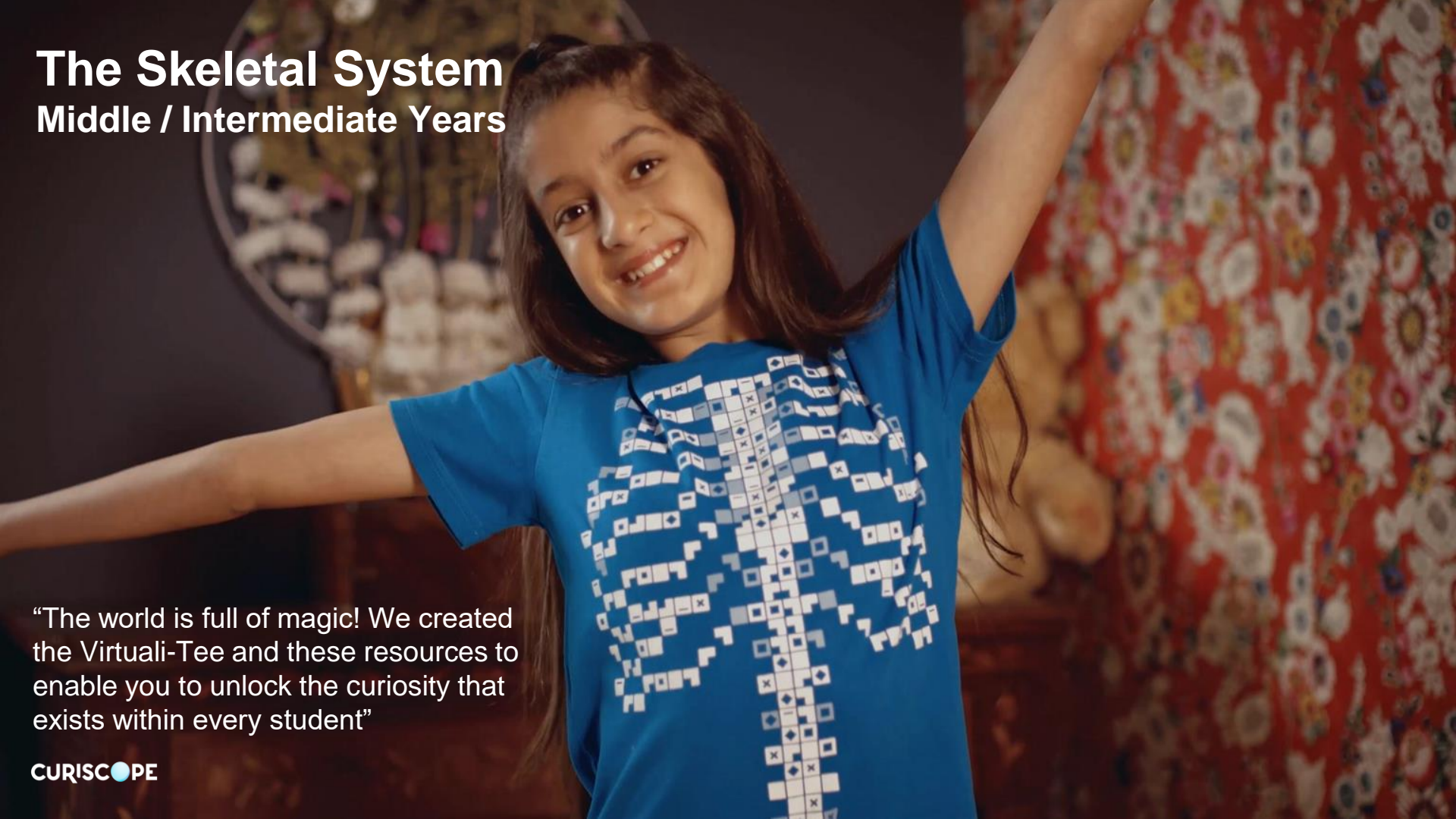


The Skeletal System

Middle / Intermediate Years



“The world is full of magic! We created the Virtuali-Tee and these resources to enable you to unlock the curiosity that exists within every student”

OVERALL LEARNING OUTCOMES

Middle / Intermediate Years

The Musculoskeletal System Objectives

- To identify the structure and function of the human skeleton
- To describe the role of the skeletal system in support, protection, movement and making blood cells



Let's get curious...

Have you got some experiences to share about your skeletal system?

What did this experience LOOK LIKE, SOUND LIKE, and FEEL LIKE?

Let's find out some more.....



The human skeleton

How many bones do you think there are?

- A) 98
- B) 206
- C) 150

Answer: B (206)

"Children are born with around 300 bones which fuse together as we grow."



Why so many bones?

Some parts of your body have many small bones.

There are 27 bones in each hand
and 26 in each foot

Why do you think that is?

We have lots of bones in our hands and feet because they need to be very adaptable and dextrus. What do you think this means?

“106 out of all 206 bones are in your hands and feet!!”

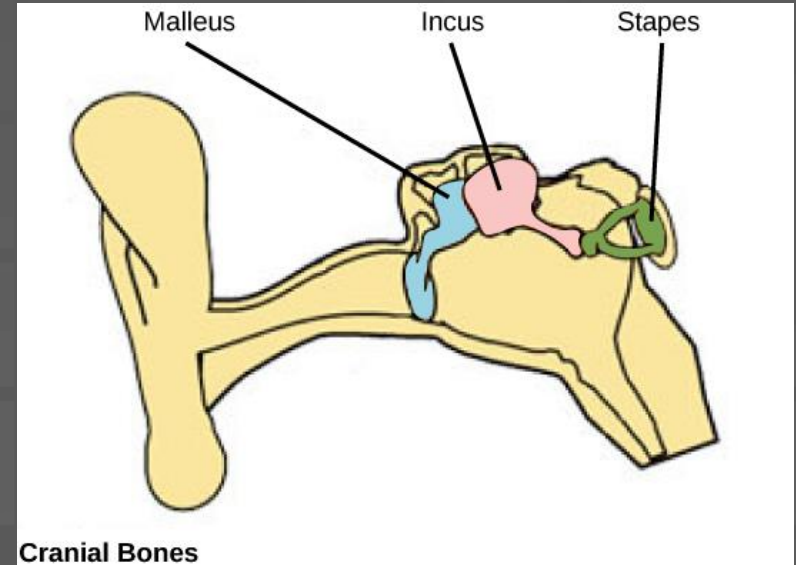
Can you spot anything unusual about this x-ray?



Little bones

The smallest bones in the human body are found in the inner ear and vibrate helping us to hear

The smallest bone of all is the stirrup or stapes bone which is about 3 mm long



Large bones

The largest and strongest bone is the Femur or thigh bone which extends from the hip to the knee.

In forensic science, a person's femur can be used to calculate the estimated height:

1. Measure the femur in centimeters.
2. If the subject is female, multiply the length by 2.47 and add 54.1 to arrive at the approximate height.

If the subject is male, multiply by 2.32 and add 65.53.

These calculations are accurate to within five centimeters.



This file comes from [Wellcome Images](#), a website operated by Wellcome Trust, a global charitable foundation based in the United Kingdom.

Human left and right femur, Palestine, 100 BCE-200 CE

This femur shows an unreduced bone fracture.

This means that the bones were not correctly realigned, using a splint or by surgical means, and therefore did not heal correctly.

These femurs are from the left leg and the right leg of a human, although it is not clear if they are a pair. The bones were excavated at Tell Fara, Palestine, by the British School of Archaeology in Egypt.

Why do we need a skeleton?

Protection

Support

Movement



Protection

The skeleton protects important organs in the body

Most of your organs are made of soft tissue.

The skeleton stops them from getting damaged.

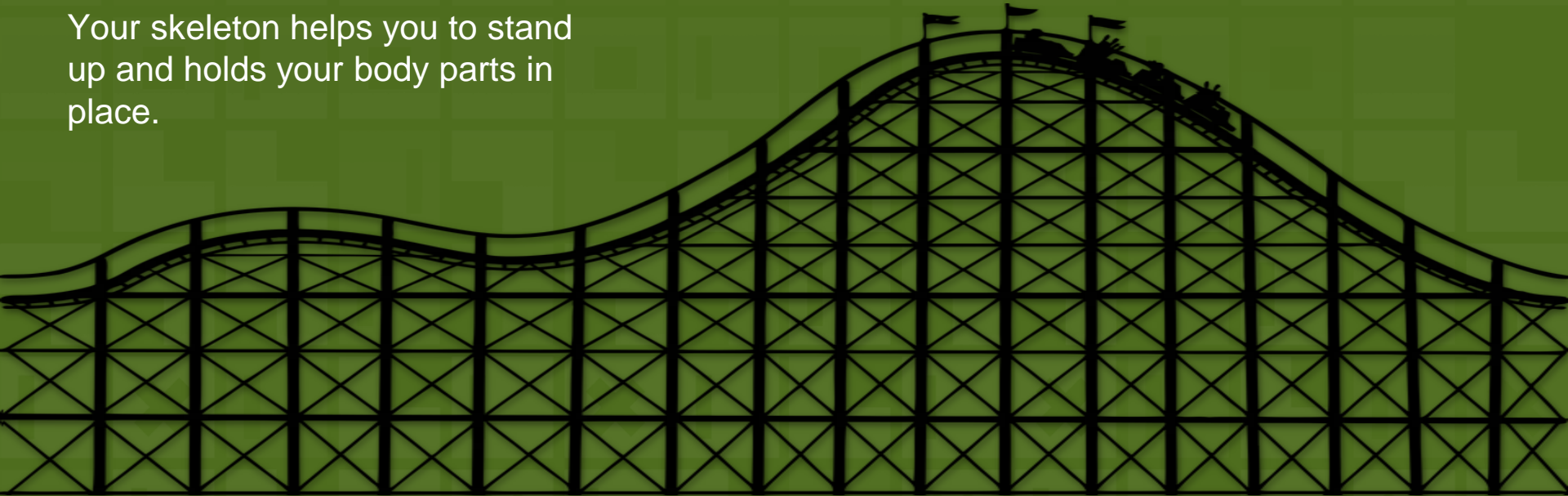
What protects your brain?



Support

Bones are hard and strong.

Your skeleton helps you to stand up and holds your body parts in place.



Movement

Your body can bend because parts of the skeleton are jointed.
Bones are so important to movement, that if we lose a limb we replace it with prosthetics.



Movement

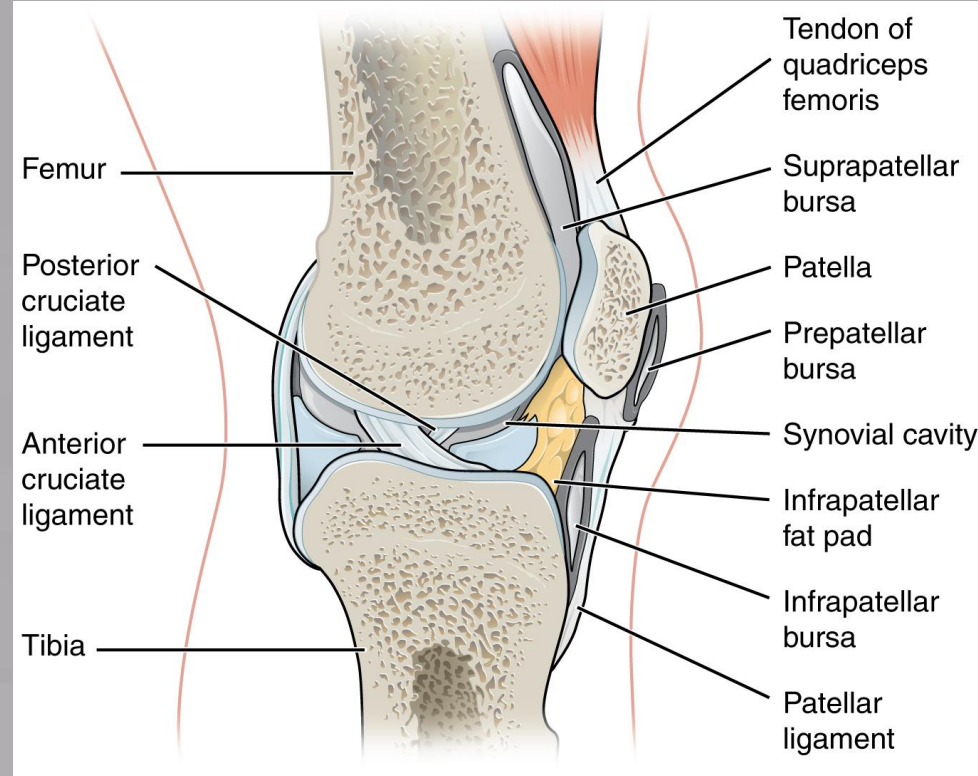
Tendons and ligaments are joined to your bones helping you to move.

Examine the diagram to the right, showing a labelled diagram of the knee. Complete the sentences below:

A tendon joins _____ to _____.

A ligament joins _____ to _____.

A **strain** is a stretching or tearing of muscle or tendon.
A **sprain** is a stretching or tearing of ligaments.
The most common location for **sprain** is in your ankle.



Source: OpenStax College

X-RAYS

X-rays are a form of electromagnetic radiation that have a higher energy than visible light. X-rays can pass through most objects, including the body.

Different parts of the body absorb the x-rays at different levels. Dense bone absorbs a lot of the radiation while soft tissue, such as muscle, fat and organs, allow more of the x-rays to pass through them.

Bones appear white on the x-ray, soft tissue shows up in shades of grey.



The Virtuali-tee

Today we are going to be using a very special t-shirt to explore your skeletal system

*“Explore the Human Body...
On a Human Body.....”*



What is the Virtuali-Tee?

A t-shirt that lets us see inside YOUR body using Augmented Reality!

We'll use a mobile device to scan the t-shirt with the app and open a portal so we can explore what is going on under your skin.



Step 1 - Getting started

To get started, simply open the Virtuali-Tee app and point at the t-shirt. The tracker image is best picked up by initially pointing at the upper chest with the device 0.5m/1.5ft from the t-shirt.

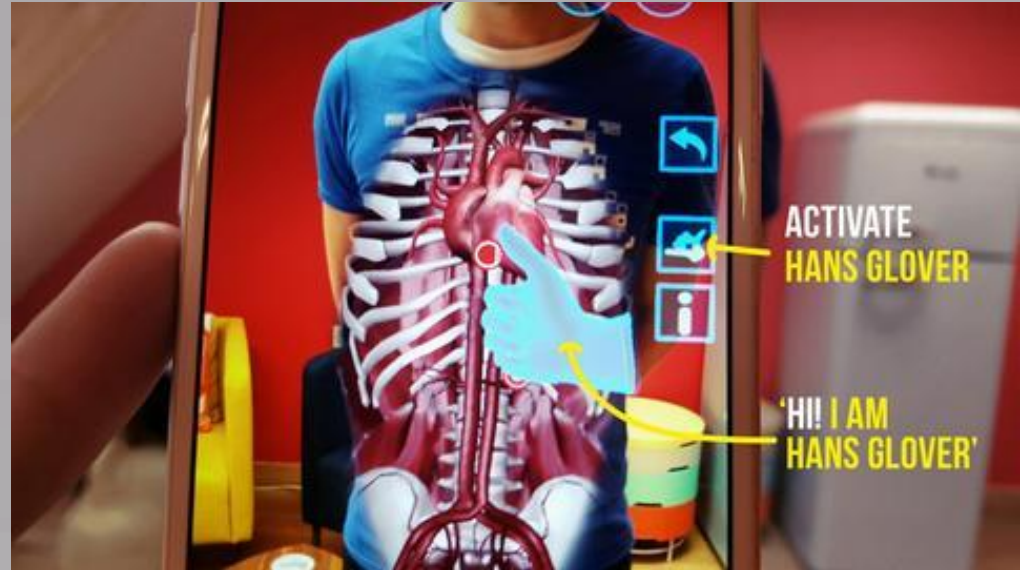
The tracking of the t-shirt requires that you are in a well lit space without heavy shadows and that the t-shirt is not stretched or heavily wrinkled.



STARTING DISTANCE OF
0.5 METRES


Step 3 - Surprise! Meet Hans Glover....your virtual expert on the body!


Think of Hans as a holographic guide to the body. He'll talk you through the anatomy and physiological systems in the body. Just tap the Hans button and he'll appear.

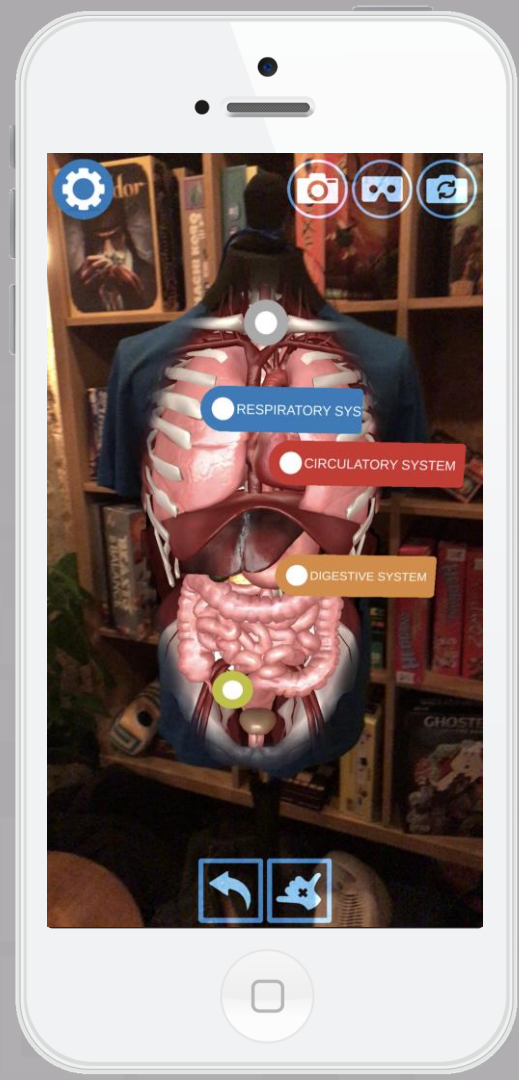


Getting into your skeletal system

Tap on the grey skeletal system hotspot and the app will isolate to just that system. See through to your spine!

Tap on the  button to call Dr Han's, who will give you a guided tour!

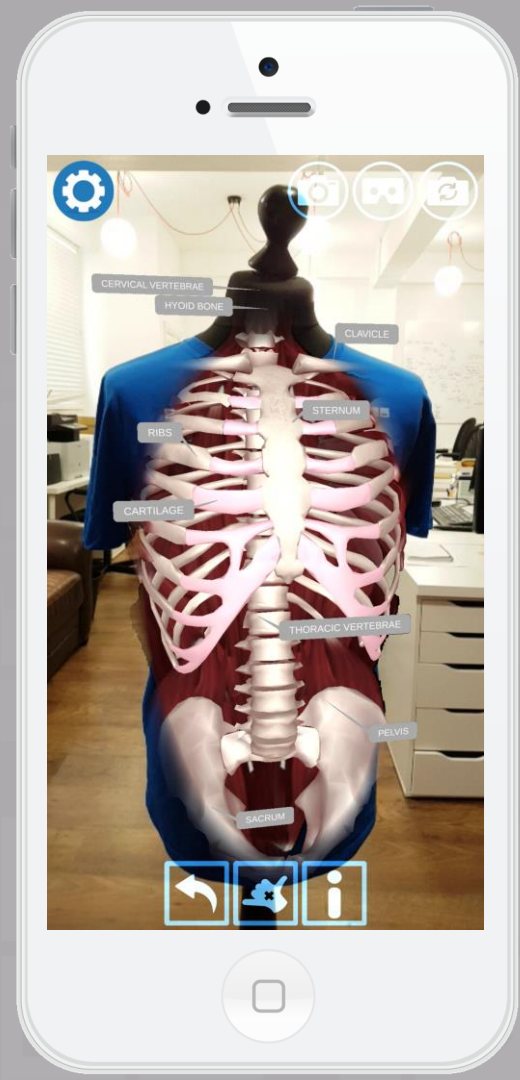
Tap the  button if you would like subtitles.



Discovering your bones

Tap on the  button to bring up the labels for the skeletal system.

Study these as they will help your next activity.



Label the skeletal system

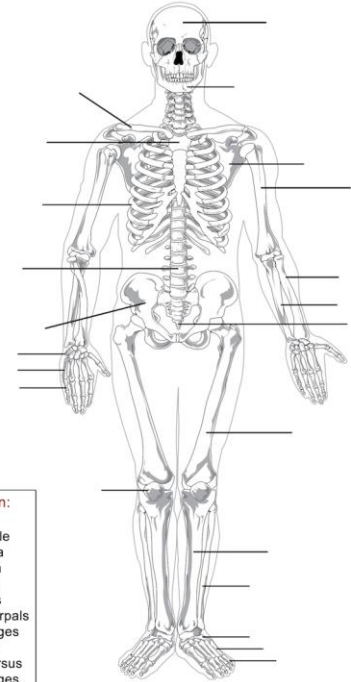
Can you feel each of these bones on your body?

In pairs or groups make and label your own model/picture of a skeleton using the materials your teacher gives you.

The print friendly take home sheet is available in the teacher resources repository:

<https://goo.gl/3UWxYK>

Today was a curious adventure into my skeletal system



- Label the skeleton:**
- | | |
|----------|-------------|
| Clavicle | Ribs |
| Skull | Mandible |
| Radius | Scapula |
| Ulna | Sacrum |
| Humerus | Patella |
| Femur | Carpals |
| Tibia | Metacarpals |
| Fibula | Phalanges |
| Sternum | Tarsus |
| Spine | Metatarsus |
| Pelvis | Phalanges |

The **ULTIMATE** way to learn about the body



www.curiscope.com

What are bones made out of?

About 70% of each bone is made from hard minerals like Calcium.

We need to eat calcium-rich foods such as milk and dairy products to keep our bones strong. Sardines, almonds and kale are wonderful ways to get your calcium dairy-free!

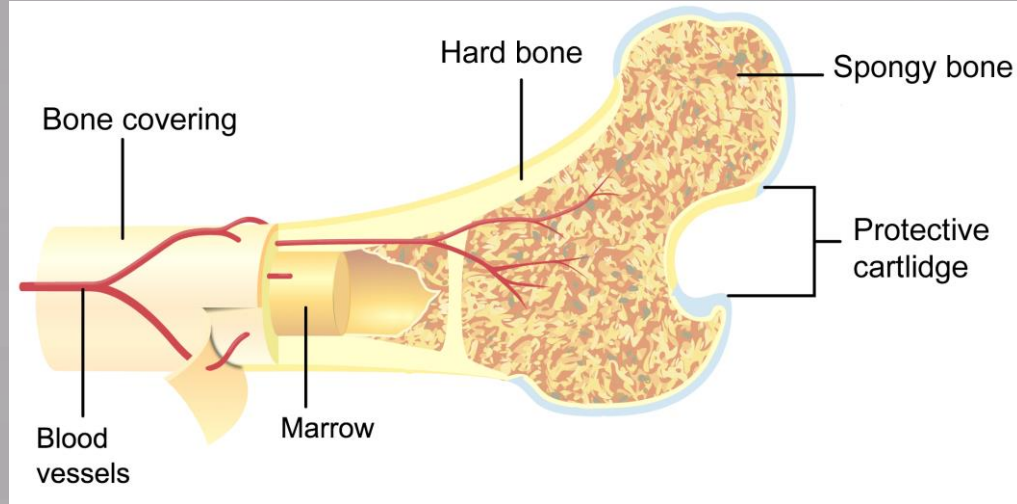


What is inside a bone?

The outside of the bone is hard whilst the inside is more spongy to make it lighter and easier to move around.

The centre of the bone is a soft substance called bone marrow.

Bone marrow makes new blood cells for your body.



Review Questions

How many bones are in the human body? 206.

What is the biggest bone in your body? Femur or thigh bone in leg.

Where is the smallest bone found? Inside the ear (stapes or stirrup bone).

What are the three functions of the skeleton? Support, protection, movement.

Which bones protect the heart and lungs? Ribs or rib cage.

What is at the centre of bones? Bone marrow, spongy material and blood vessels.

Which foods keep our bones healthy? Foods containing calcium such as milk and dairy.