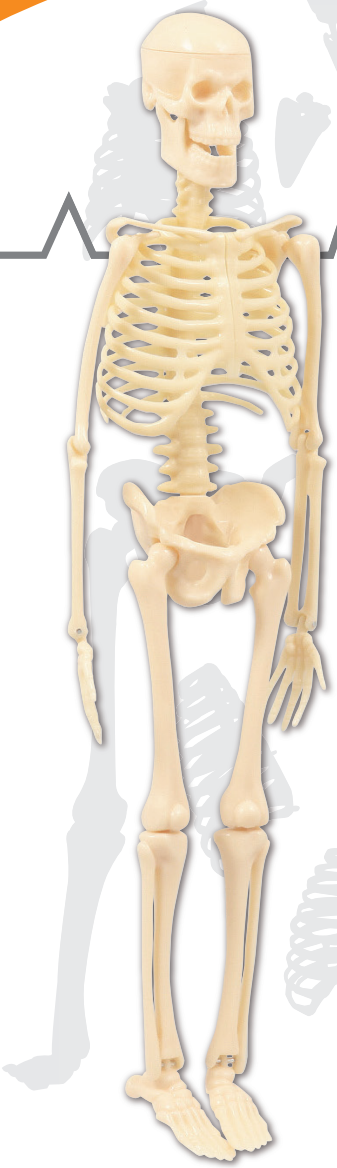
Hands-on Lab

Human Anatomy

Ariel

BONE ASSEMBLY



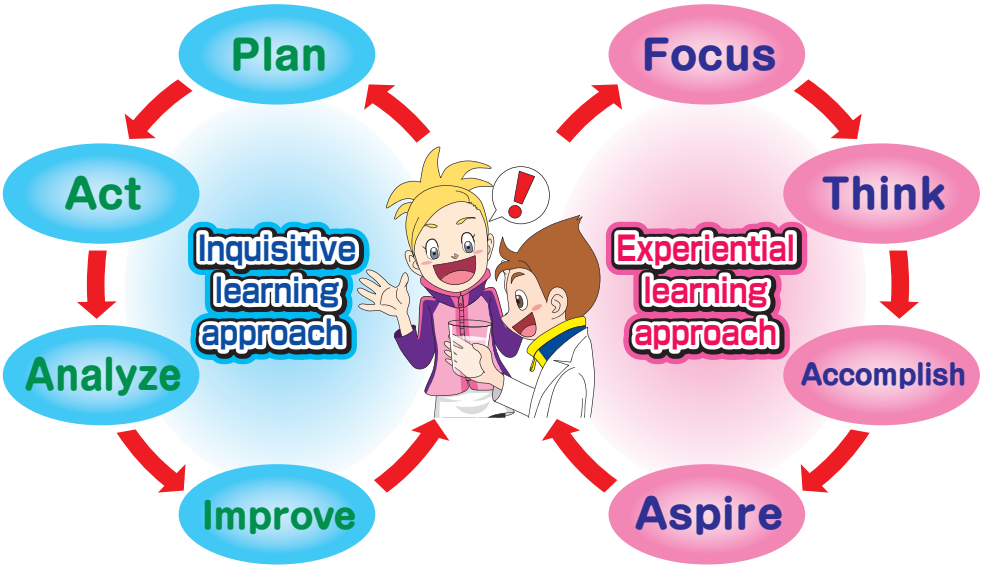
Study Guide

AGE 6+

⚠ **WARNING:**

CHOKING HAZARD – Small parts. Not for children under 3 yrs.

Two cycles for turning a child into a science lover



Inquisitive learning approach nurtures the abilities of...

① Plan ··· Look ahead by yourself.
② Act ··· Put the plan into practice.
③ Analyze ··· Self-examine the result of the action.
④ Improve ··· Improve the results based on the analysis.

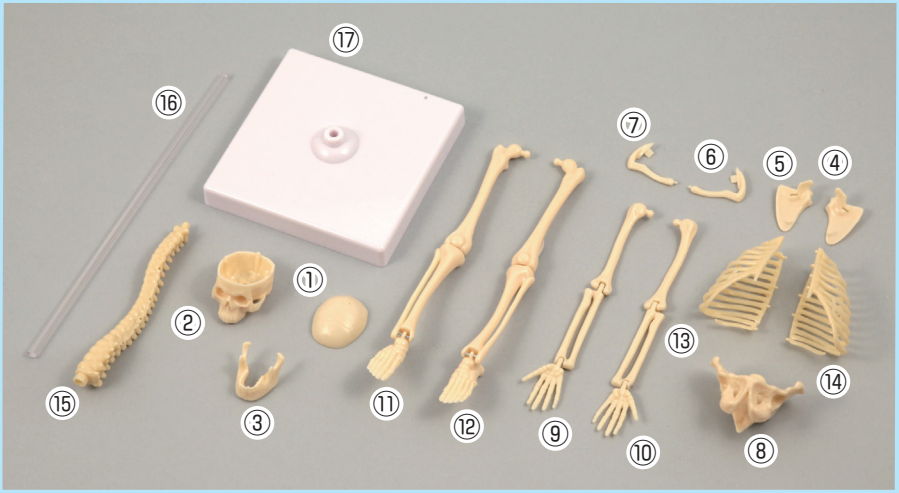
Experiential learning approach nurtures the abilities of...

① Focus ··· Direct attention to what is fun.
② Think··· Focus and think hard while experiencing.
③ Accomplish ··· Sense of accomplishment by figuring out something after thinking.
④ Aspire ··· Gain a strong desire for achievement after the accomplishment.

The inquisitive and experiential learning approaches of Artec's Science Series will turn children into great lovers of science!

Bone assembly

Contents



① Upper skull
② Lower skull
③ Mandible (jawbone)
④ Right scapula
⑤ Left scapula
⑥ Left clavicle
⑦ Right clavicle
⑧ Pelvis
⑨ Right arm
⑩ Left arm
⑪ Right leg
⑫ Left leg
⑬ Right ribs
⑭ Left ribs
⑮ Spine
⑯ Rod
⑰ Base

Warning ● **CHOKING HAZARD** - Small parts. Not for children under 3 yrs. Keep out of reach of small children to prevent accidental swallowing.

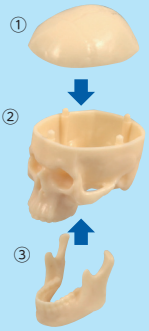
Make sure to read these carefully before use. (Parents/guardians, read these instructions carefully.)

- Instructions for parents are included and must be observed.
- Store this product away from high temperatures, humidity and direct sunlight.

How to assemble

Assemble the head

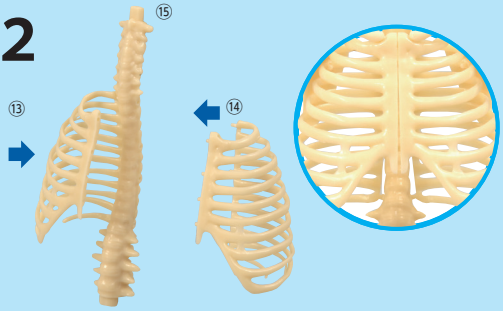
1



Attach the upper skull and the jawbone to the lower skull.

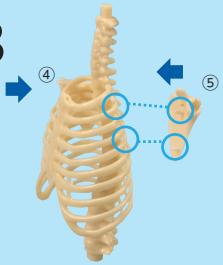
Assemble the upper body

2

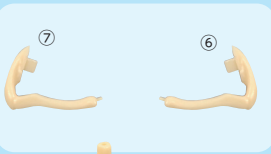


Attach the right and left ribs. Fit the edges of the ribs into the holes in each side of the spine.

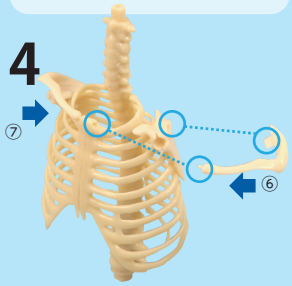
3



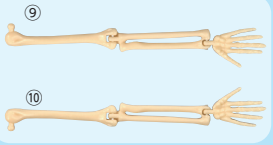
Attach the right and left scapulas.



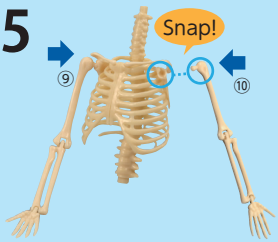
4



Attach the clavicles to the scapulas.

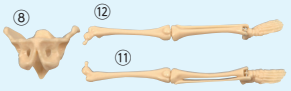


5

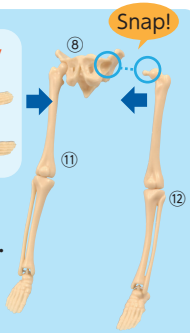


Attach the right and left arms to the scapulas.

● Assemble the lower body

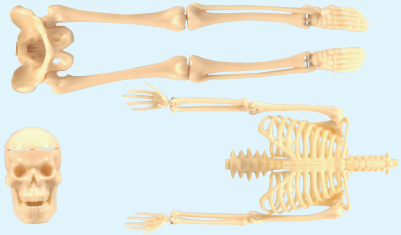


6 Attach the right and left legs to the pelvis.

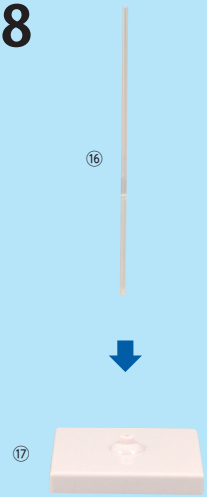


7 Attach the skull and the pelvis to the spine.

● Overall assembly

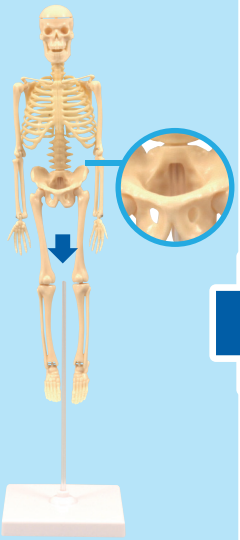


8



Push the rod into the base.

9



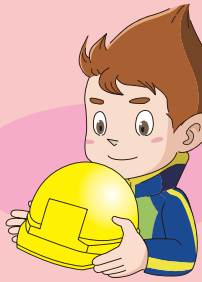
Set the skeleton on the rod.

Look at the skeleton.

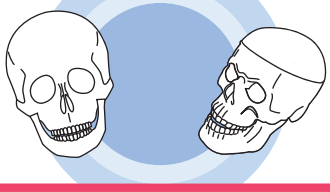
You can see many different bones in the human body.
An adult's body has about 200 bones.

Skull

The head is a very important part of the human body because it holds the brain. The skull protects the brain like a helmet.

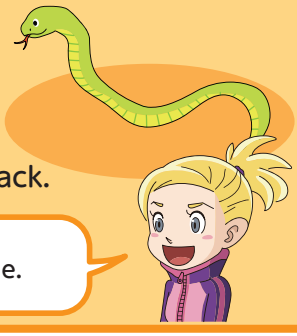


The head has a unique shape because it has a nose, ears, and eyes on it.



Spine

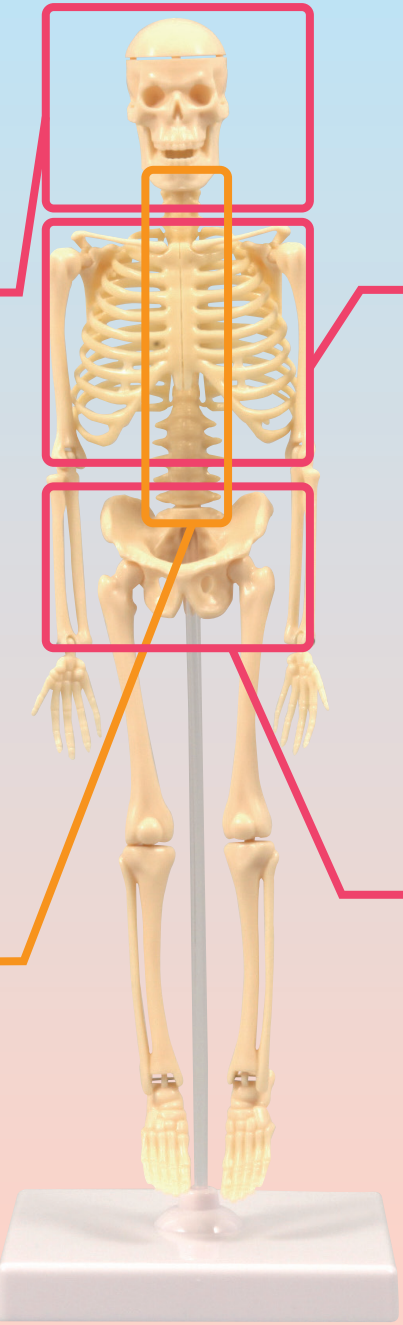
The spine is a large bone made up of many small bones joined together. This allows you to bend and twist your back.



A snake's skeleton is similar to a human spine.

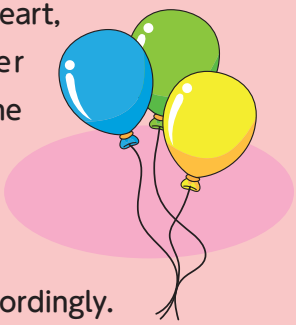
A human spine only has about 30 bones joined together, but a snake's has 200!

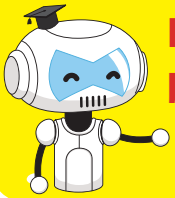
Another important function of the spine is to support the weight of the human head.



Rib cage

The ribs protect the heart, the lungs, and other important organs in the chest. The lungs expand like a balloon when you breathe in, and the ribs move accordingly.

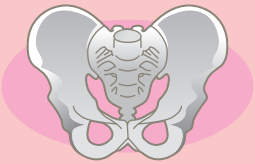




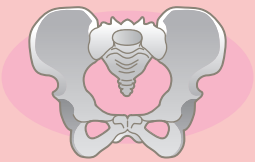
Let's count how many bones it has.

(★Find the answer below.)

Pelvis



Male pelvis

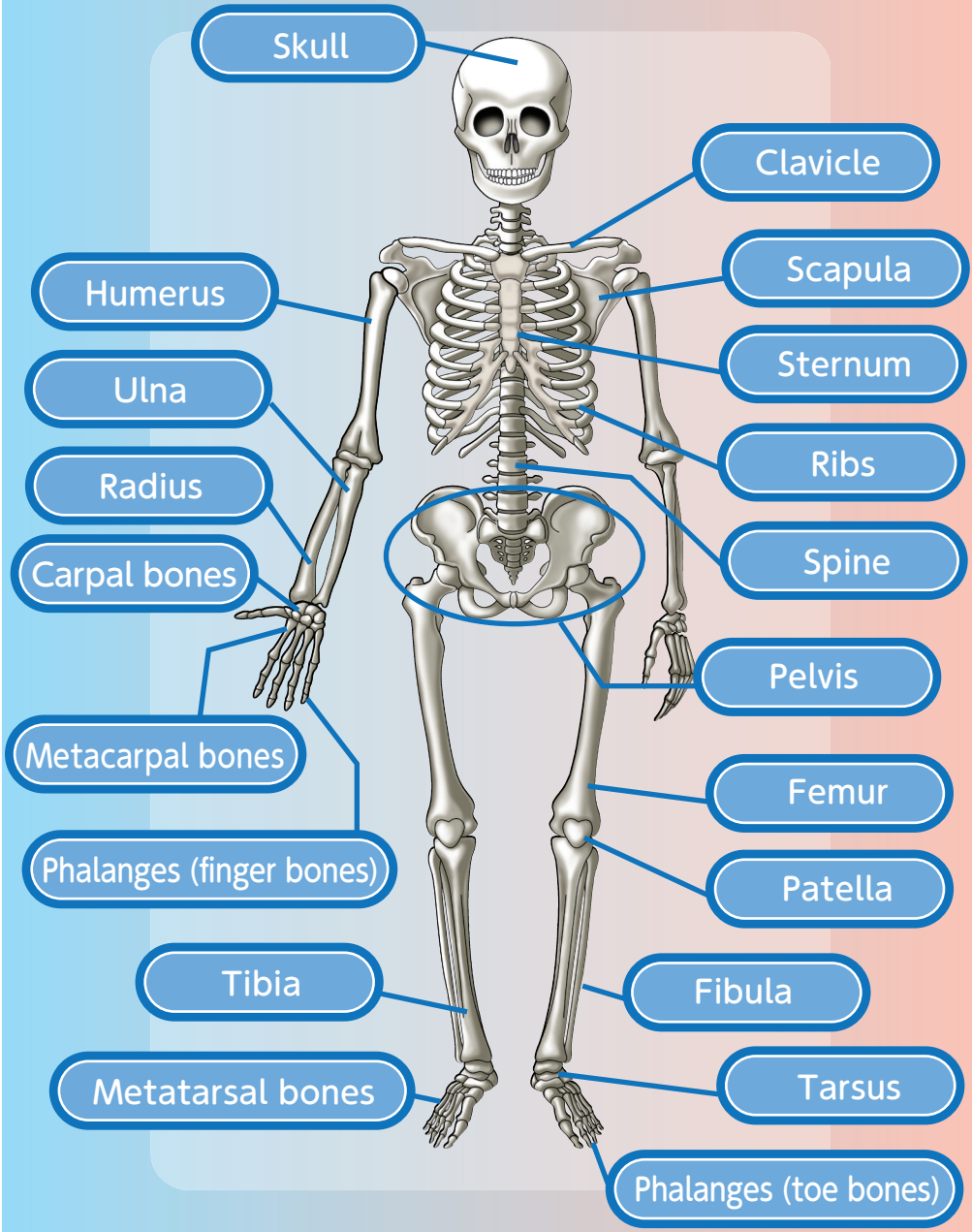


Female pelvis

The pelvis protects important organs in the waist, including the small and large intestines. The pelvis is the bone that varies the most between men and women. A female pelvis has a larger hole in the middle so a baby can pass through it.

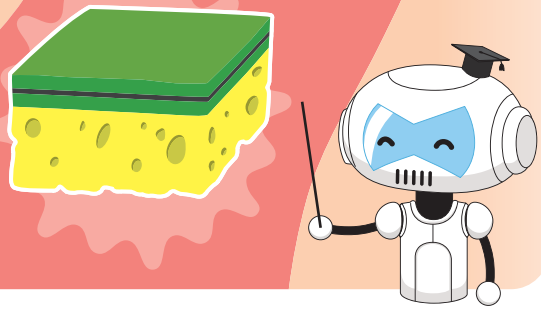
Answer: 24 bones

Names of bones



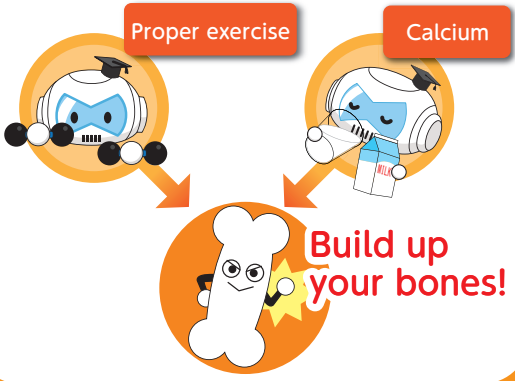
Bones must support the body, so they need to be strong. At the same time, they have to be light enough to allow free movement.

As illustrated above, the outside of the bone is a thin, solid layer. The inside is sponge-like, with numerous holes. This allows bones to be light and strong at the same time.

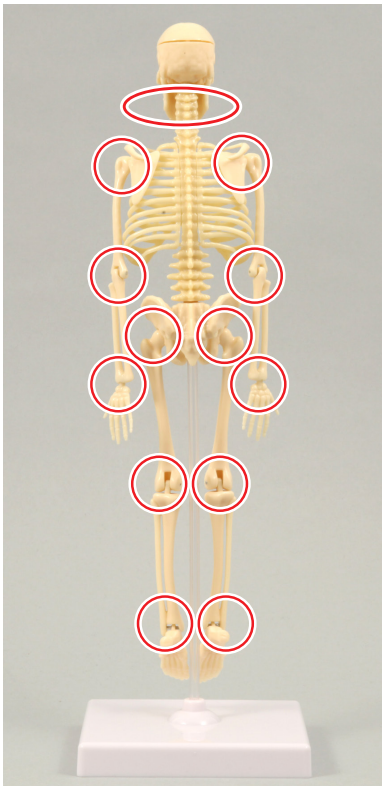


"Fracture" means breaking a bone.

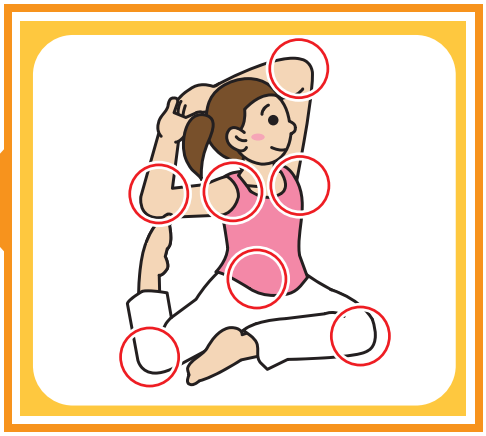
Proper exercise and calcium, such as from milk, will make your bones stronger.



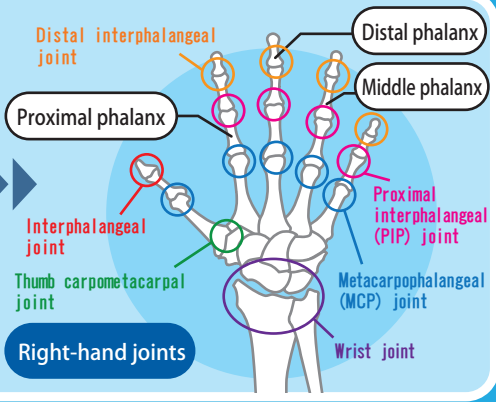
What is a joint?



A joint is an area where bones meet and the skeleton can move. The human body has more than 300 joints. With so many joints, you can move in various ways.

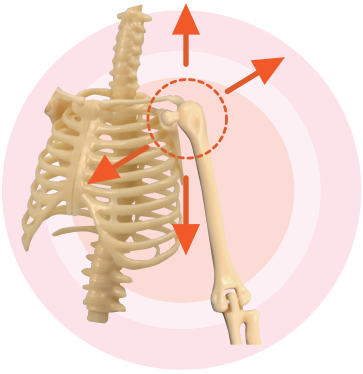


A human hand, which is capable of complex motion, has almost 20 joints!

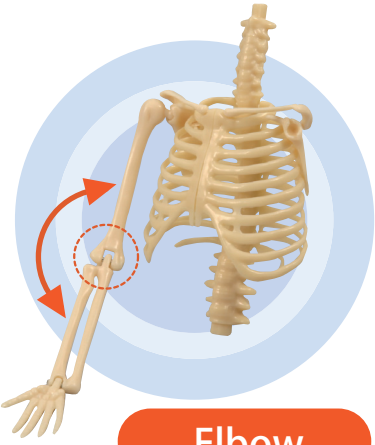


Try it yourself.

Let's use the skeleton to see how the joints move.



Shoulder



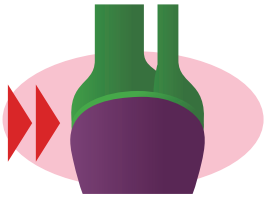
Elbow

The joints in the shoulder/thigh move differently from those in the wrist/elbow. These different types of joints are called ellipsoid joints and hinge joints, respectively.

Ellipsoid joint

- It moves freely, back and forth and around.

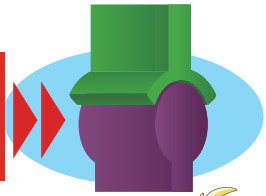
Examples: shoulders and thighs



Hinge joint

- It moves widely in a specific direction, like a door.

Examples: knees and elbows



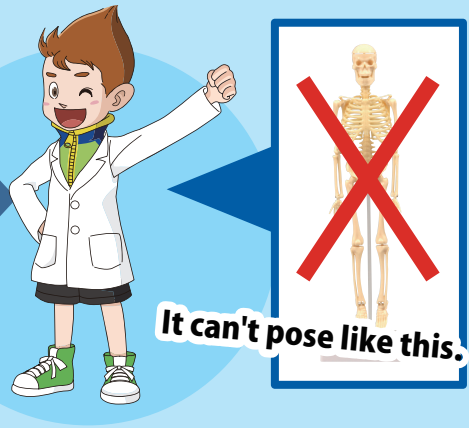
How do the other joints move?

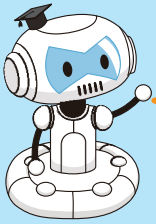
Feel how different joints actually move in your body!

How do muscles work?

Pose the skeleton!

Your body can hold a pose, but the arms and legs of the model skeleton will fall down as soon as you let go.
What makes the difference?



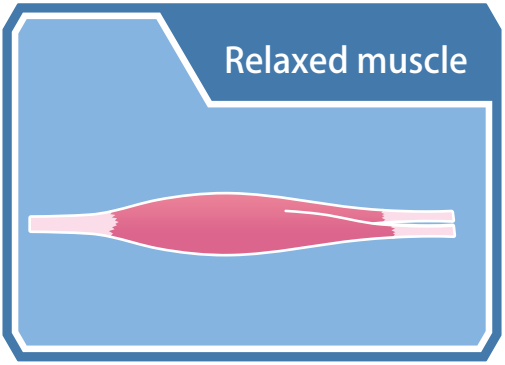


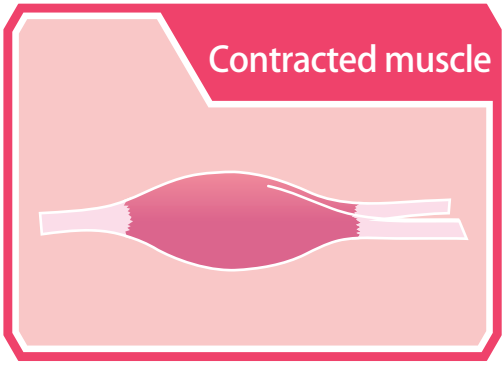
Muscles are the key factor in holding a pose.
How do they work?

Q

A muscle can relax or contract itself.
Muscles move the bones.

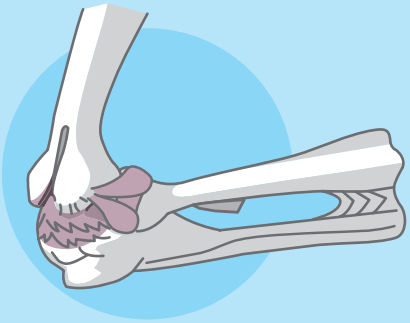
A



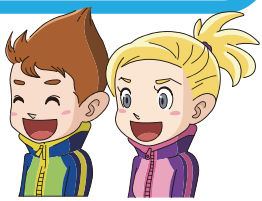


Muscles are connected to and located between bones.

You can move or support the bones by working the muscles.

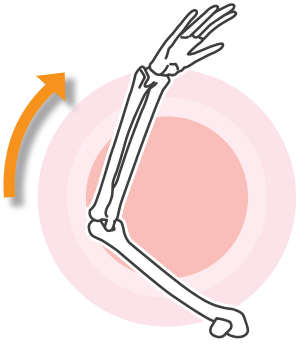


Muscles keep working while you are holding a pose. Without muscles, the model skeleton could not hold a pose.

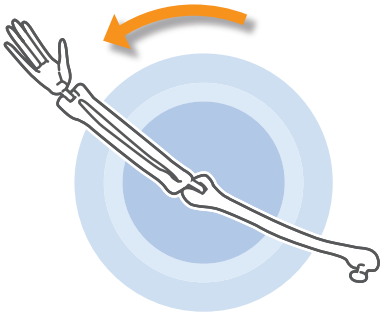


Let's think about it!

If the model skeleton had muscles, what would their condition be when the arm is bent or stretched?



When the arm is bent

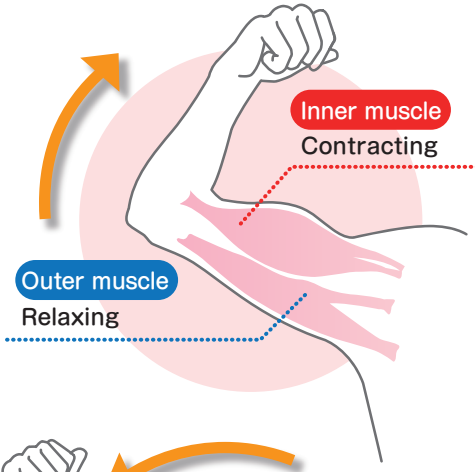


When the arm is stretched

The arm has separate muscles on the inner and outer sides. How do they work separately ?

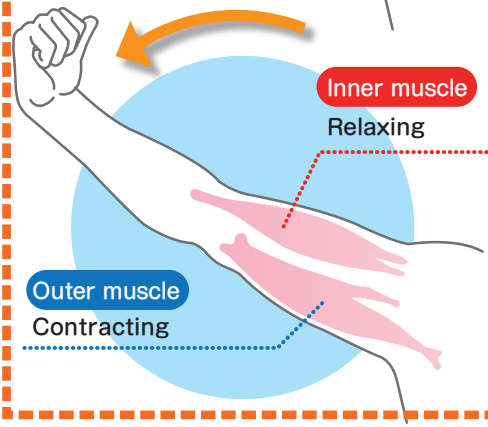
Answer

In the arm, the inner and outer muscles work differently at the same time!



When bending the arm

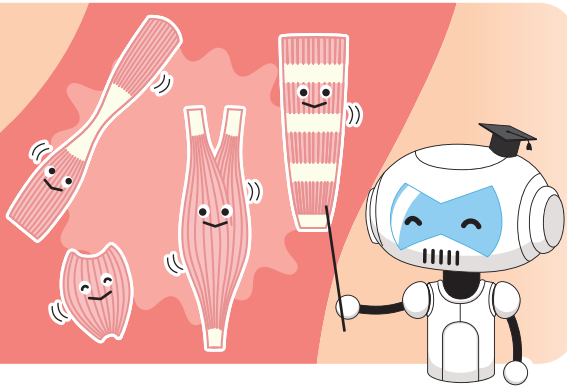
The inner muscle contracts while the outer muscle relaxes.



When stretching the arm

The outer muscle contracts while the inner muscle relaxes.

Other parts of the body, such as the hands, legs, and back, also have several muscles working at the same time.



Keep fit with proper diet and exercise!

The stronger your bone-supporting muscles, the more easily you can run or carry heavy objects. Stronger bones can also reduce the danger of injury.

You can make your bones and muscles stronger by getting enough exercise and eating a balanced diet.

Food that contains nutrients for building up bones

Milk

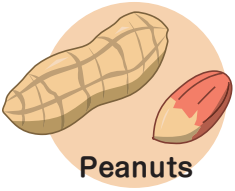
Broccoli

Cheese, Nuts

Food that contains nutrients for building up muscles

White chicken meat

Eggs

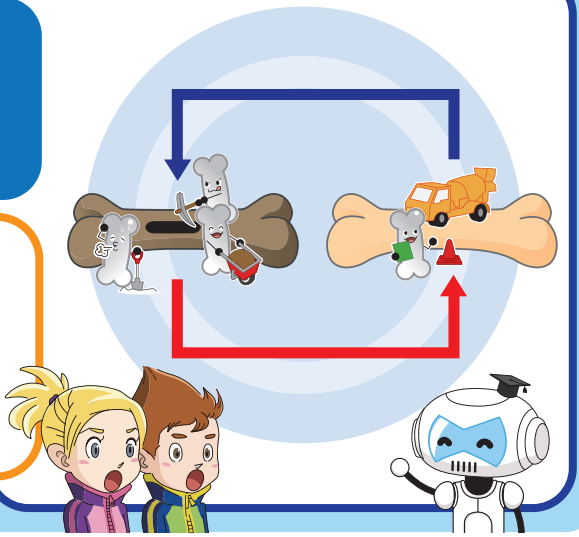


Peanuts

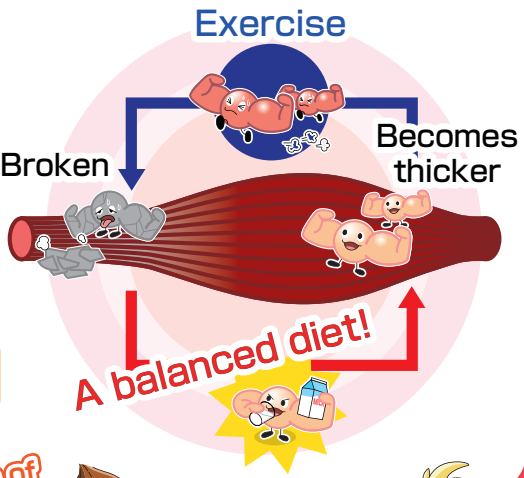
Did you know that bones and muscles repeatedly break down and repair themselves?

Bones constantly keep themselves fresh by repairing areas that are old and breaking down.

Daily exercise makes the bones stand up to stress and injury. Exercise encourages bones to become stronger.

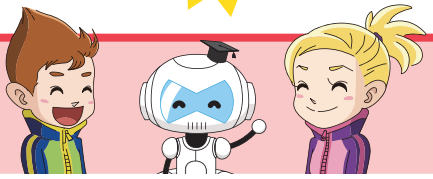


When you actively move your muscles during exercise, they begin to break down.
But with a proper, balanced diet, the broken muscle repairs itself and becomes stronger than before.



If you have stronger bones and muscles, you can live a healthier life.

Build up your knowledge of the human body and keep yourself fit!



B196811 K1215