

Cloverbud Investigators: Career Detectives



Bone Up about Bones



Background: Today we are going to learn about our bones and how they join together to hold up our body, all the way from our head to our toes. Did you know the human body is composed of 206 bones? Most of our bones are located in the hands (54 bones) and the feet (52 bones). In the head alone there are 29 bones: eight cranial bones, 14 facial bones, six ear bones and one throat bone. Below the head are four shoulder bones, 25 thorax bones and 24 vertebral column bones. In our arms we have two upper arm bones and four forearm bones. Additionally, the body has six leg bones and four bones that make up the pelvis. That's a lot of bones! Today we will talk about the 20 main kinds of bones: the cranium, mandible, clavicle, scapula, vertebrae, sternum, ribs, humerus, radius, ulna, pelvis, femur, patella, fibula, tibia, carpus (carpal bones), metacarpus (metacarpal bones), tarsus (tarsal bones), metatarsus (metatarsal bones) and phalanges.

In this investigation, we are going to dive into BONES! We will see how well our bones provide a structure for our bodies. We are going to explore this concept using play dough and straws!

Definition of each bone type: *Make bone labels as suggested below. Read these definitions out loud, as the students work in groups to attach the bone labels to the skeleton in the activity below*

1. The **cranium**, also known as the skull, supports the face structure and protects the brain from injury.
2. The **mandible** makes up the lower jaw and keeps the lower teeth in place.
3. The **clavicle**, also known as the collarbone, is located between the scapula and sternum and makes up part of the shoulder.
4. The **scapula**, also known as the shoulder blade, connects the humerus (upper arm bone) with the clavicle (collarbone).
5. The **vertebrae** make up the vertebral column, which is the backbone or spine.
6. The **sternum** is the long flat bone in the middle of the chest that forms (along with the ribs) the rib cage, which protects the lungs, heart and blood vessels.
7. The **ribs** are long curved bones that help form the rib cage and enable lung expansion.
8. The **humerus** is the long bone in the upper arm, connecting the shoulder and the elbow.
9. The **radius** is the smaller, shorter long bone in the lower arm, between the elbow and the thumb-side of the wrist.
10. The **ulna** is the larger, longer bone in the lower arm, on the side of the pinky finger.
11. The **pelvis** rests between the abdomen and the thighs and it bears the weight of the upper body.

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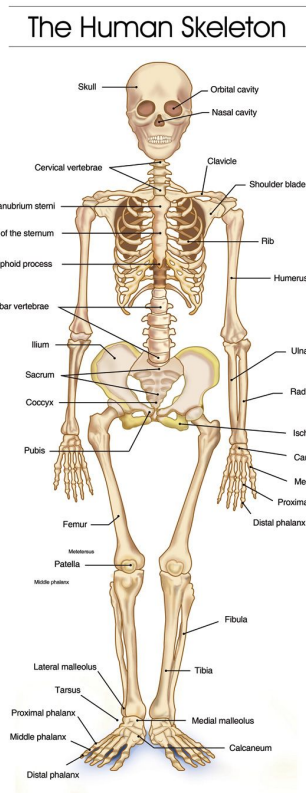
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12. The **femur**, thigh bone, is the largest and strongest bone of the body.
13. The **patella**, or kneecap, is a flat triangular bone found at the front of the knee joint. It protects and covers the joints of the knee.
14. The **fibula** is found at the outer side of the lower leg and forms the outer part of the ankle joint.
15. The **tibia** is the larger and stronger bone below the knee in the leg.
16. The **carpus** (carpal bones) is a cluster of eight bones making up the wrist.
17. The **metacarpus** (metacarpal bones) includes the five long bones, connecting each finger to the wrist.
18. The **tarsus** (tarsal bones) is a cluster of seven bones, making up the ankle, heel and arch of the foot.
19. The **metatarsus** (metatarsal bones) includes five long bones, connecting each of the toes to the ankle.
20. The **phalanges** are the bones that make up the toes and fingers.

Introduction activities:

- Get a large cut out skeleton (or you can use a 3D model) and the bone names on labels. As you read the descriptions above have the kids work in groups to try to place the name on the correct part of the skeleton.



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Optional activity: Have the students learn or listen to the “Dem Bones” song. See lyrics below.

- They can also piece together a skeleton as they listen using a skeleton drawing and brad pins or using white paper and Q-tips glued to black construction paper.
- Lay down on a large piece of paper and trace around their shape and paint, or draw in their own bones as you go over them.

*Dem bones, dem bones, dem dry bones,
Dem bones, dem bones, dem dry bones,
Dem bones, dem bones, dem dry bones,
Now shake dem skeleton bones!*

*The toe bone's connected to the foot bone,
The foot bone's connected to the ankle bone,
The ankle bone's connected to the leg bone,
Now shake dem skeleton bones!*

*The leg bone's connected to the knee bone,
The knee bone's connected to the thigh bone,
The thigh bone's connected to the hip bone,
Now shake dem skeleton bones!*

*Dem bones, dem bones, dem dry bones,
Dem bones, dem bones, dem dry bones,
Dem bones, dem bones, dem dry bones,
Now shake dem skeleton bones!*

*The hip bone's connected to the back bone
The back bone's connected to the neck bone,
The neck bone's connected to the head bone,
Now shake dem skeleton bones!*

*The finger bone's connected to the hand bone,
The hand bone's connected to the arm bone,
The arm bone's connected to the shoulder bone,
Now shake dem skeleton bones!*

*Dem bones, dem bones gonna walk around
Dem bones, dem bones, gonna walk around
Dem bones, dem bones, gonna walk around
Now shake dem skeleton bones!*



Career Connections:

- X-Ray Tech
- Orthopedic Doctor
- Orthopedic Technologist
- Rheumatologist
- Anthropologist
- Archaeologist
- Forensic Science Technician
- Physical Therapist
- Orthotist or Prosthetist



October's Mystery: Why are bones so important to have in our bodies? What function do they play?

Supplies:

-  Play-dough
-  Straws
-  Scissors
-  Tray
-  X-Rays
-  Skeleton
-  Rulers

Science Behind:

A strong skeleton is necessary to support the human body. It is important to have a bone structure that is both strong and spatially accurate because without this, the human body would not be able to withstand the physical pressures encountered in everyday life. Bones provide support, protection, and storage, as well as aid in movement, formation of blood cells and allow us to grow. Just as a house is built with a supportive frame, the human body relies on bones to keep its shape.

The role of Support – Without bones, our bodies would be nothing but a shapeless blob of tissue. Our bones support our structure and give us shape, yet are still light enough to not weigh us down.

The role of Protection – Besides our teeth, our bones are the hardest parts of our body. They serve as protection for organs and soft tissue by forming a strong layer around them. Examples of this include: the rib cage, which protects the heart, lungs, liver and spleen; the skull, which protects the brain; the backbone, which protects the spinal cord, and the pelvis, which protects the bladder, intestine and reproductive organs.

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The role of Growth – Bones allow us to grow. Our skeleton starts out as flexible cartilage when we are babies in our mother’s womb, but over time the cartilage undergoes a process called ossification, where hard deposits of calcium phosphate and collagen begin to replace the cartilage. This process can take up to 20 years to complete which is why humans continue to grow or change in size until adulthood. Children’s bones have something called growth plates which are made up of cartilage cells that continue to multiply, grow longer, and eventually ossify into bone.

The role of Storage - Bones store various minerals, such as calcium and phosphate, as well as chemical energy which can be found in the yellow bone marrow. Our bodies need calcium, but only small amounts can be stored in the blood. So our bones store the extra until the body needs it, then it can be released into the blood as needed.

The role of Blood Cell Production - Bones also help in the production of blood cells, which are critical to the body. Inside the bone is a jelly-like material called bone marrow which is where red blood cells are made. The red blood cells carry the oxygen to our body and play a critical role in keeping us alive. White blood cells are also made here. They are important to our immune system and fight off disease and infections.

The role of Movement – Bones also help us to move. Our skeletal system and muscle systems depend on each other and work together to provide movement. Not all muscles are attached to bones, but those which serve for movement are. Our bones serve as attachment sites for muscles. The muscles are attached to the bones with tendons. The contractions of the muscles allow us to move our body.

Our bones serve many different purposes and are essential in maintaining the functionality and health of the human body.

What to Do:

Step 1: First, pass out enough play dough to each member for them to make a small scale shape of a person.

Step 2: Have the members build the tallest free standing human figure they can, using only the play dough.

Step 3: Measure the results and place the figure to the side.

Step 4: Next pass out the straws. The straws will represent “bones” in our bodies.



Step 5: Members can cut the straws as needed with scissors. They can now use new play dough and the “bones” to make another free standing figure.

Step 6: Measure the figure with the “bones”.

Step 7: Go over results: Which was taller? Why? What role did the bones play?

Go Over Findings:

Investigate, Create, & Take: Investigators can take with them:

- ✓ Life size drawings of themselves
- ✓ Play-dough straw replicas
- ✓ Skeleton from Q-Tips glued to black paper
- ✓ Cut out of a skeleton and put together with brad pins

Sources:

Teach Engineering STEM Curriculum for K-12- Bones! Bones! Bones!

https://www.teachengineering.org/lessons/view/wpi_bones_lesson01

Additional Links:

Get moving and sing: Bones! Bones! Bones! -Awesome Sauce, GoNoodle-

https://www.youtube.com/watch?v=Sk_q_ShHDBM

Printable Skeleton Cutouts <https://www.pinterest.com/explore/skeleton-crafts>

Q-Tip Skeletons <https://www.allfreecrafts.com/kids/art/q-tip-skeletons/>

Sing along Dry Bones <https://www.youtube.com/watch?v=cLi55MV04a8>

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*** See attached bone labels*

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also known as the skull, supports the face structure and protects the head from injury

Mandible

makes up the lower jaw and keeps the lower teeth in place

Clavicle

also known as the collarbone, is located between the scapula and sternum and makes up part of the shoulder

Scapula

also known as the shoulder blade, connects the humerus (upper arm bone) with the clavicle (collarbone)



Vertebrae

make up the vertebral column, which is the backbone or spine

Sternum

is the long flat bone in the middle of the chest that forms (along with the ribs) the rib cage, which protects the lungs, heart and blood vessels

Ribs

are long curved bones that help form the rib cage and enable the lung expansion

Humerus

is the long bone in the upper arm, connecting the shoulder and the elbow

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Radius

is the smaller, shorter long bone in the lower arm, between the elbow and the thumb-side of the wrist

Ulna

is the larger, longer long bone in the lower arm, on the side of the pinky finger

Pelvis

rests between the abdomen and the thighs and it bears the weight of the upper body

Femur

the thigh bone, is the largest and strongest bone of the body



Patella

or kneecap, is a flat triangular bone found at the front of the knee joint. It protects and covers the joints of the knee

Fibula

is found at the outer side of the lower leg and forms the outer part of the ankle joint

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Carpus

(carpal bones) is a cluster of eight bones making up the wrist



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Tarsus

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Phalanges

are the bones that make up the toes and fingers.

