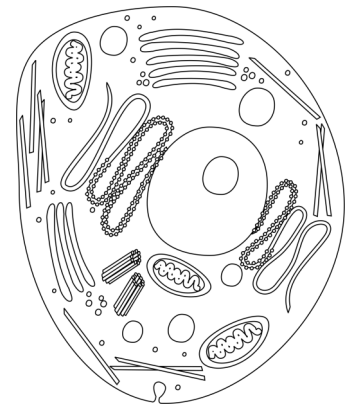


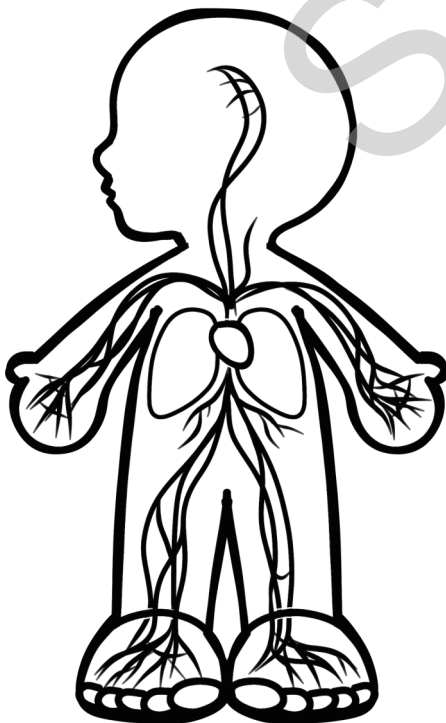
## A Closer Look at Body Systems

Do you know what one trillion is? Think of it this way. Picture one piece of breakfast cereal. Now think of how many pieces it takes to fill one bowl. 100? 200? Let's pretend it takes 250 pieces of cereal to fill your bowl. Now imagine 40 bowls of cereal. Is your table getting full? If each bowl has 250 pieces of cereal in it, now you have 10,000 pieces of cereal. Now here's where it gets amazing. Imagine you had 1,000 bowls of cereal! You would have 250,000 pieces of cereal. We're still a long way from one trillion! How about 1,000,000 (1 million) bowls of cereal? That makes 250,000,000 (250 million) pieces of cereal. What if we had 4,000,000 (4 million) bowls of cereal? Now we're up to 1,000,000,000 (1 billion) pieces of cereal. Hold onto your hats for this next one. If we multiply our 4 million bowls of cereal by 1,000, we would get 4,000,000,000 (4 billion) bowls of cereal. THAT would finally give us 1,000,000,000,000 (1 trillion) pieces of cereal.

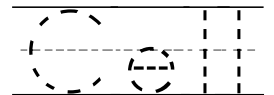
Now that we know what 1 trillion looks like, imagine this. Your body has more than 10 trillion **cells** in it! Thankfully, your cells are a lot smaller than a piece of cereal. As a matter of fact, cells are so tiny you can only see them through a microscope. Every one of those cells is made up of even smaller parts that let the cell "breathe," take in food, and get rid of waste.



When a group of cells work together to do one type of job, we call them a tissue. When groups of tissues work together, we call it an organ. Your body has many important organs such as your heart, brain, lungs, and kidneys. When a group of organs work together, we call it a system.

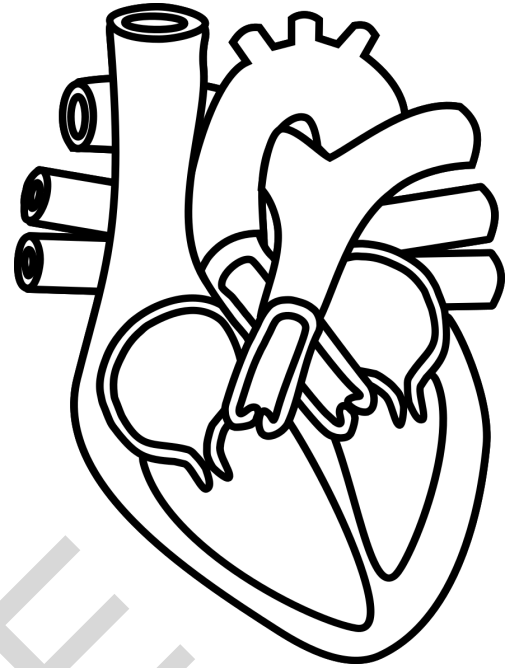


Let's look at a few of your body's amazing systems. We'll start with the circulatory system. Your cells need oxygen and nutrients to stay alive and do their jobs. The **circulatory system** is the way your body delivers these things to your cells. It has to reach every single corner of your body, from the top of your head to the bottom of your feet.



Circulatory  
system

Your body uses blood to deliver oxygen and nutrients throughout your body, but something has to keep that blood moving. That's where your **heart** comes in. Your heart is the main organ in your circulatory system. It works like a pump to keep the blood moving in a cycle through your body. Your blood delivers oxygen and nutrients to the cells using a long system of blood vessels. The blood vessels act like a system of roads, transporting the blood everywhere it needs to go. The blood drops off oxygen and nutrients and takes away waste the cells don't need anymore.



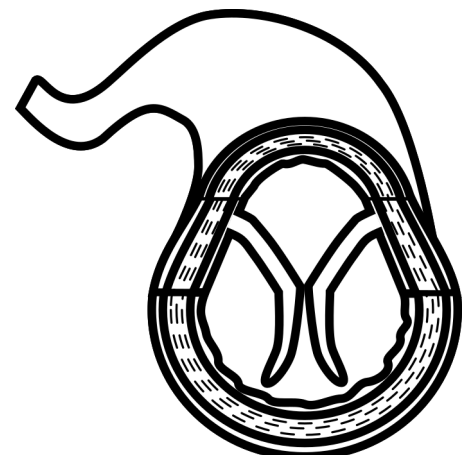
You have three types of blood vessels in your body, and just like the cells, each type has a different job to do.



Heart

Artery

**Arteries** have the job of carrying blood from the heart. The blood they carry is full of oxygen, so it looks very red. **Veins** carry blood back to the heart. The blood our veins carry has already delivered most of its oxygen to the cells, so it appears much darker.



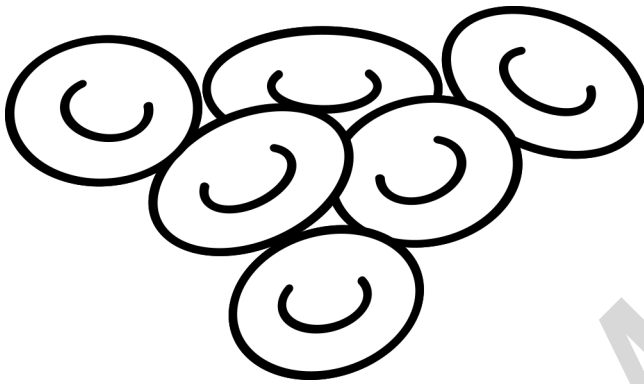
Vein

**Capillaries** have the special job of connecting our arteries and veins together.

Capillary



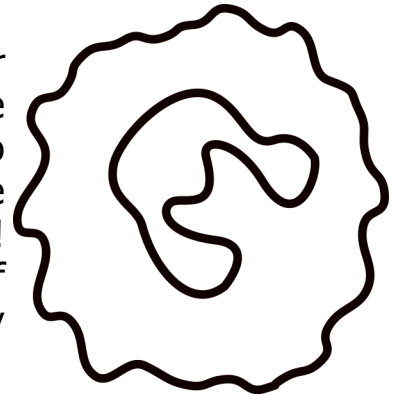
Now that we know how blood travels through the body, let's take a closer look at what makes up your blood. Your blood is made up of a watery-type of liquid called plasma. The plasma carries your blood cells. You have three types of blood cells—**red blood cells**, **white blood cells**, and **platelets**. And just like I'm sure you realize by now, each of those different types of cells has a different job to do.



Red blood cells carry oxygen to all the parts of your body. They are extremely small, as we've already discussed, and they are also very pliable. Pliable means they can bend and stretch a lot, and that comes in very handy when they have to squeeze through tight spaces in blood vessels.

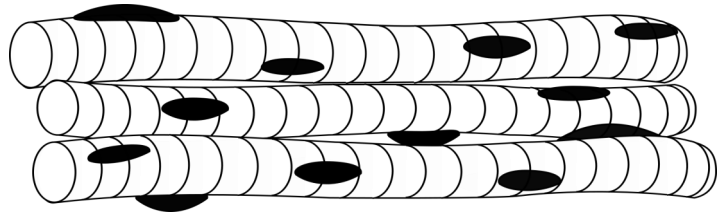
Red blood cells

White blood cells are your body's defenders. Whenever something invades your body that should not be there, like a virus or bacteria for example, the white blood cells go to work. Some of them release chemicals to fight off the attackers, and some of them just swallow the invaders! Your white blood cells multiply and build more of themselves when they have a big job to do, just as if they had called for reinforcements.



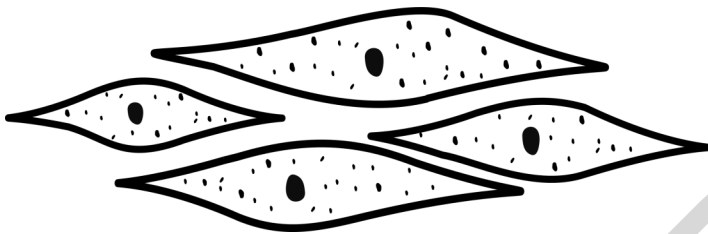
White blood cells

**Skeletal muscles** are the muscles that you probably think of first when you think about a muscle's job. These are the muscles that let you lift your arm, take a step, or move your mouth to talk. They are attached to your bones with strong tissues called tendons. Skeletal muscles are voluntary muscles, which means you can move them—or not—whenever you want. You can take a step or stand still. You can pick up a pencil or put it back down. You can talk or not talk. It's up to you!



Skeletal

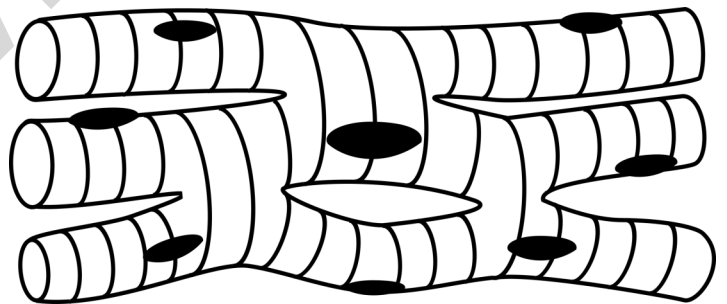
muscle cell



**Smooth muscles** are the muscles in most of our internal organs. They are the ones that push the food through your esophagus and other parts of your digestive system.

Smooth muscle cell

**Cardiac muscles** are the ones that make up the walls of your heart. These are special muscles that can work constantly without ever getting tired. They keep your heart pumping and everything else in your body working.

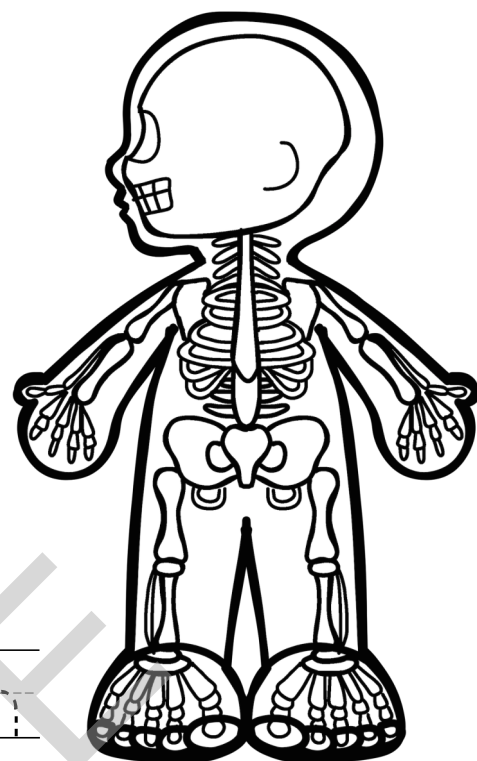


Cardiac muscle cell

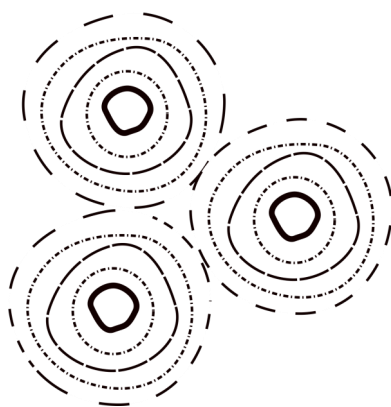
Smooth muscles and cardiac muscles are involuntary muscles. This means you don't control when they work and when they don't. It's a VERY good thing that these muscles are involuntary. If they weren't, you'd have to remember to tell them to work day in and day out. You wouldn't get much of anything else done, including sleep! Thankfully, these muscles keep working whether you are awake or asleep and whether you remember they are even there or not. Only the skeletal muscles are part of the muscular system, but it's important to know that not all muscle tissues are the same.

The last system we're going to talk about is the **skeletal system**. We usually only think about our bones when we break one, but your bones are busy every day doing their own amazing jobs. One of their most important jobs is giving your body its shape. They hold you up. They also protect some of your most important organs. Your skull protects your brain, and your rib cage protects your heart and lungs.

Your skeleton also includes a smooth tissue called cartilage that keeps bones from rubbing together, and a strong, stretchy material called ligaments that hold your bones in place.



Skeletal system

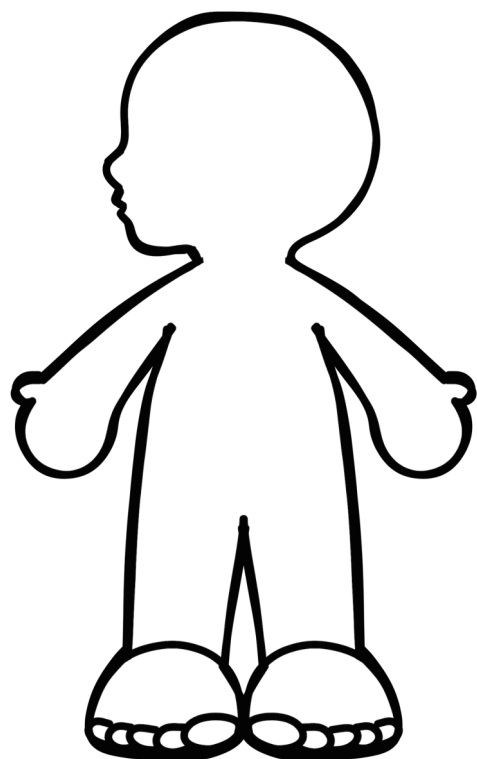


Bone cells

**Bones** may seem hard and dead, but they are actually quite alive! Most bones are hard on the outside and have softer bone on the inside. They are also home to two types of bone marrow, which is sort of a jellylike material. Yellow bone marrow is mostly fat, but red bone marrow has a terribly important job to do. It manufactures blood cells. Our red blood cells, for example, only live about 30 days, so without a way to make more of them, we'd quickly run out. Thanks to red bone marrow, we have a never-ending supply of them. Red blood cells are a critical part of the very first system we learned about, the circulatory system. Now you can see we've come all the way back to the beginning!

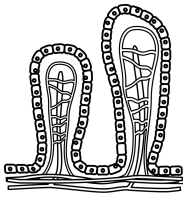
More than 10 trillion cells, 600 muscles, and 200 bones are all working together to make the one and only YOU!

YOU

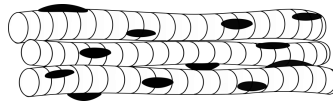


## Review

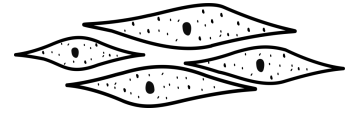
This is not a type of muscle tissue. Draw an X through it.



Villi



Cardiac



Smooth

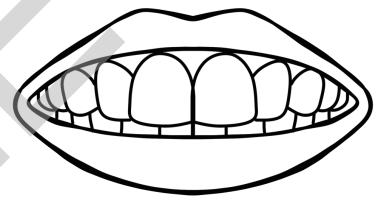
This is where the digestive system starts. Draw a circle around it.



Artery

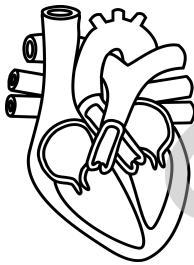


Air sacs

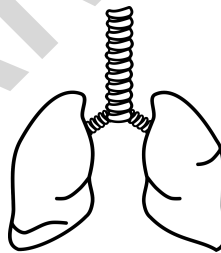


Mouth

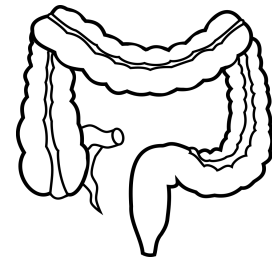
This is the main organ of the respiratory system. Draw a circle around it.



Heart

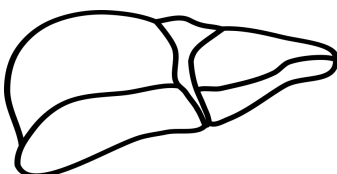


Lungs

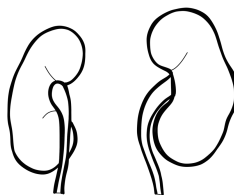


Large intestine

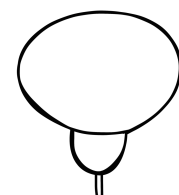
This organ is not a part of the urinary system. Draw an X through it.



Liver



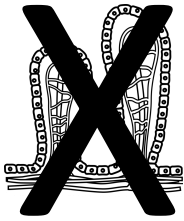
Kidneys



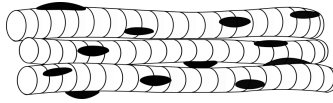
Bladder

## Review Answer Key

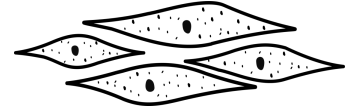
This is not a type of muscle tissue. Draw an X through it.



Villi

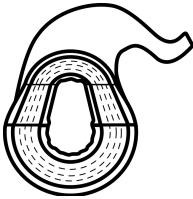


Cardiac



Smooth

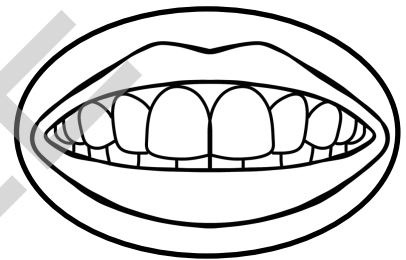
This is where the digestive system starts. Draw a circle around it.



Artery

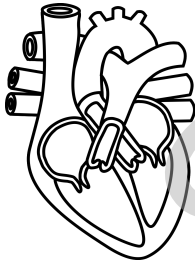


Air sacs

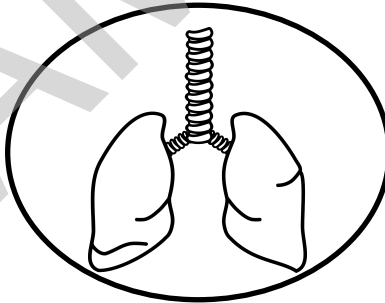


Mouth

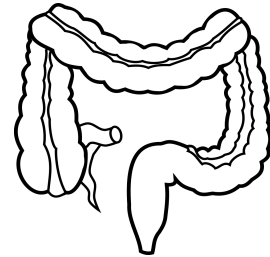
This is the main organ of the respiratory system. Draw a circle around it.



Heart

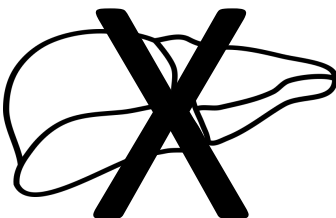


Lungs

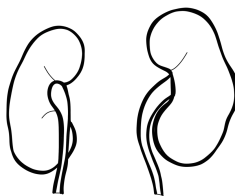


Large intestine

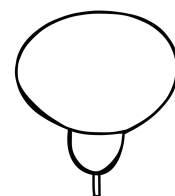
This organ is not a part of the urinary system. Draw an X through it.



Liver



Kidneys



Bladder