Human Body

Bones, Joints and Muscles
<table>
<thead>
<tr>
<th>Bone</th>
<th>Also known as</th>
</tr>
</thead>
<tbody>
<tr>
<td>cranium</td>
<td>skull</td>
</tr>
<tr>
<td>mandible</td>
<td>lower jaw</td>
</tr>
<tr>
<td>clavicle</td>
<td>collarbone</td>
</tr>
<tr>
<td>sternum</td>
<td>breastplate</td>
</tr>
<tr>
<td>humerus</td>
<td>upper arm</td>
</tr>
<tr>
<td>ribs</td>
<td>ribs</td>
</tr>
<tr>
<td>pelvis</td>
<td>hipbone</td>
</tr>
<tr>
<td>ulna</td>
<td>arm bone</td>
</tr>
<tr>
<td>femur</td>
<td>thighbone</td>
</tr>
<tr>
<td>patella</td>
<td>kneecap</td>
</tr>
<tr>
<td>phalanges</td>
<td>fingers</td>
</tr>
<tr>
<td>phalanges</td>
<td>toe tips</td>
</tr>
<tr>
<td>vertebrae</td>
<td>backbone</td>
</tr>
<tr>
<td>tibia</td>
<td>calf bone</td>
</tr>
<tr>
<td>cranium</td>
<td>mandible</td>
</tr>
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<td>---------------</td>
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**Skeleton**

Without a skeleton, your body would collapse. The skeleton is built from hard, strong bones that also allow the body to move. Internal organs such as your brain, heart and lungs are protected by the skeleton. The bones that make up your skeleton also make blood cells and store calcium.

The skeleton is divided into two parts:

1. the axial skeleton – the center part including the skull, spine, breastbone and ribcage. It supports and protects the vital organs.
2. the appendicular skeleton – includes the arms, legs, pelvis and the girdles that attach them to the axial skeleton.

The axial skeleton is made up of eighty bones while the appendicular skeleton contains 126 bones.
The skeleton

• is the framework which holds your body up
• gives the muscles a place to attach themselves too
• protects your internal organs such as your brain, heart and lungs
• the marrow inside your bones makes the billions of blood cells your body needs

There are four types of bones in your skeleton:
1. long bones - arms, legs, fingers, toes
2. short bones - wrists and ankles
3. flat bones - shoulder blades and skull
4. irregular bones - jawbone bones of the spine
Skeleton

Without a skeleton, your body would ______________________________.

A skeleton is built from hard, strong __________________________. These __________________________ also allow the body to move.

The skeleton protects internal organs such as your __________ _______

______________________________________________________________________.

The skeleton is divided into two parts:

1. the ______________________________ skeleton

2. the ______________________________ skeleton
Skeleton

The axial skeleton includes the _______________

_____________________________.

It also supports and protects the _______________

_____________________________.

The appendicular skeleton includes the _______________

_____________________________.

The axial skeleton is made up of ________________ bones.

The appendicular skeleton is made up of ______________ bones.
There are four types of bones in your skeleton:

1. ___________ bones that can be found in your arms, legs, fingers, and toes.
2. __________________ bones that can be found in your wrists and ankles.
3. __________________ bones that can be found in your skull and shoulder blades.
4. __________________ bones that can be found in your jawbones and spine.

The skeleton:

• holds your __________________ up
• gives your __________________ a place to attach themselves too
• protects your __________________ organs
• the __________________ inside your bones makes the blood cells that your body needs
**Bones**

A bone is made up of:
- cartilage
- spongy bone
- compact bone
- bone marrow

The compact bone is the outer part of the bone and is made from cylinders of hard bone tissue. They make the bone strong. At the centre are red blood vessels.

The soft bone marrow tissue fills the spaces in spongy bone. It produces all the different types of blood cell.

The spongy bone is actually quite strong. It is lighter than compact bone and helps to reduce the bone’s total weight.

The smallest bones in your body, the hammer, anvil and stirrup are located in the inner ear while the largest bone, the femur (thighbone) is located in the leg.
Bones

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Bones

Cartilage is the growing part of the bones. It is rubbery and flexible.

When you were a baby, your body contained 350 bones. As you grow older and become an adult, you end up with 206 bones.

The odd shaped bones that make up your spine are called your vertebrae. Each of these vertebrae have a hole in the middle which your spinal cord fits through.

Bones are very tough and many are protecting your vital organs. The heart and the lungs are protected by your rib cage while your skull protects your brain.
**Bones**

Bones are growing parts which make up around 20% of your weight. When they are broken or fractured, they will instantly start to repair by growing new spongy bone.

Minerals like calcium help make your bones hard. The bones of children are not fully harden. This happens when you are around 18 years old.

The skull is made up from 29 different bones that are fused together. The cranium is the part of the skull that encloses the brain and is made up from 8 interlocking bones.

The spine (backbone) is made up from smaller bones called vertebrae. Your spine protects the spinal cord.

Your spine consists of five sections:
1. cervical (neck vertebrae)
2. thoracic (chest vertebrae)
3. lumber (lower back vertebrae)
4. sacrum
5. coccyx (tailbone)
Bones

A bone is made up of:

- ______________________
- ______________________
- ______________________
- ______________________
- ______________________

The compact bone is the ____________________ part of the bone. They make the bone _____________________.
In the middle of the compact bone are the red ___________ vessels.

The bone marrow tissue fills the ______________ in the ______________ bone and produces different types of ______________ cells.

The spongy bone is _____________________. It is lighter to help reduce the bone’s ______________ weight.

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**Bones**

The smallest bones in your body are situated in the __________ ear.

The longest bone is the _______ which is located in your _______.

Cartilage is the ______________ part of the bone.

When you were a baby, your body contained ____________ bones. As an adult, you will have ____________ bones.

______________________________ is the name given to the odd shaped bones in your spine. Each of these have a small ________________ in the middle. This is for your ________________ to go through.

Bones are very ______________ and they do a good job at protecting your ______________ organs.
**Bones**

Bones make up around ______ of your weight. Can your work out how much your bones weigh?

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Calcium helps keep your bones ____________________.

The skull is made up from ________________ different bones. The cranium, which is part of the skull, is made up from ____________ interlocking bones.

Your spine, which is made up from many small bones, consists of five sections:

1. _______________________: neck vertebrae
2. _______________________: chest vertebrae
3. _______________________: lower back vertebrae
4. _______________________
5. _______________________: tailbone
# Bones

<table>
<thead>
<tr>
<th>Bone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kneecap</td>
<td>Links the knee to the ankle and carries most of the body’s weight</td>
</tr>
<tr>
<td>Thighbone</td>
<td>One of the five sole bones in the foot</td>
</tr>
<tr>
<td>Shinbone</td>
<td>Protects the front of the knee joint</td>
</tr>
<tr>
<td>Fibula</td>
<td>The inner bone of the forearm</td>
</tr>
<tr>
<td>Metatarsal</td>
<td>Skeleton’s biggest bone and supports the weight of the upper body</td>
</tr>
<tr>
<td>Ulna</td>
<td>The upper arm bone that links the shoulder to the elbow</td>
</tr>
<tr>
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<td>The smaller lower leg bone that forms part of the ankle</td>
</tr>
</tbody>
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## Bones

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<tr>
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</table>
## Bones In the Human Body

There are 206 Bones in an Adult, let’s break that down!

<table>
<thead>
<tr>
<th>Part</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skull and Upper Jaw</td>
<td>1</td>
</tr>
<tr>
<td>Ear (3 in each ear)</td>
<td>6</td>
</tr>
<tr>
<td>Lower Jaw (mandible)</td>
<td>1</td>
</tr>
<tr>
<td>Neck bone (hyoid)</td>
<td>1</td>
</tr>
<tr>
<td>Backbone (Spine)</td>
<td>1</td>
</tr>
<tr>
<td>Ribs (12 pairs)</td>
<td>24</td>
</tr>
<tr>
<td>Breastbone (Sternum)</td>
<td>1</td>
</tr>
<tr>
<td>Left Shoulder</td>
<td>1</td>
</tr>
<tr>
<td>Right Shoulder</td>
<td>1</td>
</tr>
<tr>
<td>Left Arm</td>
<td>1</td>
</tr>
<tr>
<td>Right Arm</td>
<td>1</td>
</tr>
<tr>
<td>Left Wrist</td>
<td>1</td>
</tr>
<tr>
<td>Right Wrist</td>
<td>1</td>
</tr>
<tr>
<td>Left Hand and Fingers</td>
<td>1</td>
</tr>
<tr>
<td>Right Hand and Fingers</td>
<td>1</td>
</tr>
<tr>
<td>Left Side Hip</td>
<td>1</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
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<td>1</td>
</tr>
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<td>1</td>
</tr>
<tr>
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<td>1</td>
</tr>
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<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>
Broken Bones

Bones are very strong, but sometimes accidents can fracture or break them. When you break a bone, a doctor will have an X-Ray taken to determine the best way to treat it.

Usually a doctor lines up the broken bones via manipulation or surgery. If it is a bad break, they may need to use screws, pins or metal plates to hold the broken bones in place. Then a cast is put on to hold it all in place so the body can heal the bones.

There are many different types of fractures:

• a greenstick fracture (bone bends or splits but doesn’t fully break)
• Spiral Fracture - when the bone is broken because it has been twisted and there are several breaks
• Oblique Fracture - a break that is diagonal across the length of your bone
• Transverse Fracture - a break that is at a right angle to the length of your bone
• Compound Fracture - when the bone is broken and is poking through the skin
Broken Bones

Bone are very ________________.

but sometimes they break.

What does the doctor have taken so he can see the break?

__________________________________________________________________________.

Sometimes, when the break is bad a doctor may have to use

• ______________________________________________________________________

• ______________________________________________________________________

• ______________________________________________________________________

• ______________________________________________________________________

to hold the bones in place.
Broken Bones

When your bones break or fracture, the healing process starts straight away. Within an hour, a blood clot forms to stop the bleeding from the vessels inside the bone and then the rebuilding begins.

Cartilage is used to make a temporary repair and gradually, this cartilage is replaced by stronger bone cells. This process usually takes around 12 weeks. It does take a little longer in the leg bones as they carry the body’s weight.
Broken Bones

When does your body start the healing process? ________________

_________________________________________________________________________________.

Within an hour, what happens? ________________

_________________________________________________________________________________.

What is used to make a temporary repair? ________________

_________________________________________________________________________________.

How long does it take for the bone to be repaired? ________________

_________________________________________________________________________________.

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German physicist Wilhelm Roentgen discovered x-rays in 1895. He found that when the x-rays were projected through the body onto a special photographic plate, clear images of the bones were produced.

X-rays are pictures taken of the inside of something using electromagnetic radiation.

Doctors use the x-rays to see the skeleton inside your body. It helps them to see if there are any damaged or broken bones.

Have you ever had an x-ray? ______________________

Do x-rays hurt?_______________________________
**Joints**

Joints are places where two or more of your bones come together. They provide stability by holding your bones together. Some of these joints are fixed, some are rigid, but most are free-moving joints that give your skeleton incredible flexibility allowing you to run, write and bend.

You have about 400 joints in your body. More than 250 of these are the free-moving synovial joints.

People whose bodies are very flexible are sometimes called ‘double-jointed.’ It doesn’t mean that they have more joints than you, it means that their ligaments are more stretchy, making their joints more flexible.

There are three basic types of joints:

1. **Cartilaginous Joints** - These are where the bones are joined by cartilage that is flexible enough to allow them to move.

2. **Fibrous Joints** - These link bones with tough fibers that prevent any movement.

3. **Synovial Joints** - Most of your joints are these types of joints. They allow a much greater range of movement.
**Joints**

What are joints? ________________

__________________________________

__________________________________

__________________________________

What are the three basic types of joints?

1. ________________________________

2. ________________________________

3. ________________________________

What does double-jointed mean?

________________________________________________________________________

________________________________________________________________________
Joints

There are six main types of free-moving (synovial) joints:

• **Saddle Joint:** Only in your thumb. It allows movement in two directions.

• **Pivot Joint:** Found at the top of your neck, it allows your head to turn from side to side.

• **Ellipsoidal Joint:** Found in your knuckles and wrists. It allows up and down and side-to-side movements.

• **Hinge joint:** It works the same way as a door hinge, allowing you to bend or straighten your elbows, knees, fingers and toes.

• **Plane Joint:** Where two flat bones fit together such as your ankle and allows you to make small gliding movements only.

• **Ball and Socket Joint:** This is where a ball-like head of one bone fits into a shallow cup-shaped socket of another bone. It allows you to swing your arms and legs in most directions.
Joints

What are the six main types of free-moving (synovial) joints and where can they be found?

1. __________________________________________

2. __________________________________________

3. __________________________________________

4. __________________________________________

5. __________________________________________

6. __________________________________________
Muscles

To move, you need muscles. Muscles are usually attached to bones by a strong string called a tendon. When these muscles contract, they pull on the bones, moving them around the joints.

Most humans have more than 650 skeletal muscles. You using up to 200 muscles just to take one step. They are what help us move, lift, run and jump.

The strongest muscle in the human body is the masseter or the jaw muscle.

There are 3 types of muscles:

• The skeletal muscles – These are the muscles you use to move around
• The smooth muscles - These muscles take care of things that work without you thinking about them such as moving food through the digestive system
• The cardiac muscle - This muscle keeps your heart beating
Muscles

What happens when a muscle contracts?

______________________________________________

______________________________________________

______________________________________________

What is the strongest muscle in the human body and why do you think it is so strong?

______________________________________________

______________________________________________

______________________________________________

What are the three types of muscles?

1. ____________________________________________

2. ____________________________________________

3. ____________________________________________
Bones – Answers

Kneecap
- Links the knee to the ankle and carries most of the body’s weight

Thighbone
- One of the five sole bones in the foot

Shinbone
- Protects the front of the knee joint

Fibula
- The inner bone of the forearm

Metatarsal
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<tr>
<td>3</td>
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<td>Right Arm</td>
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<td>8</td>
<td>Left Wrist</td>
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</tr>
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<td>4</td>
<td>Left Leg</td>
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<td>4</td>
<td>Right Leg</td>
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<tr>
<td>7</td>
<td>Left Ankle</td>
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