

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

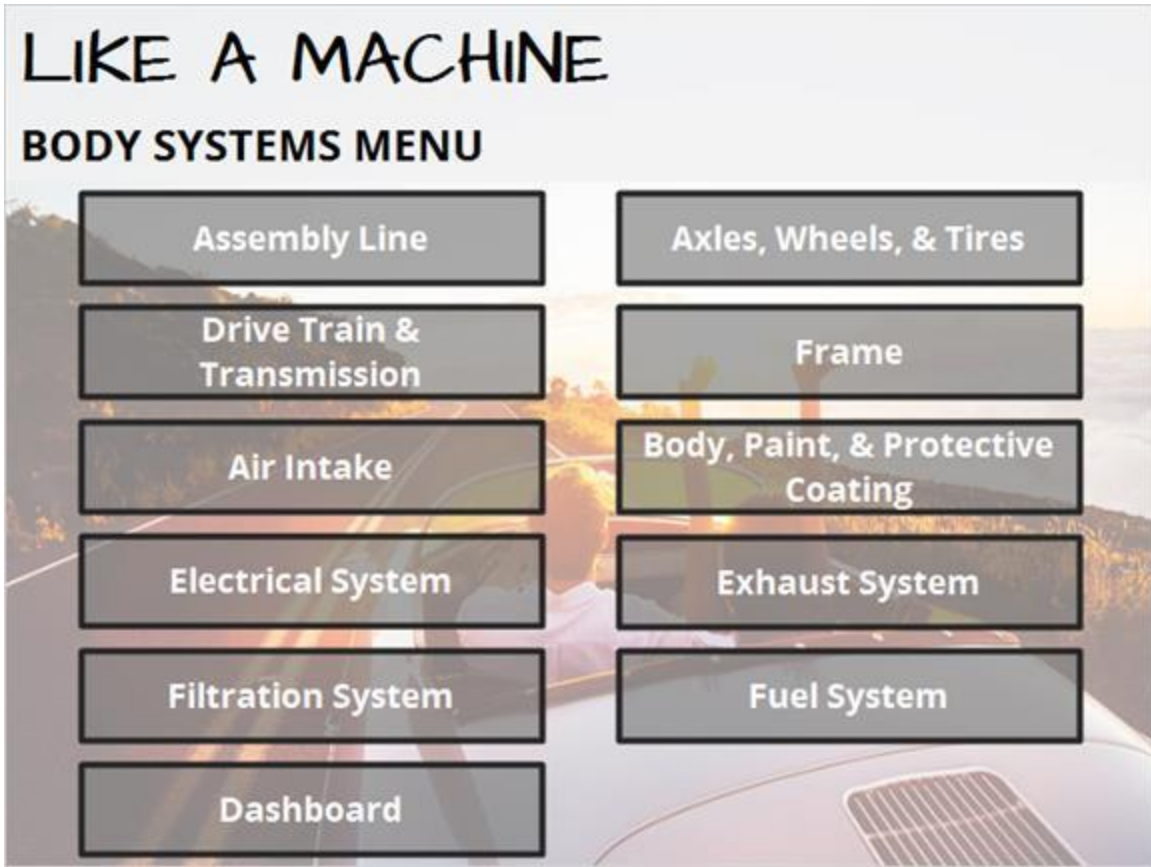
Introduction



In this interactivity you will explore how the human body is similar to a car. Click the **NEXT** button to begin.

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Menu



Click each button to explore how the human body is like a machine. Return to this menu once you have completed a body system.

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Circulatory System



Like the drive train and transmission on an automobile, the circulatory system is the driving force for the body. This body system delivers oxygen and nutrients to various parts of the body to support their functions.

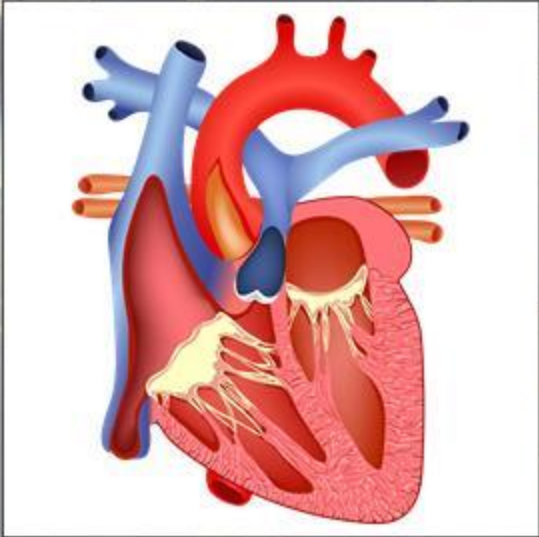
Drag the slider and drop it on each target to explore components of the circulatory system.

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Heart

Heart

CIRCULATORY SYSTEM



- Vital to survival
- Fist-sized
- In the chest
- Pumps blood
- Oxygen and nutrients
- Sinoatrial Node

The heart is similar to a car's engine, because without it, a person would not live. This muscle is about the size of a fist, and located inside of your chest. By way of a network of arteries and veins, the heart pumps blood through your body, providing it with oxygen and nutrients. The heart has its own special electrical system that initiates and maintains your pulse, or pumping action. This is called the SA Node (Sinoatrial Node). You may have heard it called the pacemaker.

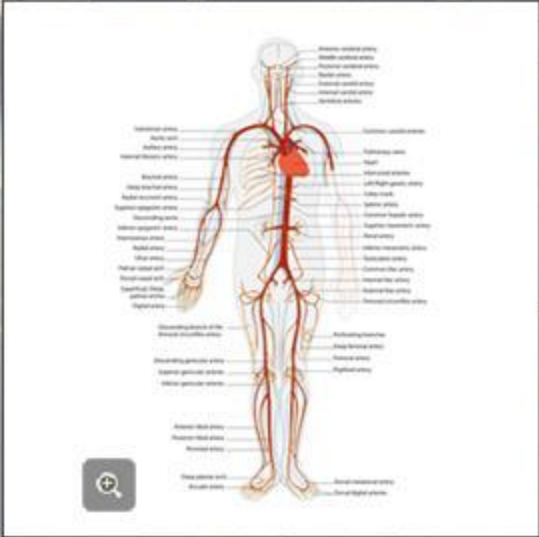
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Arteries

Arteries

CIRCULATORY SYSTEM

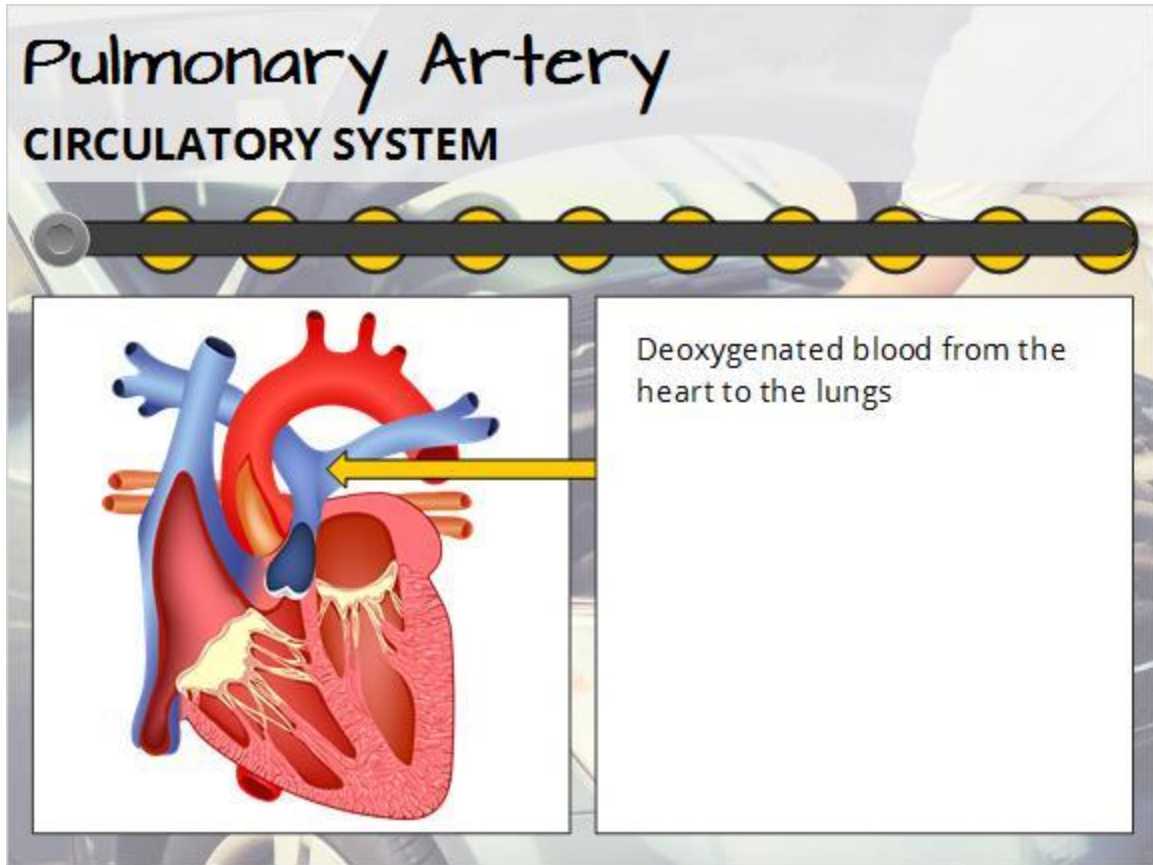


- Carry important fluids
- Carry blood away from the heart
- Mostly carry oxygenated blood
- One carries deoxygenated blood

Arteries are equivalent to automobile tubes and hoses that carry important fluids, like oil and fuel, which enable the engine, drive train, and transmission to run. Specifically, arteries are the blood vessels that carry blood away from the heart. Most arteries contain oxygenated blood that transport oxygen to the body. There is one artery, however, that carries deoxygenated blood from the heart to the lungs.

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Pulmonary Artery



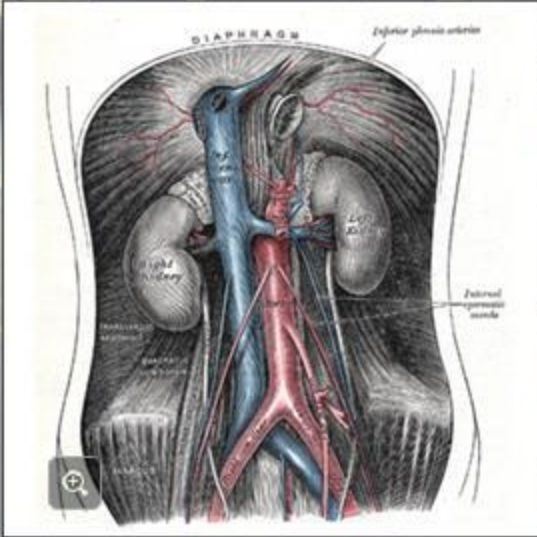
This blood vessel transports deoxygenated blood from the heart to the lungs.

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Abdominal Aorta

Abdominal Aorta

CIRCULATORY SYSTEM



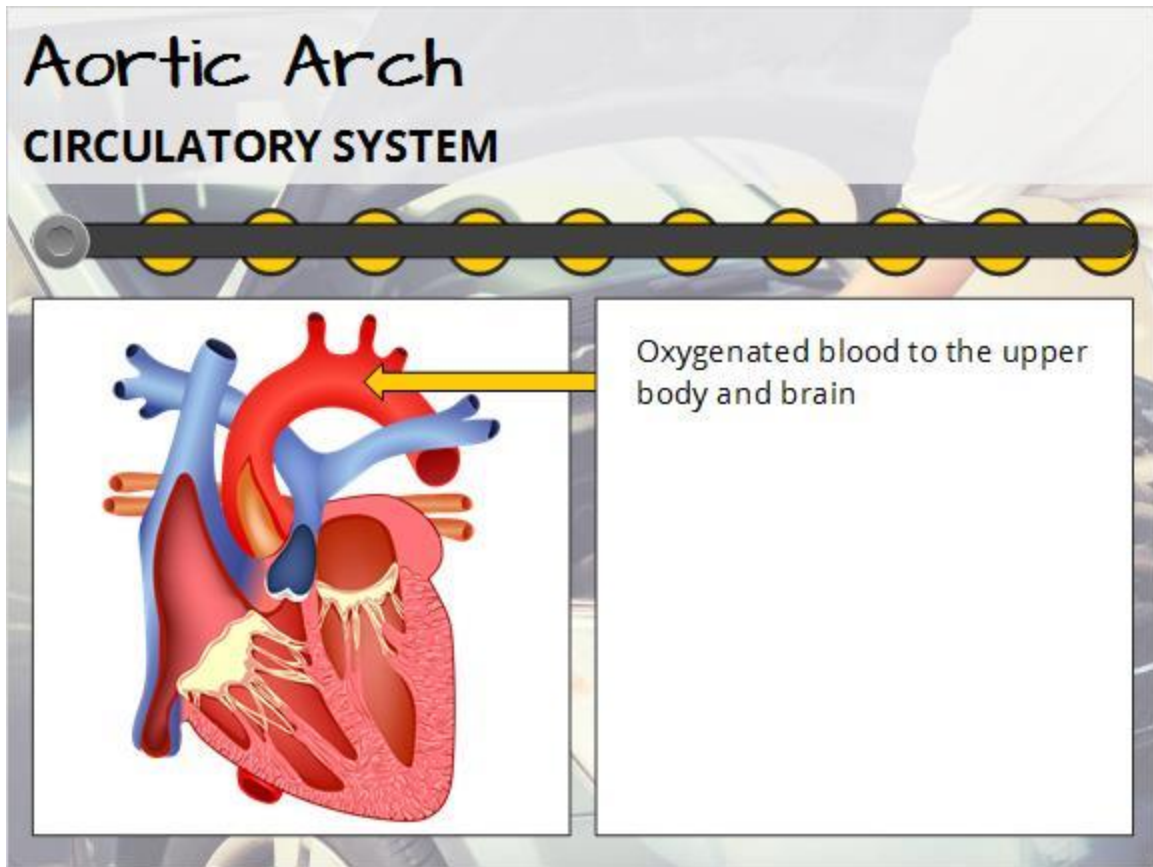
Supplies blood to the lower half of the body

The diagram shows a cross-section of the human torso. The abdominal aorta is the large red artery descending from the diaphragm. It branches into the superior mesenteric artery, the inferior mesenteric artery, and the common iliac arteries. The inferior vena cava is shown in blue, ascending from the lower half of the body. Labels include 'DIAPHRAGM', 'Superior mesenteric artery', 'Inferior mesenteric artery', and 'Paternal mesonephros'.

The abdominal aorta is the main artery that supplies blood to the lower half of the body.

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Aortic Arch



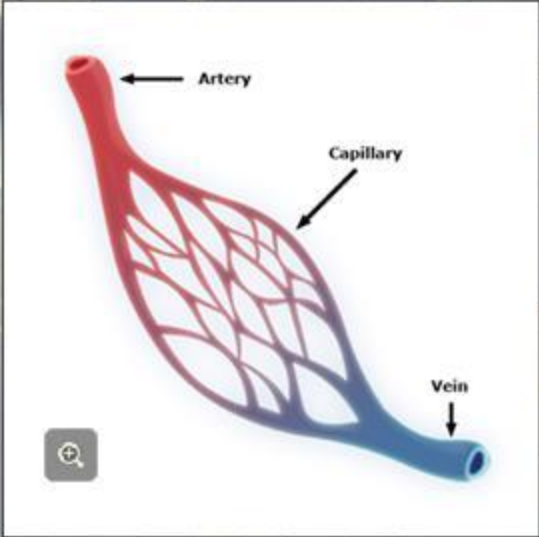
The aortic arch is the largest artery that transports oxygenated blood to the upper body and brain.

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Capillaries

Capillaries

CIRCULATORY SYSTEM



Artery

Capillary

Vein

Smallest blood vessels

Exchange oxygen, carbon dioxide, nutrients and waste

The diagram shows a red artery on the left that branches into a dense network of small red capillaries. These capillaries then merge back into a blue vein on the right. Labels with arrows point to the 'Artery', 'Capillary', and 'Vein'. A magnifying glass icon is in the bottom left corner of the diagram area.

Capillaries are the smallest blood vessels. They exchange oxygen, carbon dioxide, nutrients, and waste with the body's cells.

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Veins

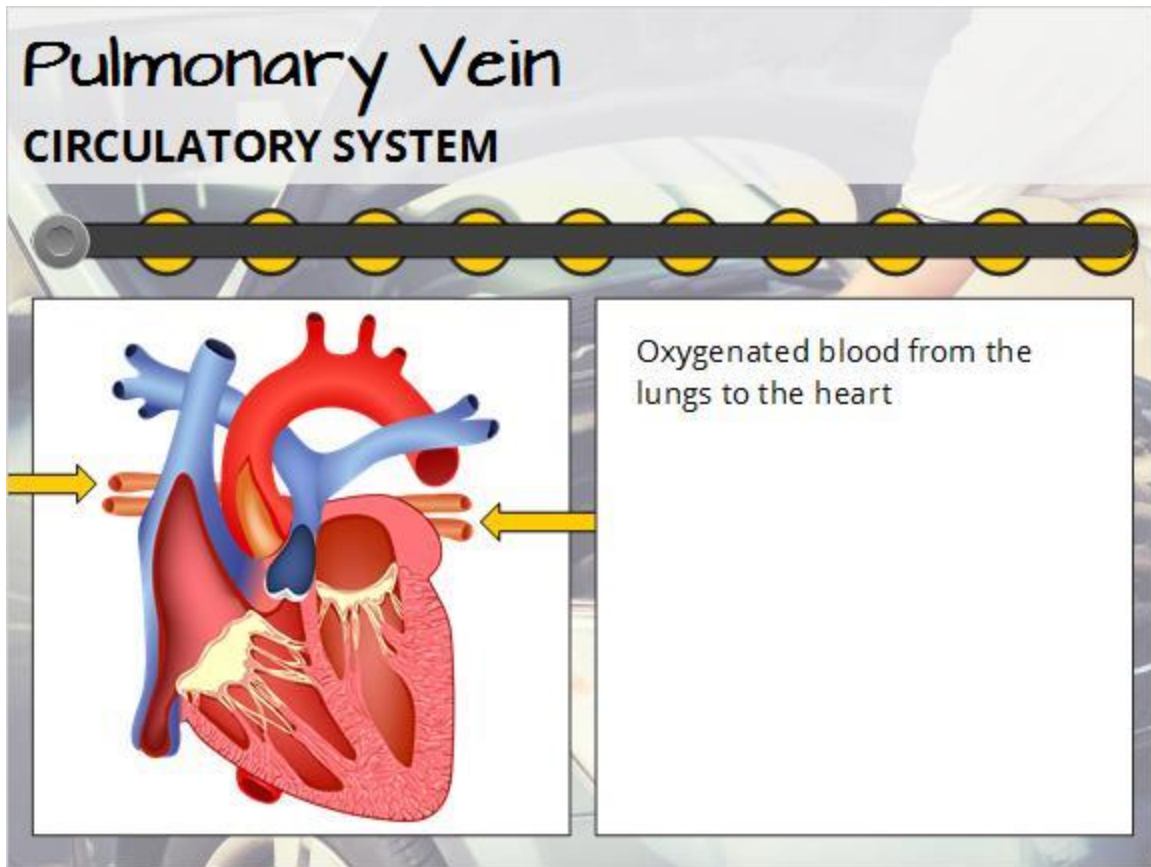
Veins
CIRCULATORY SYSTEM

- Carry important fluids
- Carry blood to the heart
- Mostly carry deoxygenated blood
- One carries oxygenated blood

Veins are equivalent to the automobile tubes and hoses that carry important fluids, like oil and fuel, which enable the engine, drive train, and transmission to run. Specifically, veins are the blood vessels that carry blood to the heart. Most veins transport deoxygenated blood away from the body to the heart. There is one vein, however, that carries oxygenated blood from the lungs to the heart.

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Pulmonary Vein



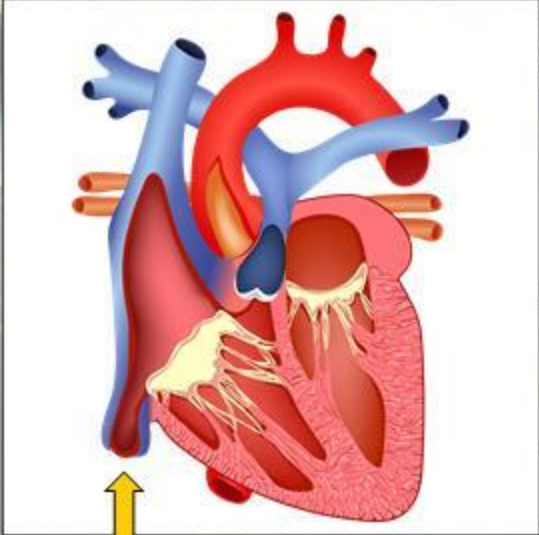
This blood vessel carries oxygenated blood from the lungs to the heart.

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Inferior Vena Cava

Inferior Vena Cava

CIRCULATORY SYSTEM



Large vein

Enters the heart from the lower body

The inferior vena cava is the large vein that enters the heart from the lower body.

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Superior Vena Cava

Superior Vena Cava
CIRCULATORY SYSTEM

Large vein
Enters the heart from the upper body

MENU

The superior vena cava is the large vein that enters the heart from the upper body.

Click the **MENU** button to return to the Body Systems Menu.

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Skeletal System



Similar to how the frame of a car functions as its support structure, the skeletal system is the support structure of the body.

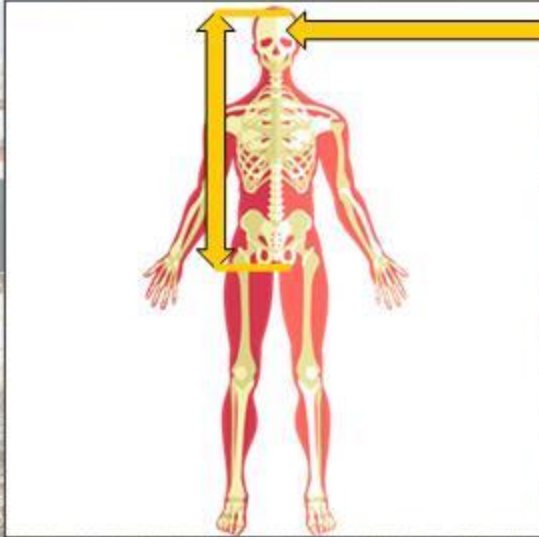
Drag the slider and drop it on each target to explore components of the skeletal system.

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Axial Skeleton and Skull

Axial Skeleton & Skull

SKELETAL SYSTEM



Axial Skeleton

- Collection of bones
- Support and protect the head and trunk

Skull

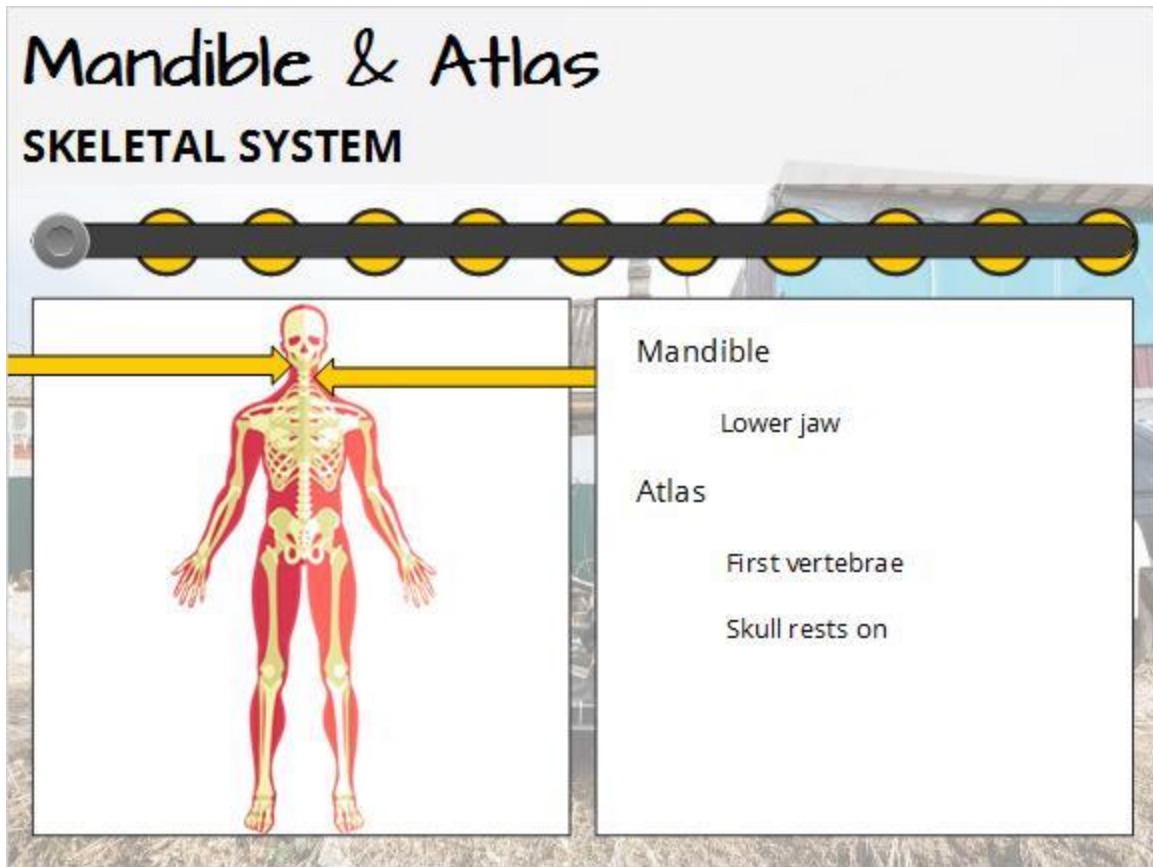
- Several bones
- Covers and protects the brain
- Anchors some muscles

The axial skeleton is a collection of bones that support and protect the head and trunk of the body.

The skull is a fusion of several bones that look like one. It covers and protects the brain, and provides anchorage for some muscles.

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Mandible and Atlas

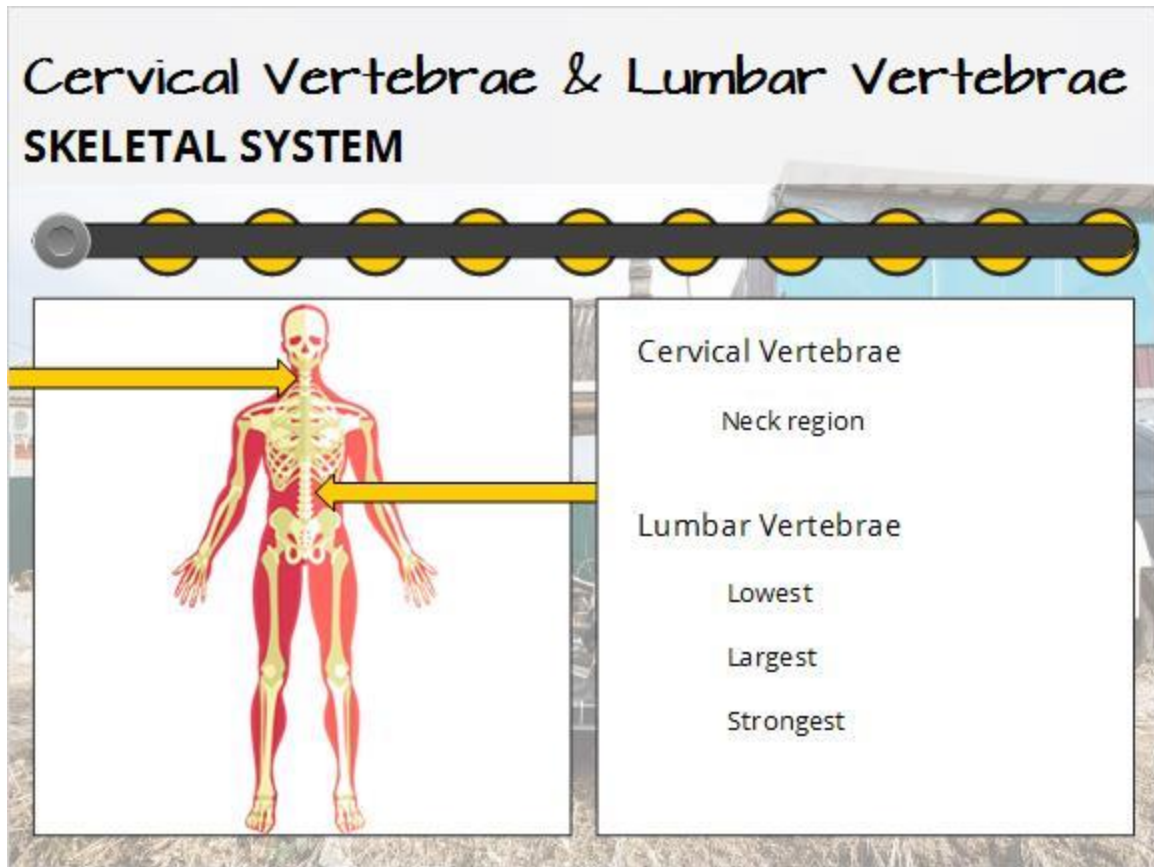


The mandible is the lower jaw.

The atlas is the very first vertebrae, and it is what the skull rests on.

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Cervical Vertebrae and Lumbar Vertebrae

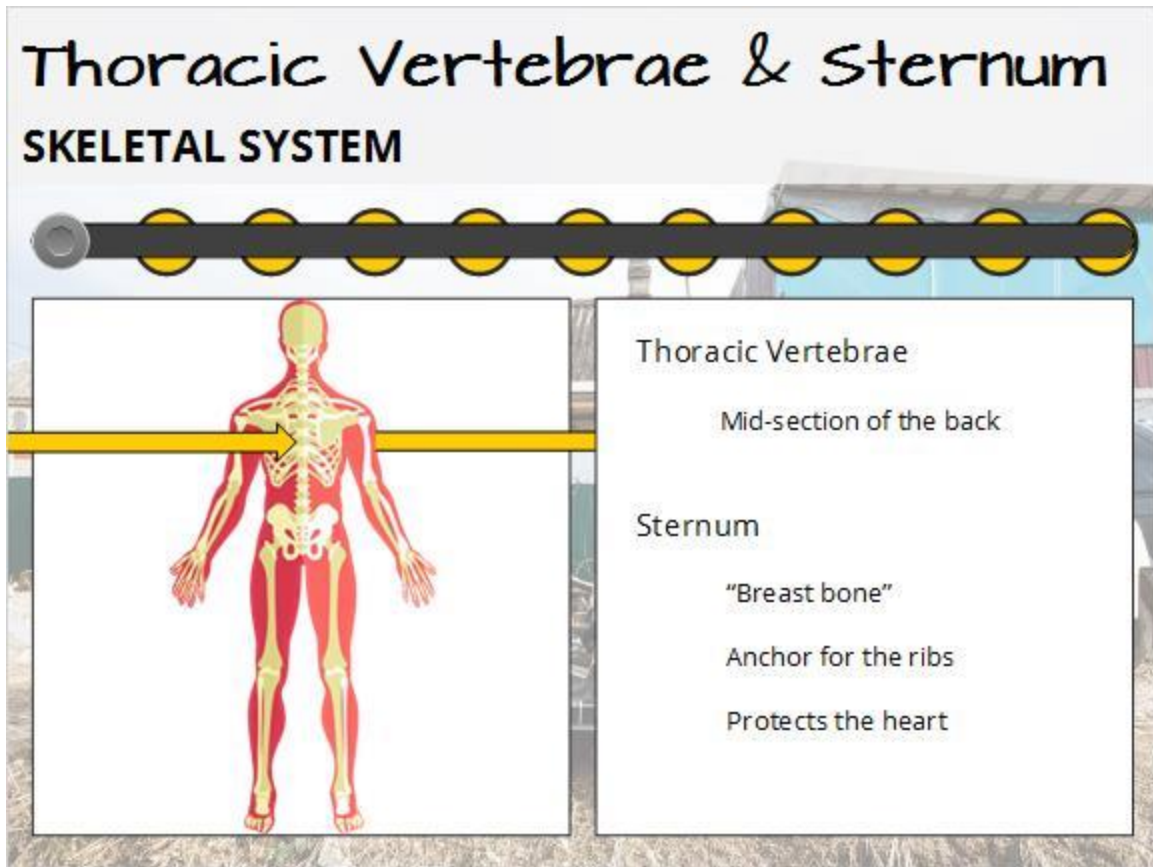


Seven bones make up the cervical or neck region.

The lumbar vertebrae is the lowest, largest, and strongest of all of the vertebrae.

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Thoracic Vertebrae and Sternum



The thoracic vertebrae are comprised of twelve bones that create the mid-section of the back.

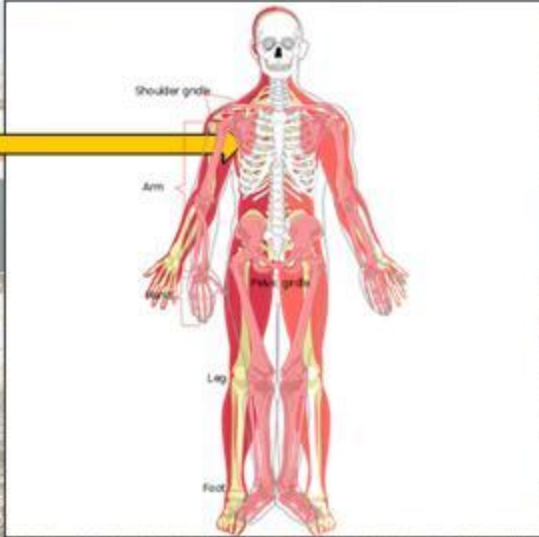
The sternum is commonly called the "breast bone." It provides an anchor for the ribs, and helps protect the heart.

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Ribs and Appendicular Skeleton

Ribs & Appendicular Skeleton

SKELETAL SYSTEM



Ribs

Cage that protects the heart, lungs, and other organs

Appendicular Skeleton

Body movement

Limbs of the body

The ribs are a collection of bones that form a cage to protect the heart, lungs, and a few other organs.

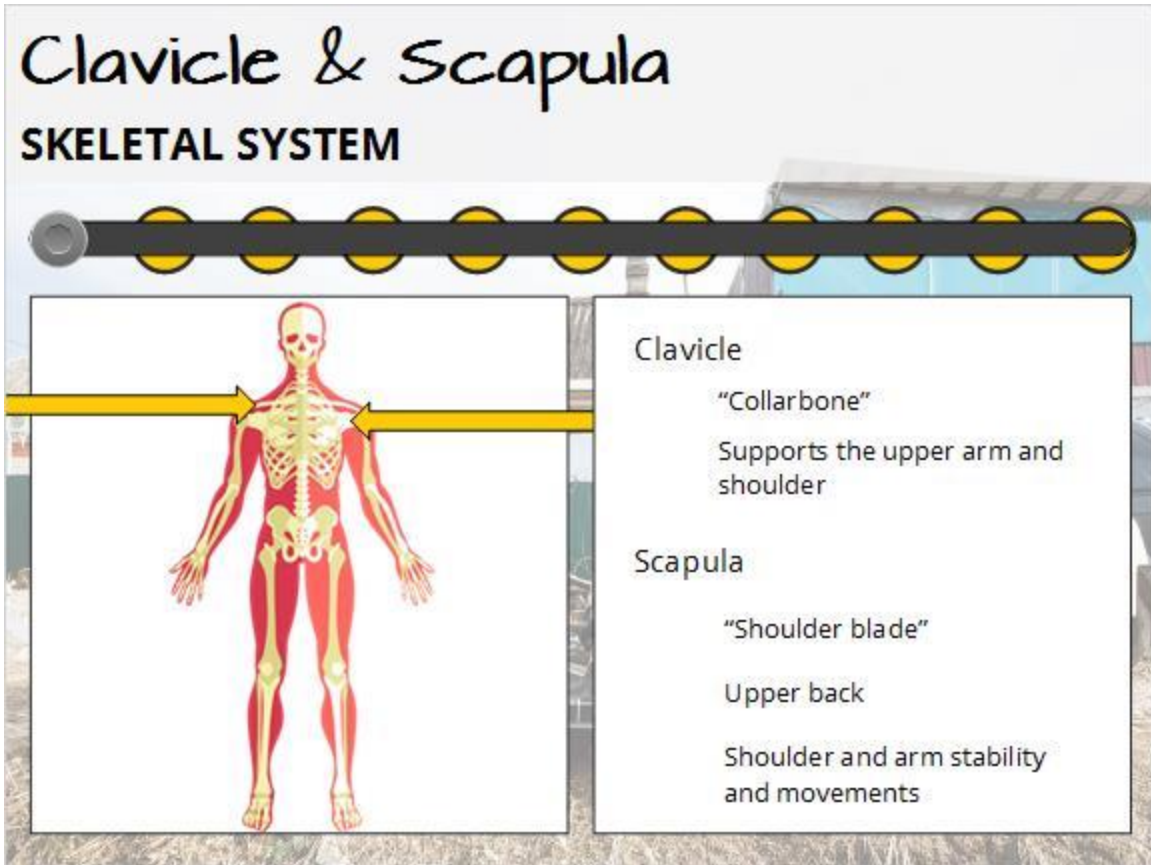
The appendicular skeleton is a collection of bones that are responsible for body movement. It is comprised of the limbs of the body.

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Clavicle and Scapula

Clavicle & Scapula

SKELETAL SYSTEM



Clavicle
"Collarbone"
Supports the upper arm and shoulder

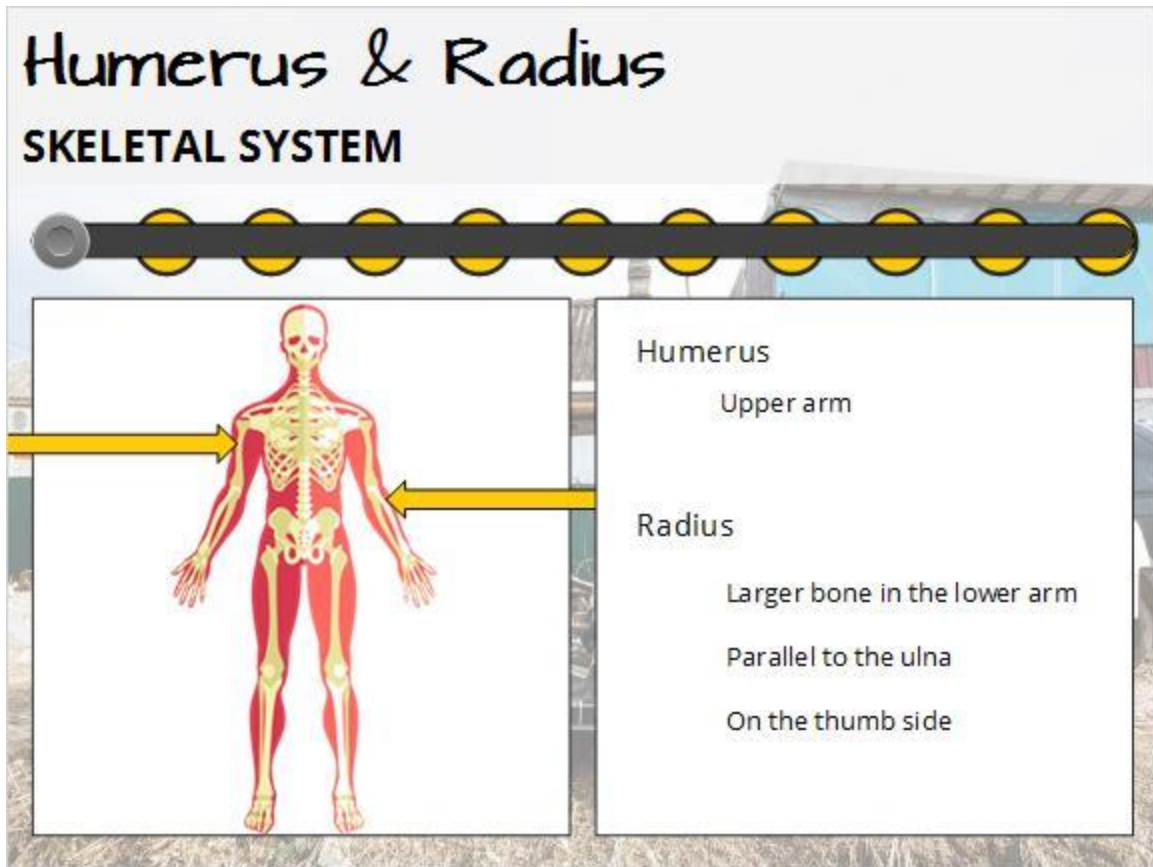
Scapula
"Shoulder blade"
Upper back
Shoulder and arm stability and movements

The clavicle is often called the "collarbone." It supports the upper arm in the shoulder joint.

Often called the "shoulder blade," the scapula is a plate-like bone located in the upper back. It helps with shoulder and arm stability and movement.

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Humerus and Radius



The humerus is the bone of the upper arm.

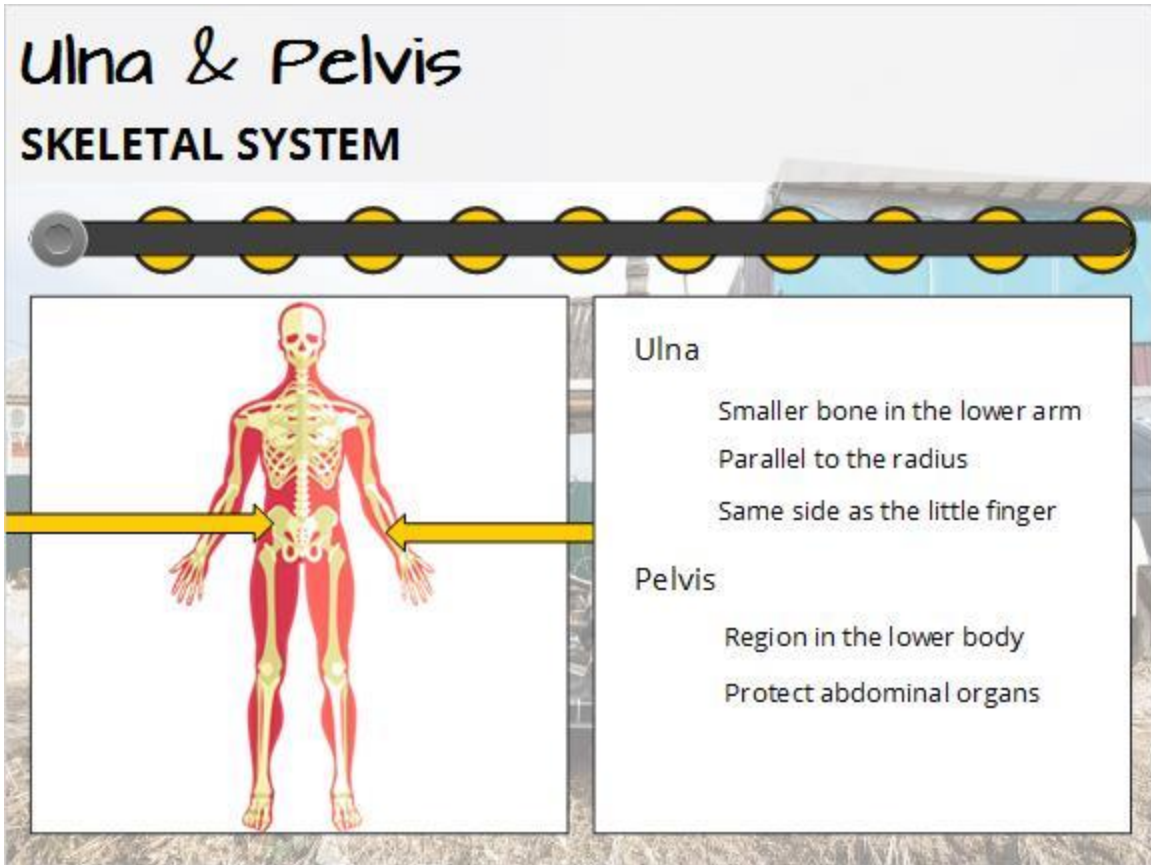
The radius is the larger of the two bones in the lower arm. It runs parallel to the ulna and is on the same side as the thumb.

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Ulna and Pelvis

Ulna & Pelvis

SKELETAL SYSTEM



The diagram shows a human skeleton with yellow arrows pointing to the ulna in the right arm and the pelvis in the lower body. Above the skeleton is a decorative horizontal bar with yellow circles. To the right of the skeleton is a text box with definitions for the Ulna and Pelvis.

Ulna

- Smaller bone in the lower arm
- Parallel to the radius
- Same side as the little finger

Pelvis

- Region in the lower body
- Protect abdominal organs

The ulna is the smaller of the two bones in the lower arm. It runs parallel to the radius, and is on the same side as your little finger.

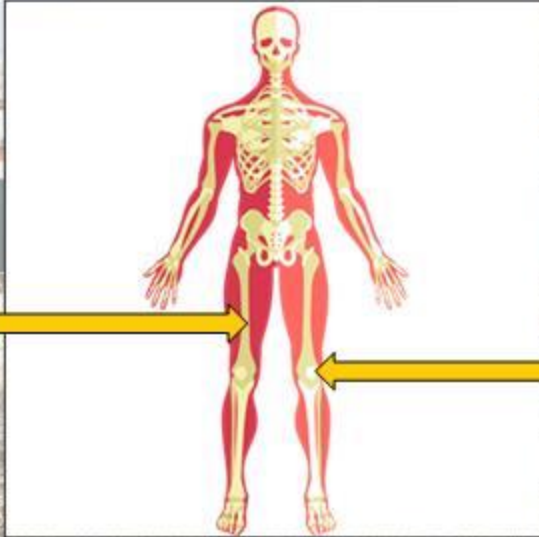
The pelvis is a region that makes up the lower body. It is a collection of several bones that protect the abdominal organs.

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Femur and Patella

Femur & Patella

SKELETAL SYSTEM



Femur

- Thigh bone
- Largest bone
- Lower end helps form the knee

Patella

- “Knee cap”
- Floating bone
- Covers and protects the knee joint

The femur is the thigh bone, and is the largest bone in the body. The lower end of the femur helps form the knee.

The patella is also called the “knee cap.” It is a floating bone that covers and protects the front of the knee joint.

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Tibia and Fibula

Tibia & Fibula

SKELETAL SYSTEM

Tibia

- “Shin bone”
- Larger bone in the lower leg
- Helps form the knee and ankle

Fibula

- “The little white lie”
- Smaller bone in the lower leg
- Helps create the knee

MENU

Known as the “shin bone,” the tibia is the larger of the two bones in the lower leg. The top of the tibia helps form the knee, and the bottom forms the ankle.

Remembered by the title, “the little white lie,” the fibula is the smaller bone of the lower leg. It helps create the knee.

Click the **MENU** button to return to the Body Systems Menu.

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Muscular System



A car moves once the axles, wheels, and tires begin to turn. Similarly, when your muscles start to move, so does your body. More than six-hundred skeletal muscles cause your bones to move at the joints.

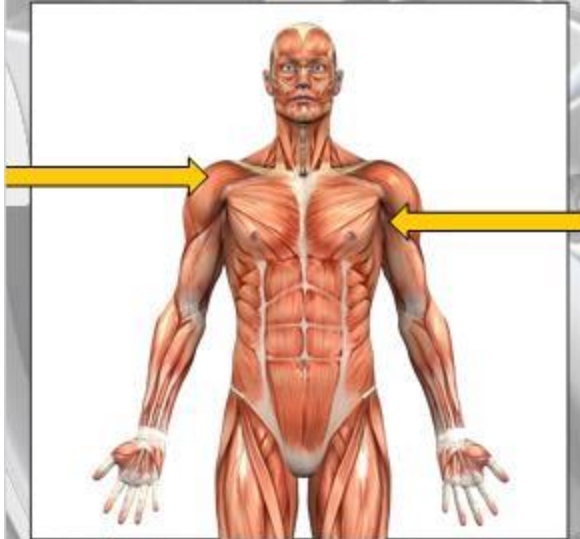
Drag the slider and drop it on each target to explore components of the muscular system.

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Rotator Cuff and Deltoid

Rotator Cuff & Deltoid

MUSCULAR SYSTEM



Rotator Cuff

- Four muscles in your shoulder
- Stabilizes the humerus

Deltoid

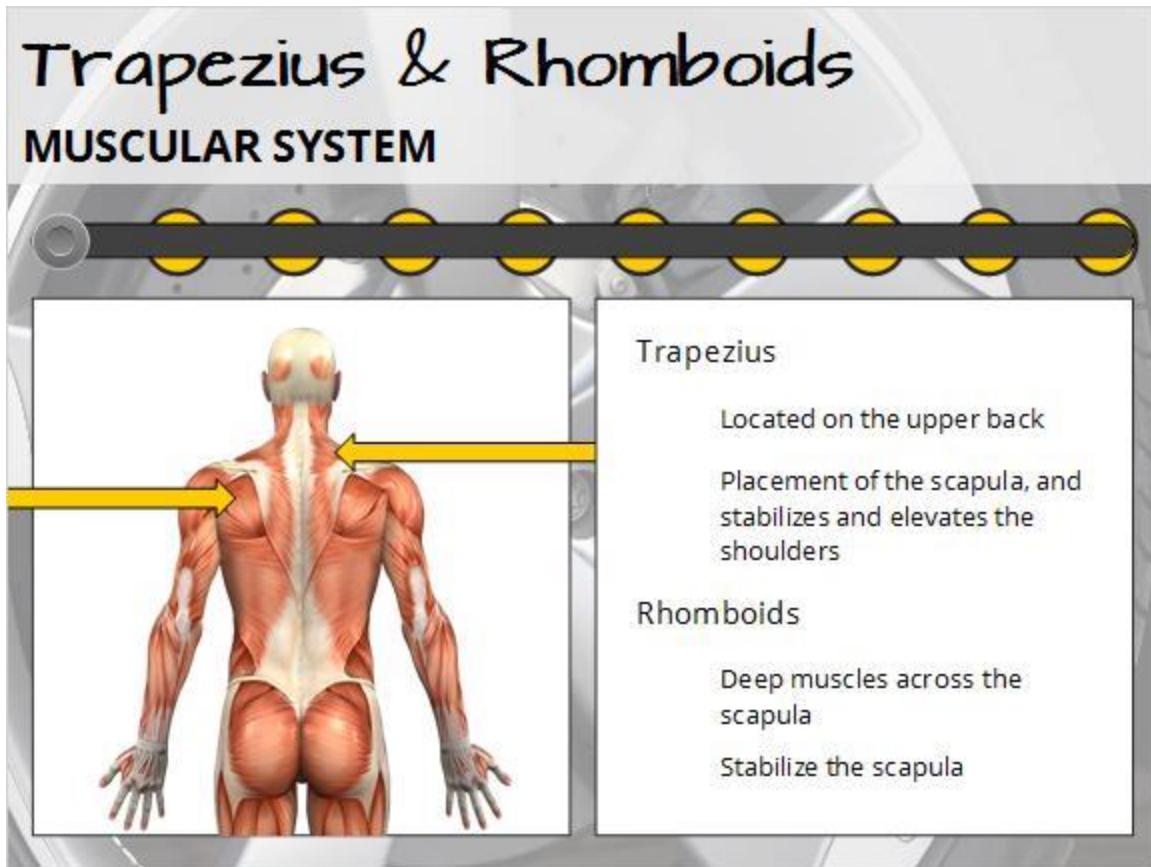
- Defines the shoulder
- Shoulder movement

The rotator cuff is comprised of four small muscles in your shoulder. It stabilizes the humerus in your shoulder's girdle. Parts of the rotator cuff include the teres minor, teres major, infraspinatus, subscapularis, and supraspinatus.

The deltoid is a large muscle that defines your shoulder. It is responsible for shoulder movement.

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Trapezius and Rhomboids

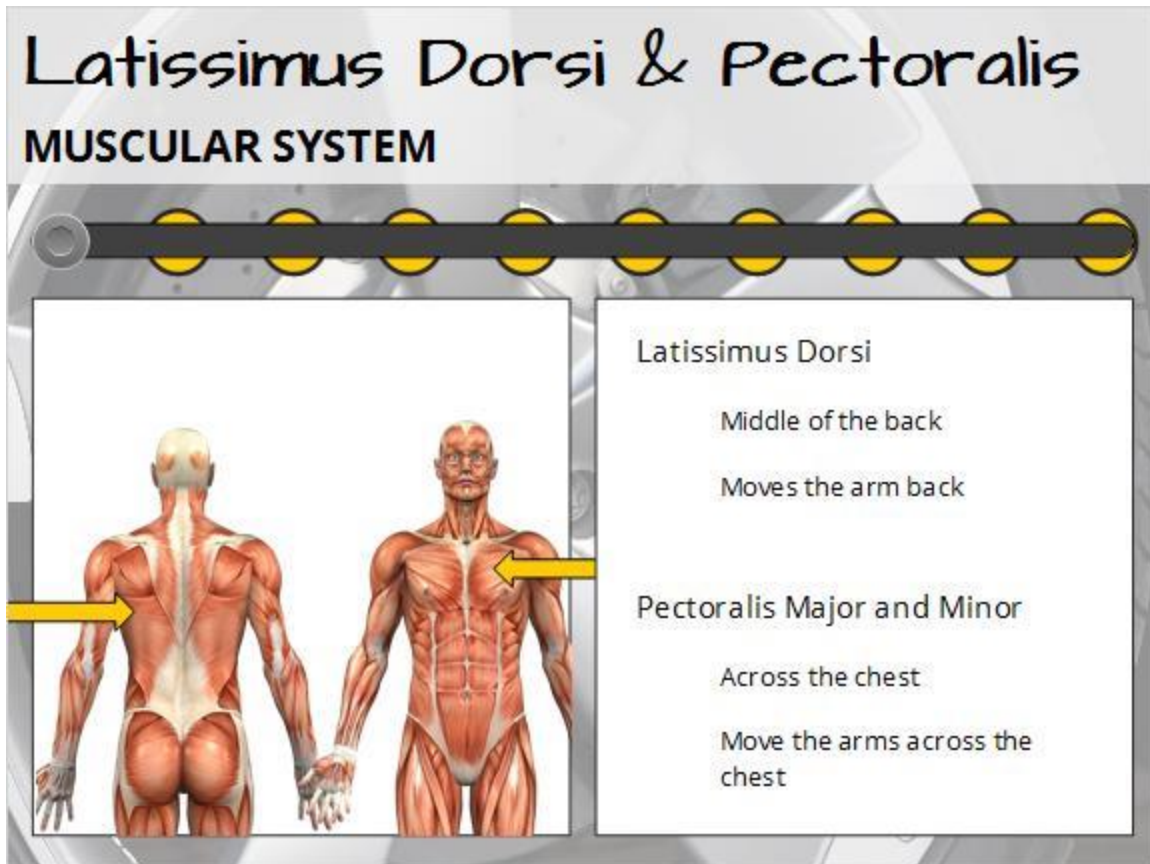


The trapezius is a flat fan-like muscle located on your upper back. It is responsible for the placement of the scapula, stabilizes the shoulders when they are under stress, and elevates the shoulders.

The rhomboids are deep muscles located across the scapula. They stabilize the scapula.

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Latissimus Dorsi and Pectoralis

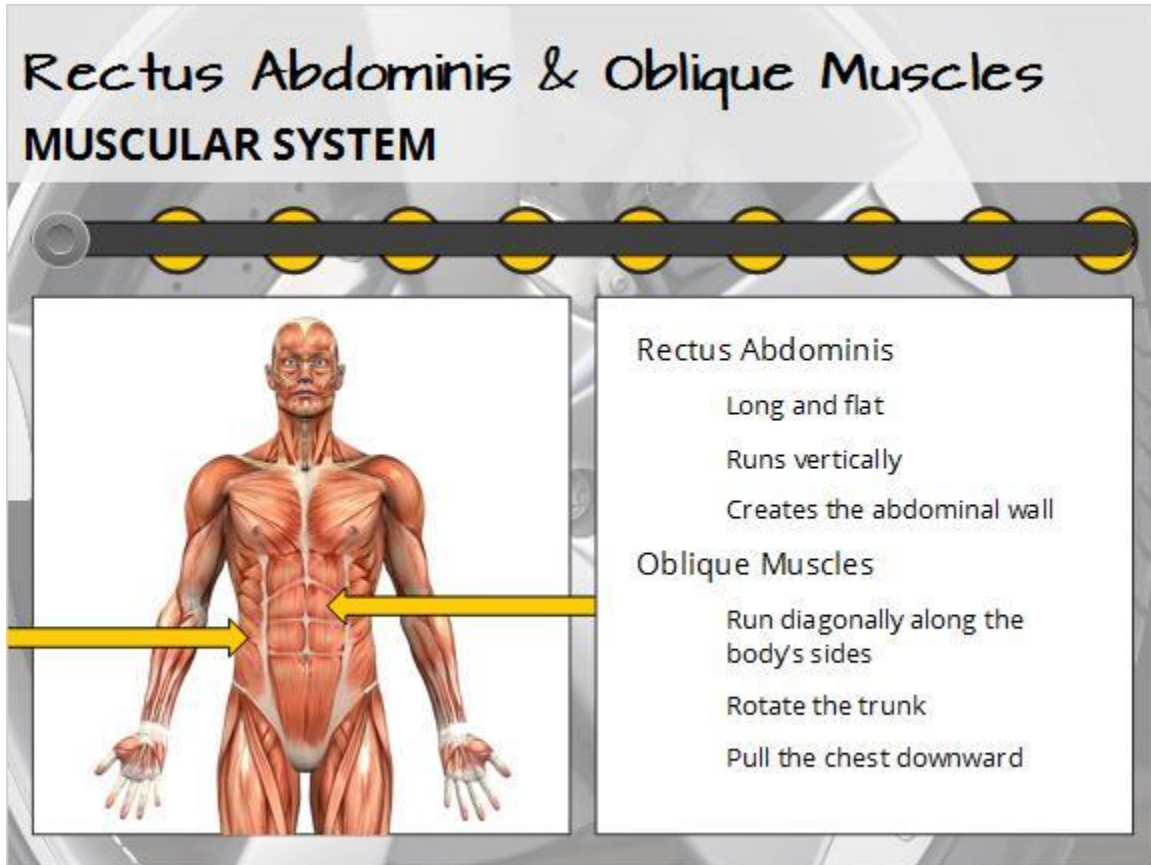


The latissimus dorsi is a large muscle that forms in the middle back. It primarily moves the arm back when doing motions like swimming or rowing.

The pectoralis major and pectoralis minor are fan-shaped muscles that run across the chest. They primarily move the arms across the chest.

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Rectus Abdominis and Oblique Muscles



The rectus abdominis is a long, flat muscle that runs vertically, and creates the abdominal wall. It is enclosed in a sheath that helps hold it into place. When someone has abs that are a “six-pack,” it means he or she has a well-defined rectus abdominis.

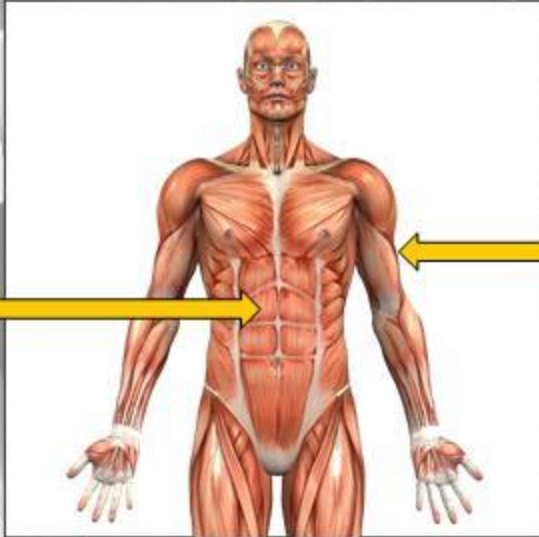
Oblique muscles run diagonally on the sides of the body. These muscles help rotate the body's trunk, pull the whole chest downward, and rotate the spine.

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Diaphragm and Triceps

Diaphragm & Triceps

MUSCULAR SYSTEM



Diaphragm

- Under the rib cage
- Helps control breathing

Triceps

- Back part of the upper arm
- Extend or straighten the elbow

The diaphragm is located under the rib cage. It helps control breathing.

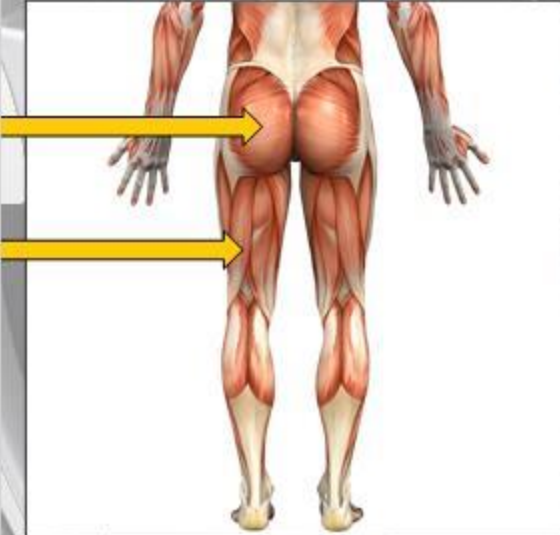
Triceps create the back part of the upper arm. They extend or straighten the elbow.

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Gluteus Maximus and Hamstrings

Gluteus Maximus & Hamstrings

MUSCULAR SYSTEM



Gluteus Maximus

- Large and strong
- Forms most of the buttocks
- Extends or straightens the thigh

Hamstrings

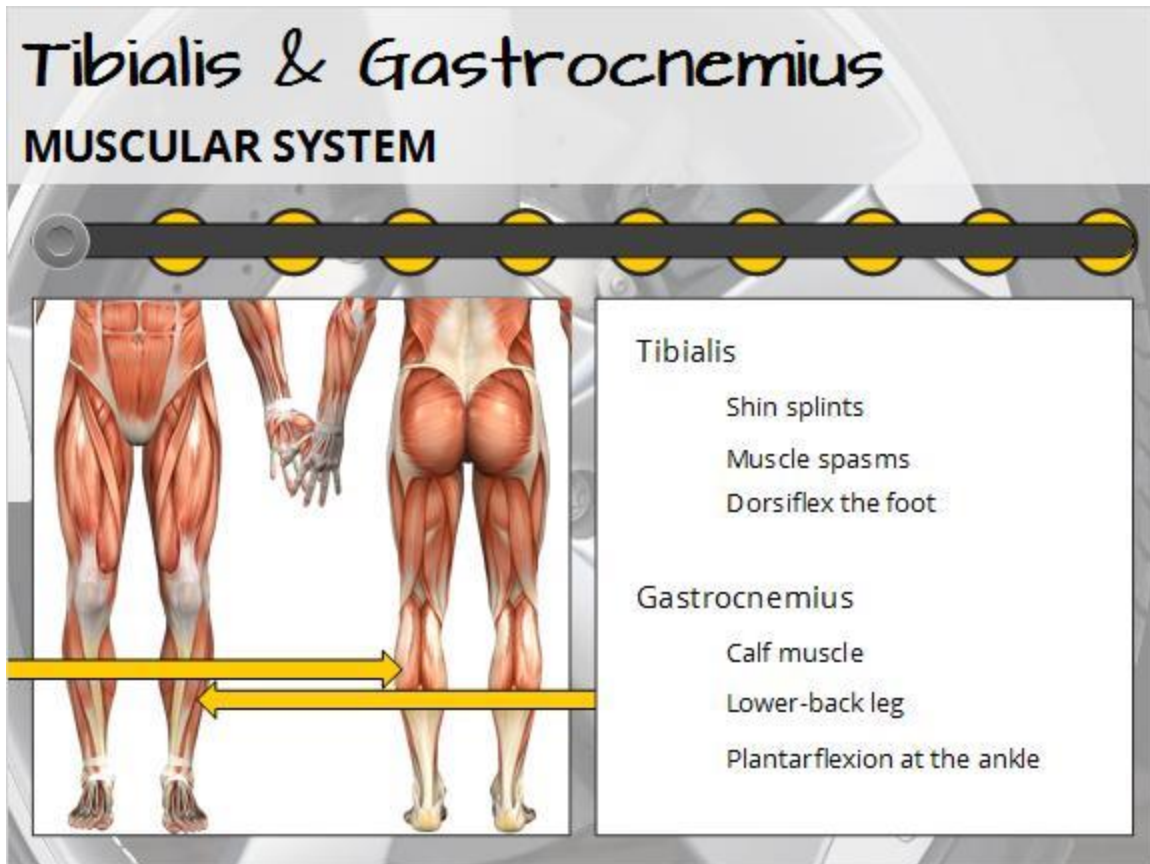
- Back of the thigh
- Flex or bend the knee

The gluteus maximus is the largest and strongest skeletal muscle. It forms the majority of the buttocks. The primary job of the gluteus maximus is to extend or straighten the thigh.

Hamstrings are a group of muscles on the back of the thigh, opposite to the quadriceps. They flex or bend the knee, which is a reason they are often called the “biceps of the thigh.”

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Tibialis and Gastrocnemius (Calf Muscles)



If you get “shin splints” or have a muscle spasm, the pain is caused because the tibialis is over exerted from an exercise like running. The shin muscle acts to dorsiflex the foot, or pull the foot upward.

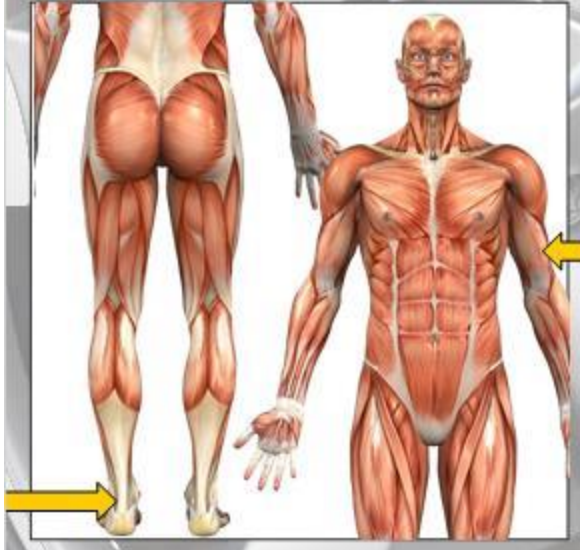
The gastrocnemius, also known as the calf muscle, helps create the lower-back part of the leg. The calf muscles point your toes, which is referred to as plantarflexion at the ankle.

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Achilles Tendon and Biceps Brachii

Achilles Tendon & Biceps Brachii

MUSCULAR SYSTEM



Achilles Tendon

- Thick and fibrous
- Extension of the calf muscle
- Stabilizes the ankle
- Allows you to stand on your toes

Biceps Brachii

- Front part of the upper arm
- Flexes at the elbow

The achilles tendon is a thick, fibrous extension of the calf muscles. It stabilizes the ankle, and allows you to stand on your toes.

The biceps brachii creates the front part of your upper arm. It flexes, or bends, the elbow.

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Quadriceps

Quadriceps
MUSCULAR SYSTEM

Quadriceps

- Front of the thigh
- Four muscles
- Attach at the kneecap and hip bone
- Extend the knee

MENU

Located in the front of the thigh, the quadriceps contain four different muscles. Three muscles attach to the kneecap, and the fourth attaches to the hip bone. These muscles help extend the knee when you do physical activities like running, walking, and standing.

Click the **MENU** button to return to the Body Systems Menu.

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Respiratory System

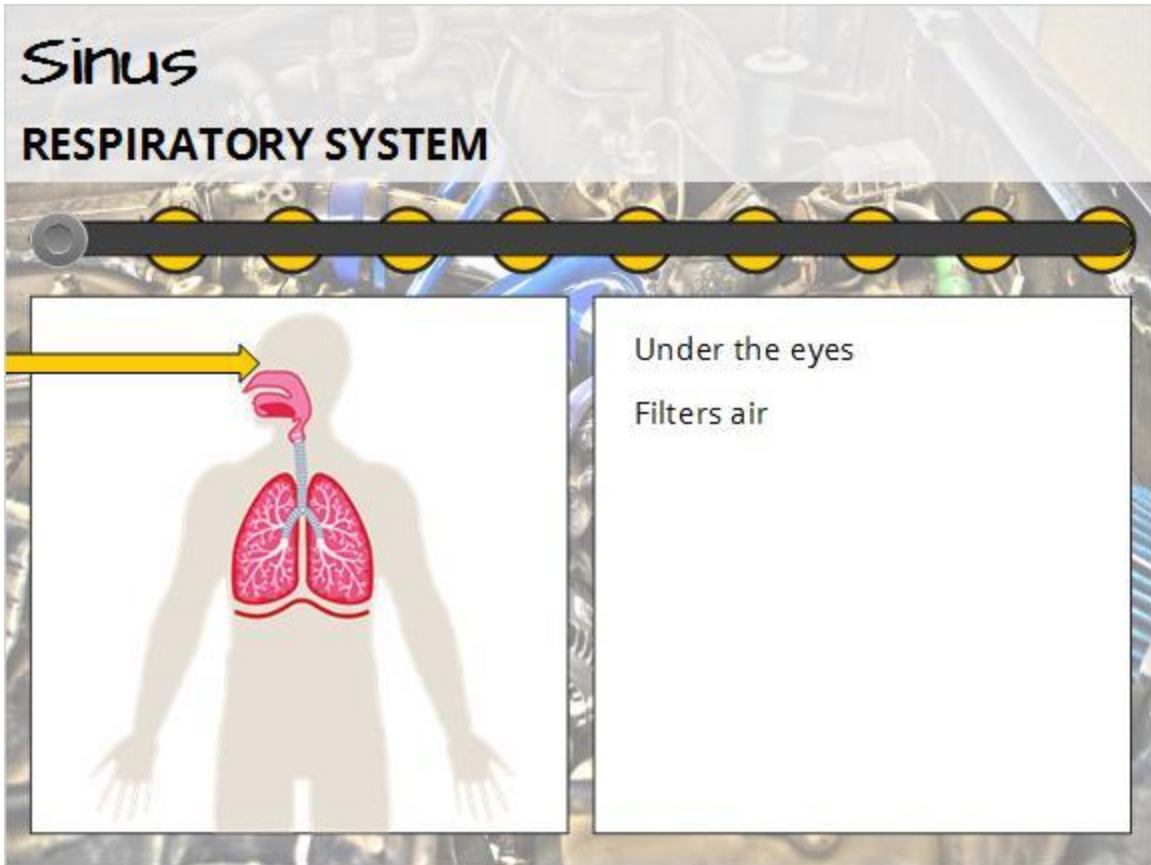


Automobiles need clean air to help gasoline combust so the engine can run. Similarly, your body needs clean air to burn fuel, move muscles, think, and run smoothly. The respiratory system allows your body to obtain clean air.

Drag the slider and drop it on each target to explore components of the respiratory system.

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Sinus

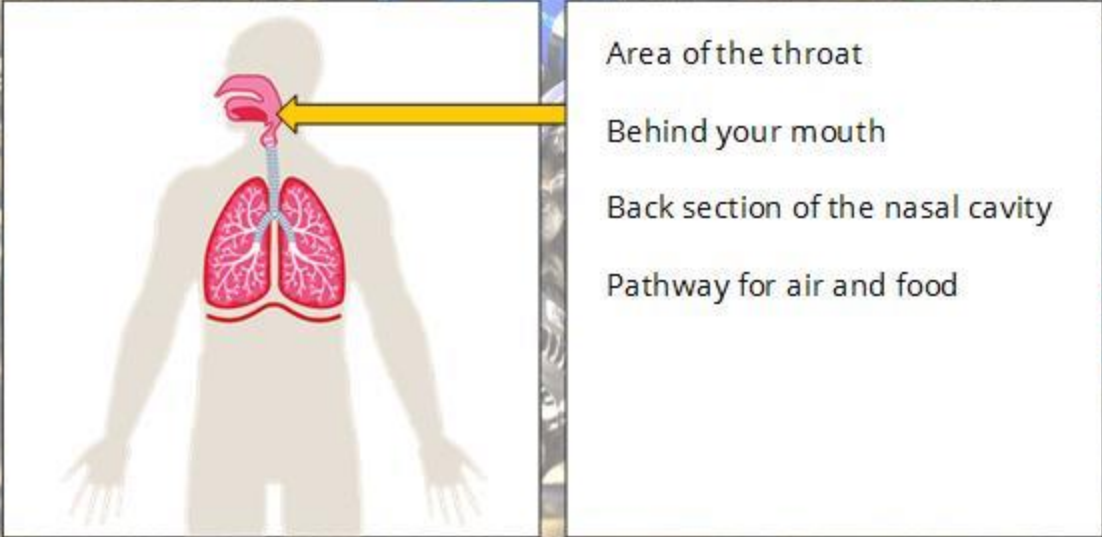


Located just under your eyes, the sinus provides filtration for air as it passes to the lungs.

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Pharynx

Pharynx
RESPIRATORY SYSTEM



The diagram shows a human silhouette with the respiratory system highlighted in pink and red. A yellow arrow points from a callout box to the pharynx, which is the area of the throat behind the mouth and the back section of the nasal cavity. The callout box lists the following characteristics of the pharynx:

- Area of the throat
- Behind your mouth
- Back section of the nasal cavity
- Pathway for air and food

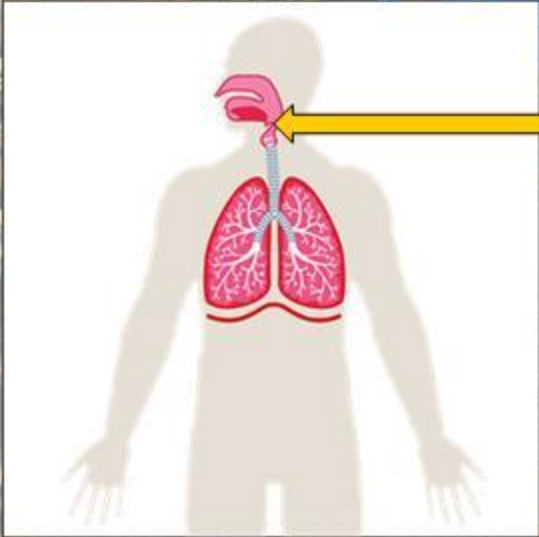
The pharynx is the area of your throat behind your mouth, and toward the back section of your nasal cavity. It is a pathway for air and food.

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Epiglottis

Epiglottis

RESPIRATORY SYSTEM



The diagram shows a human silhouette with the respiratory system highlighted in pink and red. A yellow arrow points from the callout box to the epiglottis, a pink flap of cartilage at the top of the trachea.

- Flap of cartilage
- Allows air to pass to the lungs
- Seals over the pharynx when you swallow
- Prevents food from entering the airway

The epiglottis is a flap of cartilage that remains open to allow air to pass to the lungs. When you swallow, the epiglottis seals over the pharynx to prevent food from entering the airway.

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Larynx

Larynx
RESPIRATORY SYSTEM

Voice box

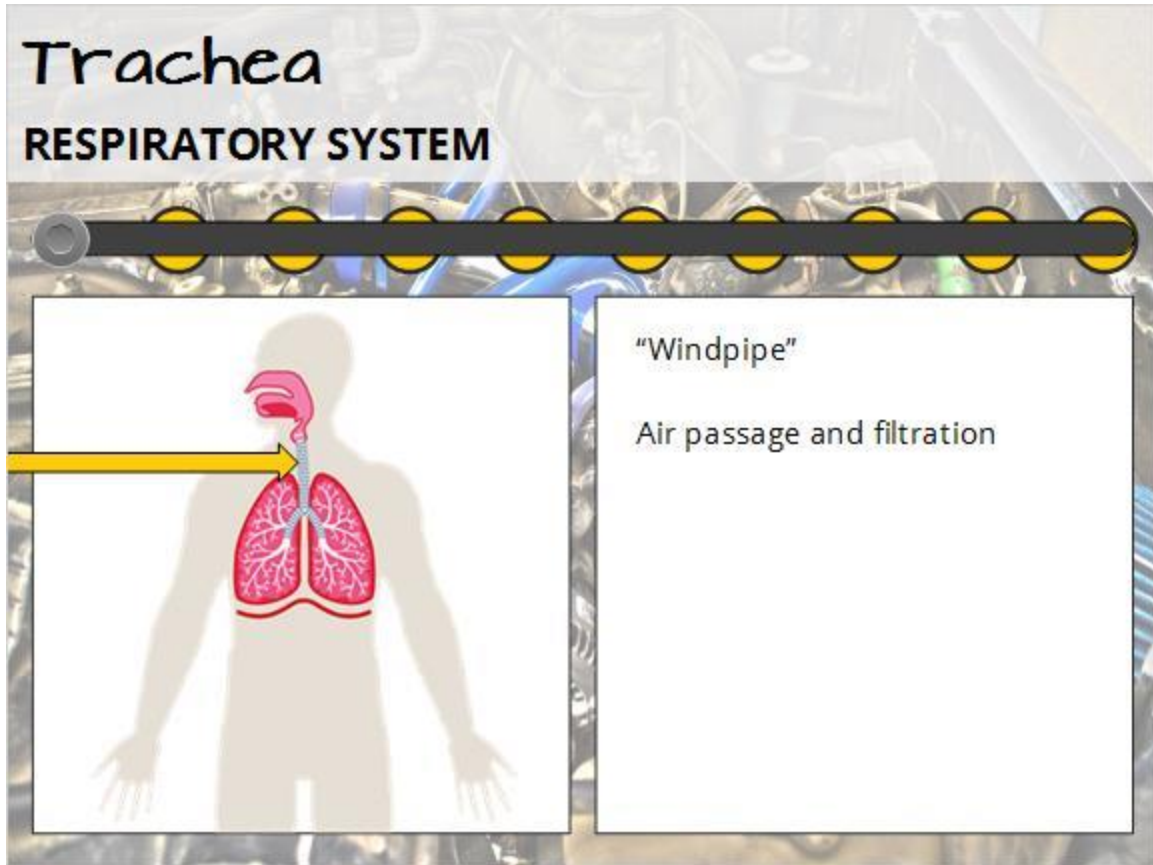
Muscles vibrate

Makes a sound when air passes over

The larynx is your voice box. It is made of long, thick muscles that vibrate to create a sound when air passes over them.

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Trachea



The diagram features a background image of a car engine. At the top, the word "Trachea" is written in a large, black, handwritten-style font, followed by "RESPIRATORY SYSTEM" in a smaller, bold, black, sans-serif font. Below the text is a horizontal black bar with several yellow circular markers. A yellow arrow points from the left side of the bar to a central illustration of the human respiratory system. The illustration shows a grey silhouette of a human torso with the trachea and lungs highlighted in pink and red. To the right of the illustration is a white rectangular box containing the text: "Windpipe" and "Air passage and filtration".

Commonly called the “windpipe,” the trachea is a tube that provides air passage and filtration toward the lungs.

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Bronchi

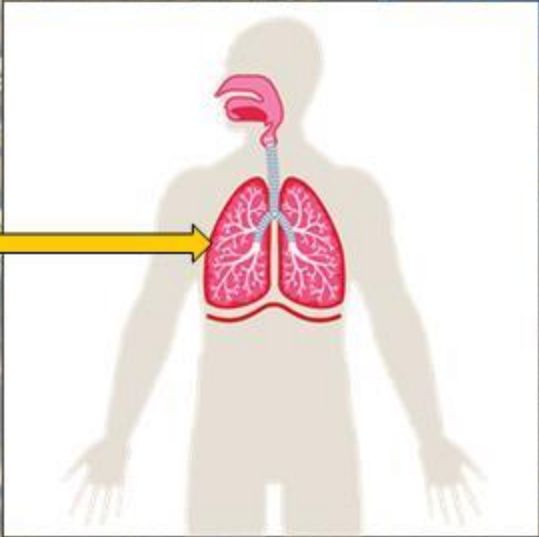
The slide is titled "Bronchi" in a large, black, sans-serif font, with "RESPIRATORY SYSTEM" in a smaller, bold, black, sans-serif font below it. The background is a faded image of a car engine. A horizontal black bar with yellow circular markers runs across the middle. Below this bar, on the left, is a diagram of a human torso showing the respiratory system in red and pink. A yellow arrow points from the left edge of the diagram to the bronchi. On the right, a white text box contains the text: "Branches of the trachea" and "Connect to the lungs".

The trachea branches off into two columns called the bronchi. They are tubes that connect to the lungs.

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Lungs

Lungs
RESPIRATORY SYSTEM



Principle organs

The diagram shows a human silhouette with the respiratory system highlighted in red and pink. The lungs are the central focus, with a yellow arrow pointing to them from the left. The trachea and bronchi are also visible. The background of the slide features a car engine, suggesting a mechanical analogy for the human body.

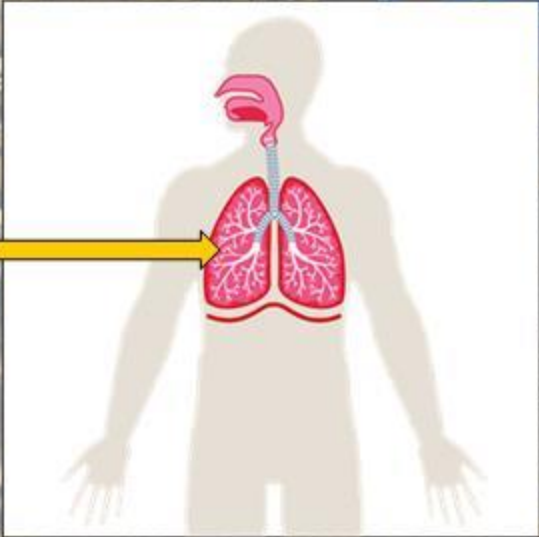
The lungs are the principle organs of the respiratory system.

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Bronchioles

Bronchioles

RESPIRATORY SYSTEM



Smaller branches of the bronchi

The image features a background of a car engine. At the top, the word 'Bronchioles' is written in a large, black, sans-serif font, followed by 'RESPIRATORY SYSTEM' in a smaller, bold, black, sans-serif font. Below this, a horizontal black bar with yellow circular markers spans the width of the content area. On the left, a white rectangular box contains a diagram of a human silhouette with the respiratory system highlighted in red and pink. A yellow arrow points from the left side of the box to the bronchioles. To the right of the diagram is another white rectangular box containing the text 'Smaller branches of the bronchi'.

Bronchioles are smaller branches of the bronchi.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Alveoli

The slide features a background image of a car engine. At the top left, the text "Alveoli" is written in a large, stylized font, with "RESPIRATORY SYSTEM" below it in a smaller, bold font. A horizontal black bar with yellow circular markers runs across the middle. On the left, a diagram of the human respiratory system is shown in a grey silhouette, with a yellow arrow pointing to the lungs. Below this is a magnified inset diagram of alveoli, labeled with "Connective tissue", "Alveolar sacs", "Alveolar duct", "Capillary beds", "Pulmonary vein", "Pulmonary artery", "Alveolus", and "Atrium". On the right, a white box contains the text "Tiny sacs" and "Gas exchange". At the bottom center, there is a black button with the word "MENU" in yellow capital letters.

Alveoli are tiny, thin-walled sacs where gas exchange takes place.

Click the **MENU** button to return to the Body Systems Menu.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Endocrine System



Like the dashboard that houses the controls of an automobile, the endocrine system of the body is a collection of glands that produce hormones that control various functions of the body.

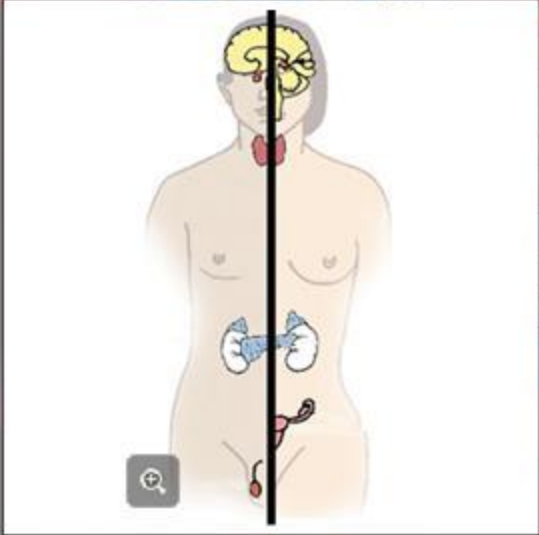
Drag the slider and drop it on each target to explore components of the endocrine system.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Hormones

Hormones

ENDOCRINE SYSTEM



Produced in glands

The image shows a digital interface for an educational module. At the top, the title 'Hormones' is written in a large, black, handwritten-style font, followed by 'ENDOCRINE SYSTEM' in a smaller, bold, black, sans-serif font. Below the text is a horizontal black bar with several yellow circular buttons. In the background, a speedometer is visible with numbers like 10, 140, and 160. The main content area is divided into two white panels. The left panel contains a diagram of a human torso with a vertical line down the center. Various glands are highlighted in different colors: the brain in yellow, the thyroid in red, the adrenal glands in blue, and the ovaries in red. A magnifying glass icon is in the bottom left corner of this panel. The right panel is mostly empty, with the text 'Produced in glands' at the top.

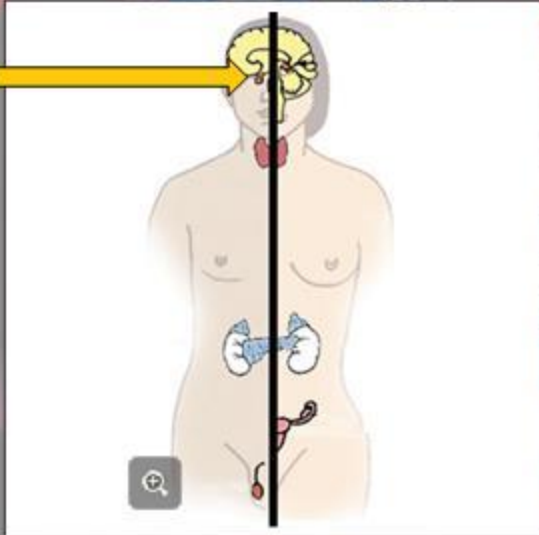
Glands regulate activities of different cells in your body. Hormones are produced in glands.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Pituitary Gland

Pituitary Gland

ENDOCRINE SYSTEM



- Behind the bridge of the nose
- Links the nervous system and endocrine system
- Commanded by the hypothalamus
- Releases hormones
- Affects growth, sexual development, and metabolism

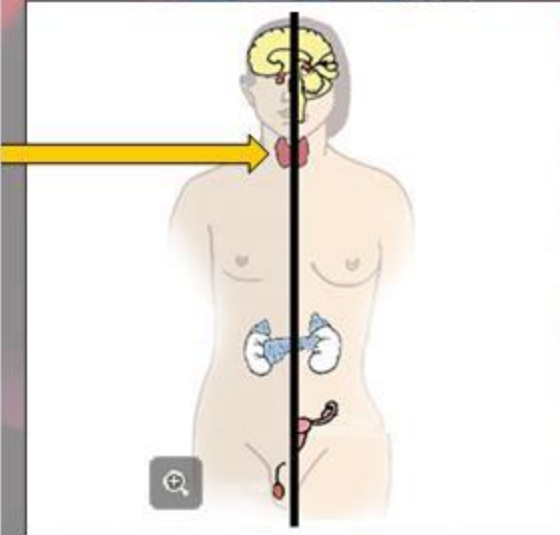
This small powerful gland is located just behind the bridge of your nose. The pituitary gland links the nervous system and the endocrine system, and is commanded by the hypothalamus (a cluster of brain cells just behind the pituitary gland). It also releases hormones, which affect growth, sexual development, and metabolism.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Thyroid Gland

Thyroid Gland

ENDOCRINE SYSTEM



Located in the throat

Thyroid cartilage protects the thyroid gland and larynx

Regulates the rate at which the body metabolizes nutrients

The diagram shows a human torso with internal organs highlighted. A vertical line runs through the center, and a yellow arrow points to the thyroid gland in the neck. The thyroid gland is depicted as a butterfly-shaped structure. The thyroid cartilage is shown as a red, shield-shaped structure above the larynx. The thyroid gland is shown as a red, butterfly-shaped structure below the thyroid cartilage. The thyroid gland is connected to the larynx by the thyroid cartilage. The thyroid gland is also connected to the larynx by the thyroid cartilage. The thyroid gland is also connected to the larynx by the thyroid cartilage.

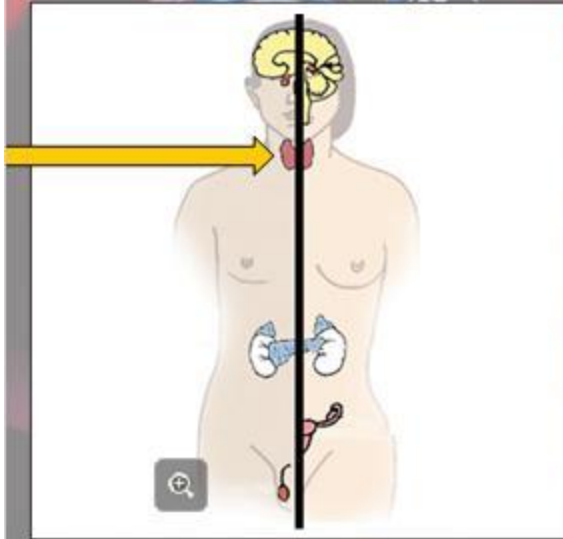
This butterfly-shaped gland is located in your throat. The thyroid cartilage, also called the Adam's Apple, protects the thyroid gland and larynx. The thyroid regulates the rate at which the body metabolizes nutrients into energy.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Parathyroid Glands

Parathyroid Glands

ENDOCRINE SYSTEM



Behind the thyroid gland
Controls blood-calcium levels

Calcium is used for:

- Muscle contractions
- Nerve impulses
- Blood clotting
- Glandular secretions
- Bone and teeth structure

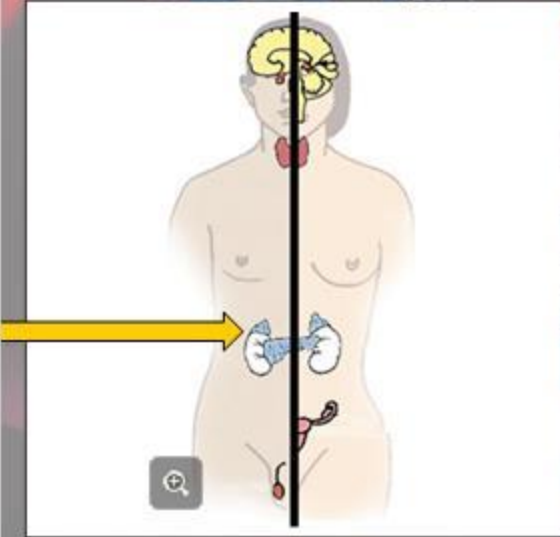
Located behind the thyroid gland, the four parathyroid glands control blood-calcium levels. Calcium is needed for muscle contraction, nerve impulses, blood clotting, glandular secretions, and bone and teeth structure.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Adrenal Glands

Adrenal Glands

ENDOCRINE SYSTEM



The diagram shows a human torso with internal organs highlighted in yellow. A vertical line runs down the center. A yellow arrow points from the left to the adrenal glands, which are shown as two small glands sitting atop the kidneys. A magnifying glass icon is located at the bottom left of the diagram.

- Located at the top of the kidneys
- Adrenal cortex
 - Blood volume and pressure
 - Metabolism of nutrients
 - Recovery from stress
- Adrenal medulla
 - Secretes adrenaline

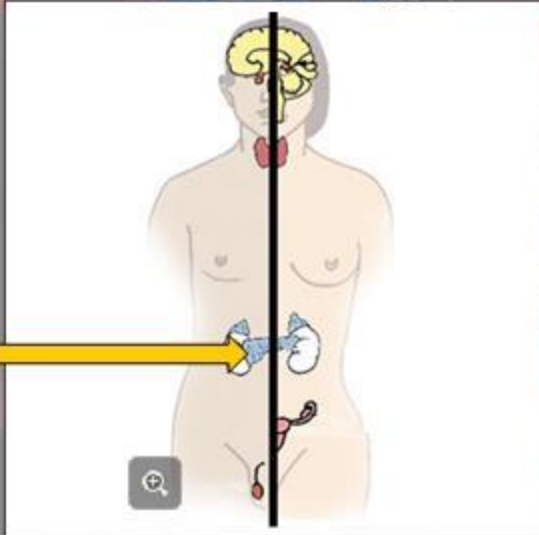
The two adrenal glands, the adrenal cortex and adrenal medulla, are located at the top of the kidneys. The adrenal cortex controls blood volume and pressure, metabolism of nutrients, and helps the body recover from stress. The adrenal medulla secretes adrenaline, which increases heart rate, breathing rate, and blood pressure, and decreases digestion rate.

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Pancreas

Pancreas

ENDOCRINE SYSTEM



Part of the endocrine and digestive systems

Secretes insulin and glucagon

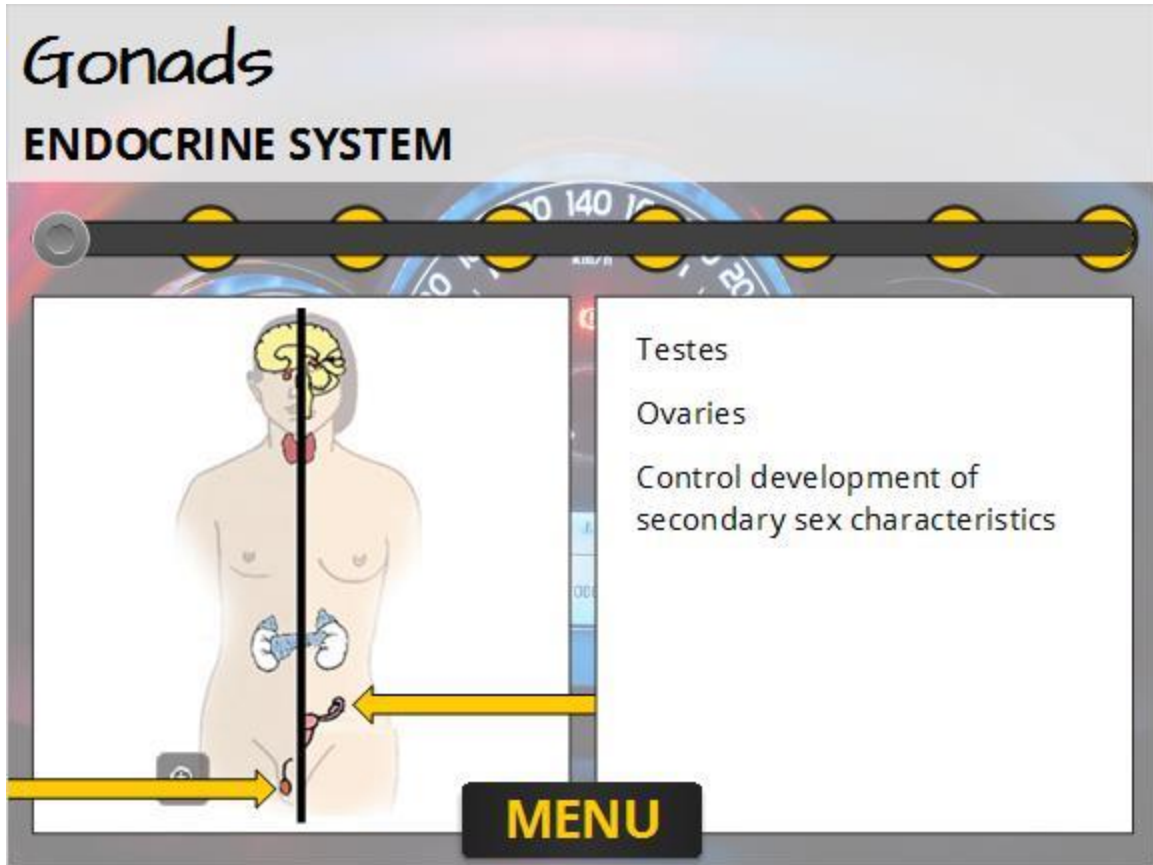
Regulate glucose

The diagram shows a human torso with internal organs. A vertical line runs through the center, and a yellow arrow points from the left to the pancreas, which is located in the abdominal area. The text to the right describes its role in the endocrine and digestive systems, specifically mentioning the secretion of insulin and glucagon to regulate glucose levels.

The pancreas is part of the endocrine system and the digestive system. Its function in the endocrine system is to secrete insulin and glucagon. These hormones regulate the amount of glucose, or blood sugar, in your blood.

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Gonads



In males, gonads are the testes; and in females, gonads are the ovaries. The hormones released by these glands control the development of secondary sex characteristics such as breasts and facial hair.

Click the **MENU** button to return to the Body Systems Menu.

Module 1: The Perfect Machine
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Reproductive System

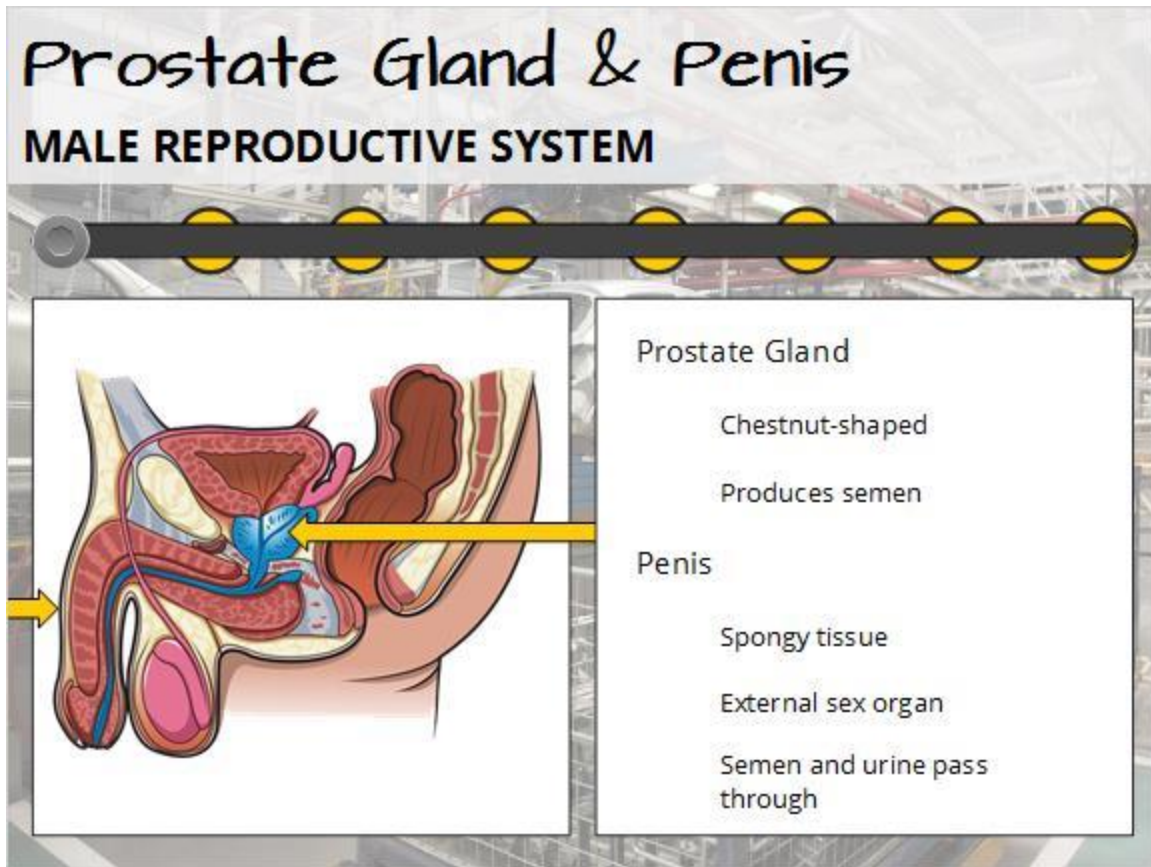


Automobiles are reproduced on the manufacturer's assembly line. By comparison, sexual organs for males and females produce sperm in males and eggs in females so humans can reproduce.

Drag the slider and drop it on each target to explore components of the reproductive system.

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Prostate Gland and Penis



The prostate gland is a chestnut-shaped organ that produces semen.

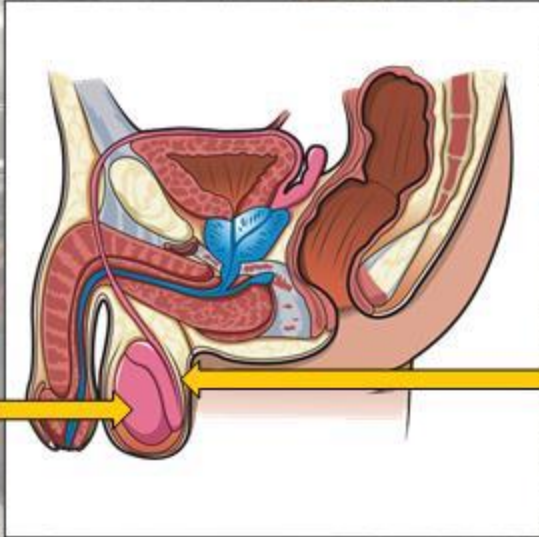
The penis is a spongy tissue. This organ is the external sex organ of a male through which semen and urine pass.

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Epididymis and Testis

Epididymis & Testis

MALE REPRODUCTIVE SYSTEM



Epididymis

- Temporary storage and incubation of sperm
- Sperm mature

Testis

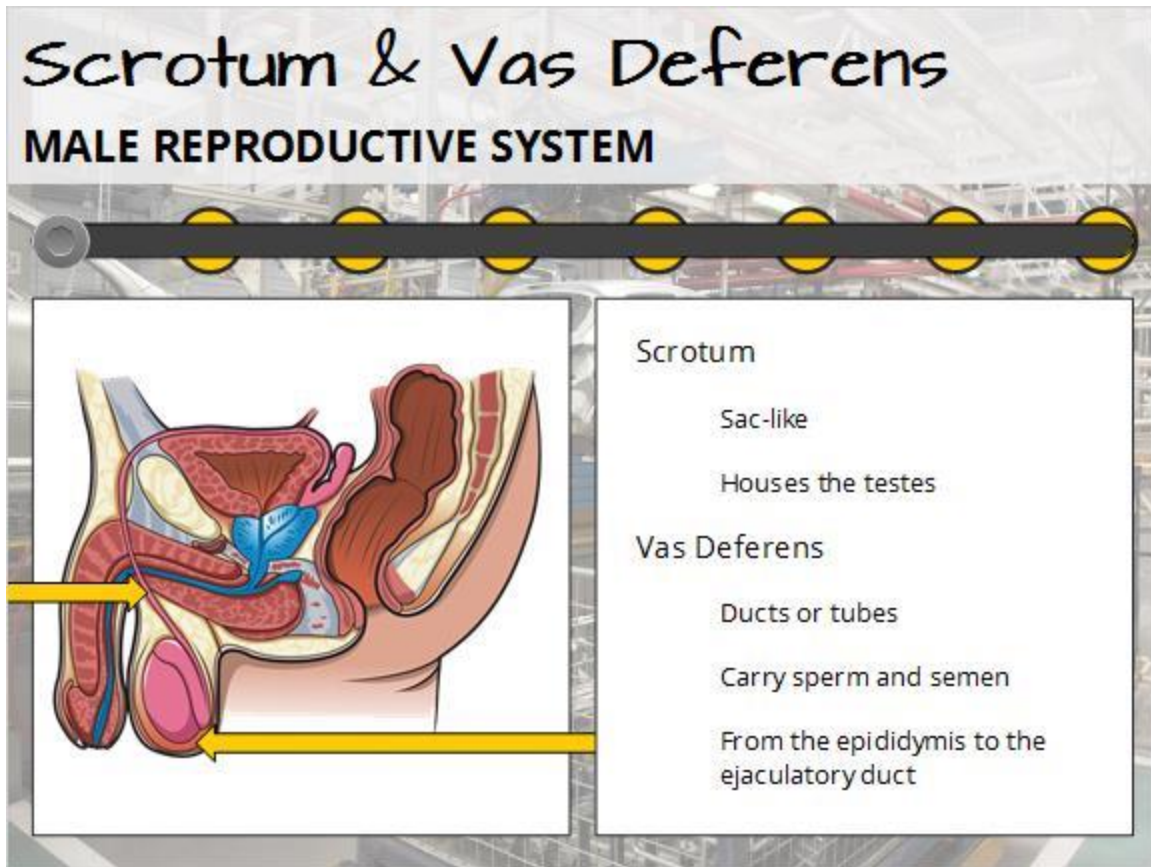
- Outside of the body
- Inside the scrotum
- Produces sperm

The epididymis is a temporary storage and incubation place for sperm to mature.

The testis is located outside of the body, within a sac called the scrotum. This organ produces sperm.

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Topic 1 Content: Like a Machine – The Human Body and a Car

Scrotum and Vas Deferens

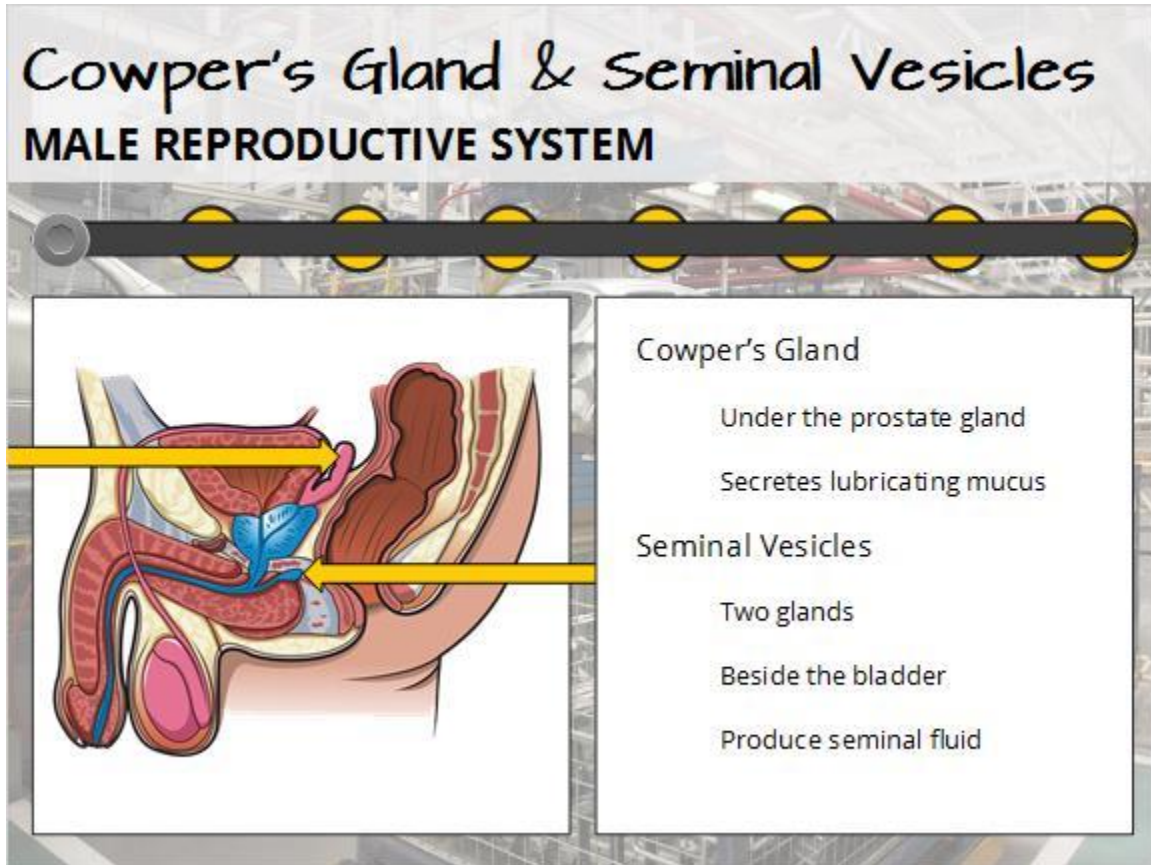


The scrotum is a sac-like structure that houses the testes.

The vas deferens are ducts or tubes that carry sperm and semen. They lead from the epididymis to the ejaculatory duct.

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Cowper's Gland and Seminal Vesicles



The Cowper's gland is located under the prostate gland. It secretes lubricating mucus before and during ejaculation.

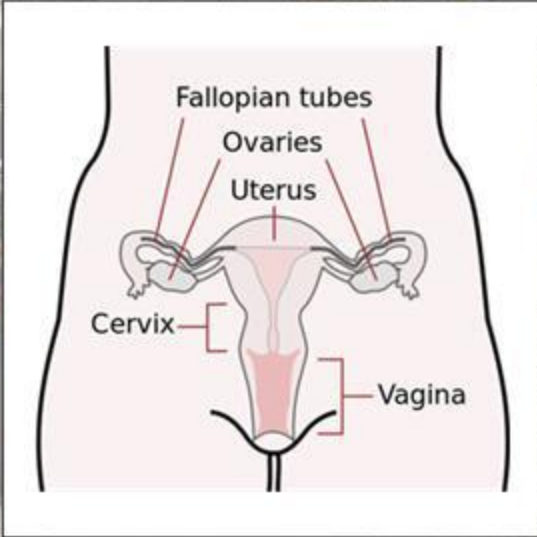
Seminal vesicles are the two glands located beside the male's urinary bladder. They produce seminal fluid.

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Ovaries and Fallopian Tubes

Ovaries & Fallopian Tubes

FEMALE REPRODUCTIVE SYSTEM



The diagram shows a frontal view of the female reproductive system. The uterus is a pear-shaped organ in the center. Two fallopian tubes extend from the upper corners of the uterus towards the ovaries. The ovaries are located on either side of the uterus. The cervix is the lower part of the uterus, leading to the vagina. Labels with lines pointing to the organs are: Fallopian tubes, Ovaries, Uterus, Cervix, and Vagina.

- Ovaries**
 - Two on side of the uterus
 - Store eggs
 - Produce estrogen
- Fallopian Tubes**
 - Project toward each ovary
 - Pathway for the egg
 - Fertilization

Females have two ovaries, one on either side of the uterus. Ovaries store a woman's eggs; and one egg gets released once a month. Ovaries also produce the female sex hormone estrogen.

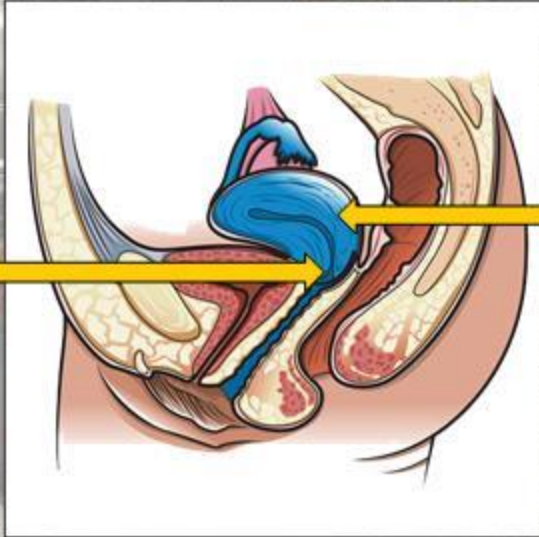
Fallopian tubes are long, thin tubes that project from the uterus in a sideways fashion, toward each ovary. They provide a pathway for the egg to travel. In fact, eggs become fertilized by sperm in the fallopian tubes.

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Uterus and Cervix

Uterus & Cervix

FEMALE REPRODUCTIVE SYSTEM



Uterus

- Size of a fist
- Prepares eggs for fertilization
- Houses and protects zygotes

Cervix

- Opening of the uterus into the vagina
- Stretches during birth and contractions

The uterus is a pear-shaped organ about the size of your fist. It prepares for egg fertilization once a month. If fertilization occurs, the uterus will house the growing zygote, and provide protection and nourishment for nine months.

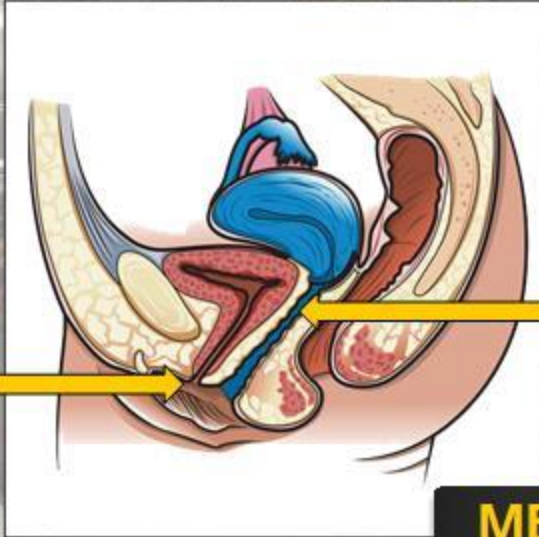
The cervix is the narrow opening of the uterus into the vagina. It stretches when a baby is being born, and when the mother is having contractions.

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Vagina and Labia

Vagina & Labia

FEMALE REPRODUCTIVE SYSTEM



The diagram shows a cross-section of the female pelvic region. The vagina is depicted as a pinkish-red tube extending from the uterus (top) towards the vulva (bottom). The labia are shown as fleshy folds surrounding the vaginal opening. Yellow arrows point from the text descriptions to the corresponding anatomical parts in the diagram.

Vagina

- 2.5 to 4 inches long
- Sexual intercourse, childbirth, menstrual flow

Labia

- Fleshy folds
- Open into the vagina

MENU

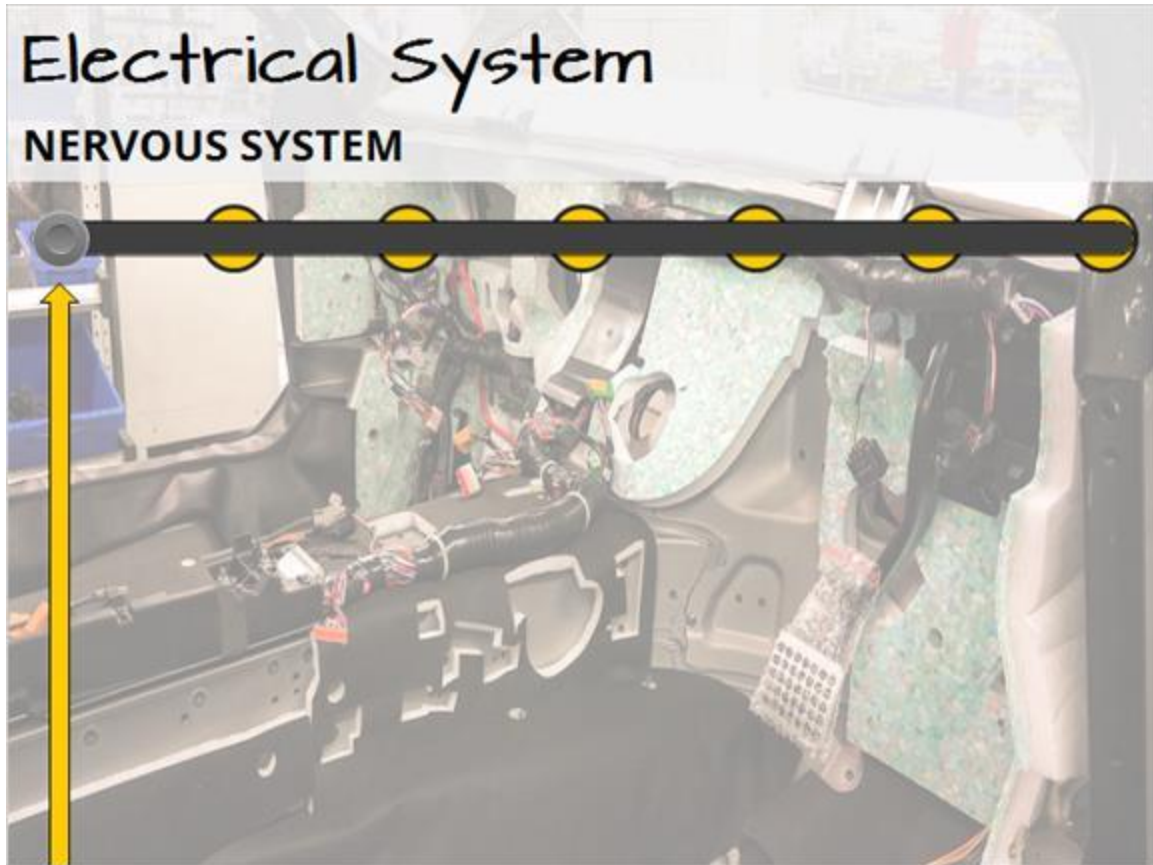
The vagina is a two-and-one-half to four inch long tube that runs from the uterus to the outside of the body. It enables sexual intercourse and childbirth, and provides a pathway for menstrual flow.

The labia are fleshy folds that open into the vagina.

Click the **MENU** button to return to the Body Systems Menu.

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Nervous System




Like the electrical system of an automobile, the nervous system is your communication system and control panel. It controls all body movement and functions related to stimuli received from your surroundings.

Drag the slider and drop it on each target to explore components of the nervous system.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Brain

Brain
NERVOUS SYSTEM



Three pounds
Nerve cell bodies
Receives, processes, and stores information

The brain is approximately three pounds, and is comprised of nerve cell bodies that form a jelly-like mass. It is the central control panel that constantly receives, processes, and stores information.

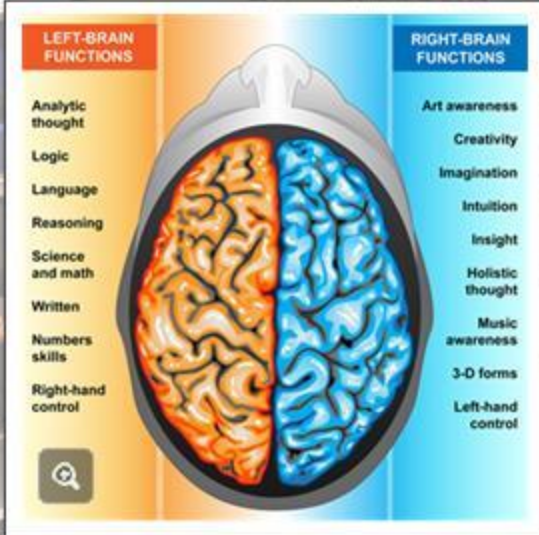
Module 1: The Perfect Machine

Topic 1 Content: Like a Machine – The Human Body and a Car

Cerebrum

Cerebrum

NERVOUS SYSTEM



The diagram shows a cross-section of the human brain, with the left hemisphere colored orange and the right hemisphere colored blue. The left hemisphere is labeled 'LEFT-BRAIN FUNCTIONS' and lists: Analytic thought, Logic, Language, Reasoning, Science and math, Written, Numbers skills, and Right-hand control. The right hemisphere is labeled 'RIGHT-BRAIN FUNCTIONS' and lists: Art awareness, Creativity, Imagination, Intuition, Insight, Holistic thought, Music awareness, 3-D forms, and Left-hand control.

LEFT-BRAIN FUNCTIONS	RIGHT-BRAIN FUNCTIONS
Analytic thought	Art awareness
Logic	Creativity
Language	Imagination
Reasoning	Intuition
Science and math	Insight
Written	Holistic thought
Numbers skills	Music awareness
Right-hand control	3-D forms
	Left-hand control

Upper portion

Higher-level intelligent thinking and reasoning

Muscle action and body movement

Right side controls creativity, imagination, and emotional response

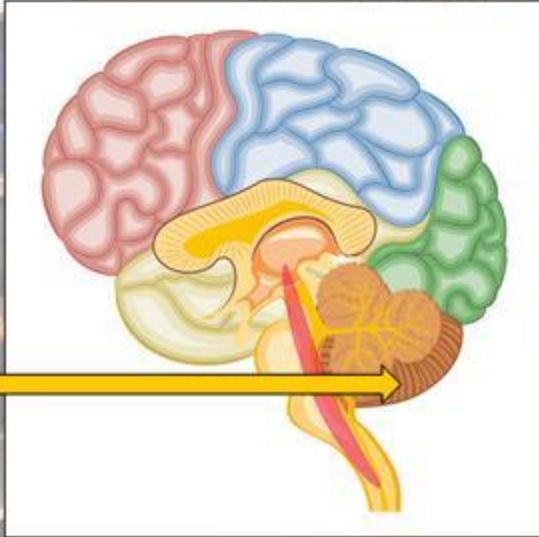
Left side controls critical thinking, logic, and language

The cerebrum, located in the upper portion of the brain, is the largest and most complex part. It controls higher-intelligent thinking and reasoning. It also initiates muscle action. Specifically, the right side of the cerebrum controls left-body movement, and the left side controls right-body movement. Additionally, the right side is mainly responsible for creativity, imagination, and emotional responses. The left side, however, controls critical thinking, logic, and language.

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Cerebellum

Cerebellum
NERVOUS SYSTEM



Posture
Balance
Skeletal system coordination

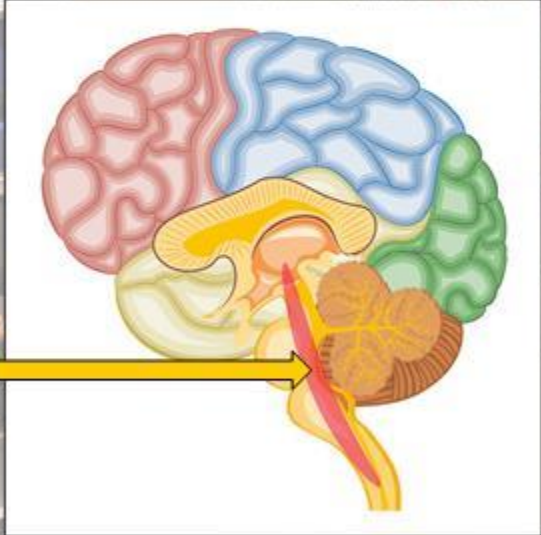
The diagram shows a lateral view of the human brain. The cerebellum is located at the back and bottom of the brain, colored green. A yellow arrow points from the left towards the cerebellum. The brain is divided into several regions: the cerebrum (red and blue), the cerebellum (green), and the brainstem (yellow and orange). The cerebellum is connected to the brainstem by a stalk. The background of the slide features a blurred image of a car's interior.

The cerebellum is the second-largest part of the brain. It functions to control posture, balance, and skeletal system coordination.

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Topic 1 Content: Like a Machine – The Human Body and a Car

Brainstem

Brainstem
NERVOUS SYSTEM



Bundle of nerves
Connects the brain to the spinal cord
Controls basic involuntary actions


The brainstem is a tight bundle of nerves that connects the brain to the spinal cord. It controls basic involuntary actions such as heartbeat, breathing, and reflexes.

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Topic 1 Content: Like a Machine – The Human Body and a Car

Spinal Cord

Spinal Cord

NERVOUS SYSTEM



Bundle of nerves

Communication channel between the body, brain, and itself

The diagram shows a human silhouette with the nervous system highlighted in yellow. The brain is at the top, and the spinal cord runs down the center of the back. A yellow arrow points from the left towards the spinal cord. The background of the slide features a blurred image of a car's interior.

The spinal cord is a bundle of nerves that acts as a two-way communication channel between the body, brain, and itself.

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Nerves

Nerves
NERVOUS SYSTEM

Peripheral nervous system
Pathways for electrical impulses

MENU

Nerves are part of the peripheral nervous system, and provide pathways for electrical impulses to travel to and from the central nervous system.

Click the **MENU** button to return to the Body Systems Menu.

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Lymphatic System



Similar to how the filtration system in a car wards off particles that could harm the system, the lymphatic system provides the body with immunity to fight off pathogens.

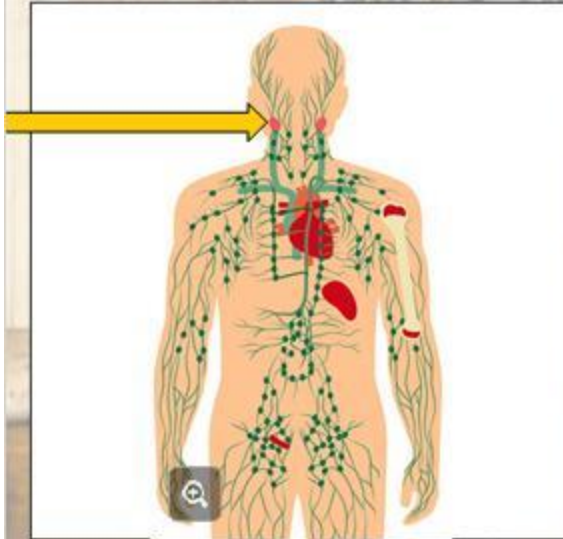
Drag the slider and drop it on each target to explore components of the lymphatic system.

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Topic 1 Content: Like a Machine – The Human Body and a Car

Tonsils

Tonsils

LYMPHATIC SYSTEM



Back of the throat

Trap germs that pass through the mouth

The diagram shows a human figure from the back with a network of green lymphatic vessels. A yellow arrow points from the left to the back of the throat, where two red tonsils are visible. The lymphatic system is shown as a complex network of green vessels and nodes throughout the body, with red nodes indicating areas of infection or activity.

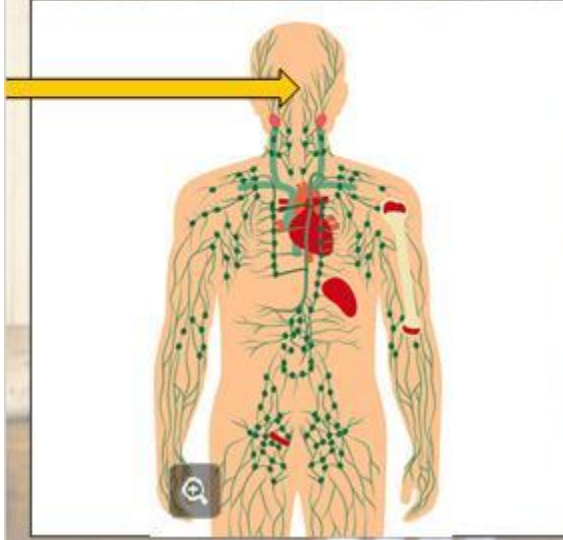
Located in the back of the throat, the tonsils trap germs that enter the body through your mouth.

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Adenoids

Adenoids

LYMPHATIC SYSTEM



Above the tonsils and behind the nose

Trap germs that pass through the nose

The diagram shows a human torso with a network of green lymphatic vessels and nodes. A yellow arrow points from the left towards the throat area, specifically to the adenoids. The text to the right explains their location and function.

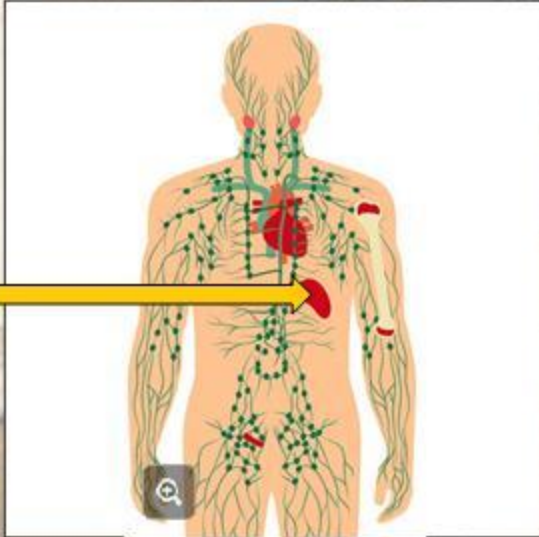
Located just above the tonsils, behind the nose, the adenoids trap germs that pass through your nose.

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Spleen

Spleen

LYMPHATIC SYSTEM



The diagram shows a human torso with the lymphatic system highlighted in green. A yellow arrow points to the spleen, which is located on the left side of the body, under the rib cage. The spleen is shown as a red, bean-shaped organ.

- Filters blood
- Stores white blood cells
- Protected by the rib cage

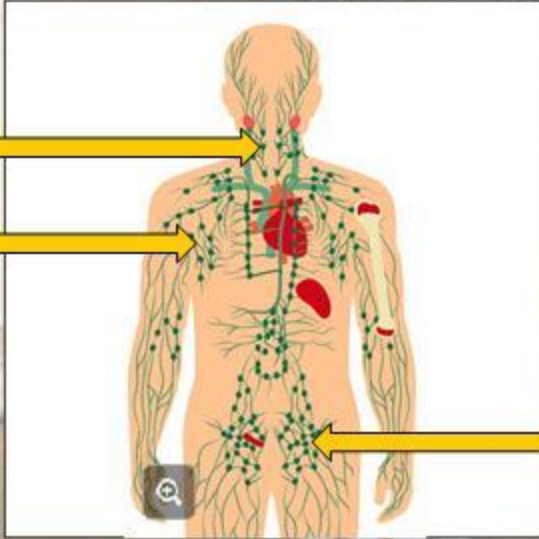
The spleen filters blood, and stores lymphocytes, or white blood cells. On the left side of your body, the rib cage protects spleen.

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Lymph Nodes

Lymph Nodes

LYMPHATIC SYSTEM



Located along lymphatic ducts
Produce lymphocytes
Filter lymph

The diagram shows a human figure with a network of green lymphatic ducts and nodes. Three yellow arrows point to specific lymph nodes: one in the neck, one in the armpit, and one in the groin. The text box on the right lists the functions of lymph nodes: they are located along lymphatic ducts, produce lymphocytes, and filter lymph.

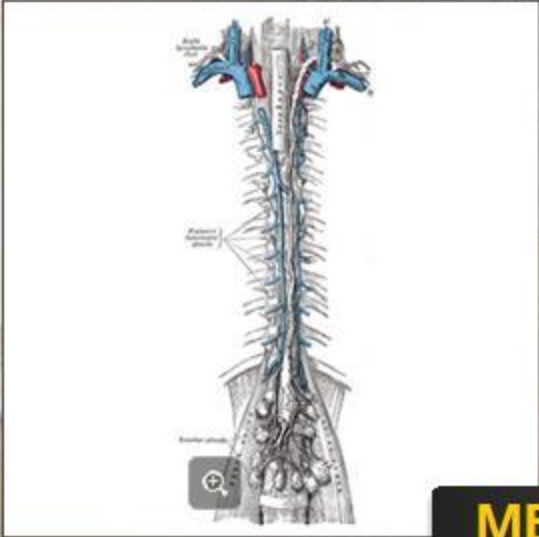
Lymph nodes are located along the lymphatic ducts in the groin, armpits, and the neck regions. They produce lymphocytes, and filter lymph before it returns to the blood.

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Lymphatic Ducts

Lymphatic Ducts

LYMPHATIC SYSTEM



Vessels that transport lymph

MENU

The image shows a digital interface for learning about the lymphatic system. At the top, the title 'Lymphatic Ducts' is written in a large, black, handwritten-style font, with 'LYMPHATIC SYSTEM' in a smaller, bold, black, sans-serif font below it. A horizontal black bar with five yellow circular accents spans across the middle. Below this bar, there are two main content areas. On the left is a detailed anatomical diagram of the human lymphatic system, showing the thoracic duct, lymph nodes, and lymph vessels. On the right is a white rectangular box with the text 'Vessels that transport lymph'. At the bottom center, there is a black rectangular button with the word 'MENU' in yellow, bold, sans-serif font.

Lymphatic ducts are vessels that transport lymph.

Click the **MENU** button to return to the Body Systems Menu.

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Urinary System



Similar to how the exhaust system in a car moves gases out of the vehicle and away from the passengers, the urinary system in the body filters and eliminates waste after all of the other systems have used the nutrients or destroyed the germs.

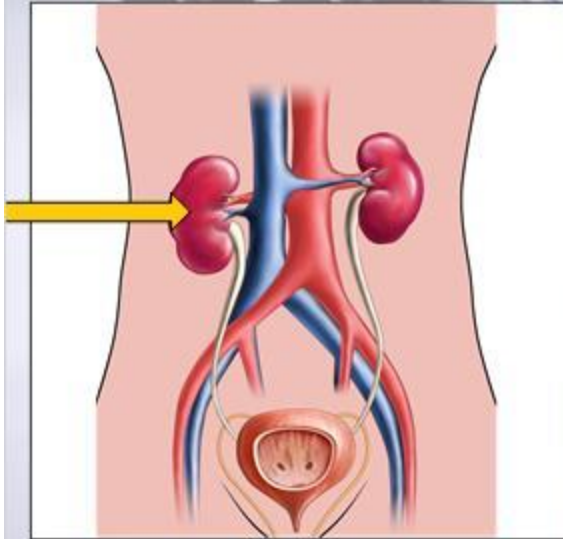
Drag the slider and drop it on each target to explore components of the urinary system.

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Kidneys

Kidneys

URINARY SYSTEM



Blood travels through
Filters out urine

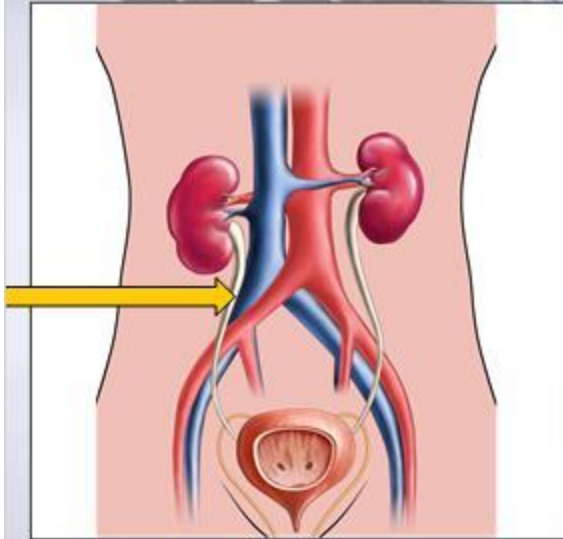
Blood travels through the kidneys to filter out all of the toxic waste called urine.

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Ureter

Ureter

URINARY SYSTEM



Urine travels through
Tubes
Heading toward the bladder

The diagram shows a human torso with the urinary system highlighted. Two red kidneys are at the top, connected by yellow ureters to a central bladder at the bottom. A yellow arrow points to the left ureter tube. The text box on the right explains that urine travels through these tubes toward the bladder.

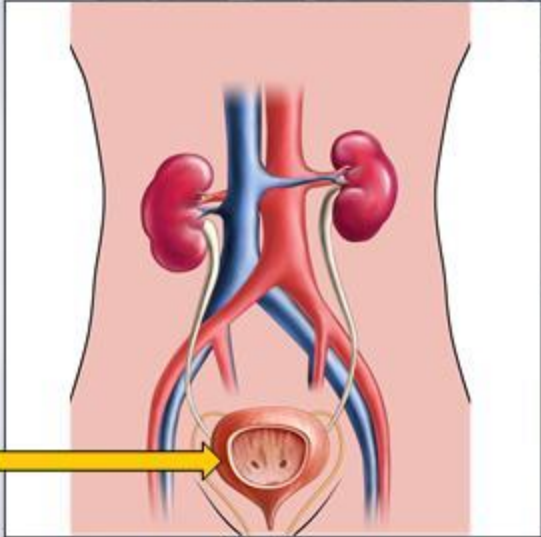
Urine travels through the tubes of the ureter on its way to the bladder.

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Urinary Bladder

Urinary Bladder

URINARY SYSTEM



Protected by the pelvis
Storage unit for urine

The diagram shows a human torso from the waist up, with the urinary system highlighted. Two red kidneys are located in the upper back, connected by blue and red blood vessels. Two yellow ureters lead from the kidneys down to the urinary bladder, which is a sac-like structure in the pelvic region. A yellow arrow points from the left side of the diagram to the urinary bladder. The text to the right of the diagram states: 'Protected by the pelvis' and 'Storage unit for urine'.

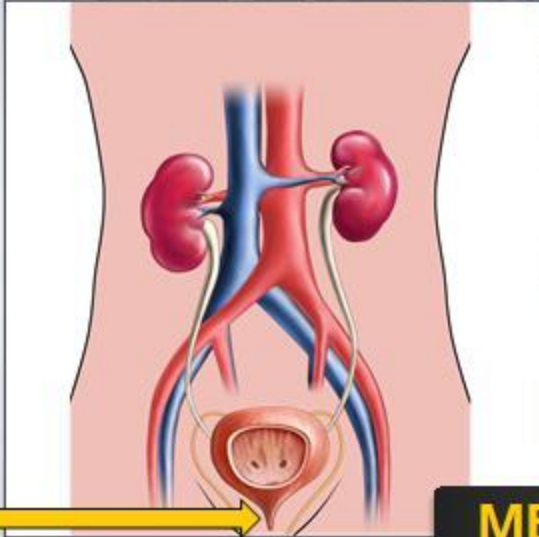
Protected by the pelvis, the urinary bladder is a storage unit that holds urine until it can be released out of the body.

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Urethra

Urethra

URINARY SYSTEM



Tube

Connects the urinary bladder to outside of the body

Pathway for urine to be released

MENU

The urethra is a tube that connects the urinary bladder to outside of the body. It provides a pathway for urine to be released.

Click the **MENU** button to return to the Body Systems Menu.

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Integumentary System




Similar to the way automobiles are protected by body work, paint, and a clear coat, the integumentary system provides protection from invaders, water loss, and damage.

Drag the slider and drop it on each target to explore components of the integumentary system.

Module 1: The Perfect Machine
Topic 1 Content: Like a Machine – The Human Body and a Car

Hair

Hair
INTEGUMENTARY SYSTEM




- Grows all over the body
- Protects skin from sun
- Keeps small substances from entering the body

Although most evident on your head, hair grows all over the body. It insulates your body, and protects your skin from exposure to too much sun. In addition, hair helps keep small particles and substances from entering your body.

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Skin

Skin
INTEGUMENTARY SYSTEM



Largest organ

Protects from germs, larger objects, and ultraviolet damage


The image shows a woman with curly hair touching her shoulder. To the right of the image is a text box with two lines of text. Above the image and text box is a horizontal line with four yellow circles and a grey circle on the left.

Skin is the largest organ. It protects the body from foreign invaders like germs and larger objects, and ultraviolet sun damage.

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Nails

Nails
INTEGUMENTARY SYSTEM



Grow from fingers and toes
Protect the fleshy ends

MENU

The image shows a hand with manicured nails. The nails are painted with a dark, patterned polish. The hand is positioned with fingers slightly curled. The background is a light blue, textured surface. The text 'Nails' and 'INTEGUMENTARY SYSTEM' is at the top. Below the image is a 'MENU' button.

Nails grow from your fingers and toes, and help protect their fleshy ends.

Click the **MENU** button to return to the Body Systems Menu.

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Digestive System



Like an automobile, your body needs fuel to function. The digestive system is responsible for the ingestion, digestion, and absorption of food -- your form of fuel. It is also responsible for the elimination of solid waste.

Drag the slider and drop it on each target to explore components of the digestive system.

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Mouth

Mouth
DIGESTIVE SYSTEM



Receptacle
Start of food digestion
Food breakdown into useable nutrients

The image shows a woman with long braids, wearing a purple shirt, eating a green salad from a bowl with a fork. The background is a light gray with a decorative horizontal line of yellow circles. The text 'Mouth' and 'DIGESTIVE SYSTEM' is at the top left. The text 'Receptacle', 'Start of food digestion', and 'Food breakdown into useable nutrients' is in a white box on the right.

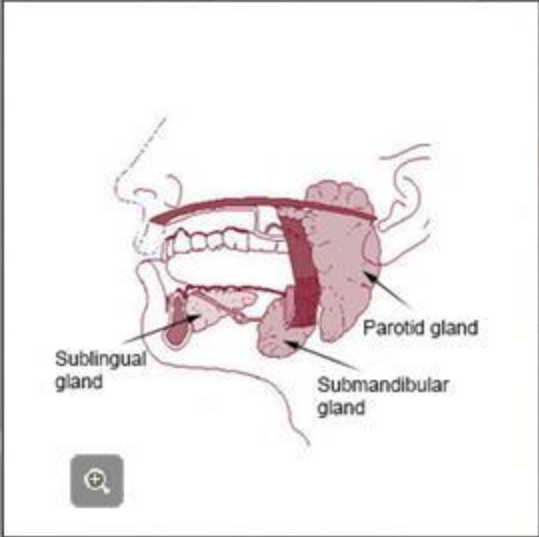
Similar to how cars have an opening for gasoline to go into the fuel tank, your mouth acts as a receptacle, and the beginning stage for food digestion. Specifically, it receives food, crushes it, and mixes it with saliva. This marks the beginning of food breakdown into useable nutrients.

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Salivary Glands

Salivary Glands

DIGESTIVE SYSTEM



Produce and release saliva

Enzymes breakdown carbohydrates into sugar

Lubricate food

The diagram shows a cross-section of the human head and neck. Three salivary glands are highlighted in red: the Sublingual gland (under the tongue), the Parotid gland (in front of the ear), and the Submandibular gland (under the jaw). Arrows point from the labels to the respective glands. A magnifying glass icon is located in the bottom left corner of the diagram area.

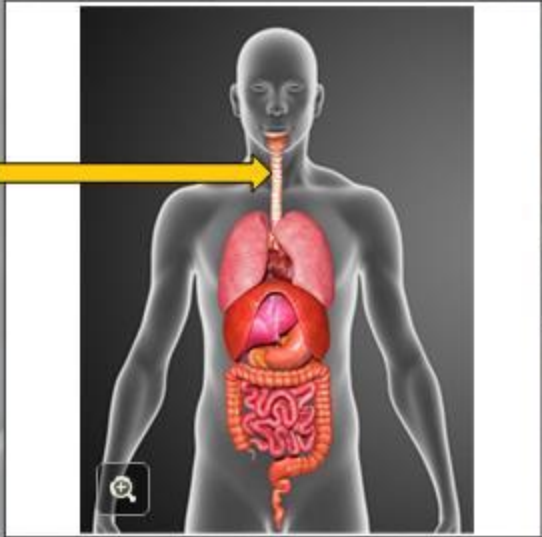
Salivary glands produce and release saliva. Enzymes in saliva break down carbohydrates into useable forms of sugar. Saliva also lubricates food, which makes it easier to swallow.

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Esophagus

Esophagus

DIGESTIVE SYSTEM



Tube that carries food
Mouth to stomach
Peristalsis

The image shows a human torso with internal organs highlighted in red. A yellow arrow points from the mouth down the esophagus to the stomach. The diagram is part of a presentation slide with a decorative border of yellow circles and a grey bar at the top.

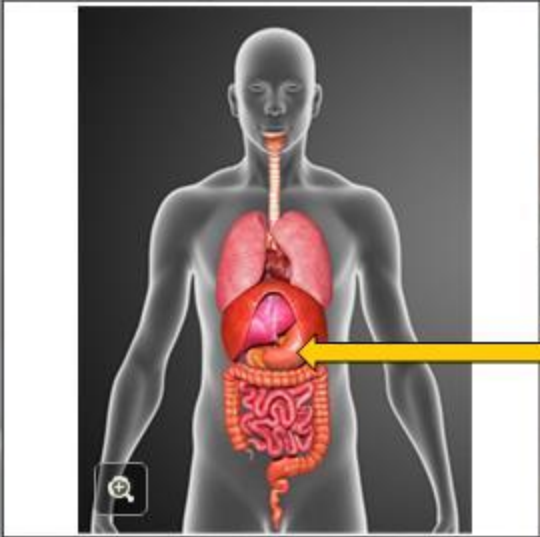
The esophagus is a tube that carries food from the mouth to the stomach through a series of contractions called peristalsis.

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Stomach

Stomach

DIGESTIVE SYSTEM



- Sac-like organ
- Storage unit for food
- Food mixed with gastric juices
- Breakdown of food
- Absorption
- Chyme

The diagram shows a human torso with internal organs highlighted in red. A yellow arrow points from the stomach area to a list of functions on the right. The list includes: Sac-like organ, Storage unit for food, Food mixed with gastric juices, Breakdown of food, Absorption, and Chyme.

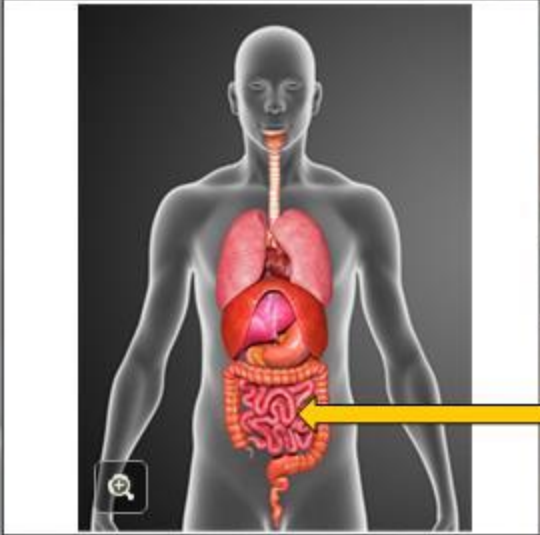
The stomach is a sac-like organ that provides a storage unit for food. While in the stomach, food is mixed with gastric juices that break down the food, and prepare it for absorption. The food-enzyme mixture is called chyme.

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Small Intestine

Small Intestine

DIGESTIVE SYSTEM



- 18-20 feet long
- Food digestion
- Nutrient absorption
- Receives fluids from the pancreas and liver
- Digestive juices
- Lining comprised of villi

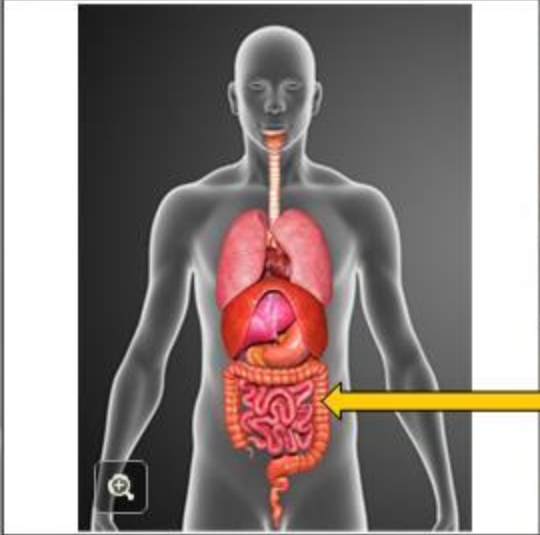
This eighteen to twenty-three foot long organ supports the major part of food digestion and nutrient absorption into the bloodstream. Specifically, the small intestine receives fluids from the pancreas and liver. It also produces its own digestive juices that finish the breakdown of chyme. The lining of the small intestine is made of finger-like projections called villi that contain a network of capillaries.

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Large Intestine

Large Intestine

DIGESTIVE SYSTEM



Receives unabsorbed food
Colon
Absorbs water
Eliminates undigested food

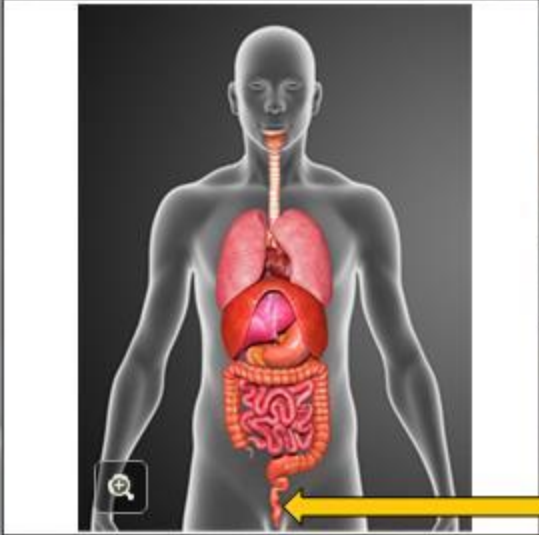
The diagram shows a human torso with internal organs highlighted in red. A yellow arrow points from the text box on the right to the large intestine in the diagram. The text box lists the functions of the large intestine: receiving unabsorbed food, being the colon, absorbing water, and eliminating undigested food.

The large intestine receives unabsorbed solid food from the small intestine. The main function of this organ, often called the colon, is to absorb remaining water and eliminate undigested food.

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Rectum

Rectum
DIGESTIVE SYSTEM



End of large intestine
Waste products
Ends at the anus

The diagram shows a human torso with internal organs highlighted in red. A yellow arrow points from the text box on the right to the rectum, which is the final part of the large intestine. The text box lists the rectum's function as the end of the large intestine, its role in holding waste products, and its termination at the anus.

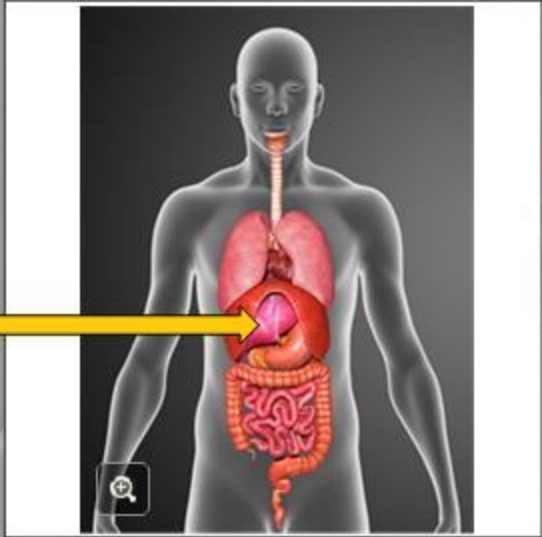
The rectum is a short tube at the end of the large intestine. It houses waste products, or feces, until it is expelled through the anus by way of muscular contraction.

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Liver

Liver

DIGESTIVE SYSTEM



- Regulates chemicals
- Clears poisonous substances
- Converts food to glucose
- Converts glucose to glycogen
- Breaks down proteins and fats
- Decides if food is useful or waste
- Produces bile

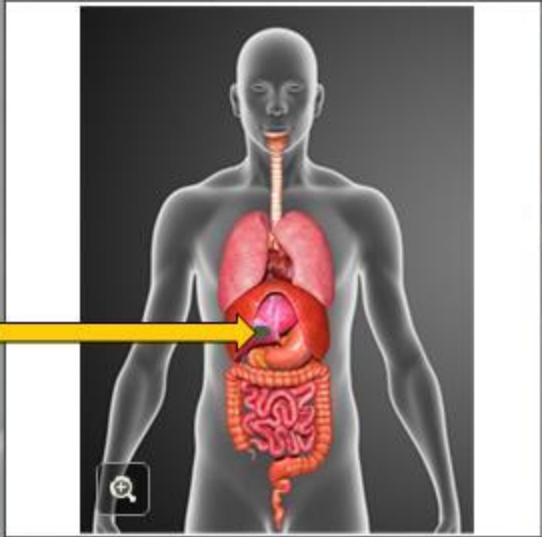
The liver regulates most of the chemicals in your body. It also clears poisonous substances, converts food to glucose (useable sugar) and glucose to glycogen (storable sugar), breaks down proteins and fats, decides if incoming foods are useful or waste, and produces bile to be stored in the gallbladder.

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Gallbladder

Gallbladder

DIGESTIVE SYSTEM



Pear-shaped
Stores bile
Releases bile into the small intestine

The image shows a human torso with internal organs highlighted in red. A yellow arrow points from the left towards the gallbladder, which is a pear-shaped organ located in the upper right quadrant of the abdomen, just below the liver. The digestive system, including the stomach and intestines, is also visible.

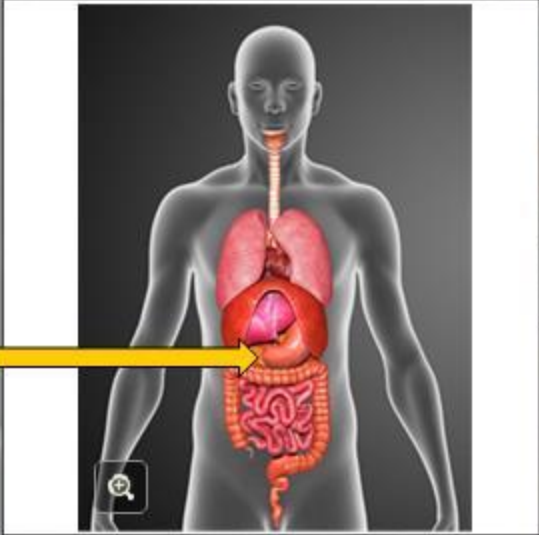
This small pear-shaped organ stores bile and releases it into the small intestine. Bile is the enzyme that breaks down fats contained in food.

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Pancreas

Pancreas

DIGESTIVE SYSTEM



Endocrine system and digestive system

Produces enzymes

- Trypsin digests proteins
- Amylase digests carbohydrates
- Lipase digests fats

The pancreas is part of the endocrine system and the digestive system. As part of the digestive system, the pancreas produces three enzymes called trypsin, amylase, and lipase. Trypsin digests proteins, amylase digests carbohydrates, and lipase digests fats.

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Appendix

The image shows an interactive educational interface. At the top left, the word "Appendix" is written in a large, black, sans-serif font, with "DIGESTIVE SYSTEM" in a smaller, bold, black, sans-serif font below it. A horizontal black bar with yellow circular markers runs across the top. Below this bar is a white rectangular area containing a human torso diagram with internal organs highlighted in red. A yellow arrow points from the left towards the appendix. To the right of the diagram is a white text box with a black border containing the following text: "Beginning of the large intestine", "No function", "Appendicitis", and "Digestion in primitive ancestors". Below the diagram and text box is a black button with the word "MENU" in yellow, bold, sans-serif font.

The appendix is located at the beginning of the large intestine. In modern humans, the appendix has no function. However, it can become inflamed and cause pain, leading to a diagnosis of appendicitis. A theory exists that the appendix helped with digestion in primitive ancestors.

Click the **MENU** button to return to the Body Systems Menu.