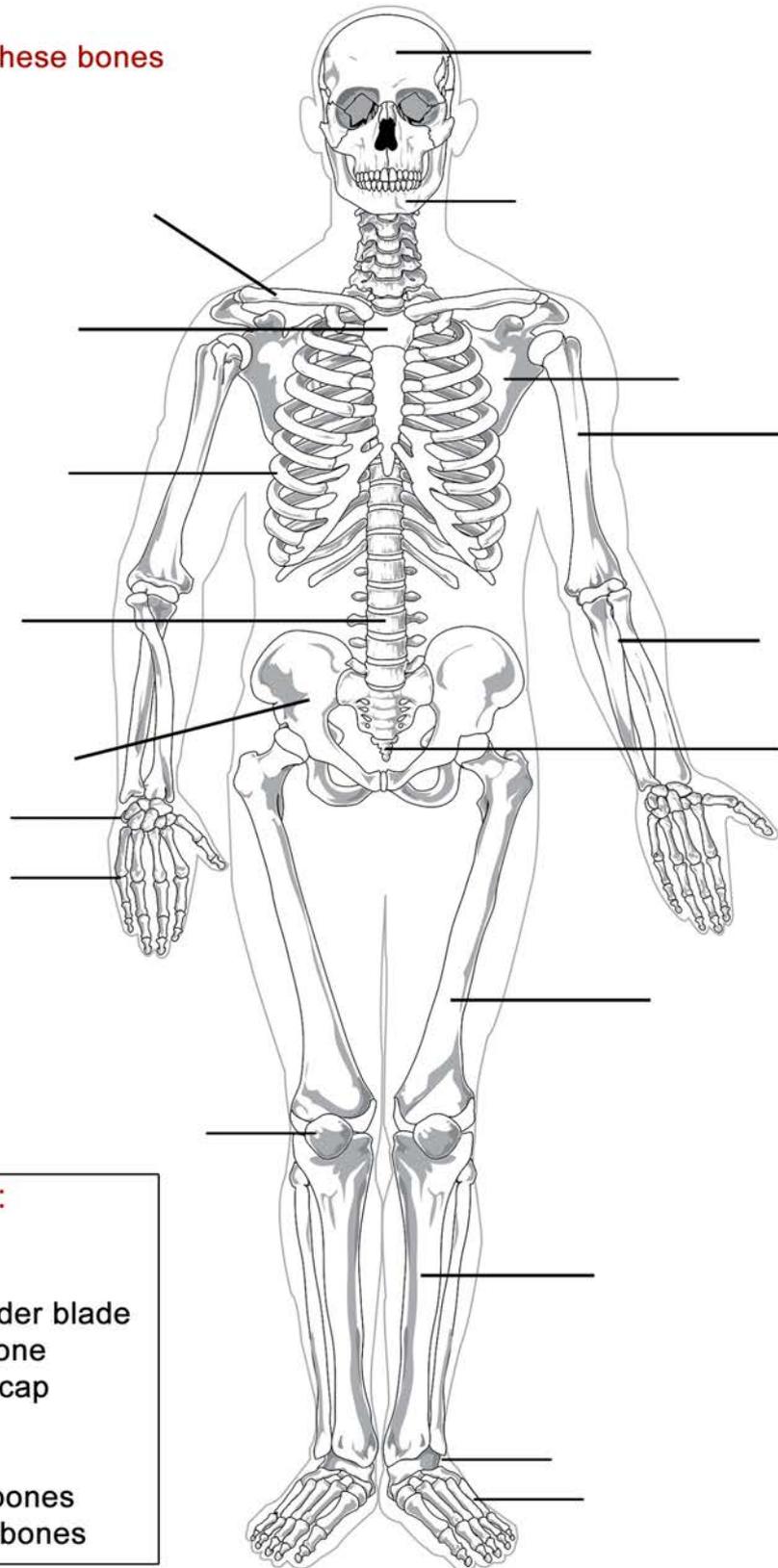


Today was a curious adventure into my skeletal system

Can you feel each of these bones on your body?



Label the skeleton:

- | | |
|-------------|----------------|
| Collar bone | Ribs |
| Skull | Jaw |
| Upper arm | Shoulder blade |
| Forearm | Tail bone |
| Thigh bone | Knee cap |
| Calf bone | Wrist |
| Breast bone | Ankle |
| Back bone | Foot bones |
| Hip | Hand bones |

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



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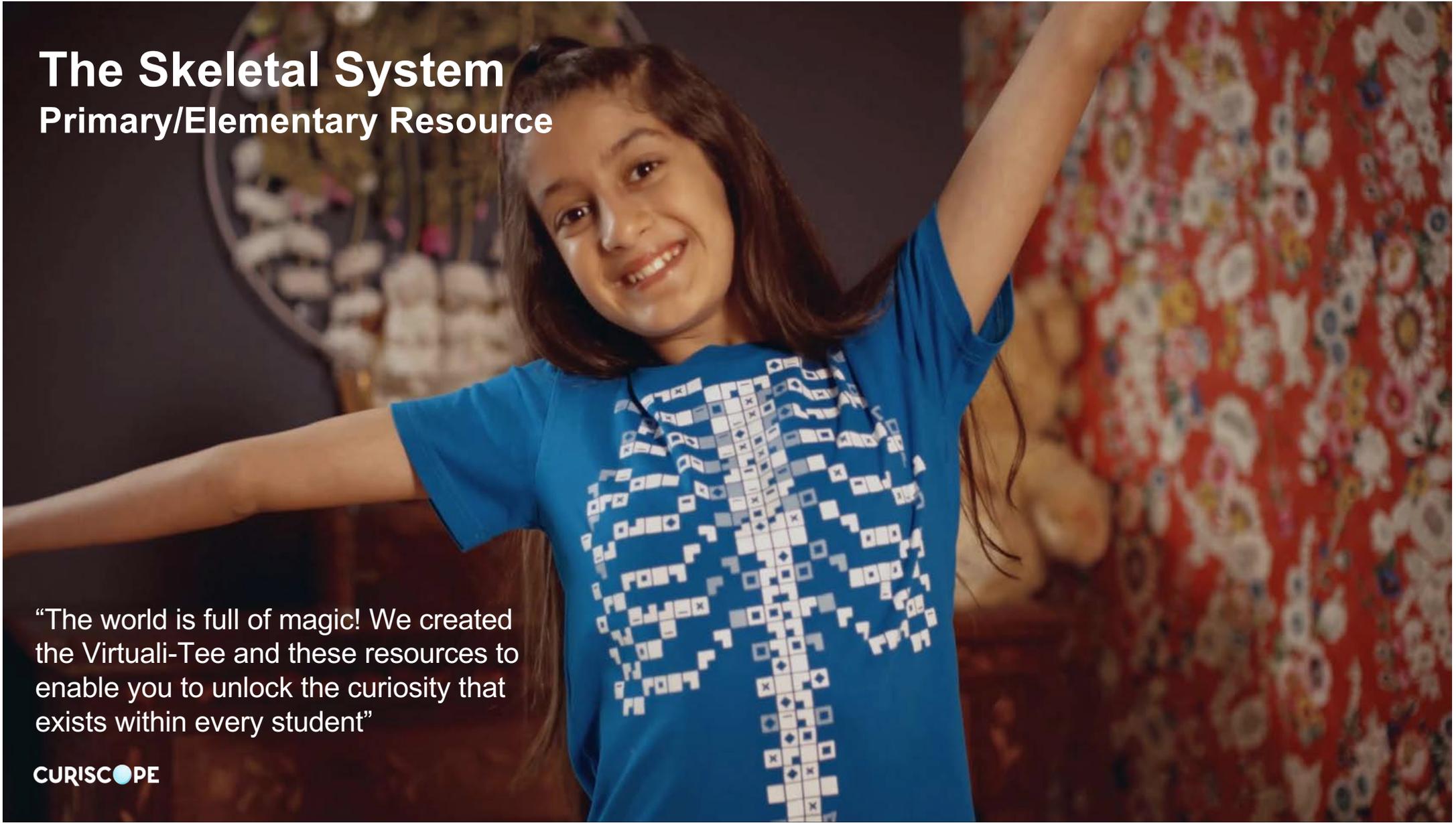


The Skeletal System

Primary/Elementary Resource

“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”

CURISCOPE



OVERALL LEARNING OUTCOMES

Primary / Elementary

The Musculoskeletal System Objectives

- To identify the functions of the skeleton
- To relate images of bones, muscles and joints to diagrams and the body



Let's get curious...

Have you ever seen a skeleton?

Do you have a skeleton?

How do you know?

What would happen if you didn't have a skeleton?

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



A KWL Inquiry worksheet for the skeletal system is available in the teacher's resources repository at:

<https://drive.google.com/drive/folders/17N-hPZnEAdBwevuxAYoTi-yasNatYQM9?usp=sharing>

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 lots of 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 dextrous. 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?

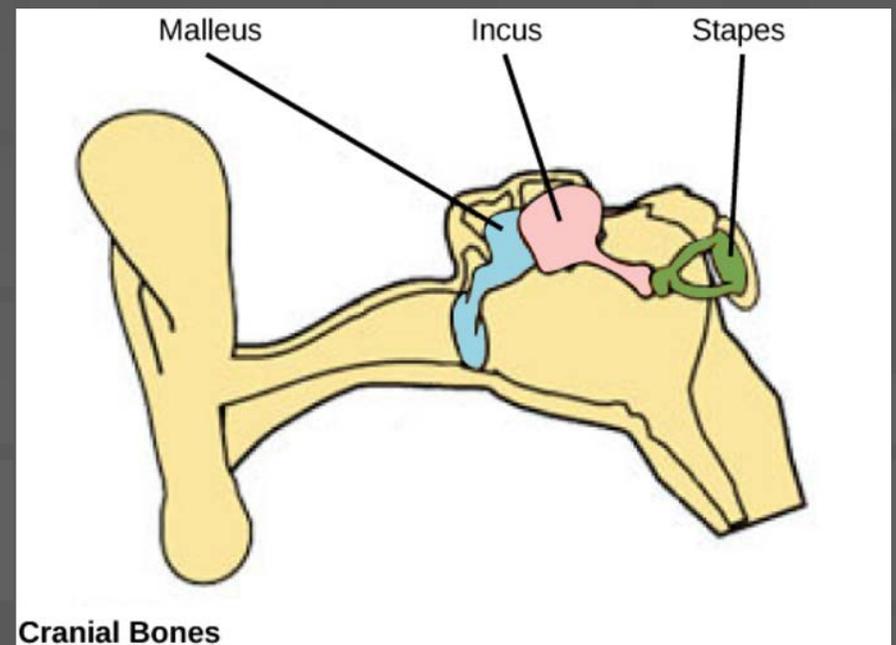


Little and large bones

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

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



Why do we need a skeleton?

Protection

Support

Movement



Protection

The skeleton protects important organs in the body

Most of your organs are soft and squishy.

The skeleton stops them from getting damaged.

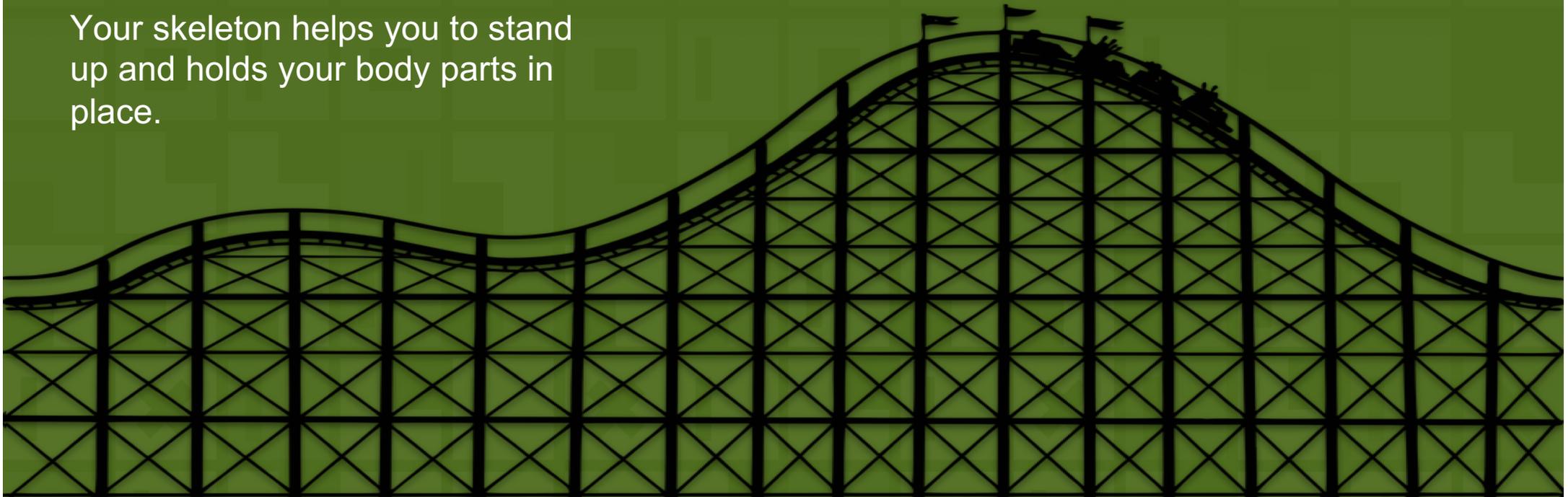
What protects your brain?



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.

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

Bones are so important to movement, that if we lose a limb we replace it with prosthetics.



X-RAYS

Doctors can use x-rays to see inside your body.

They can see if any bones are broken.

A cast or support will be put on to hold the bone still and in place whilst it grows back and heals.

Bones are growing all the time and can fix themselves!



Do all animals have skeletons?

Scientists classify animals into vertebrates (with a backbone) and invertebrates (without a backbone)

Discuss which these are invertebrates and which ones are vertebrates:



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 tshirt 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.

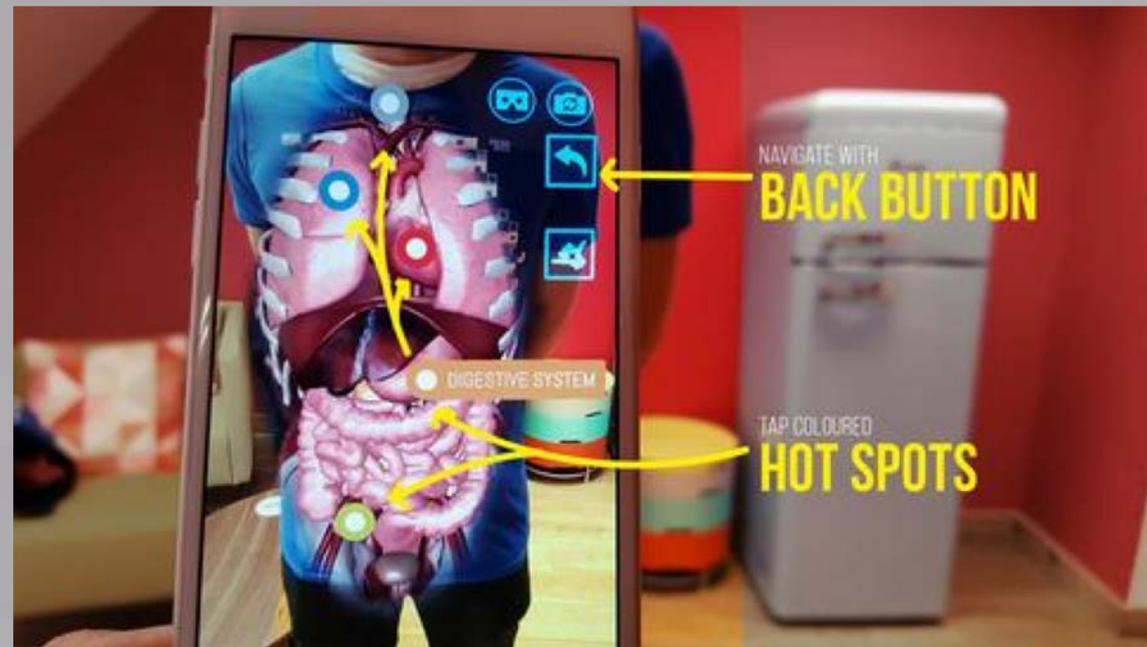
The tracking of the t-shirt requires that you are in a well lit space without heavy shadows and that the t-shirt is not stretched or heavily wrinkled.



Step 2 - Wow, the organs look amazing...now what!?

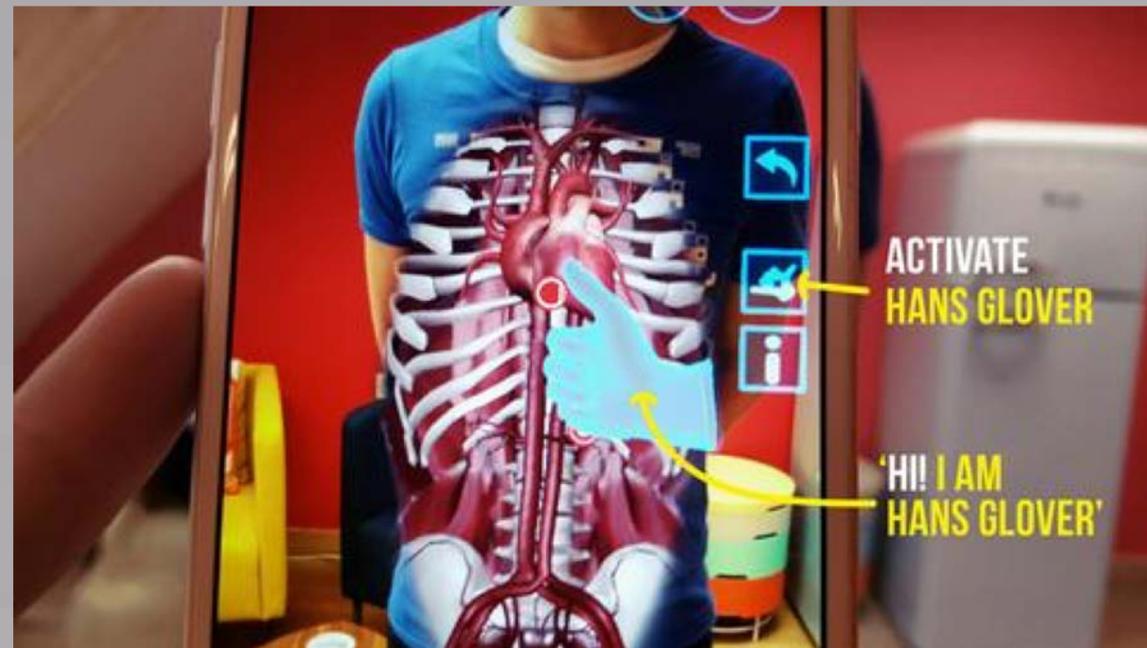
Well, we have implemented some pretty cool features into the app. Just tap the screen to get started. You can then isolate the physiological system by tapping on the coloured hot spots. You'll see some buttons floating outside the chest, use the back button to navigate between systems.

We encourage you to explore, if you see a button....tap it to find out what it does!



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.

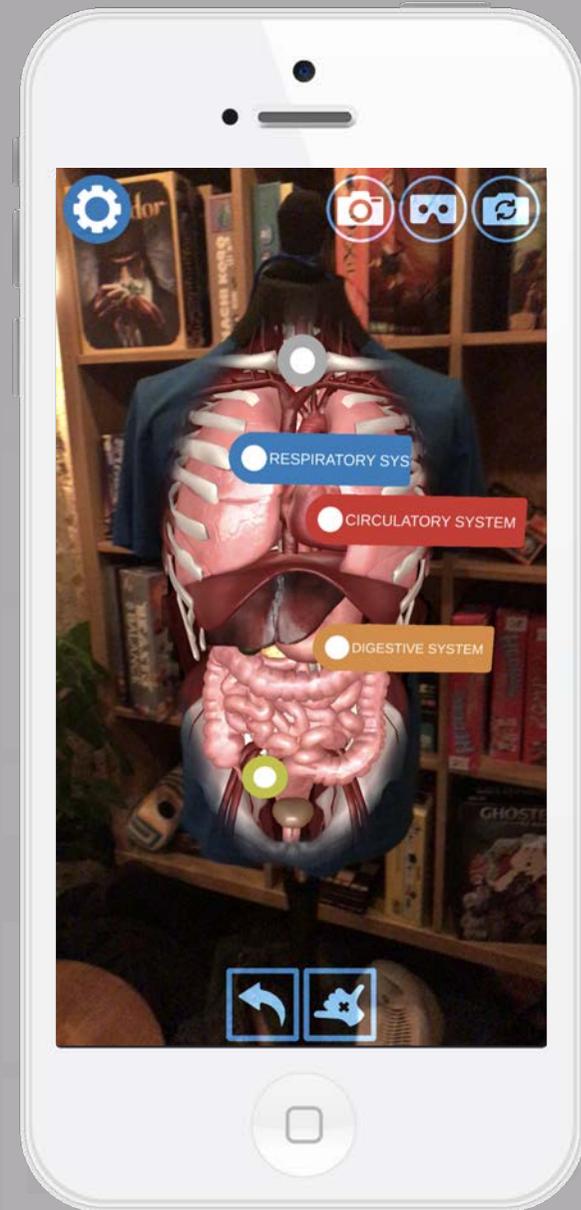


Getting into your skeletal system

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!

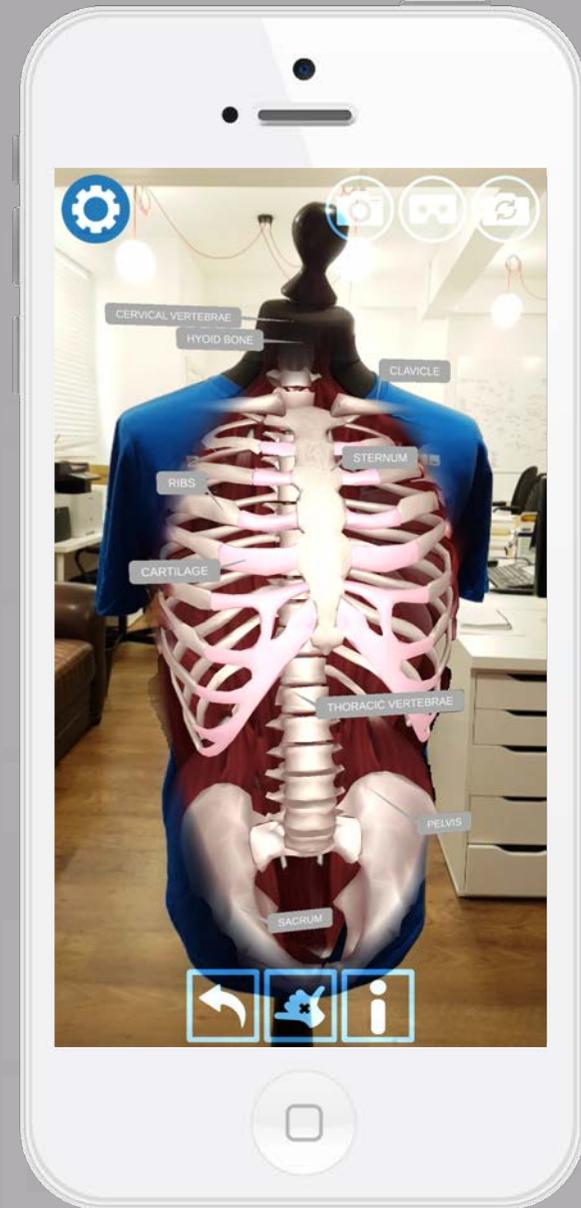
Tap the  button if you would like subtitles.



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?

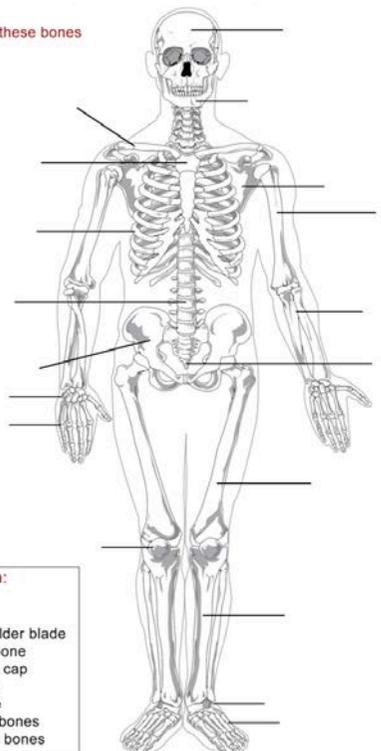
In pairs or groups make and label your own model/picture of a skeleton using the materials your teacher gives you.

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

Can you feel each of these bones on your body?



Label the skeleton:

Collar bone	Ribs
Skull	Jaw
Upper arm	Shoulder blade
Forearm	Tail bone
Thigh bone	Knee cap
Calf bone	Wrist
Breast bone	Ankle
Back bone	Feet bones
Hip	Hand bones

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

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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!

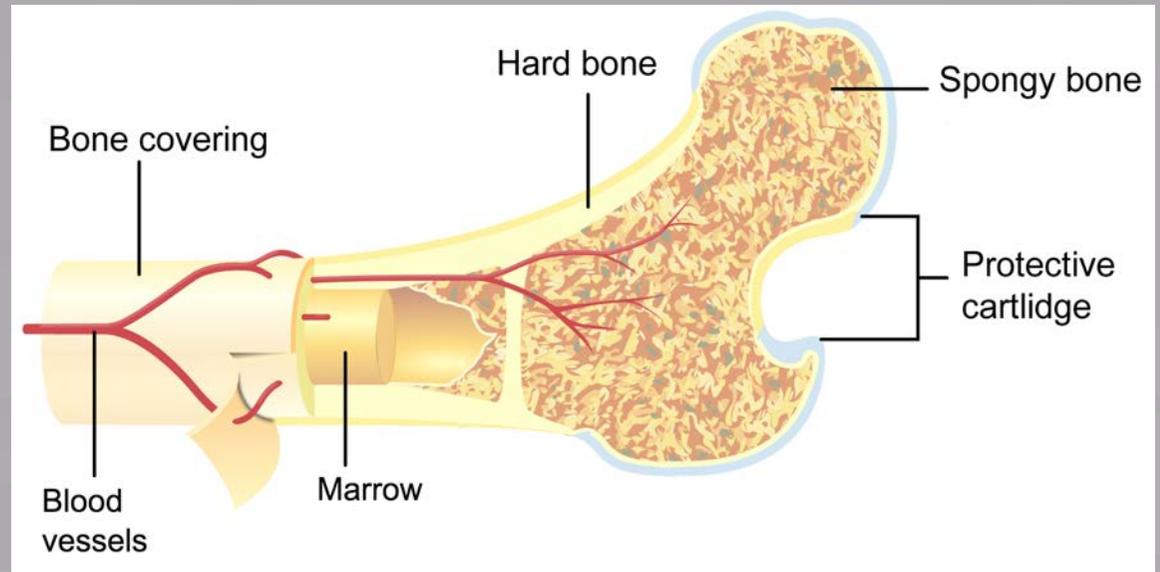


What is inside a bone?

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.

A note to that teacher: These **Challenge Cards** are designed for students to discover the answers as they use the 'Virtuali-Tee' and app. Answers can be found on the Skeletal System Quiz.

Challenge 1

Without bones you would...

- A. Float
- B. Sink
- C. Fall over
- D. Look the same

Challenge 2

Which of the following is NOT an organ?

- A. Cells
- B. Lungs
- C. Bones
- D. Heart

Challenge 3

Bones are made of...

- A. Steel
- B. Carbon fibre
- C. Collagen and calcium
- D. Hardened muscles

Challenge 4

Astronauts can come back to earth with...

- A. More teeth
- B. More bones
- C. Lighter bones
- D. A heavy heart

Challenge 5

Which of the following can have stronger than average bones?

- A. Accountants
- B. Animators
- C. Athletes
- D. Art teachers

Challenge 6

What can be found inside bones?

- A. Turnips
- B. Marrow
- C. Courgette
- D. Carrots

Challenge 7

What is marrow responsible for?

- A. Storing oxygen
- B. Producing red and white blood cells
- C. Filling in the gaps
- D. Filtering your blood

Challenge 8

White blood cells are able to...

- A. Change colour
- B. Carry oxygen
- C. Defend the body
- D. Carry instructions to organs

Challenge 9

Collagen can also be found in...

- A. Apples
- B. Hair
- C. Steel
- D. Pencils

Challenge 10

You can improve the health of your bones through...

- A. Eating foods that are high in calcium
- B. Exercise
- C. Taking vitamin D
- D. All of the above

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



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My curious adventure into my SKELETAL SYSTEM...

K

What I **K**now

W

What I **W**onder

L

What I **L**earned

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



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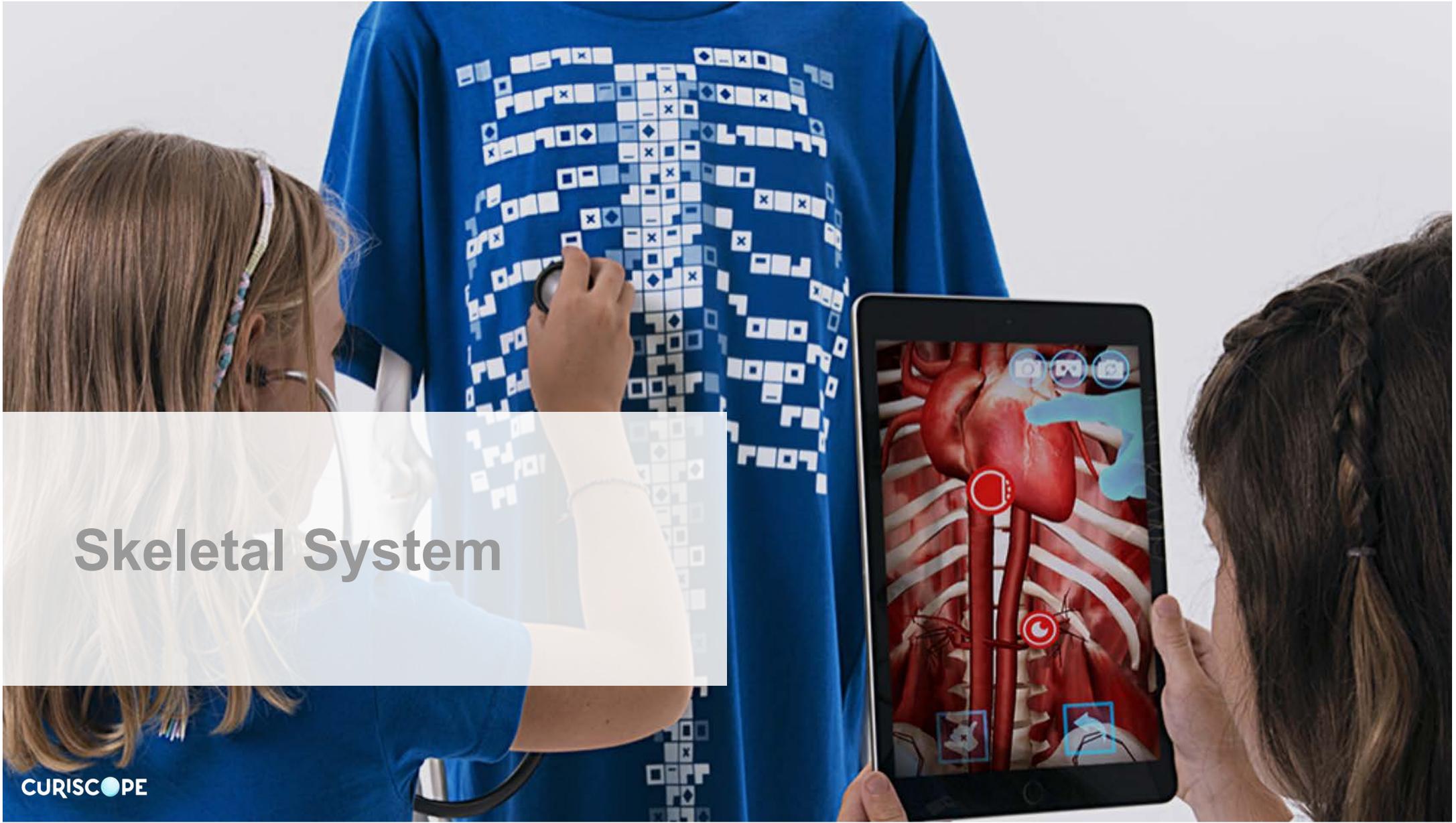
Skeletal System Quiz

A note to teachers

This resource is recommended for use in two ways:

1. As the answer scheme to the Skeletal System Challenge cards. Using the challenge cards, students discover the answers to each question as they are using the Virtuali-Tee app. Downloads are available in the teacher resources repository <https://drive.google.com/drive/folders/17N-hPZnEAdBwevuxAYoTiyasNatYQM9?usp=sharing>
2. As a group quiz after using the Virtuali-Tee app.

Skeletal System

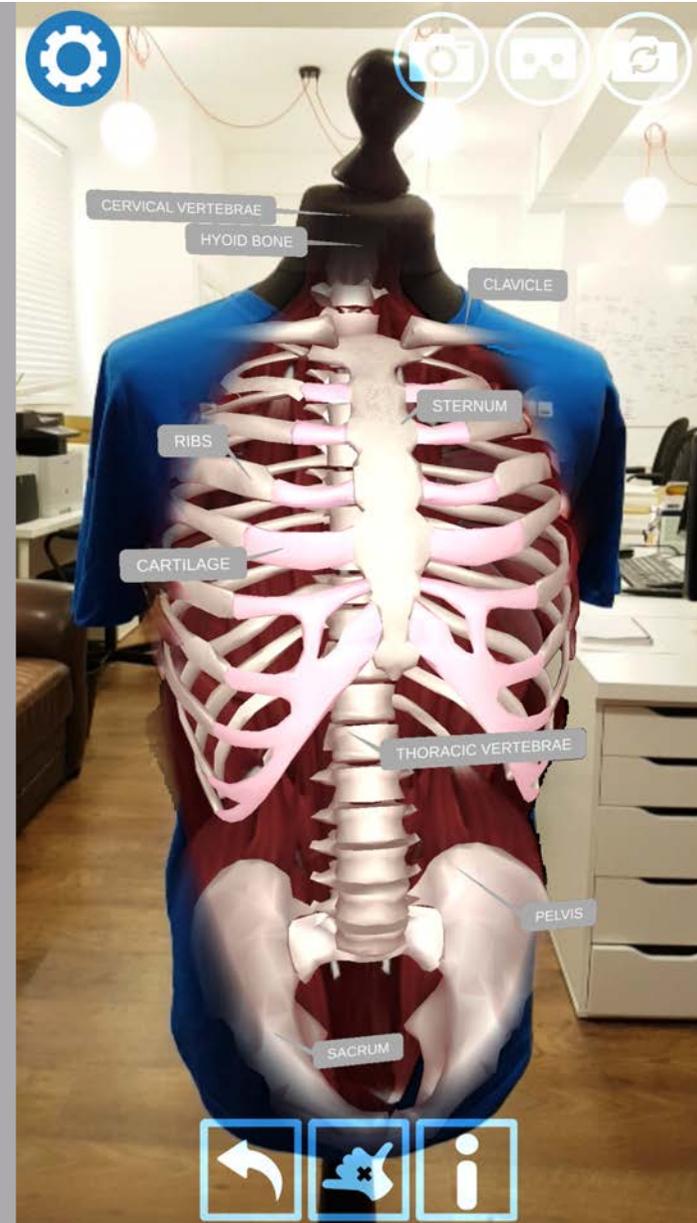


Question 1

Without bones you would ...

- A. Float
- B. Sink
- C. Fall over
- D. Look the same

Falling over would be the least of your worries!



Question 2

Which of the following is NOT an organ?

- A. Cells
- B. Lungs
- C. Bones
- D. Heart

Bones are organs too!
Cells make up every organ in our body but are not organs in themselves, they are the building blocks.



Question 3

Bones are made of...

- A. steel
- B. carbon fibre
- C. collagen and calcium
- D. hardened muscles

Collagen adds flexibility to the calcium, which forms the firm framework of the bone. Together they can handle great strain while still being able to flex.

Carbon fibre is often used for prosthetic running blades.



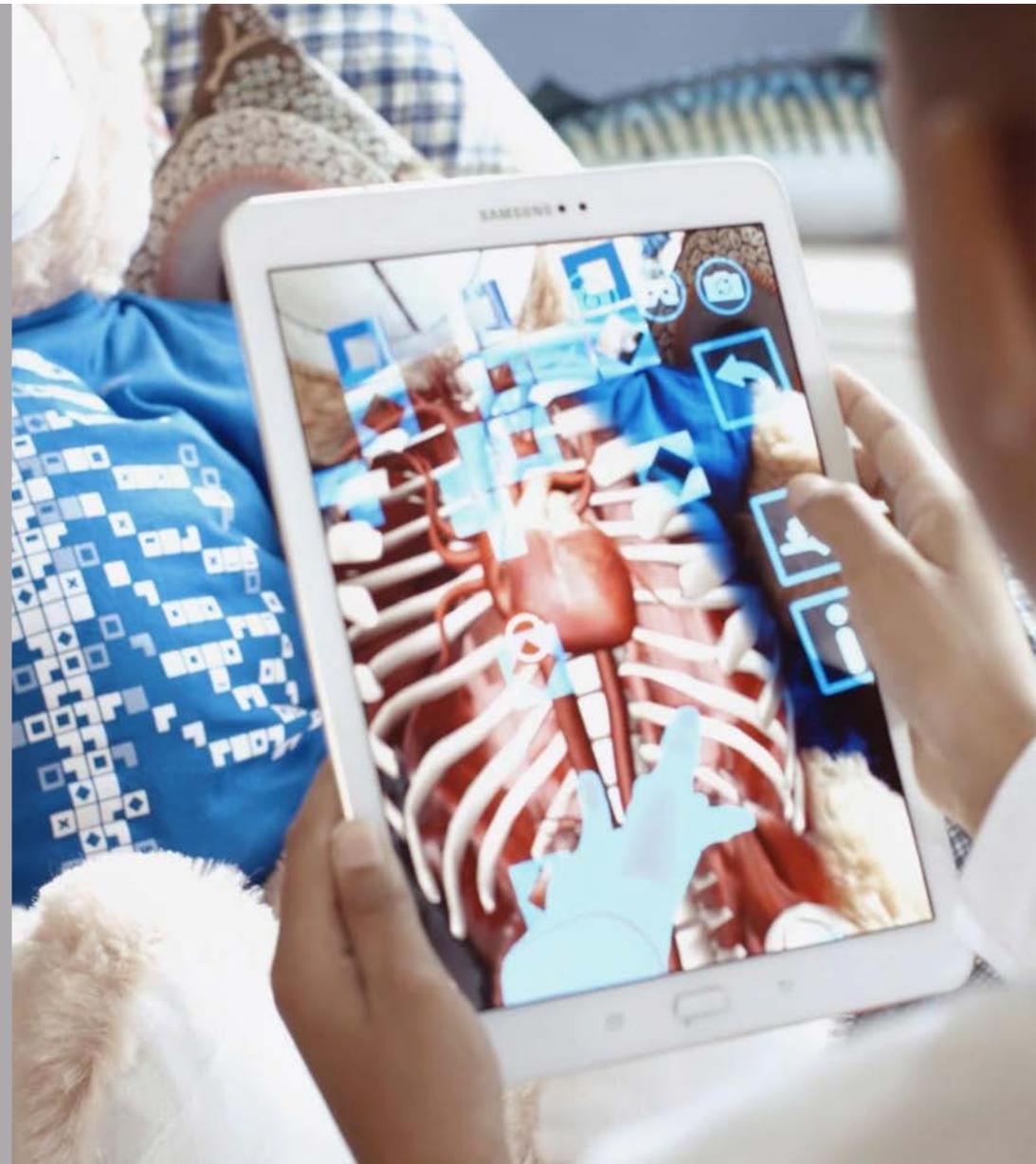
Question 4

Astronauts can come back to earth with

...

- A. More teeth
- B. More bones
- C. Lighter bones
- D. A heavy heart

Weightlessness has many strange effects on the body.



Question 5

Which of the following can have stronger than average bones?

- A. Accountants
- B. Animators
- C. Athletes
- D. Art teachers

Perhaps your gym teacher too!



Question 6

What can be found inside bones?

- A. Turnips
- B. Marrow
- C. Courgette
- D. Carrots

To be fair, marrow does share its name with a vegetable (overgrown courgettes aka zucchini).

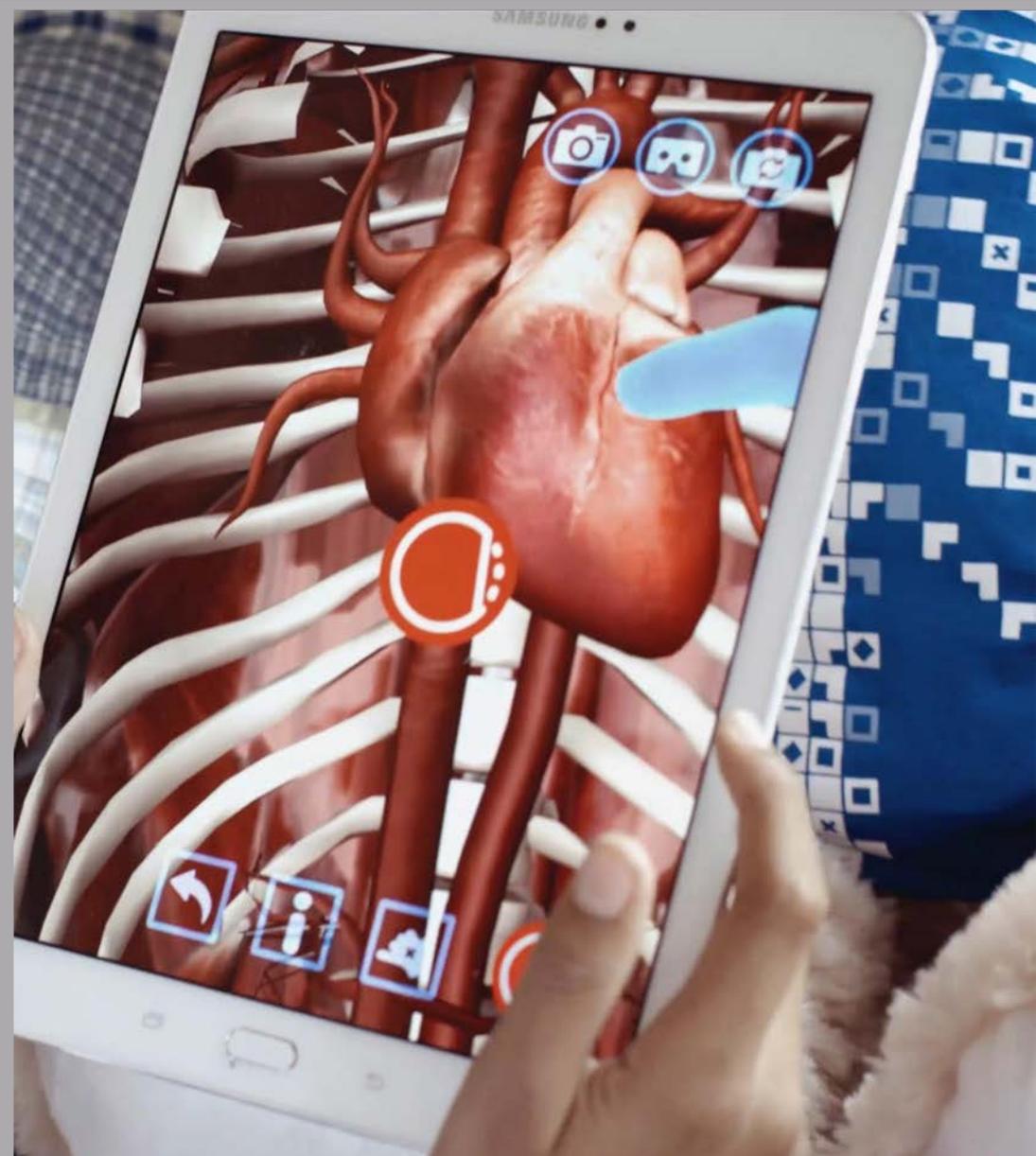


Question 7

What is marrow responsible for?

- A. Storing oxygen
- B. Producing red and white blood cells
- C. Filling in the gaps
- D. Filtering your blood

Marrow is soft and spongy and works day and night to renew your red and white blood cells.

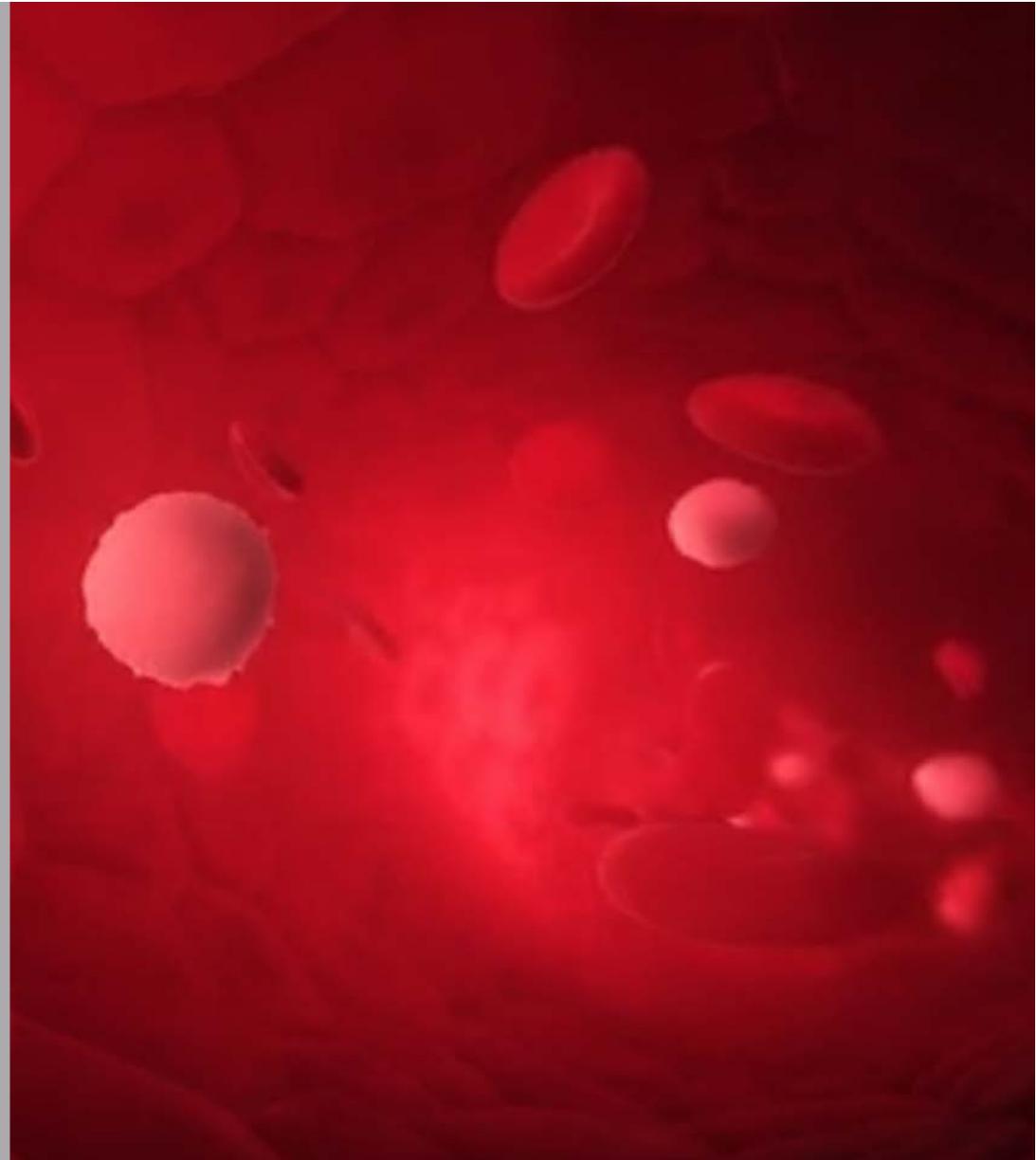


Question 8

White blood cells are able to ...

- A. Change colour
- B. Carry oxygen
- C. Defend the body
- D. Carry instructions to organs

Pus contains dead white blood cells, fallen heroes in the battle to protect your body.



Question 9

Collagen can also be found in...

- A. Apples
- B. Hair
- C. Steel
- D. Pencils

Collagen is our bodies most abundant protein, making up to 35% of your total protein content.



Question 10

You can improve the health of your bones through ...

- A. Eating foods that are high in calcium
- B. Exercise
- C. Taking vitamin D
- D. All of the above

It's always a good idea to think and read about your health, but it is best to be active throughout your life.

