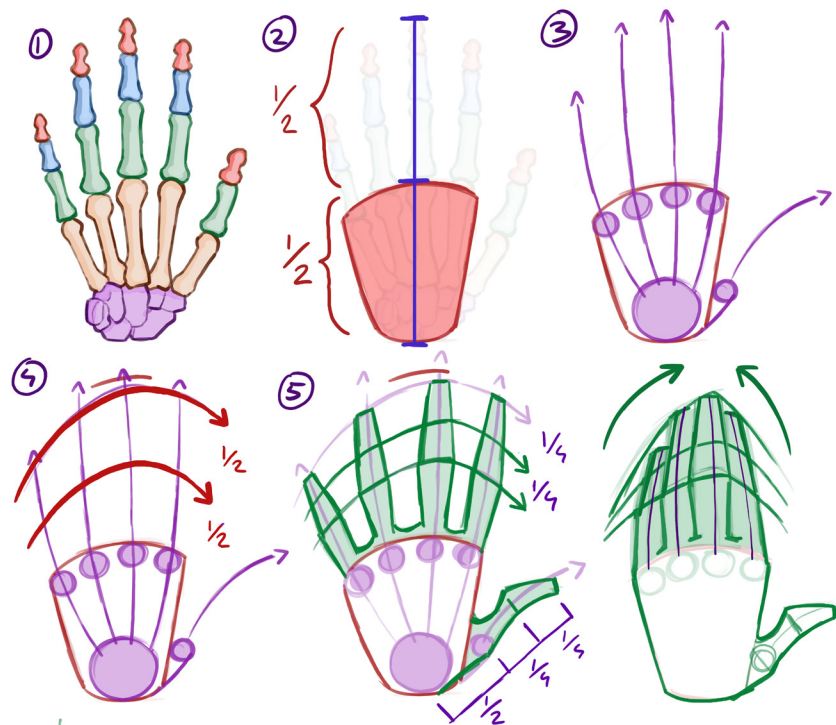
The hand can be very tricky to draw. There are so many small parts in it that can rotate or bend. It's important to at least understand how

the hand is build, even when you don't draw realistic. So I start with a detailed version and simplify it more and more.

HAND CONSTRUCTION

1. There are many small bones in the hand. This makes the hand flexible.
2. The first step of what I do is to draw a line and divide it in two parts.
3. Now I start adding the fingers coming from the bottom centre in the hand.
4. Here i divide the fingers in two parts. Drawing these arcs helps with the length of the fingers.
5. Now you can draw the finger shapes on it. On the next page I show how I draw the fingers.

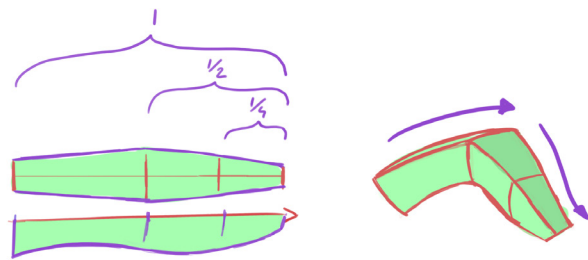
Final check: When you close the fingers they should come together.



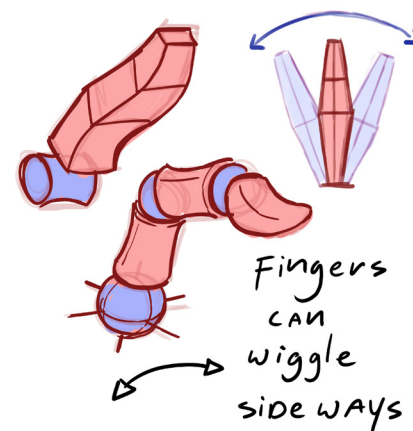
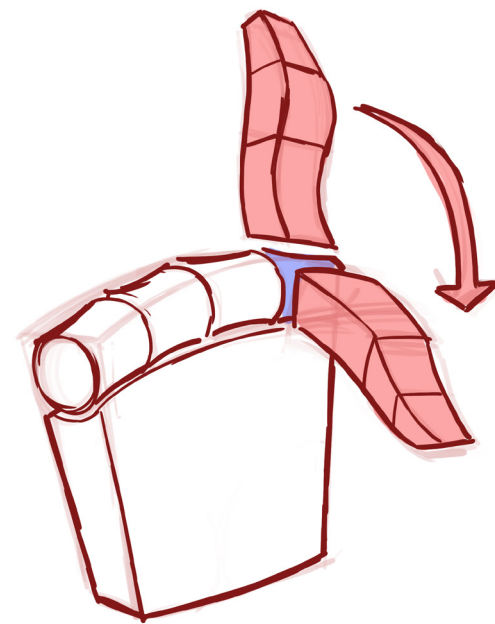
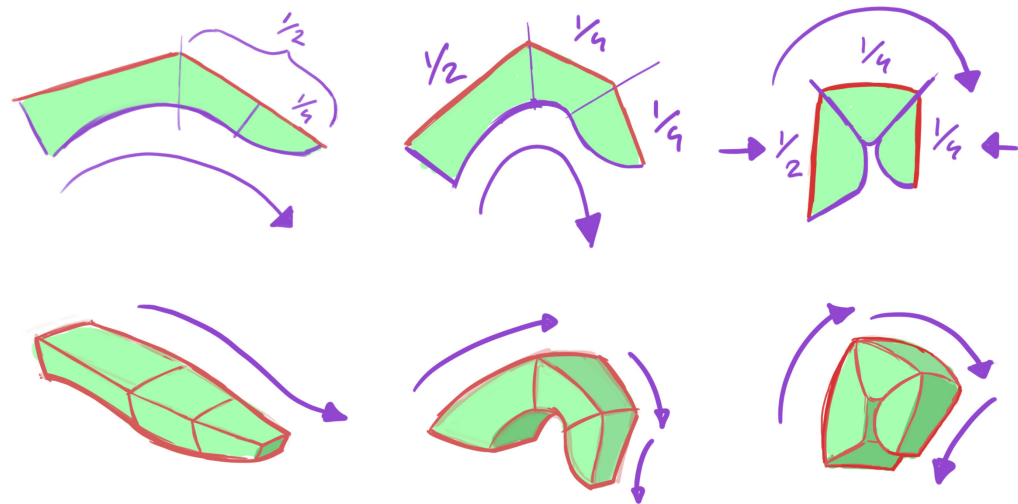
It's quite easy to figure out the size of the hand. It's just a bit smaller than the head. It's roughly as big as the bottom as the chin to the hair line. Always leave a bit of space between all the fingers.

FINGER CONSTRUCTION

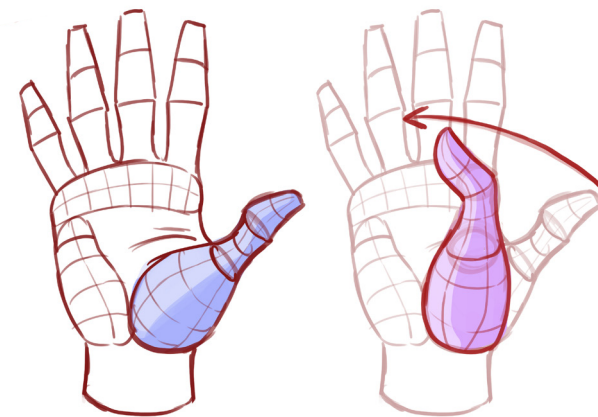
This is the formula I use for drawing fingers. It also shows how it looks when you bend the finger.

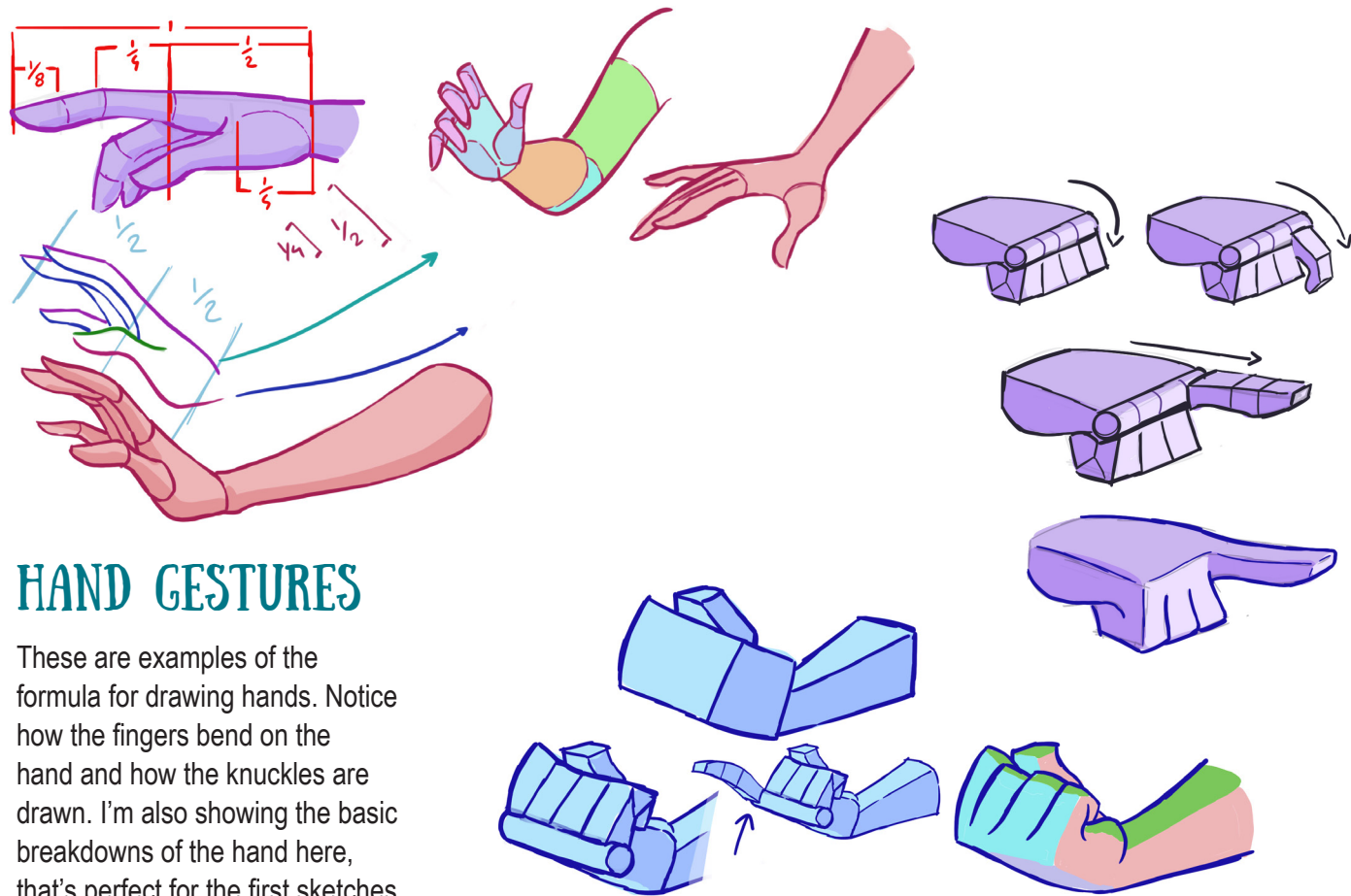


As you can see the top is straight and the bottom is curved, there is a straight versus curved.



Here I show how the fingers move within their joints. Don't get mistaken: the fingers have ball joints, these make it possible to wiggle your fingers side ways aswell. Take also notice of how the fingers bend on top of the knuckle, this is a common mistake by many illustrators.

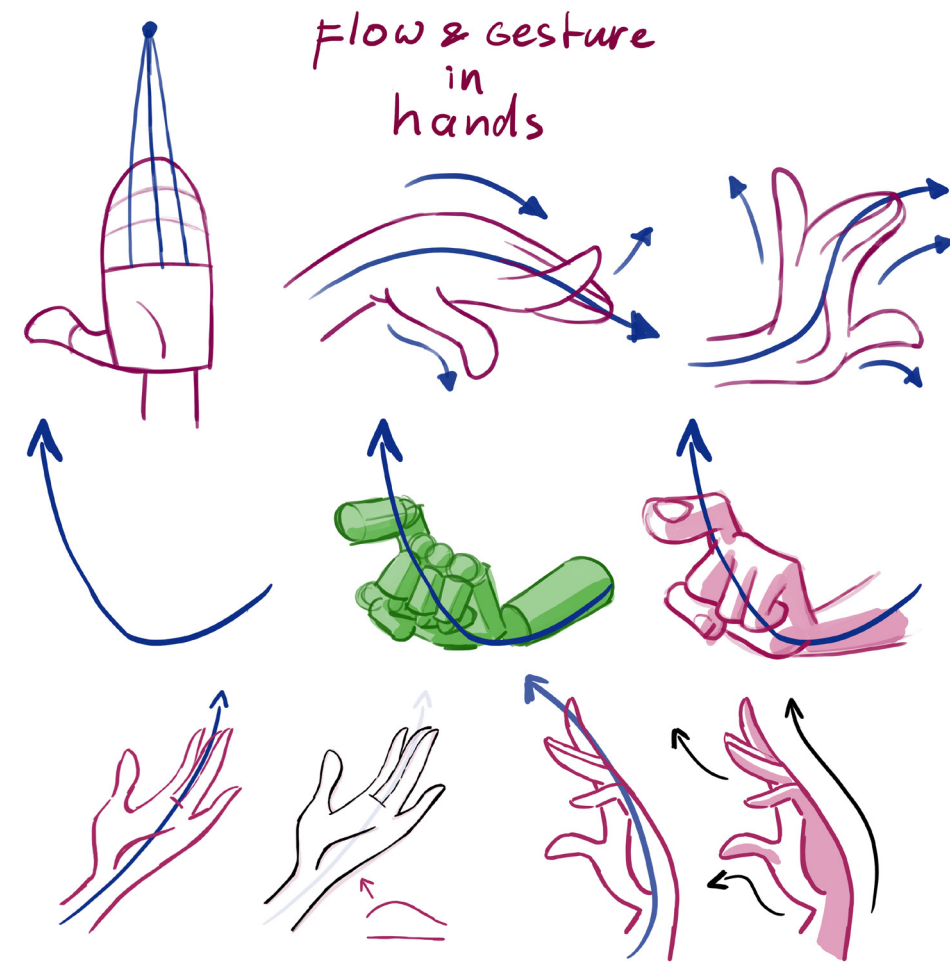




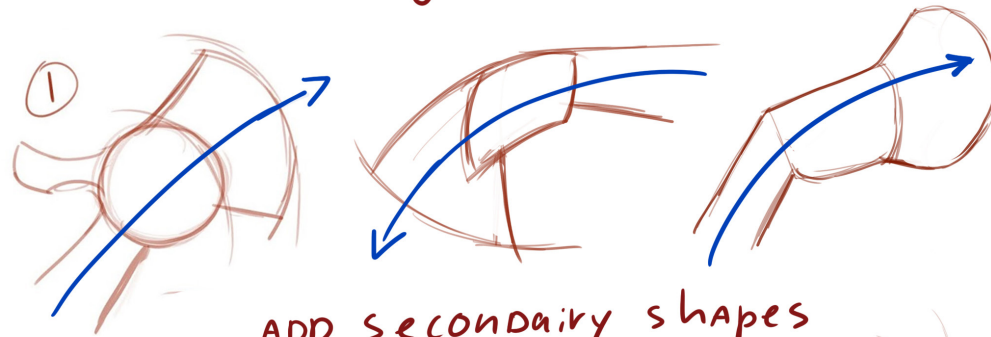
HAND GESTURES

These are examples of the formula for drawing hands. Notice how the fingers bend on the hand and how the knuckles are drawn. I'm also showing the basic breakdowns of the hand here, that's perfect for the first sketches.

When I'm sketching or doing gesture drawing I start with these flowing lines, these help you to create a lively drawing. You can think of it as flowing water. It really helps when you are starting with these curved lines and use them as a guide to draw on top of. This way you break it down in small steps and it's easier to understand and create a lively gesture.



Start with gesture & Flow



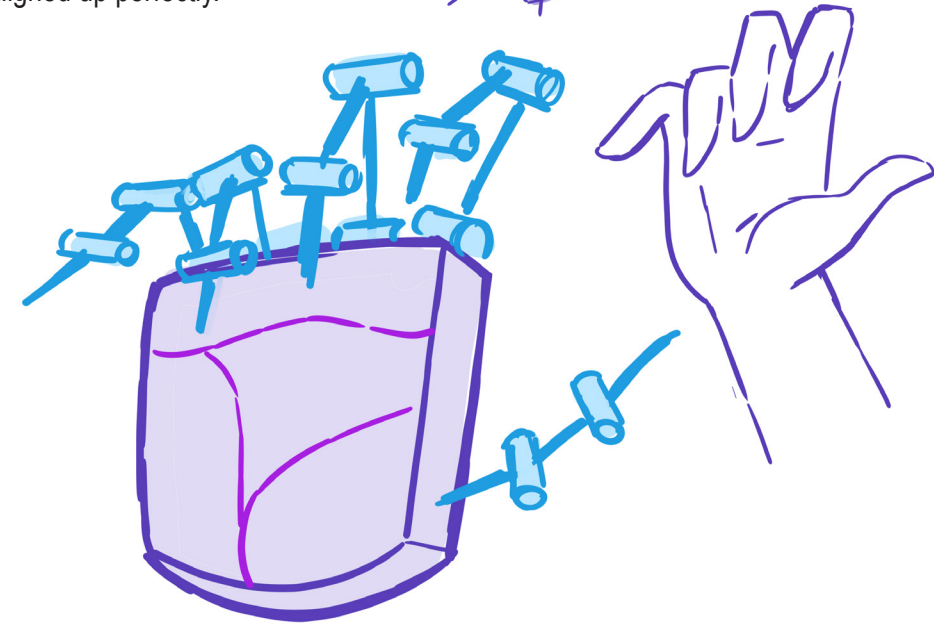
Here you see some more examples of showing the steps for drawing a hand with gesture lines.

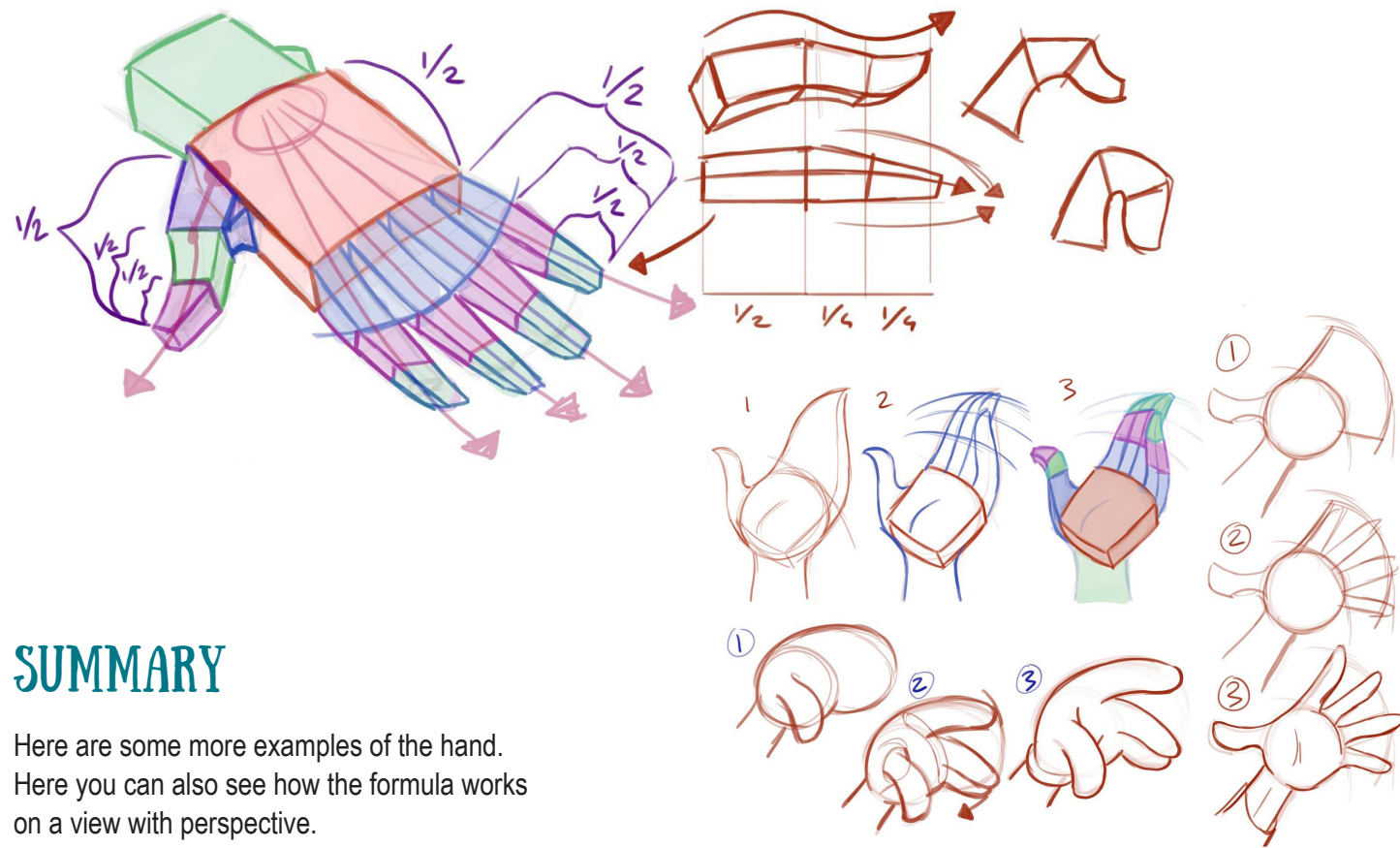
When drawing bended fingers it's important that you don't draw them each in the same angle. Fingers do wiggle a bit so they aren't all aligned up perfectly.

All the joints have different Angles

Angles ✓

Too even ✗



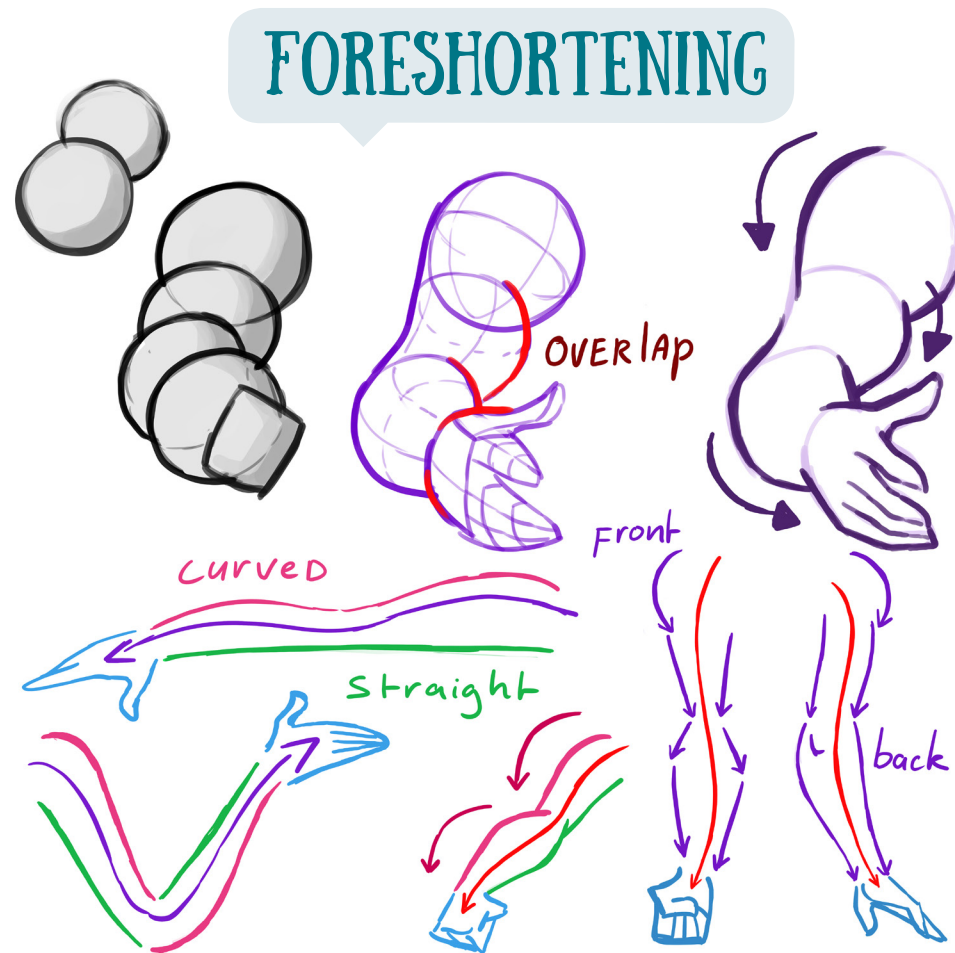


ARMS

Foreshortening is when a shape is coming straight to the viewer. Because of the perspective there is this illusion of the shape looking compressed and smaller than that it actually is.

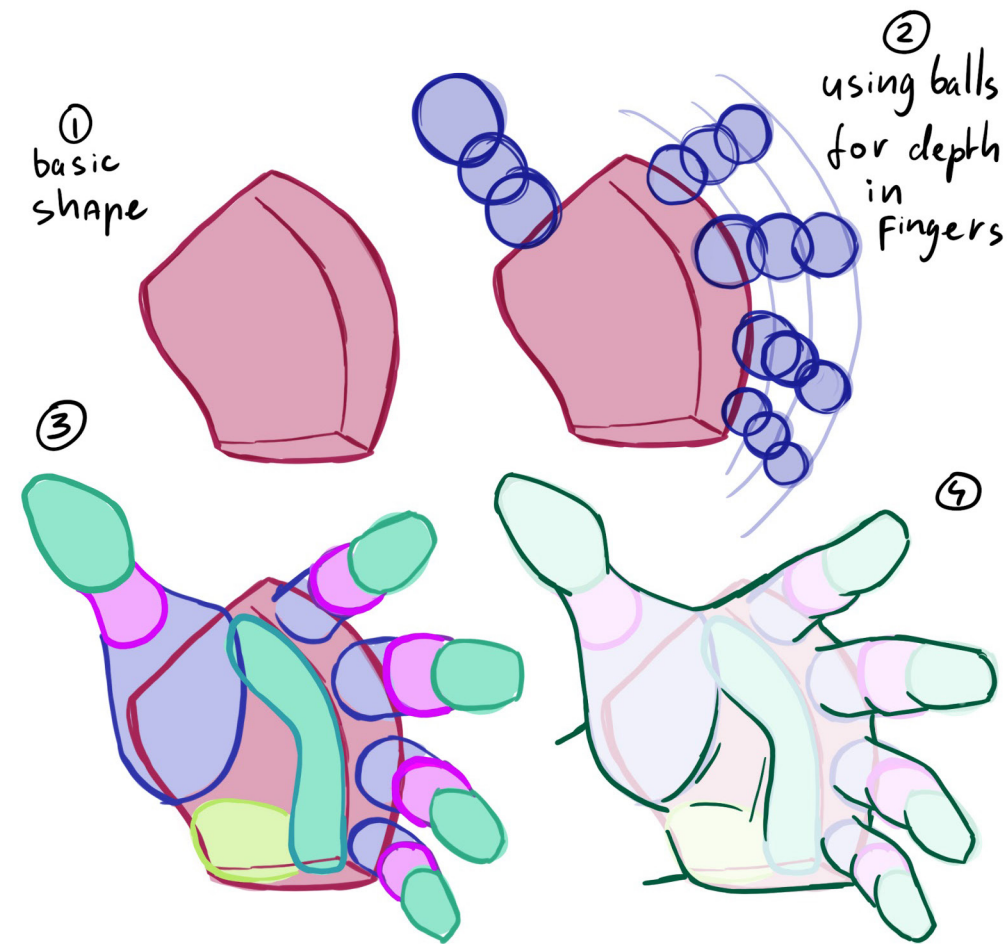
Here I also show the flow of the arm, using this flow helps creating a dynamic arm with interesting shapes. And helps avoid stiff arms.

Using these big shapes first helps with drawing foreshortening.



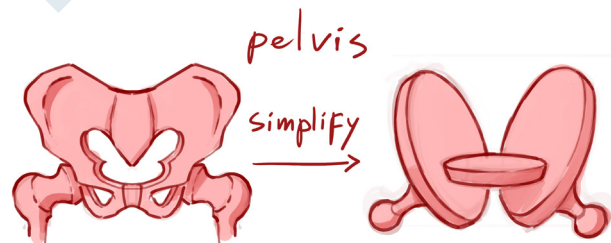
HANDS

Here I show how to draw a hand with foreshortening. Drawing with foreshortening is quite difficult, but using these basic shapes first really makes it a lot more manageable.



A CLOSER LOOK AT
THE LEGS

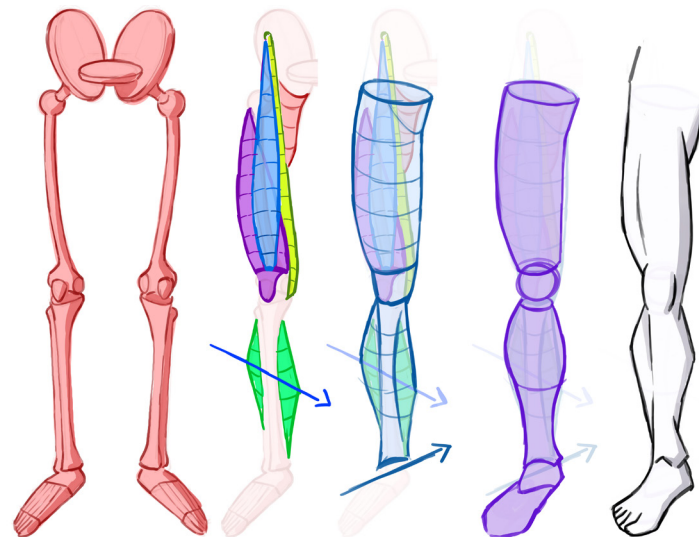
CONSTRUCTION OF THE LEGS



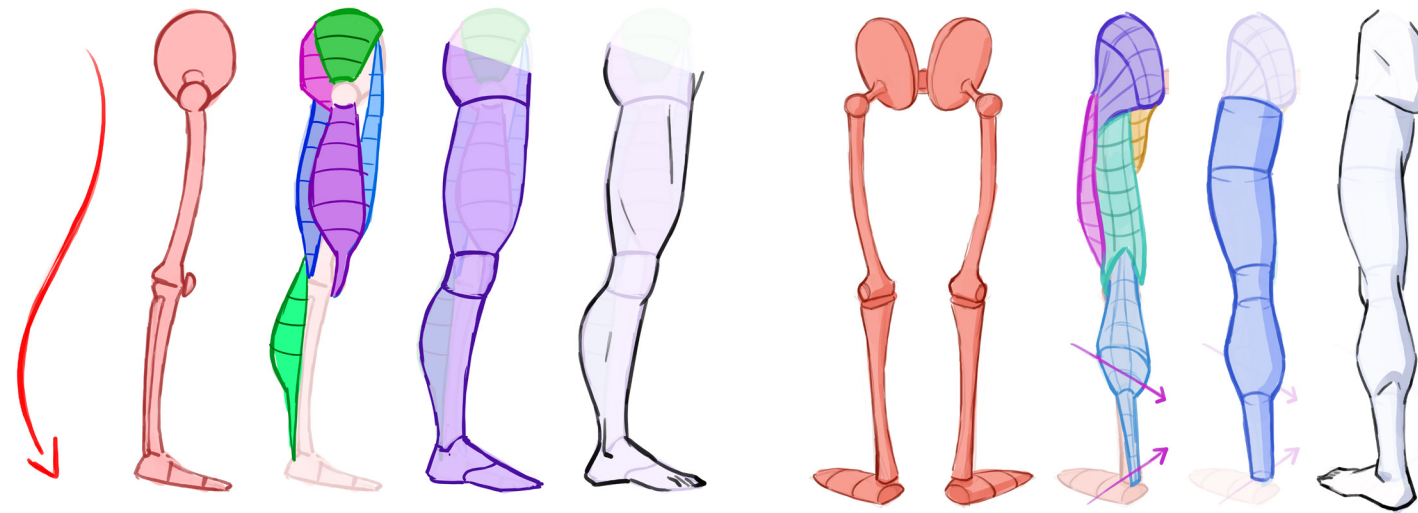
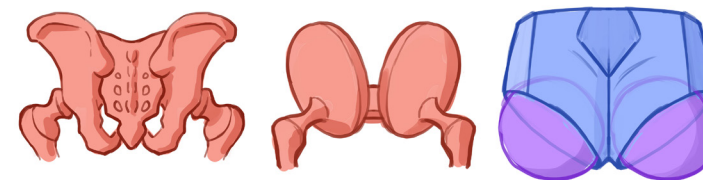
The pelvis bone is quite detailed, but you can easily simplify it. I often use this 3 disc method.

In the legs are a lot of muscles and I break them down in these muscles. In the blue draw over you can see the overall shape. Here you see how it follows the shape of the muscles.

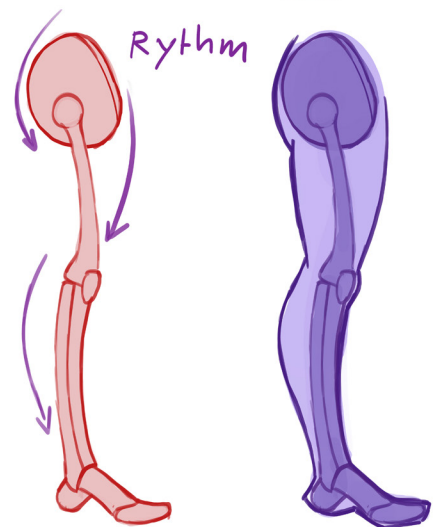
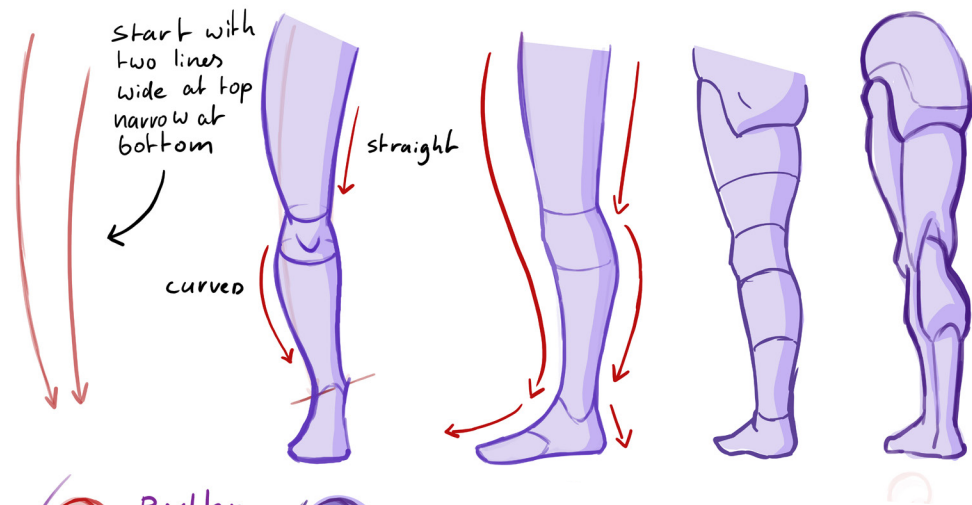
Also note the angles at the ankles and at the calves with the arrow.



The pelvis from the back. As you can see the 3 disc method applies here too.



This is the same pose as on the previous page, but now from the side and behind.



In this more simplified construction of the leg I start with just two guide lines on which I draw the rest of the leg.

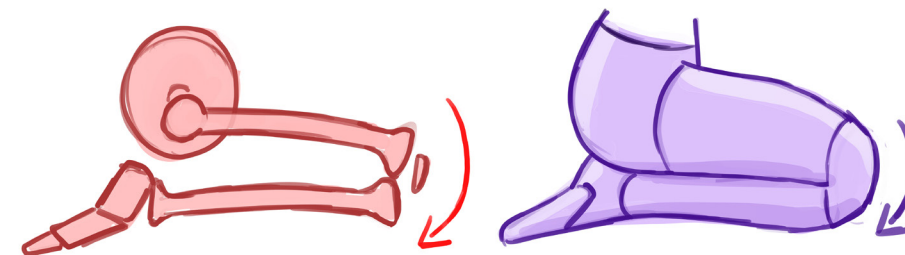
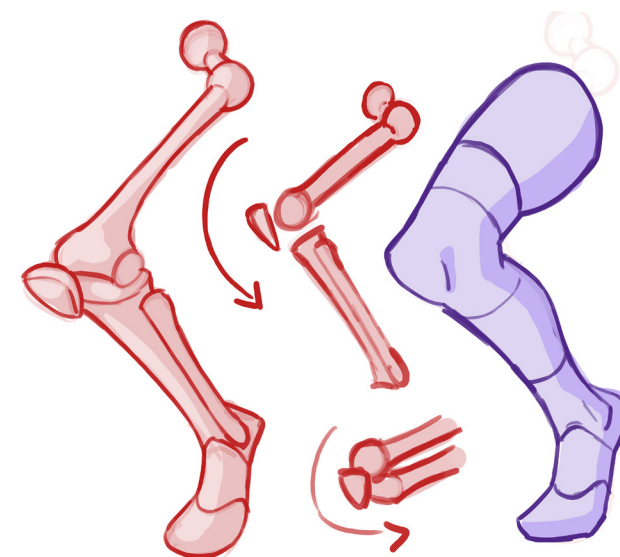
A leg is not symmetrical, so avoid identical, parallel lines on both sides. Straight vs curved and try to use a mix of small, medium and long lines. Create a flow between the lines, think of it as if water streams through it.

LEG MOVEMENT

BENDING THE KNEE

When you bend the knee, the skin on top of the knee get stretched a lot and the skin behind the knee is squashed together.

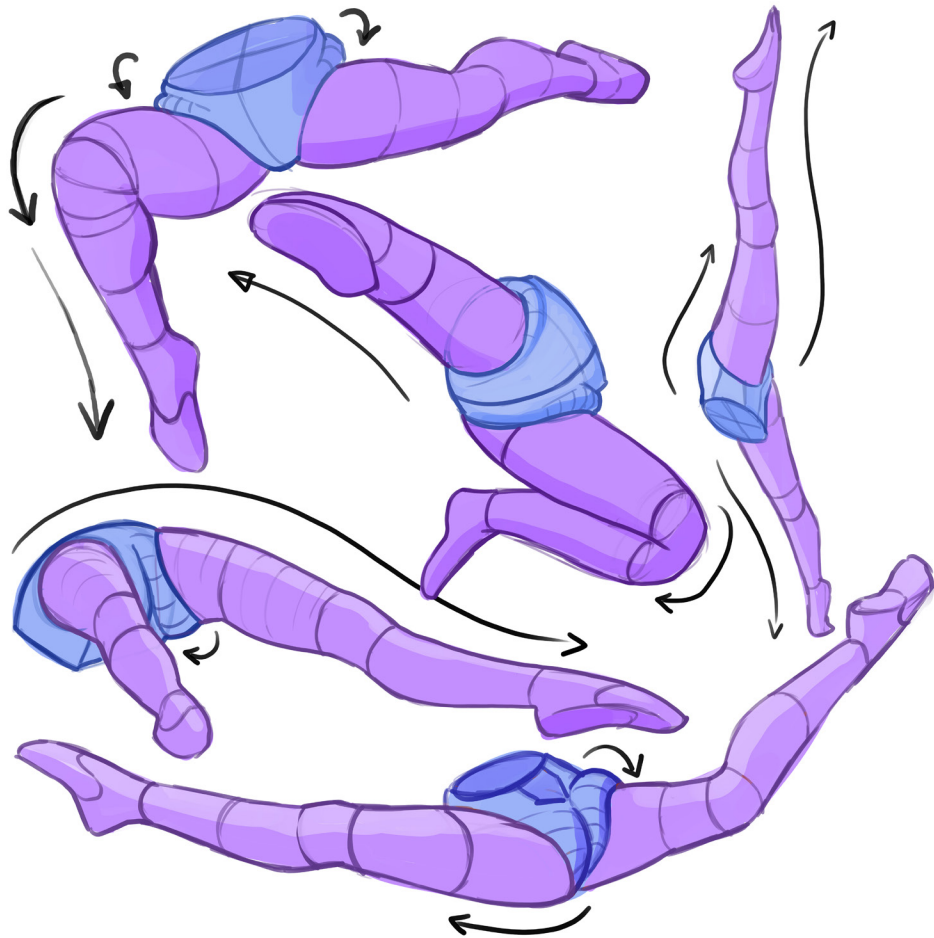
It helps me a lot to think of the knee as a ball that is stretched and squashed together in movement. When you bend the knee it's stretches to an oval shape, while in normal position it has a round shape.



FULL MOTION

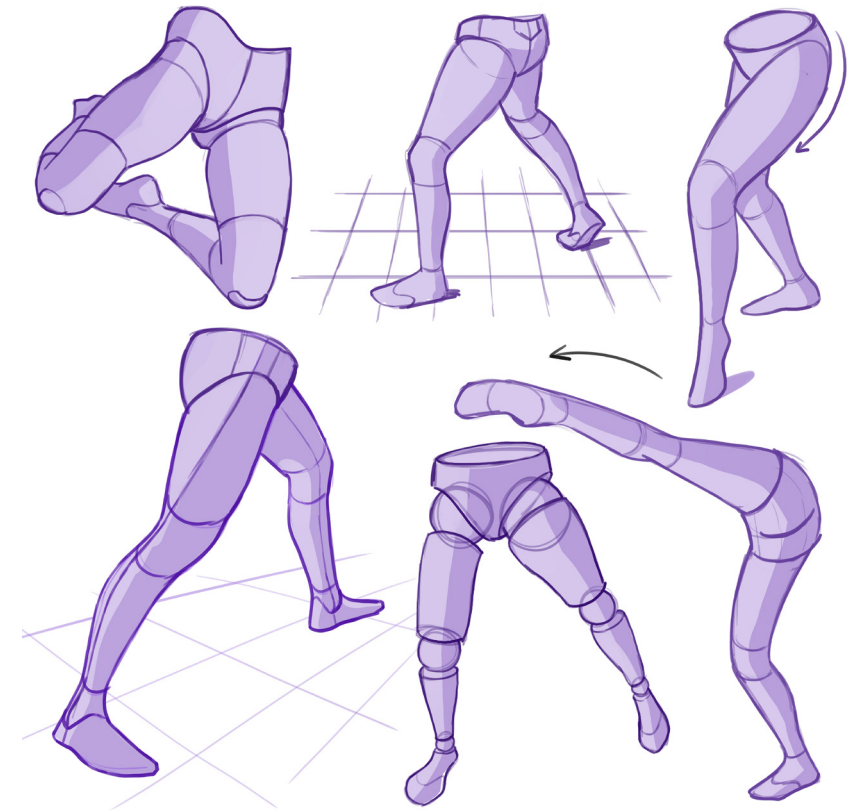
These are some examples of the legs in different poses. Notice when the leg bends backwards the tissue on top of the leg gets bulged out.

We exist of soft tissue that get's pulled and pushed together. Try to notice the parts that get stretched or that get squashed.

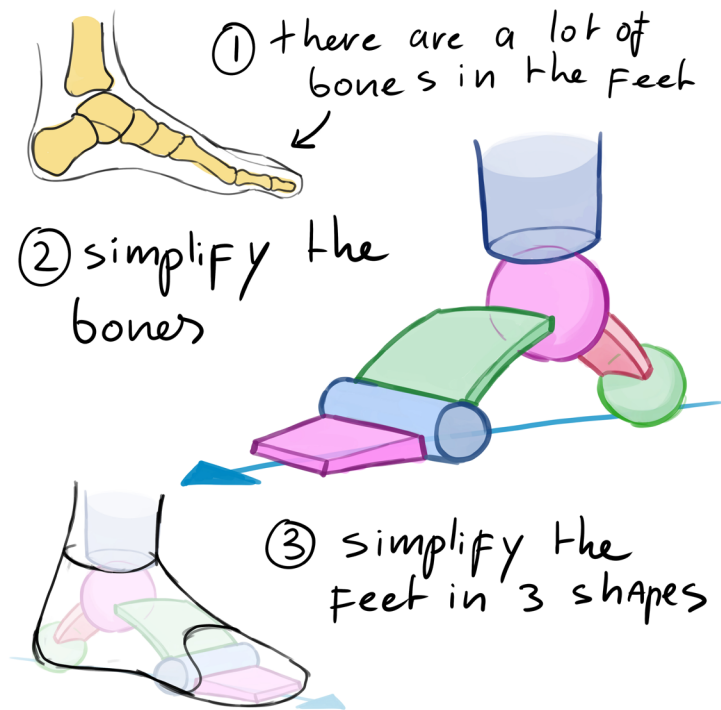


PERSPECTIVE

When drawing legs and feet try to think of the floor. By drawing a grid on the floor you can better see where and how to place the feet. Tip: Basic understanding of perspective is always good.



CONSTRUCTION OF THE FOOT



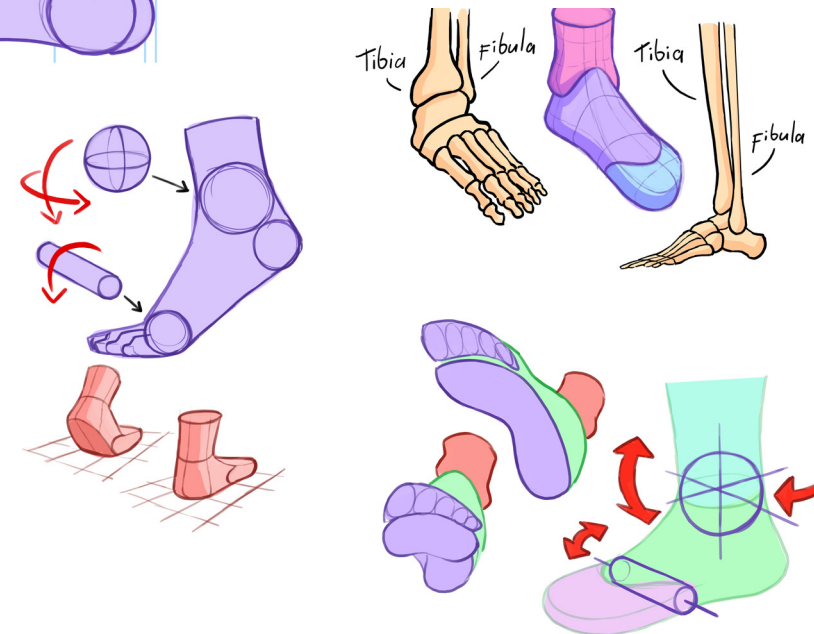
Like in the hand, the feet has a lot of bones and is quite flexible. In the second image you can see the simplification of the feet. This makes it easy to understand and helps with thinking of how the feet moves and bends.

Some parts can rotate and other parts only bends. In the 3th image the feet is broken down in 3 shapes, in most situations you can perfectly draw a foot like this.



Here are some different versions of the foot. Including an overview of the different sides.

When you are drawing feet in a difficult angle it can help to first draw the bottom side of the feet like I've shown in the example.



FOOT MOVEMENT

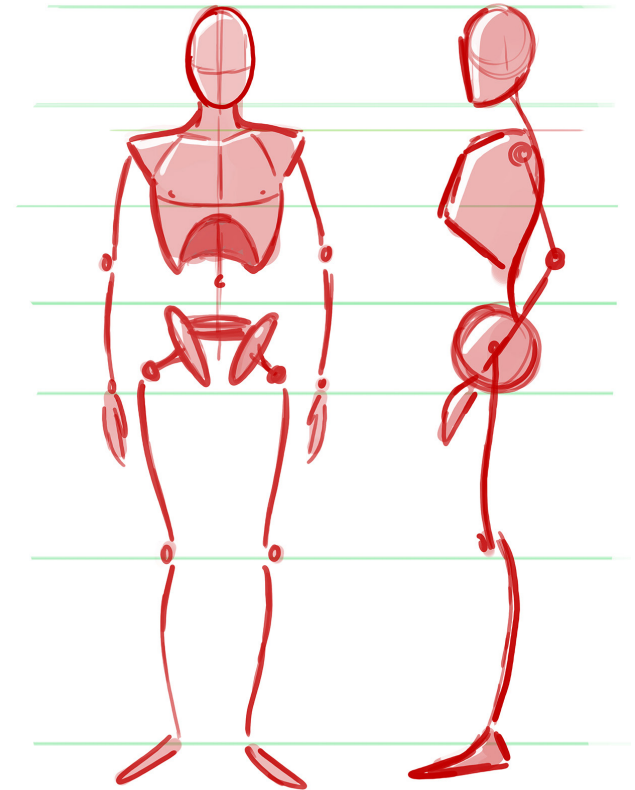
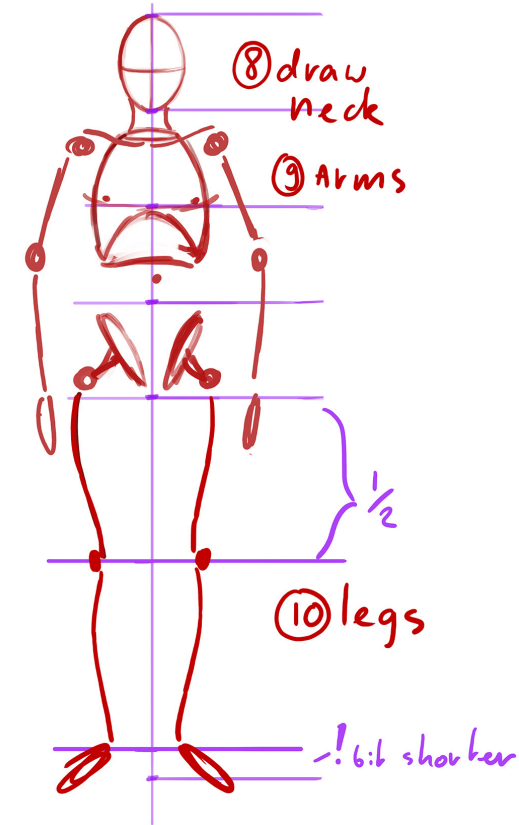
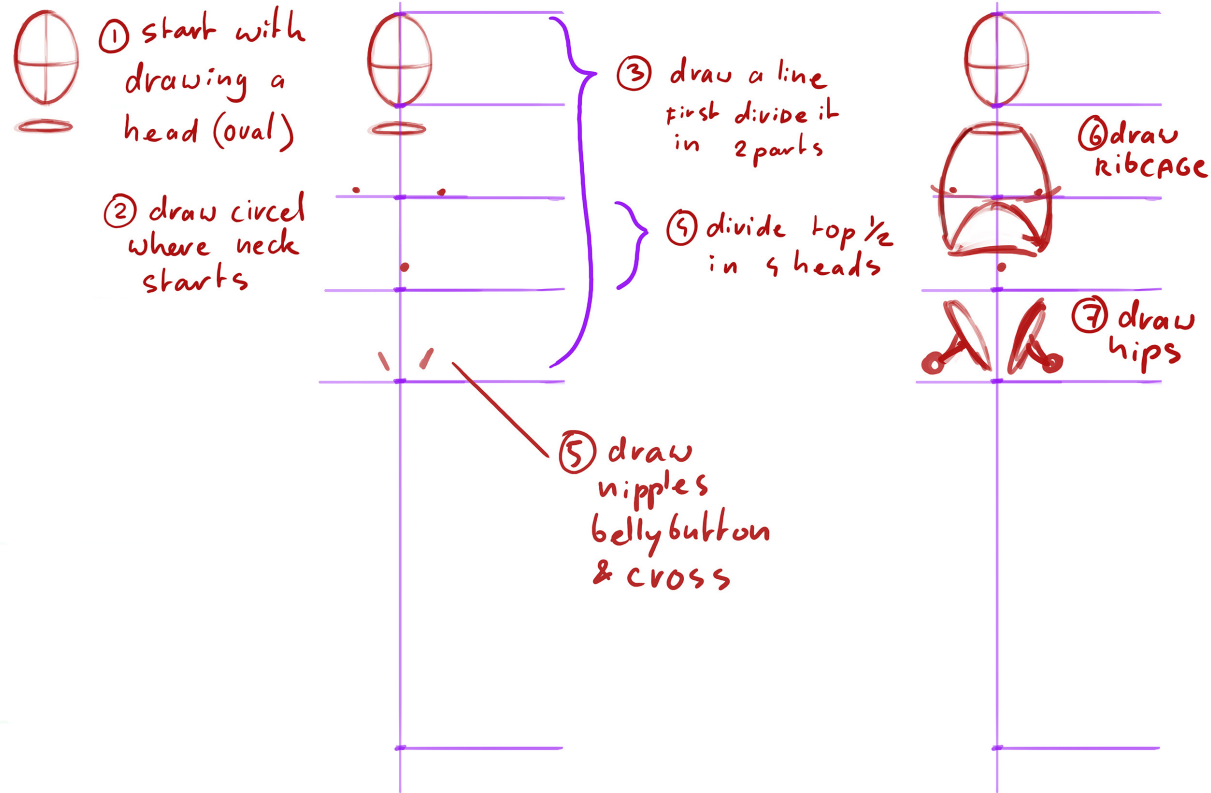
BENDING THE FOOT

Examples of bending the foot and some different views. Most of the time I draw a foot in those three parts to keep it simple and most of the times it's enough for me to draw it that way.

Also notice the angle of the angle on the foot. On the outside the angle is a bit lower than on the inside, see image or check out your own feet for reference.



TOTAL BODY



BASIC SKELETON

This is how I draw the skeleton. It really helps to think of it as a stick figure but with a little bit more details.

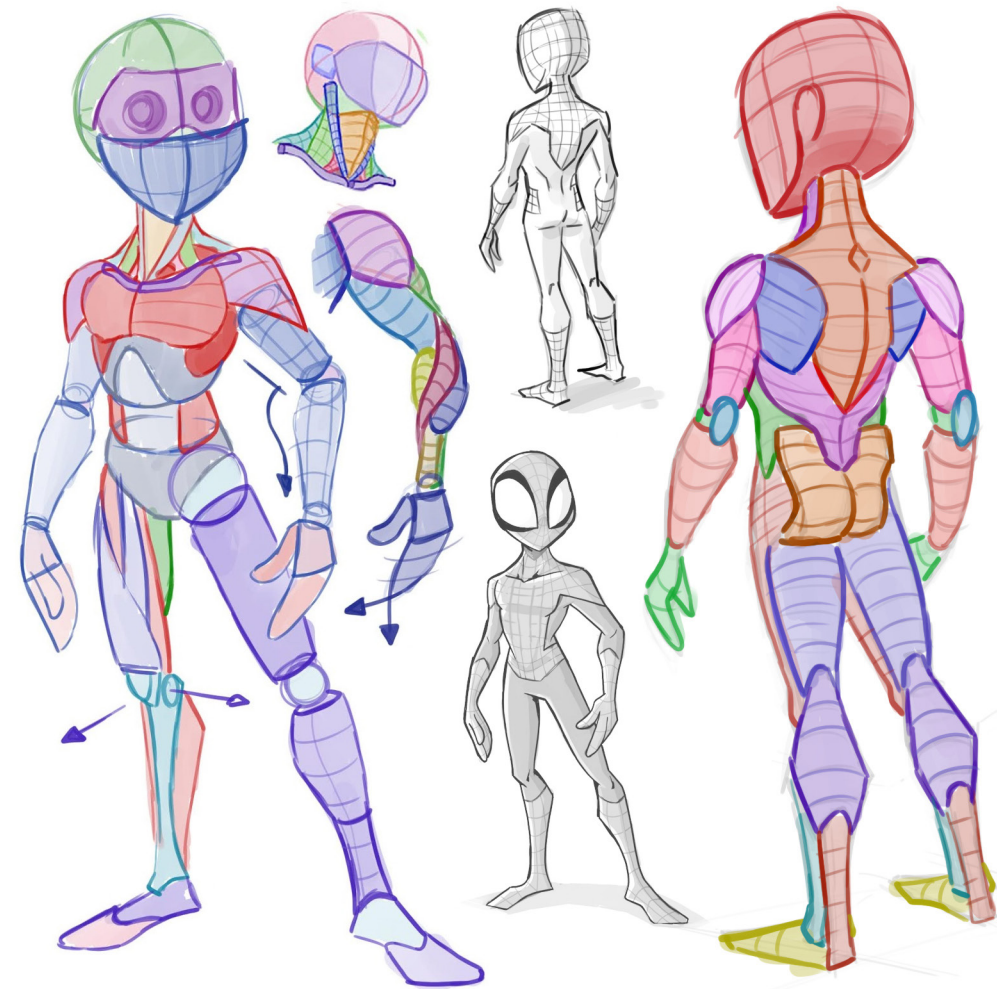


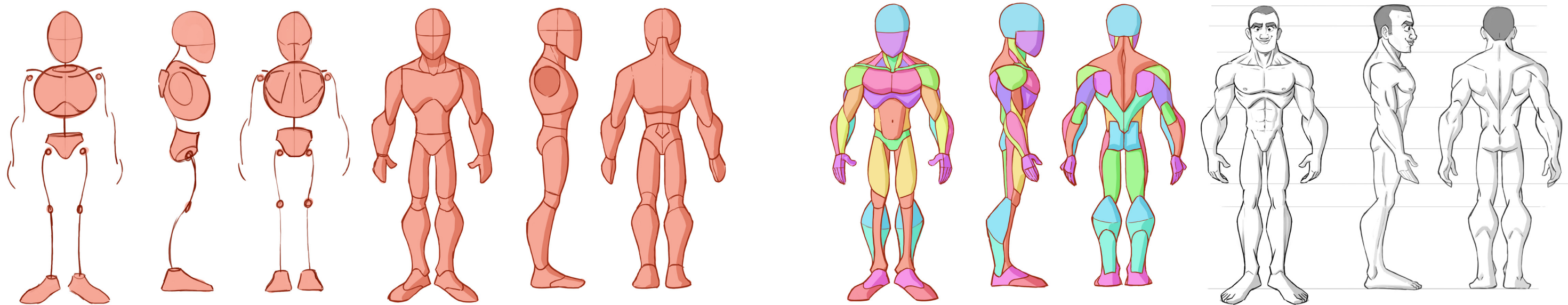
MUSCLES

It's really useful to understand all these muscles and bones. I personally don't know all the muscles and try to keep it simple so I can use it for my own drawings.

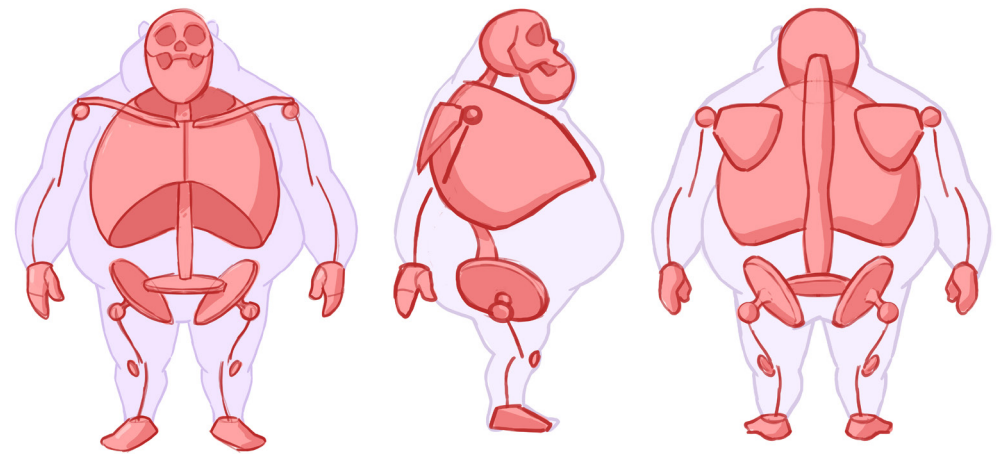
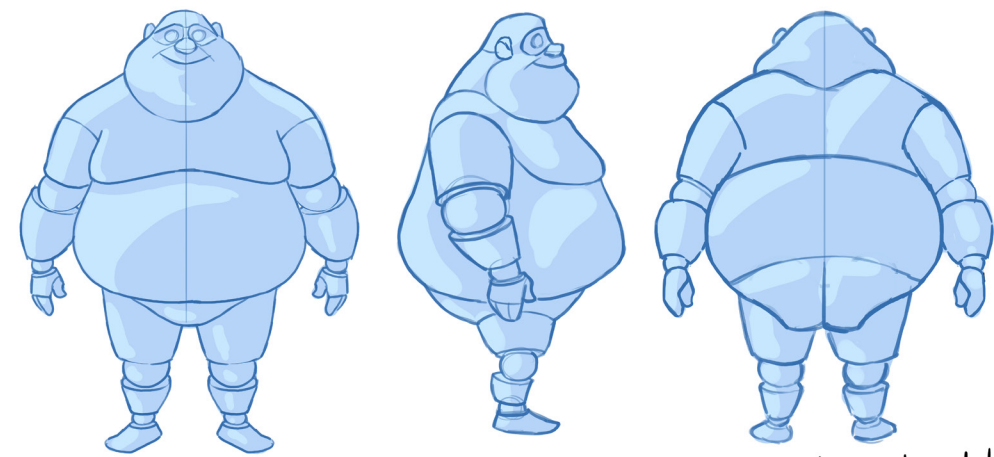
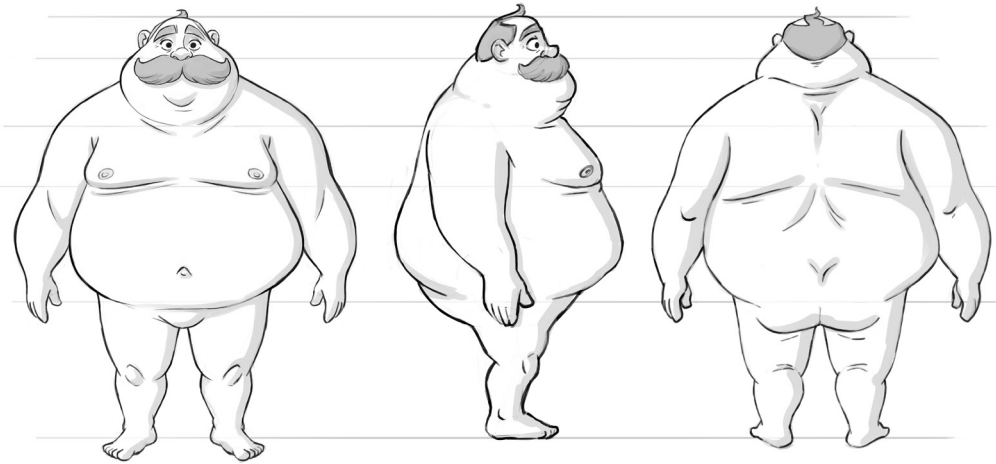
This image demonstrates how I use this knowledge to draw characters. Again starting with a line of action and lay shapes on top of that line.

Overall example of all the muscles from the front and back view of the body. I often use this reference when I drawing a difficult pose.

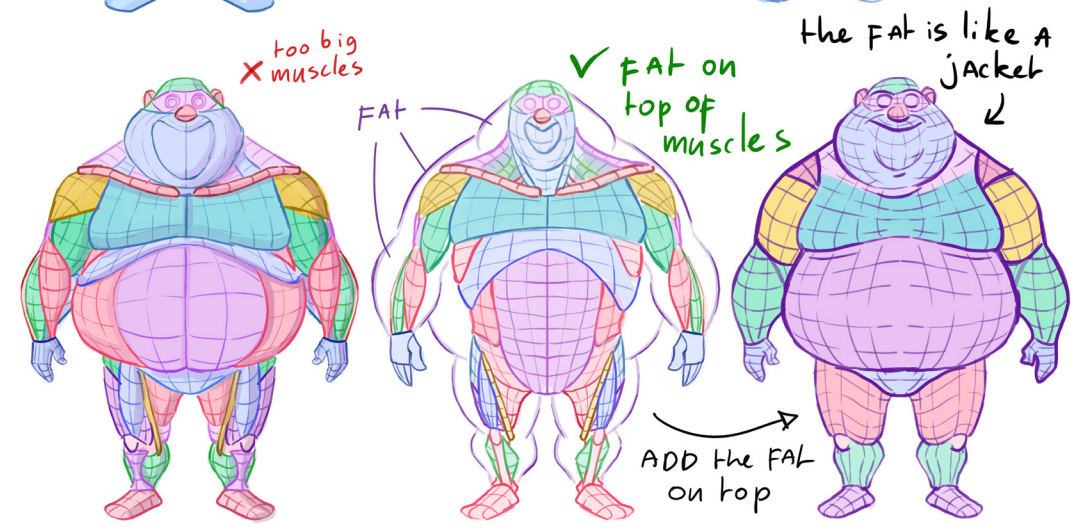




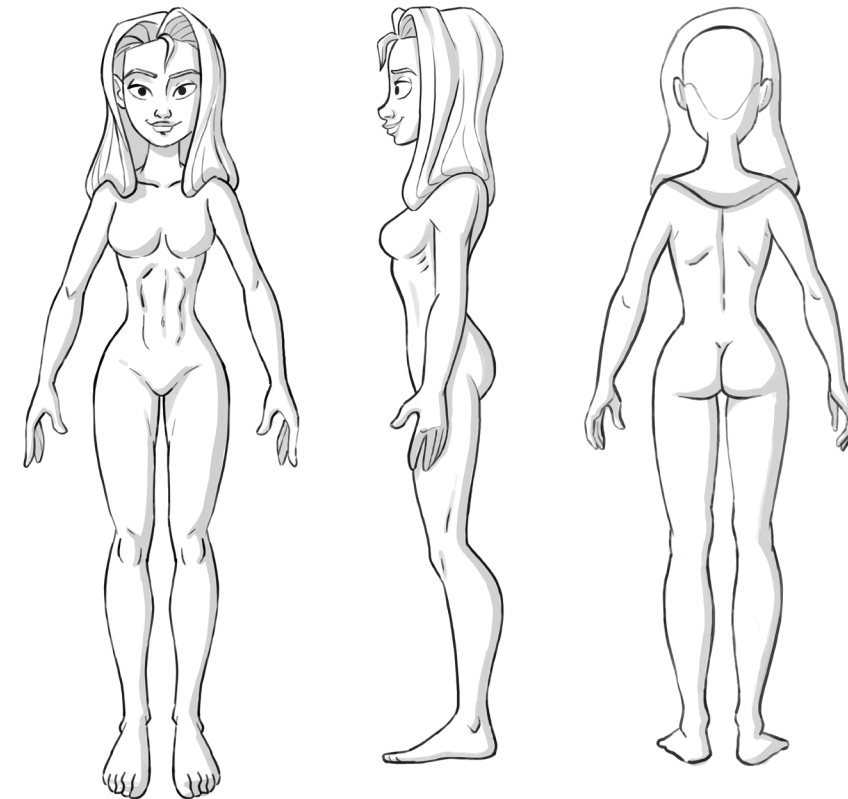
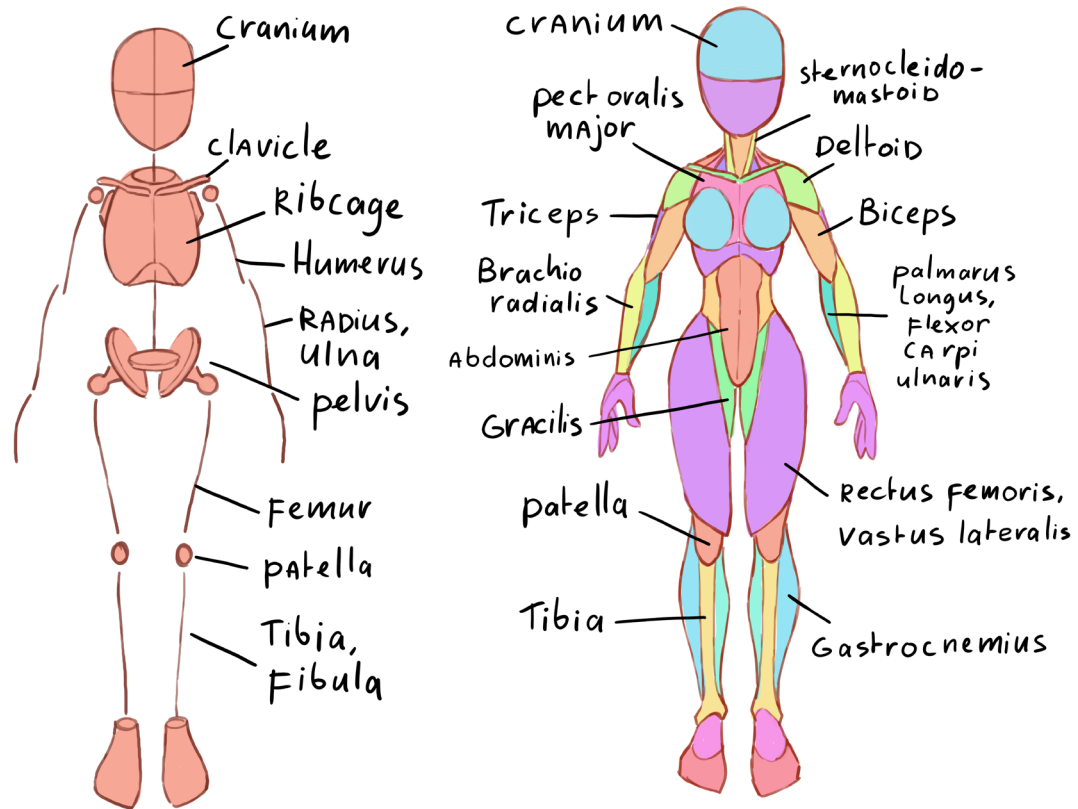
Here you can see that you can play around with the skeleton of the character. Play around with the proportions.



Notice that with heavy set people the muscles aren't big but there is fat on top of the muscles.

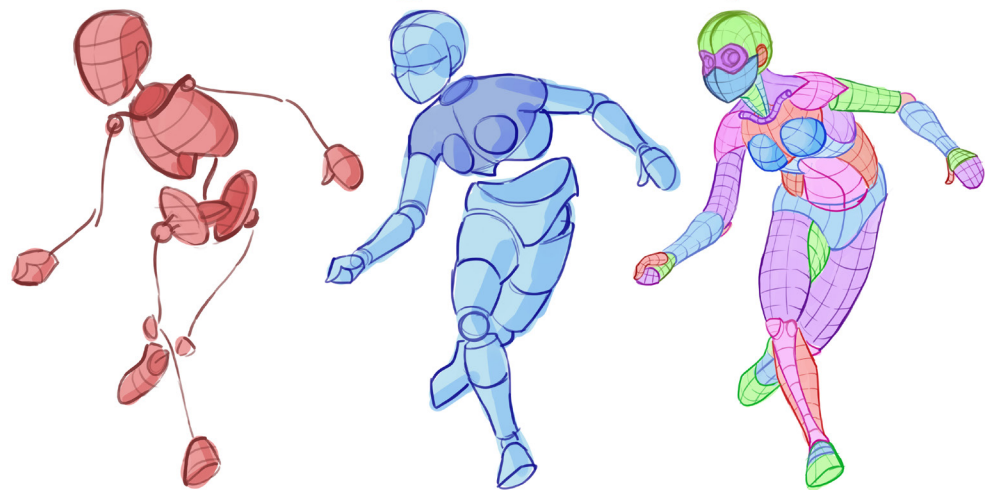


Here is a version with some of the names of the muscles and bones. It are not all the bones and muscles and me personally doesn't know this out of my head. I think It can help you with remembering all the shapes but I always forget it after a while. I also simplify the muscles a bit because it's everything I need when I'm drawing characters.



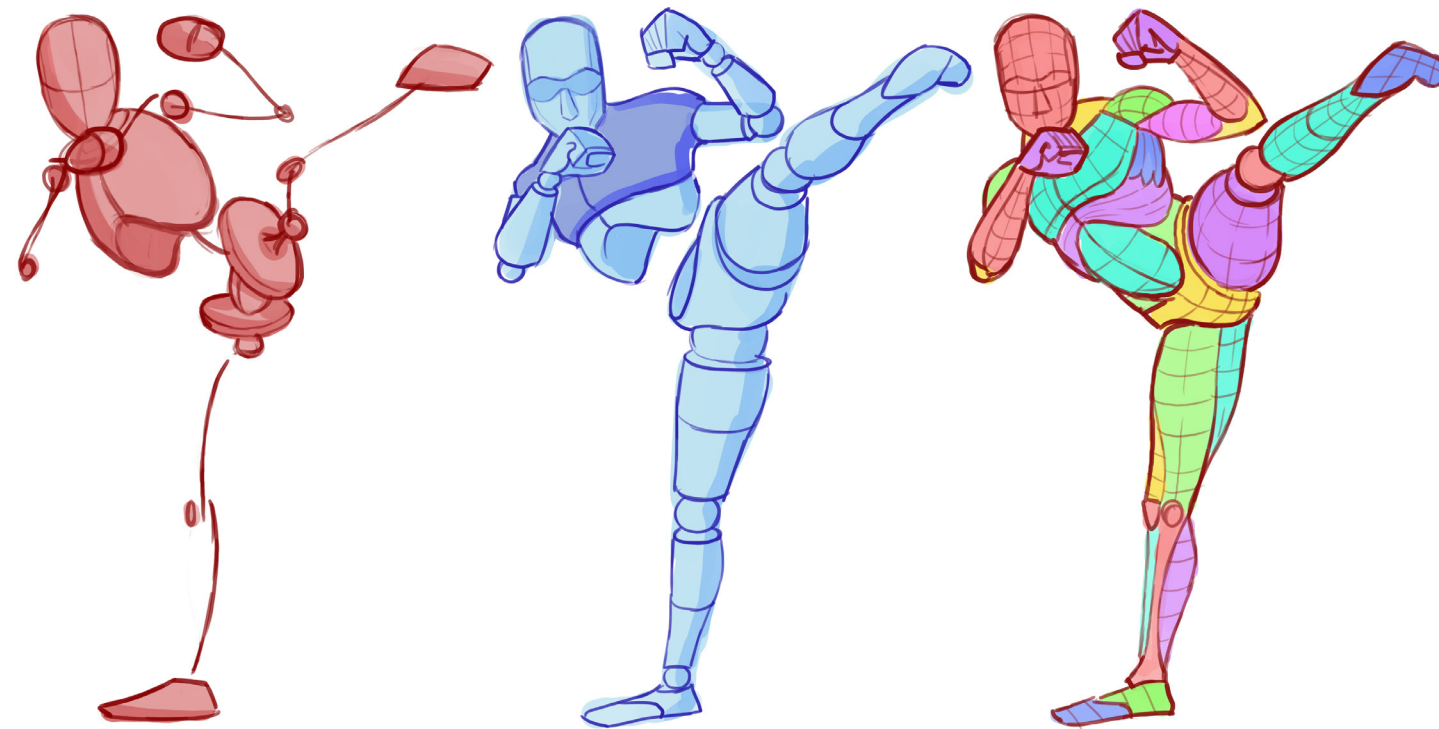
Different views of a female character. One of the big difference between the male and the female is that the widest part of the legs with a female is higher around the

hips than at the male. That widest point with the male is above the knee, depending on how muscular the leg is.



MOVEMENT

Always start with drawing an action line and draw on top of that the skeleton and add basic shapes on top of that. After that you can more easily draw the muscles on top of that. I'm not always drawing all the muscles in detail I know, I think of what is necessary and what is not.



FINAL TIP

THAT'S IT!

Thanks for reading the book. I hope it helped and you to have a better understanding of how to use and draw anatomy. All these things definitely helped me and I'm still learning.

The thing with drawing is that you are never done learning. Being an artist is a bit like being a gardener. You always have to water your garden or it will become dry and eventually dies. So always keep learning and try to find

water for your garden. With this I mean it's important to always keep studying and learning.

If you have any question or want to show me some of your studies drop me a message on my Instagram or send me an email.

Best,
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