Created in collaboration with medical illustrator Kate Galloway: ktb-studios.com

Medical Illustration

OVERVIEW

Do you love science and art? Did you know there are careers that combine these fields? Medical Illustration is one! Explore medical illustration as you learn to draw the human stomach, heart, and lungs!

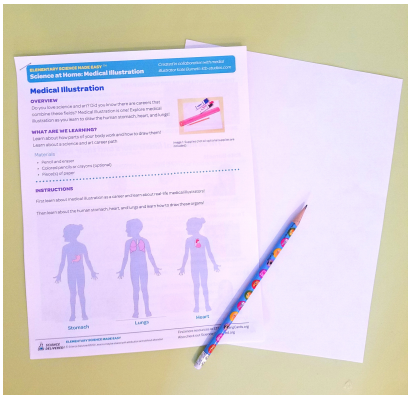


Image 1: Supplies - get a pencil, paper, and instructions and you are ready to go! Colored pencils, markers or crayons are optional.

WHAT ARE WE LEARNING?

Learn about how parts of your body work and how to draw them!
Learn about a science and art career path

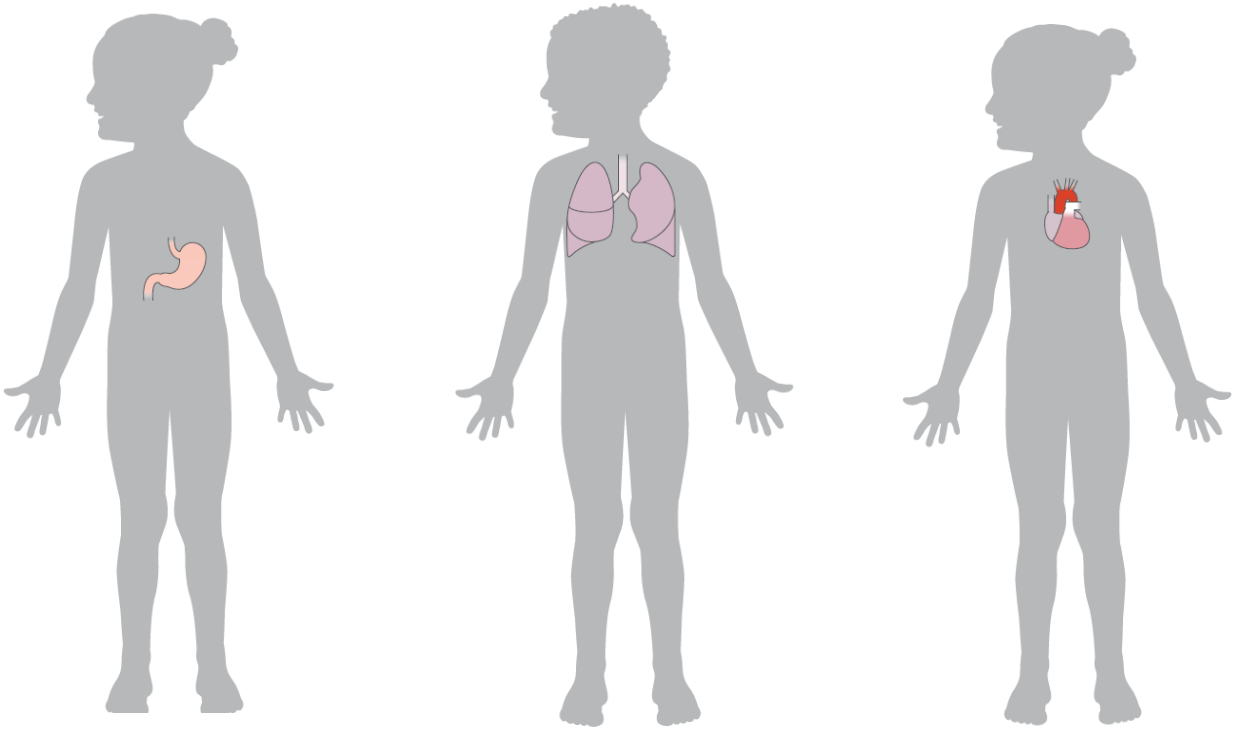
Materials

- Pencil and eraser
- Colored pencils or crayons (optional)
- Piece(s) of paper

INSTRUCTIONS

First learn about medical illustration as a career and learn about real-life medical illustrators!

Then learn about the human stomach, heart, and lungs and learn how to draw these organs!



Stomach Lungs Heart

Science at Home: Medical Illustration

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THE MEDICAL ILLUSTRATOR CAREER PATH

For people who love art and science, becoming a medical illustrator and/or medical animator can be a great fit! People in this career create illustrations or animations for medical or science textbooks, pharmaceutical companies, scientists, and more!

Illustrators and animators can also work in other areas of science, technology, or engineering. For example, there are technical illustrators who draw or animate different types of machines.

Below are three real-life medical illustrators and some of their work - see their websites for more!

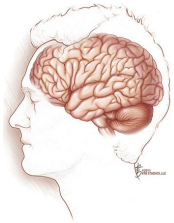
Three medical illustrators and their work!

Which illustration is your favorite?

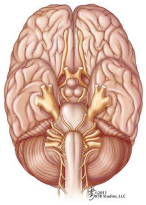
Kate Galloway

ktb-studios.com

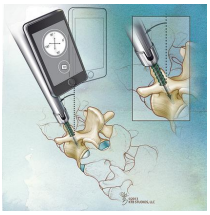
human brain



underside of brain



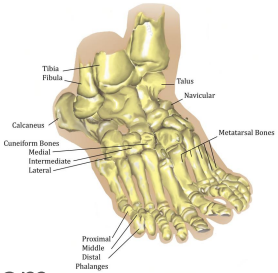
iPod-assisted drill



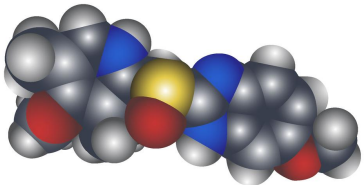
Tess Buckley

tessbuckley.myportfolio.com

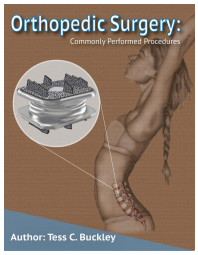
bones of feet



"Esomeprazole" molecule



textbook cover

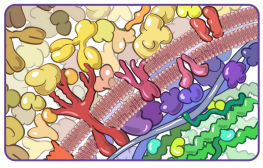


Li Yao

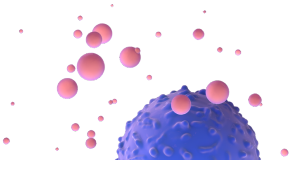
liyaovisuals.com

mouse brain

part of a cell

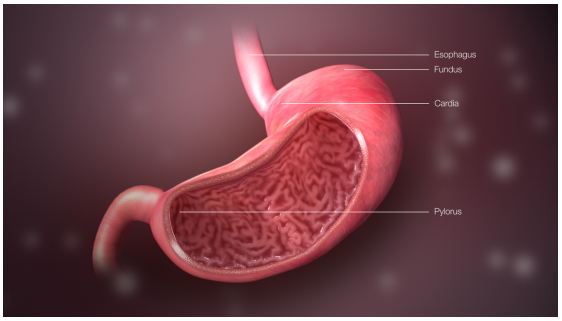


cells



The Stomach

The stomach is an organ in your body that digests food and is part of the digestive system (see below). It's pretty simple-looking from the outside but it's very important to your body!



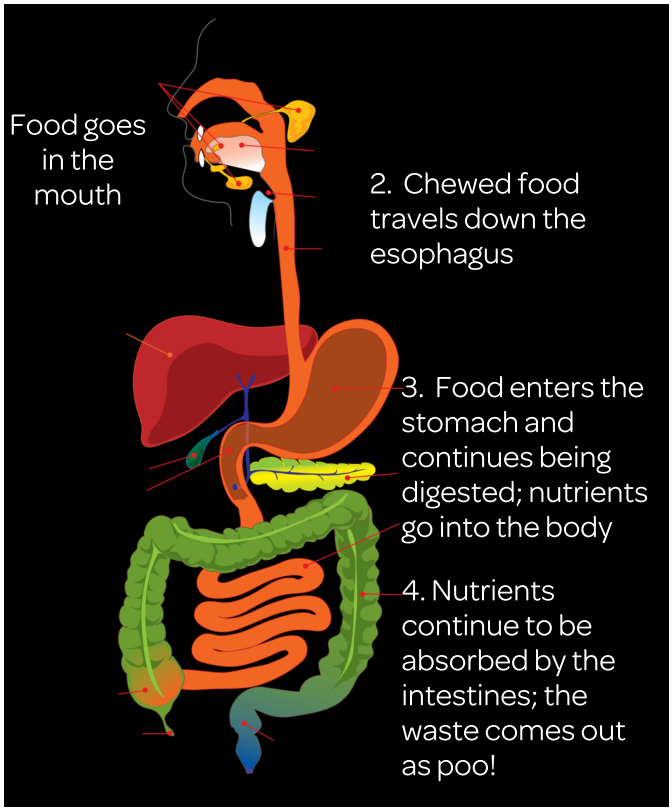
By https://www.scientificanimations.com - https://www.scientificanimations.com/wiki-images/, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=86463792

Fun Stomach Facts

1. Food travels down a tube (called the esophagus) to get from your mouth to your stomach.

2. The stomach has lots of chemicals that help break down your food so your body can get the nutrients it needs from the food!

3. Your stomach has muscles in it that make it move and churn the food around .



Adapted from: Leysi24 - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=32707342

The Digestive System

You eat food every day right? Have you ever thought about why you eat and what happens to the food in your body?

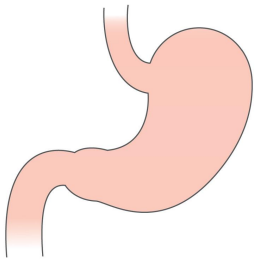
You eat to get energy and nutrients from food! But your body needs to break the food down and take the the good stuff out of that food.

Your food travels through your body to different body parts. Your body uses some of the food for nutrients and energy and the rest comes back out as poop!

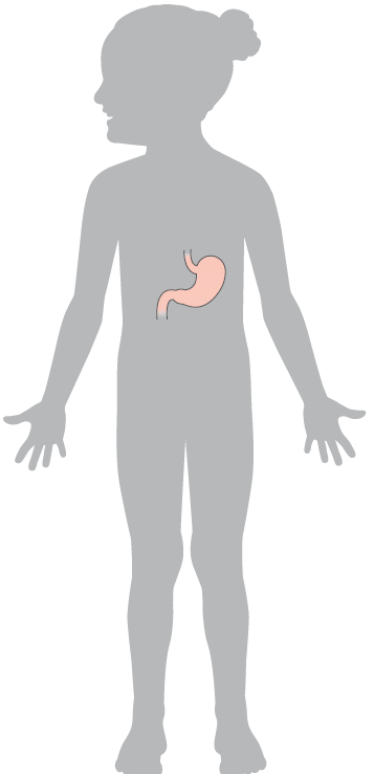
HOW TO DRAW A STOMACH

Get a pencil, paper, and eraser.

IMPORTANT: Make your initial lines lightly with pencil so they are easy to erase.

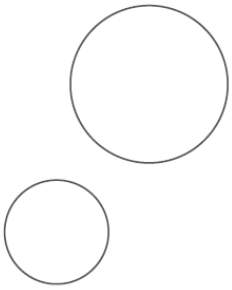


The stomach is one of the easiest parts of the digestive system to draw. Learn to draw a stomach here!



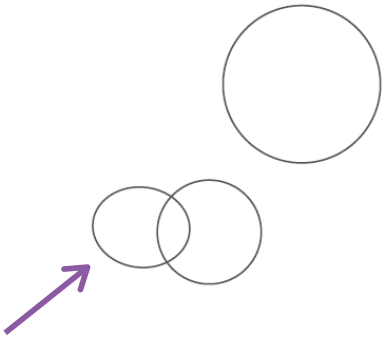
Step 1

Use a pencil to draw one big circle and one small circle. Remember to make light lines as you will erase some of your lines later.



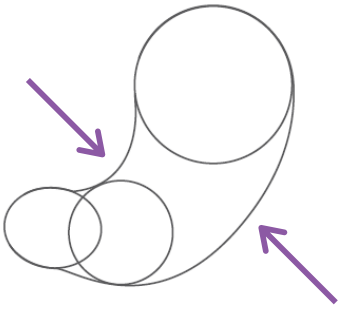
Step 2

Draw an oval that overlaps with the small circle. The arrow points to the new part.



Step 3

Draw curved lines that connect the big circle to the oval.

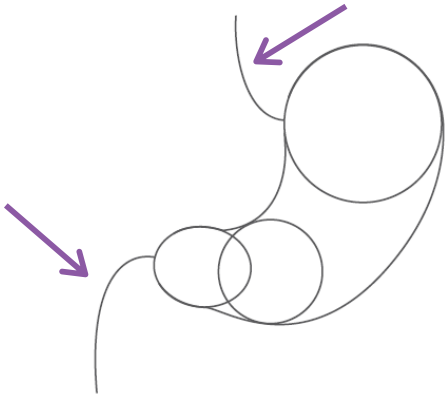


HOW TO DRAW A STOMACH (CONT)

IMPORTANT: Make your initial lines lightly with pencil so they are easy to erase.

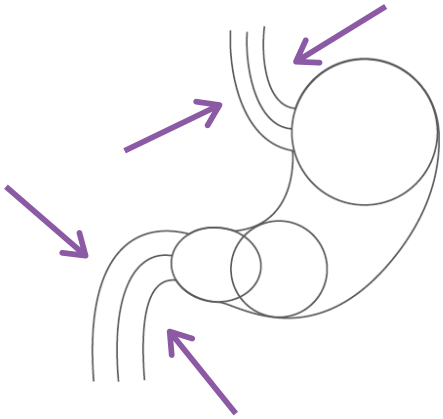
Step 4

Add a "tail-shaped" line to the left side of the big circle and the left side of the oval. The tail coming off the oval should curve downward. The tail coming off the big circle should curve upward.



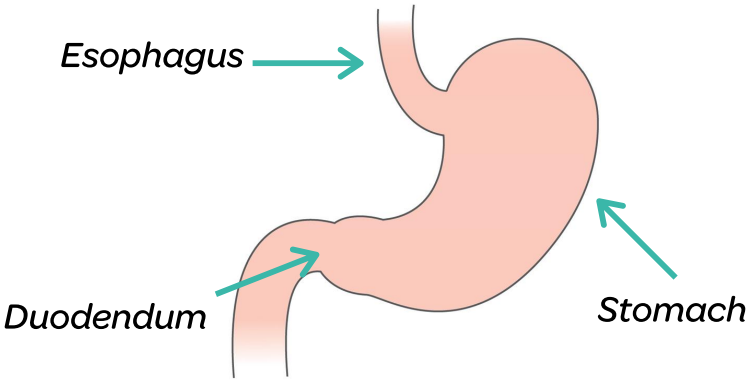
Step 5

Add lines alongside the tails to form the esophagus (top) and intestine (below). You are adding four lines total in this step.



Step 6

Erase all the lines on the inside of the shape and color it in. Don't forget to label!



Esophagus: A tube in your body that connects your throat to your stomach. It's muscular.

Duodendum: The first part of the small intestine. It's where the food goes when it leaves the stomach.

The Lungs

The lungs are a part of the "respiratory system" (see below). They are what allow us to breathe or, in fancy scientist words, respirate. The lungs help distribute oxygen throughout the body.

Adapted from: https://www.healthline.com/human-body-maps/lung#lungs-at-work--powered by Biodigital

Fun Facts:

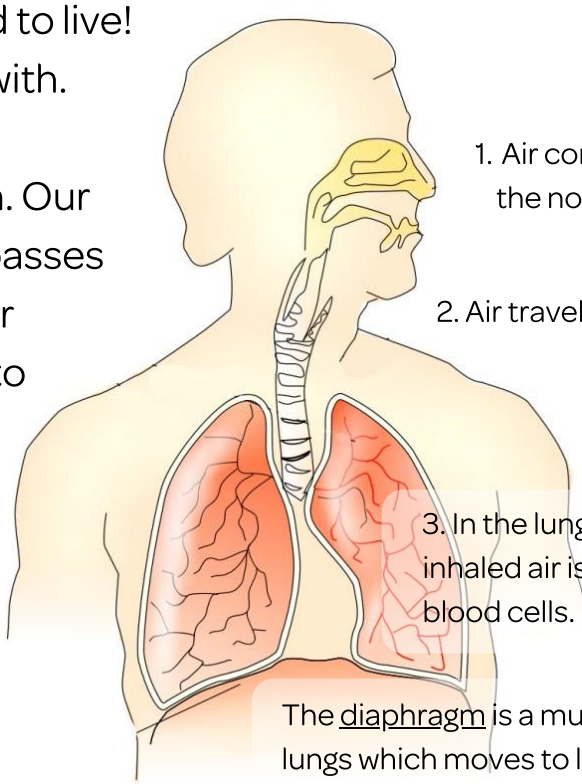
1. Believe it or not, our nose hairs play an important part in keeping us safe: they filter the air we breathe!
2. We breathe in-and-out 15-25 times per minute.
3. Our left lung is slightly smaller than our right lung to make space for the heart.

The Respiratory System

We all breathe which gives us air we need to live! The lungs are the body part we breathe with.

We breathe in air, which contains oxygen. Our body needs oxygen to have energy. Air passes through our nose and mouth and into our lungs. Red blood cells (RBC) then come to "collect" the oxygen in the lungs and bring it to the rest of the body.

The lungs also work closely with the heart. For more information, check out the sections THE HEART and THE CIRCULATORY SYSTEM on page 10.



1. Air comes in through the nose or mouth.
2. Air travels into our lungs.
3. In the lungs, oxygen in the inhaled air is picked up by red blood cells.

The diaphragm is a muscle below the lungs which moves to let us breathe in and out.

Image from: Unknown Author
https://tartrerepub.blogspot.com/2018/02/blank-respiratory-system-diagram.html

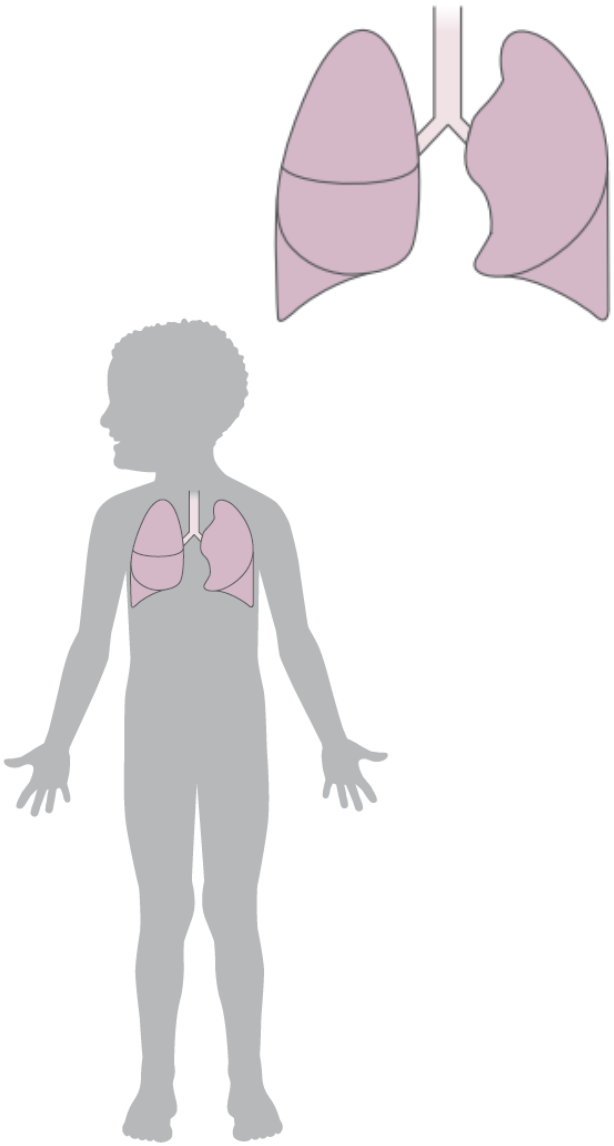
Created in collaboration with medical illustrator Kate Galloway: ktb-studios.com

HOW TO DRAW LUNGS

Get a pencil, paper and eraser.

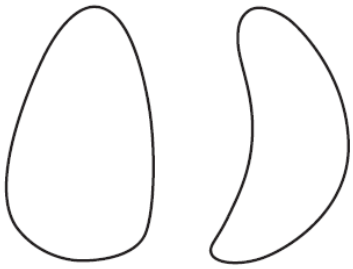
IMPORTANT: Make your initial lines lightly with pencil so they are easy to erase.

The lungs are an important part of the respiratory system. They are a bit harder to draw than the stomach, but with a little patience you'll give life to your very own portrait of the human lungs!



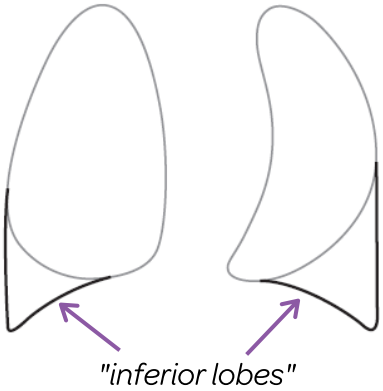
Step 1

Use a pencil to draw a skinny egg shape on the left and a rounded banana shape on the right. These are the start tothe right and left lungs.Remember to make light lines as you will erase some at the end.



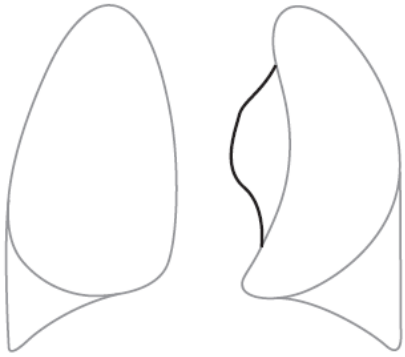
Step 2

The lungs are made of multiple "lobes." Draw pointy triangles below both shapes to add two lobes.



Step 3

Add a curved-shape to the left side of the banana-shape.

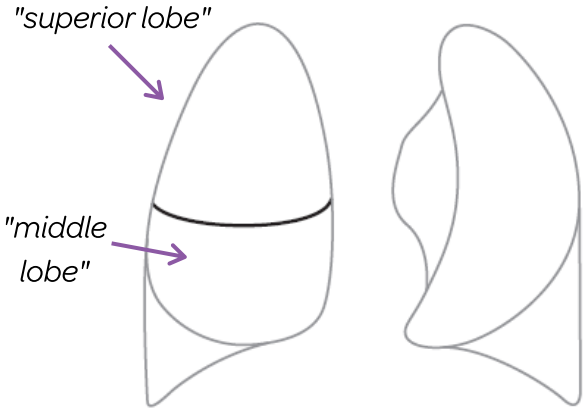


HOW TO DRAW LUNGS (CONT)

IMPORTANT: Make your initial lines lightly with pencil so they are easy to erase.

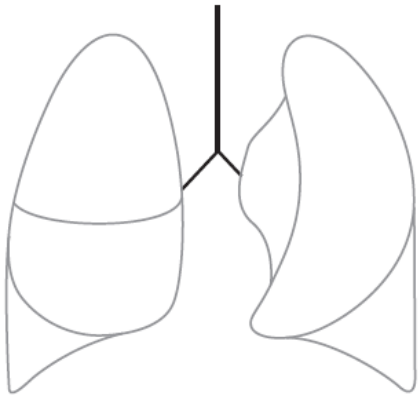
Step 4

The right, bigger lung has three lobes. Add a curved line across the middle of the 'egg' which breaks the upper right lung into the "superior" and "middle" lobes.



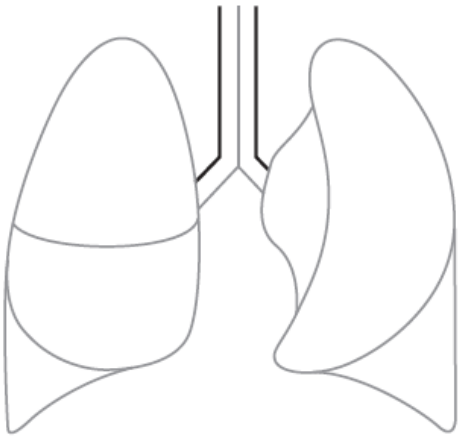
Step 5

Draw an upside down 'Y' between the 'egg' and the curved-shape off the 'banana' (i.e. between the right and left lung).



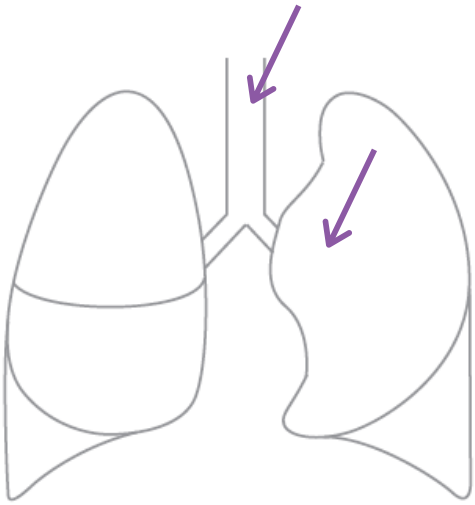
Step 6

Add lines alongside the 'Y' to form the trachea.



Step 7

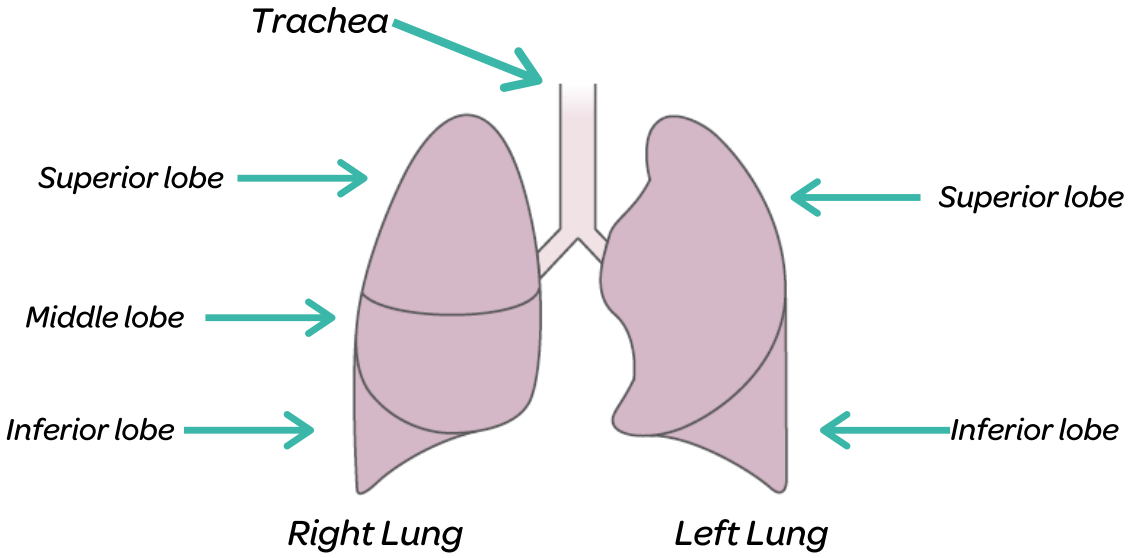
Erase the tail of the 'Y' and the line between the 'banana' and the 'banana's nose'.



HOW TO DRAW LUNGS (CONT)

Step 8

Add color, if possible. Make sure to label it!



Trachea: Also called the windpipe. This tube connects the nose and the mouth to the lungs, transporting air in and out.

Lobes: The lobes are different sections of the lung. The right lung is bigger and has three sections, or lobes, while the left lung only has two. The word "superior" is often used in describing body parts to mean "above" while "inferior" means below.

The Heart

The heart is, well, "the heart" of the circulatory system (see below). That is, the heart is at the center of this system and is working 24/7 to pump blood.

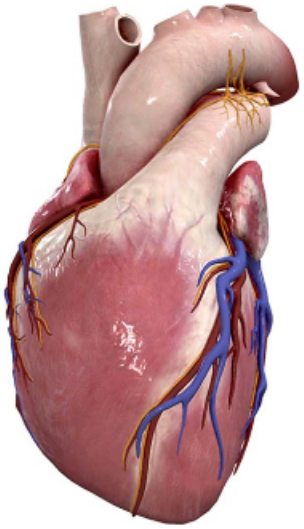


Image captured from : Complete Heart @ https://3d4medical.com/apps/complete-heart

Fun Heart Facts:

1. The heart is mostly made of muscle.
2. The heart beats, on average, 100,000 times per day.
3. The heart can continue beating outside of the body.

The Circulatory System

The organs in your body need blood to function properly. Blood brings oxygen and nutrients to body organs. The circulatory system refers to the parts of your body, like the hearts and veins, that carry and pump blood.

Veins and arteries are tubes that carry blood to and from the heart, they make a kind of "circuit" in your body. Arteries carry blood with oxygen away from the heart TO the organs. Veins carry blood without oxygen back to the heart and lungs. When blood goes back through the lungs it gets infused with oxygen and the cycle starts over again!

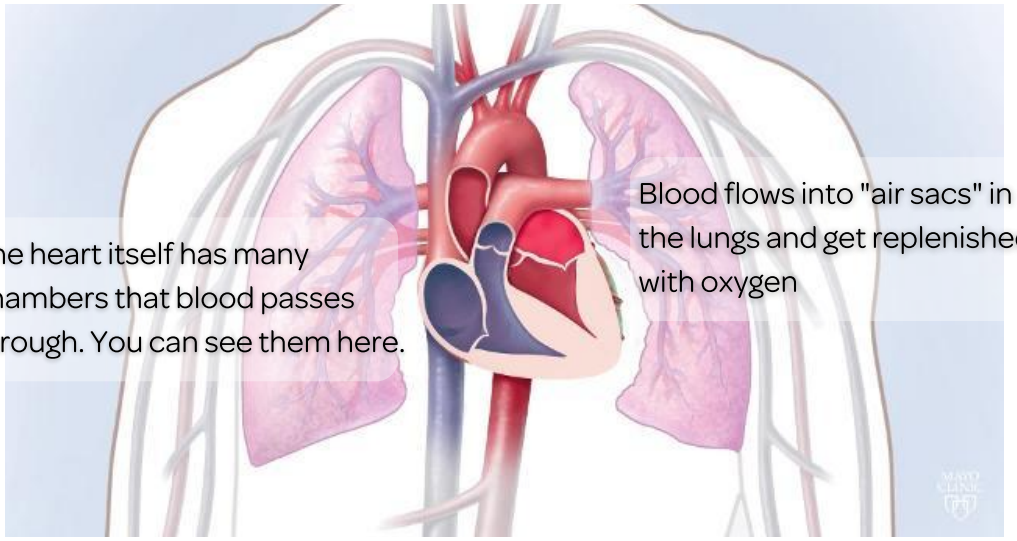


Image captured from: https://www.mayoclinic.org/diseases-conditions/heart-disease/multimedia/circulatory-system/vid-20084745

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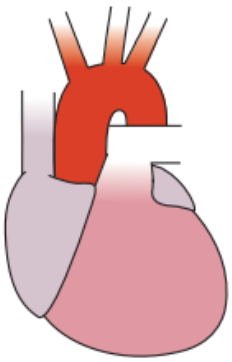
HOW TO DRAW A HEART

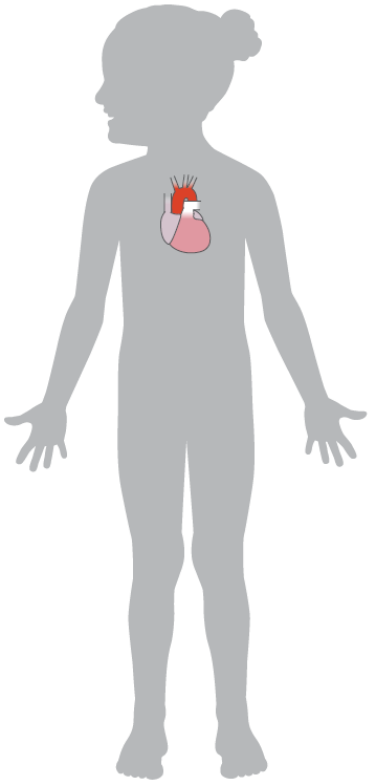


Get a pencil, paper and eraser.

IMPORTANT: Make your initial lines lightly with pencil so they are easy to erase.

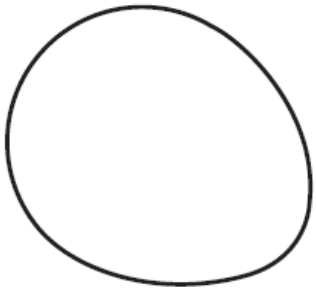
You likely know how to draw this kind of heart: ❤

But do you know how to draw the heart that's beating in your chest? Let's learn



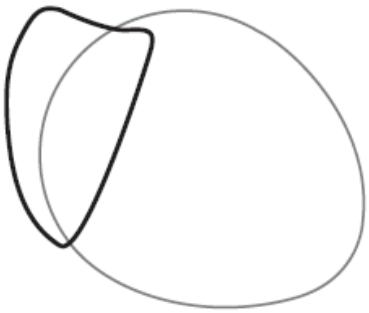
Step 1

Use a pencil to draw an 'egg' lying on its side. Remember to make light lines as you will erase some at the end.



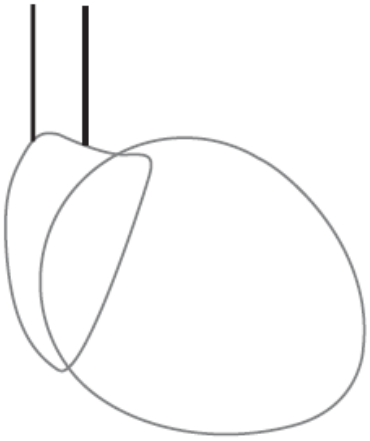
Step 2

Draw a triangle with round corners on the left side of the 'egg.'



Step 3

Add two straight lines to the top of the triangle to form a 'pipe.'

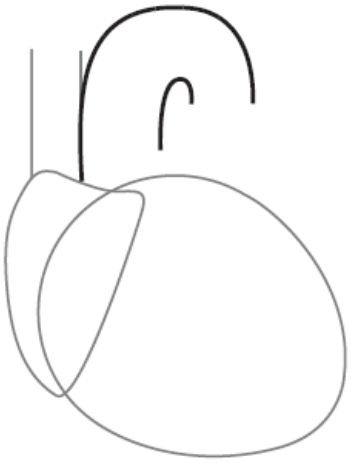


HOW TO DRAW A HEART (CONT)

IMPORTANT: Make your initial lines lightly with pencil so they are easy to erase.

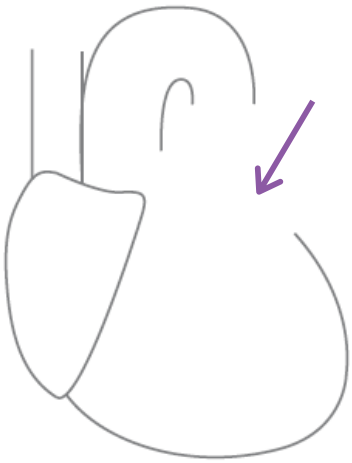
Step 4

Add two curved lines beside the 'pipe' to form a rainbow shape.



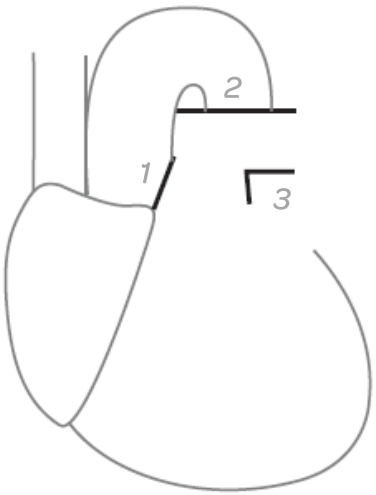
Step 5

Erase the top part of the 'egg.'



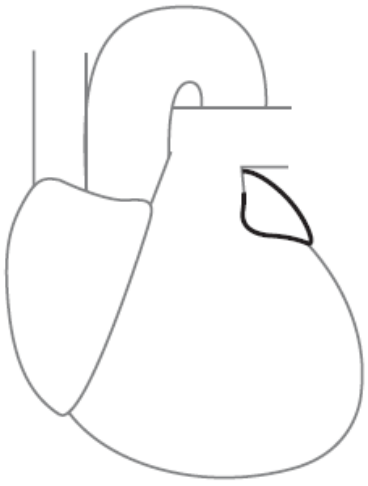
Step 6

1. Draw a diagonal line to connect the bottom of the 'rainbow' with the corner of the triangle-like shape. 2. Add a straight line to close the other end of the 'rainbow.' 3. Draw a shape like a '7' on its side below.



Step 7

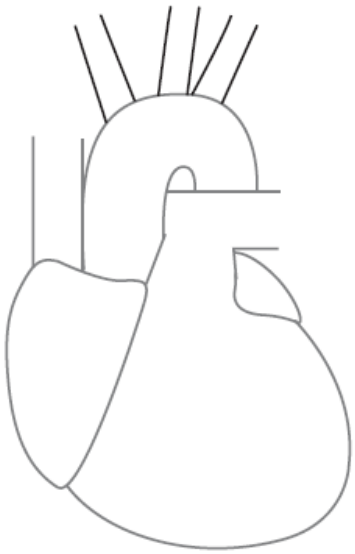
Add another, small triangular shape with rounded corners to the right side of the 'egg.'



HOW TO DRAW A HEART (CONT)

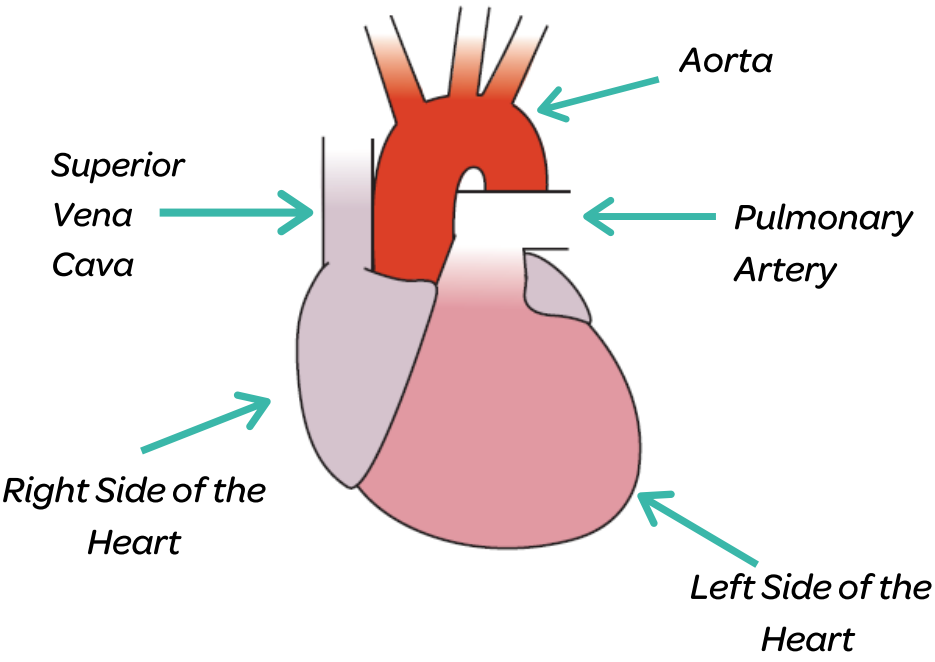
Step 8

Draw three 'pipes' on top of the 'rainbow. '



Step 9

And you're done! Make sure to label the parts of the heart. Color the heart in if you are able.



Superior Vena Cava: A vein that returns blood without oxygen to the right side of the heart.

Aorta: An artery that carries blood with oxygen away from the left side of the heart.

Pulmonary Artery: An artery that carries blood from the right side of the heart to the lungs.

Science at Home: Medical Illustration

Created in collaboration with medical illustrator Kate Galloway: ktb-studios.com

FURTHER EXPLORATION

Draw other body parts or draw entire systems like the digestive system or circulatory system. You might also make 3D body organ models with play-doh, crafts, or other at-home items. Look up different types of STEM (science, technology, engineering and math) illustration or animation jobs.

ADVICE FOR DOING SCIENCE WITH YOUR KIDS

- Encourage exploration and curiosity - science is about more than facts and content (although these things are important too!)
- Consider writing down your child's questions and ideas during the activity. You may be able to turn these into a future research project or activity!
- Consider getting a dedicated science journal for your child where they can keep all their thoughts, ideas, and notes on their experiments. This could be a full-on notebook or paper stapled together.
- Do not worry about not knowing the answer to questions! Many "simple" kids science activities have very complicated, or even unknown(!) science behind them. Even scientists often don't know the answers to questions outside their field. No one knows everything! Be honest about not knowing the answer and suggest trying to figure it out together.

- Deviations from exact instructions can often be fruitful - especially if the child has been inspired and wants to try out another line of investigation.
- For home-schoolers: In many states, the science standards are called the "Next Generation Science Standards," or "NGSS." They can be complicated to parse through but in essence they want student to learn not only content (called "disciplinary core ideas" or "DCI") but also the practices scientists and engineers use ("scientific and engineering practices" or "SEP") and also concepts that cut across all fields ("crosscutting concepts" or "CCC"). Other states have a variety of standards.