

# Today was a curious adventure into my circulatory system

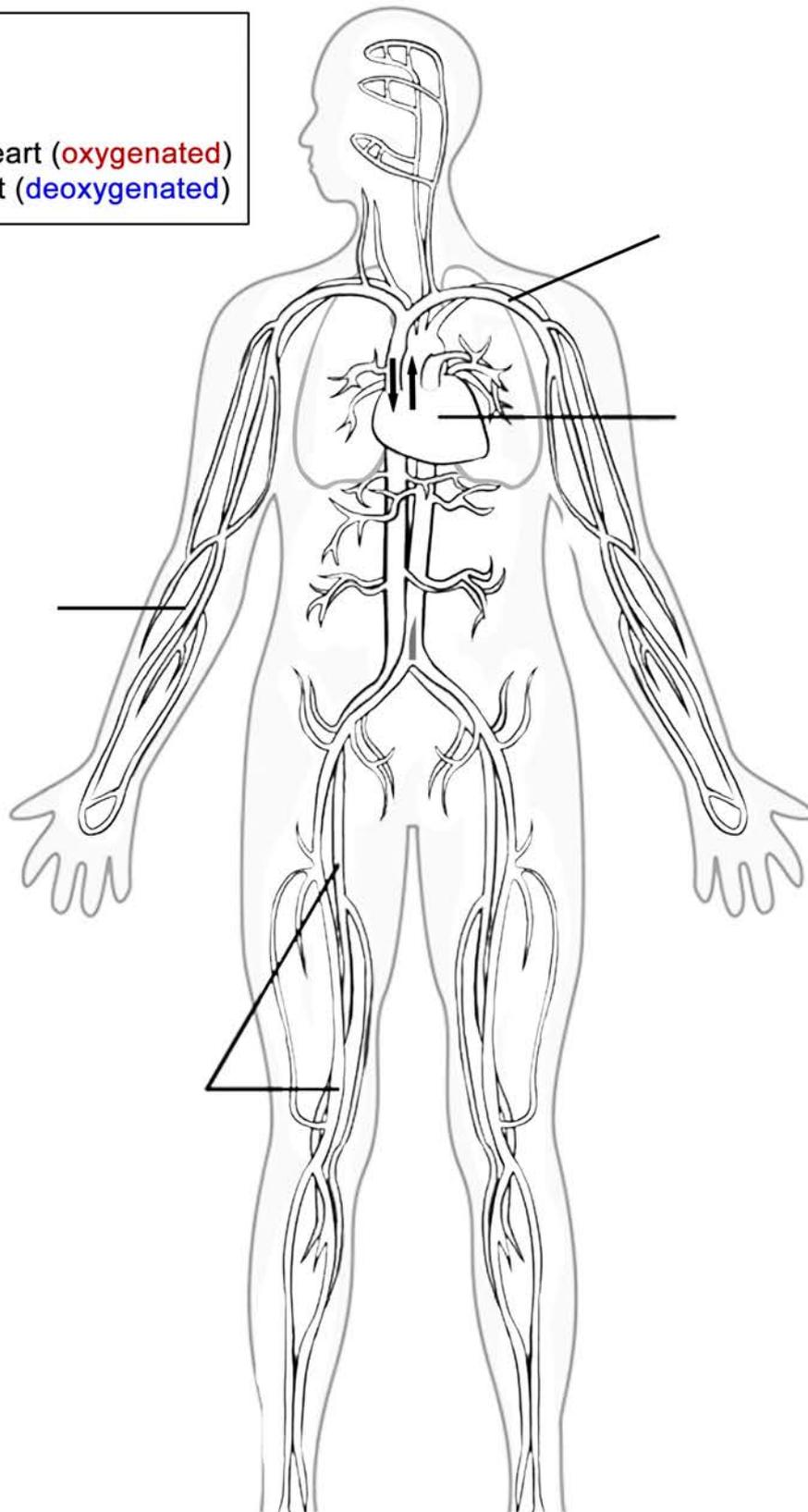
Labels:

Heart

Blood vessels

Blood from the heart (**oxygenated**)

Blood to the heart (**deoxygenated**)



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



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## My curious adventure into my CIRCULATORY 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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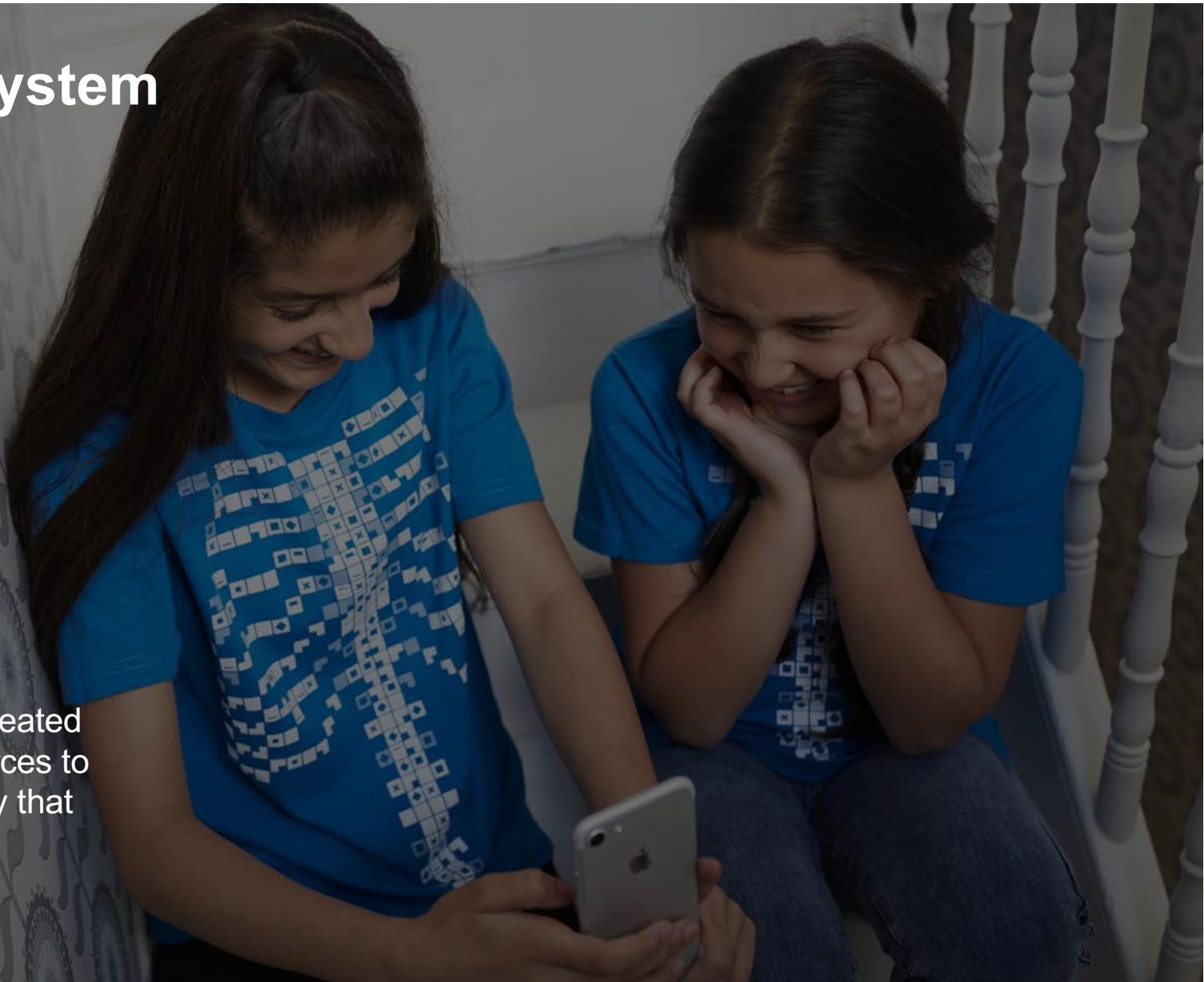
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# The Circulatory System

## Primary/Elementary

“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

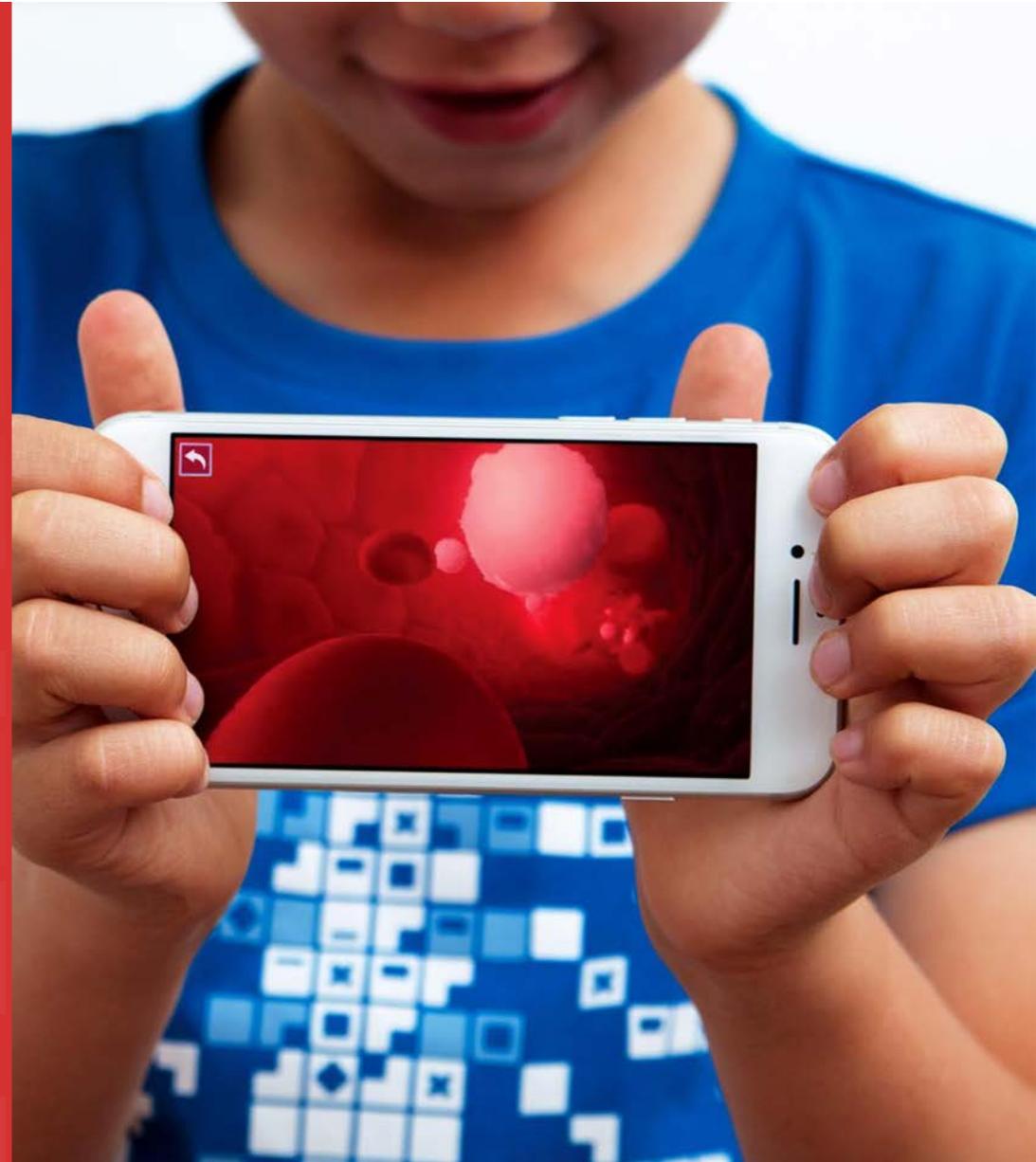


# OVERALL LEARNING OUTCOMES

## Primary / Elementary

### The Circulatory System Objectives

- To describe how the circulatory system works
- To describe the purpose of the main parts of the circulatory system and their function



# Let's get curious...

Have you ever cut your finger?

Where does the blood come from?

How does it get to your finger?

What would happen if you didn't stop bleeding?

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



A KWL Inquiry worksheet for the circulatory system is available in the teacher's resources repository at:  
<https://drive.google.com/drive/folders/17N-hPZnEAdBwevuxAYoTi-yasNatYQM9?usp=sharing>

# Your heart.

Can you feel your heart beating?

Place your hand in the middle of your chest.

What is happening when your heart beats?

Is it sometimes faster or slower?

Why?



# Your heart is AMAZING!

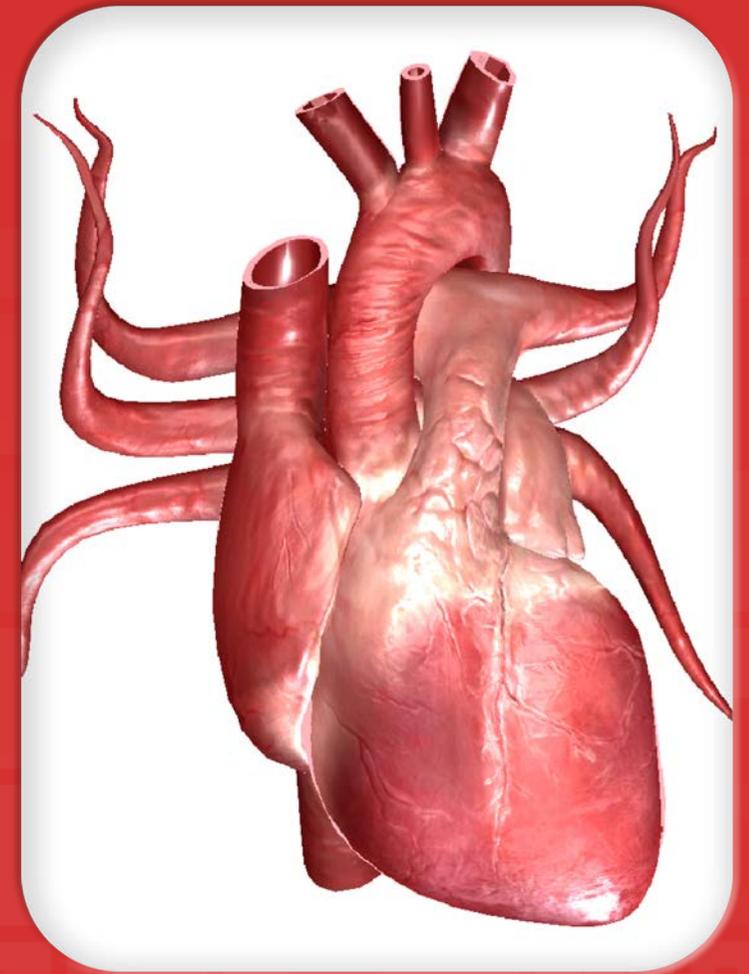
Your heart is a muscle which pumps your blood around your body.

In young people it beats at about 70 to 90 beats per minute (your heart rate or pulse)

It never takes a rest and keeps beating day and night for your whole life.

Doctors can listen to your heart with a stethoscope and you can feel your pulse on your wrist.

How fast is your heart beating now?



## The Virtuali-Tee

Today we are going to be using a very special t-shirt to explore your circulatory 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.

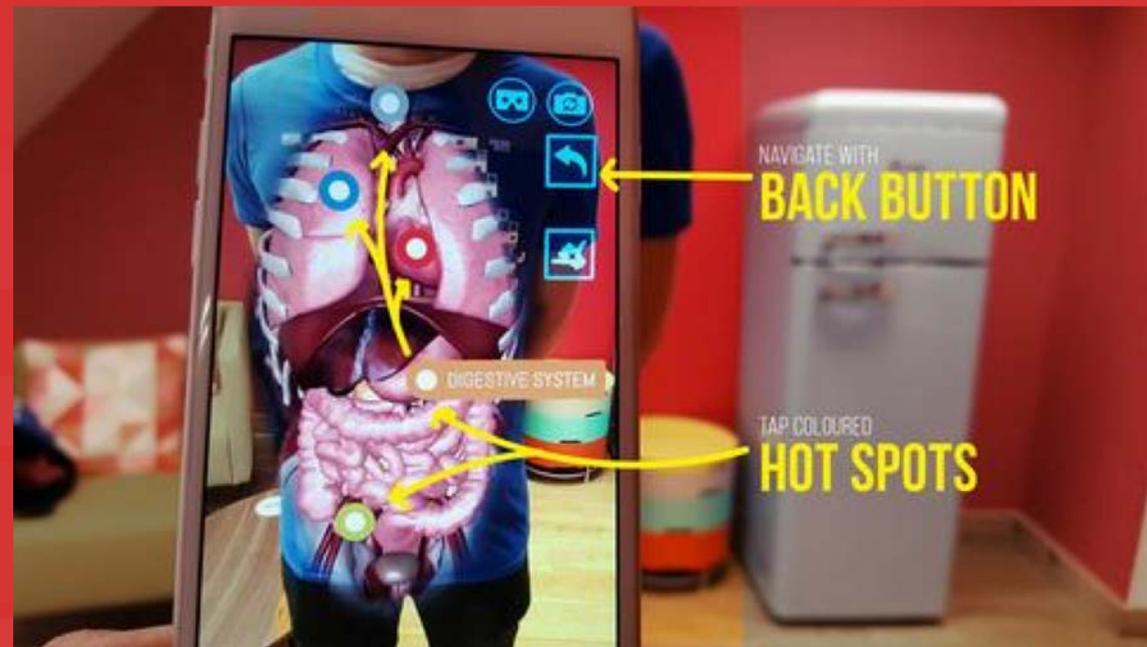
The tracking of the t-shirt requires that you are in a well lit space without heavy shadows and that the t-shirt is not stretched or heavily wrinkled.



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

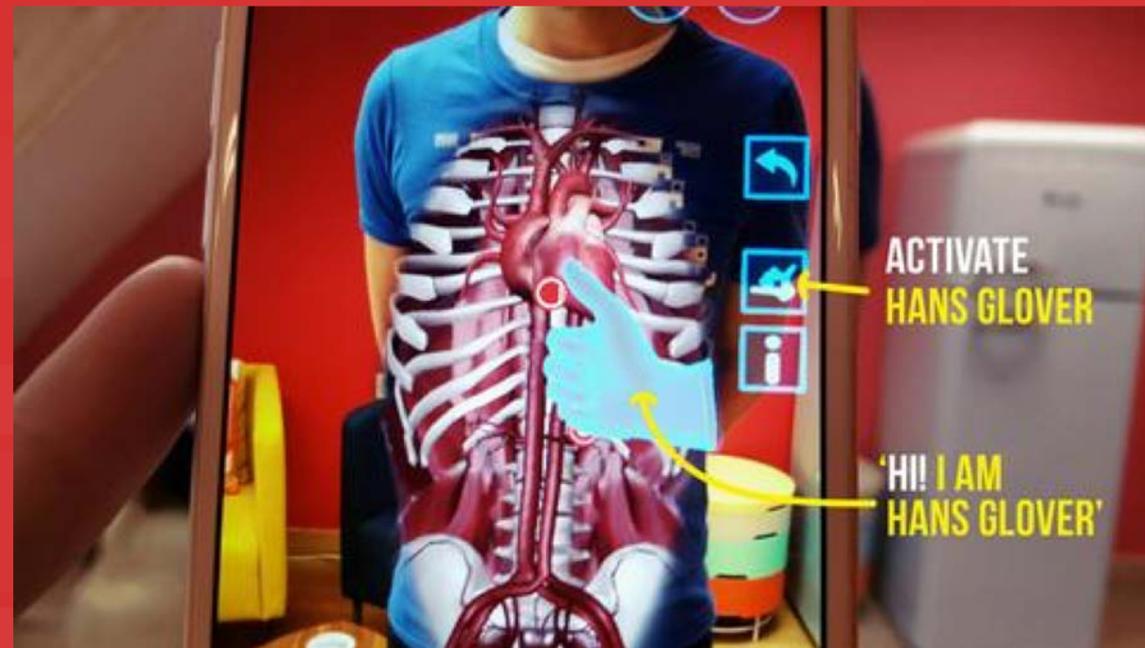
Well, we have implemented some pretty cool features into the app. Just tap the screen to get started. You can then isolate the physiological system by tapping on the coloured hot spots. You'll see some buttons floating outside the chest, use the back button to navigate between systems.

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.

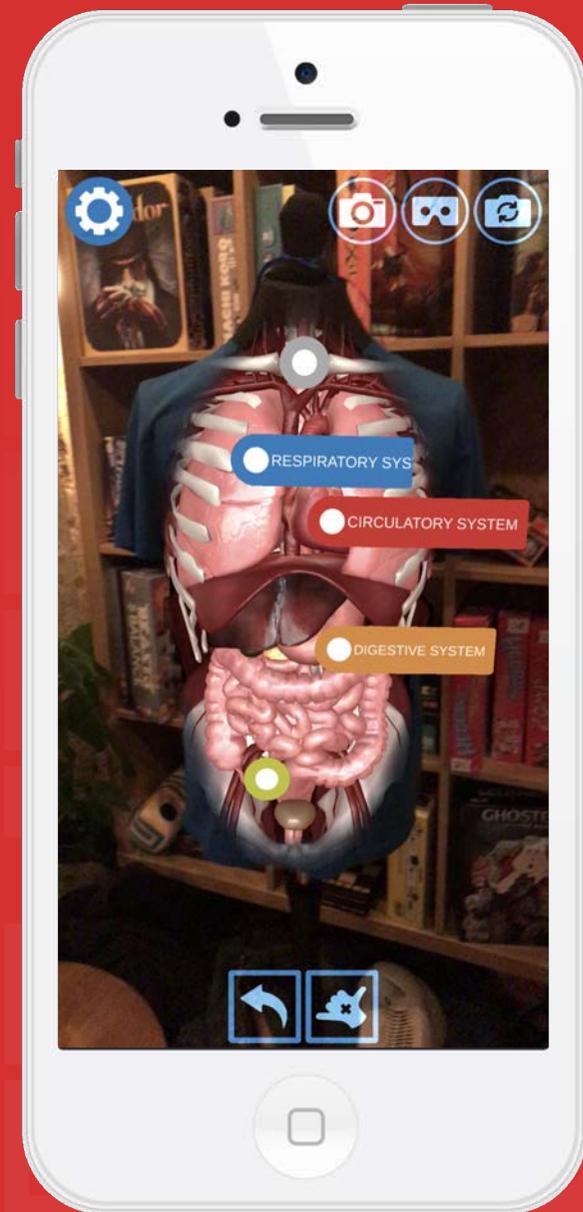


# Getting into your circulatory system

Tap on the circulatory system hotspot and the app will isolate to just that system. See your heart beating!

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

Tap the  button if you would like subtitles.



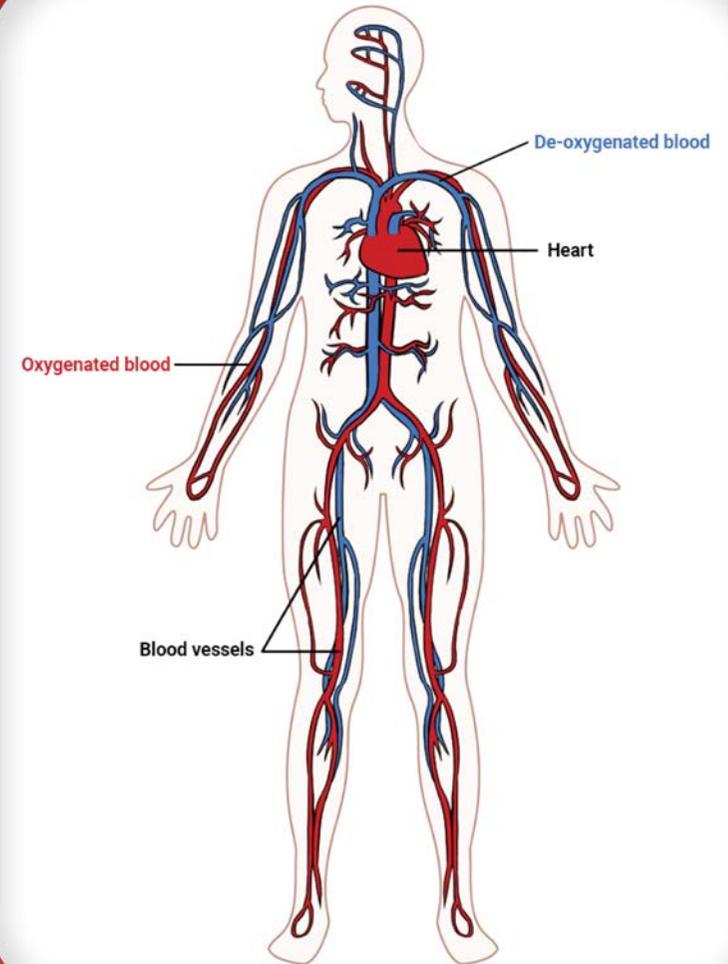
# Circulatory system

The heart pumps blood through blood vessels around your body to deliver oxygen and nutrients to your organs and muscles.

Blood then returns to the heart with the oxygen and nutrients used up.

Tubes called Arteries take the blood away from the heart.

Tubes called Veins take the blood back to the heart.



# Your blood is amazing!

Tap on the  icon in the circulatory system to look inside your bloodstream.

You can see the red blood cells and white blood cells and hear what they do.

Blood is made up of plasma (a yellowish watery liquid). Inside the plasma are blood cells.

The red blood cells carry oxygen and make blood red.

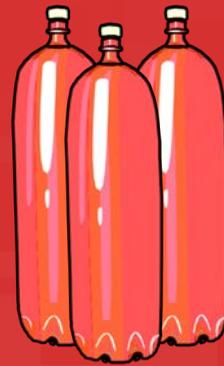
White blood cells fight infection.

**FUN FACT** There are 250 million red blood cells in a single drop of blood!



# How much blood do you have?

The amount of blood you have depends on your height and weight.



An average 10 year old has 3 litres



The average adult has 5 litres

## Curious facts!

If you were to lay all your blood vessels in a long line they would stretch about 60,000 miles (96,560 km)! (that's over two times around the entire world).

Your heart beats about 100,000 times a day.

Your heart beats without you having to think about it.

The image on the right is a satellite image of rivers in southern Australia. It's interesting that they look like blood vessels.



# Quiz

Can you fill in the blanks and show what you've learnt today? Use the words in blue to help you.

Our heart is a \_\_\_\_\_ which pumps blood through our body. You can feel your \_\_\_\_\_ in your wrist. You can feel your heartbeat by placing your hand on your \_\_\_\_\_. If you get excited or do exercise your heart rate gets \_\_\_\_\_. Your blood delivers oxygen and nutrients to your body. A ten year old has about \_\_\_\_\_ of blood in their body. Blood is made of plasma and blood cells. \_\_\_\_\_ is carried in red blood cells. White blood cells fight \_\_\_\_\_. The right side of the heart receives blood from the body and the left side sends \_\_\_\_\_ from the lungs to the rest of the body. The process of blood going round the body is called \_\_\_\_\_.

Oxygen - infection - faster - muscle - chest - pulse -  
circulation - 3 litres - oxygen-rich blood

# Quiz

Can you fill in the blanks and show what you've learnt today? Use the words in blue to help you.

Our heart is a **muscle** which pumps blood through our body. You can feel your **pulse** in your wrist. You can feel your heartbeat by placing your hand on your **chest**. If you get excited or do exercise your heart rate gets **faster**. Your blood delivers oxygen and nutrients to your body. A ten year old has about **3 litres** of blood in their body. Blood is made of plasma and blood cells. **Oxygen** is carried in red blood cells. White blood cells fight **infection**. The right side of the heart receives blood from the body and the left side sends **oxygen-rich blood** from the lungs to the rest of the body. The process of blood going round the body is called **circulation**.

# Keeping your heart healthy

Take regular exercise that makes your heart beat faster

Eat healthily – fruit and vegetables and not too much salt sugar or fat

Take time to relax and avoid too much stress

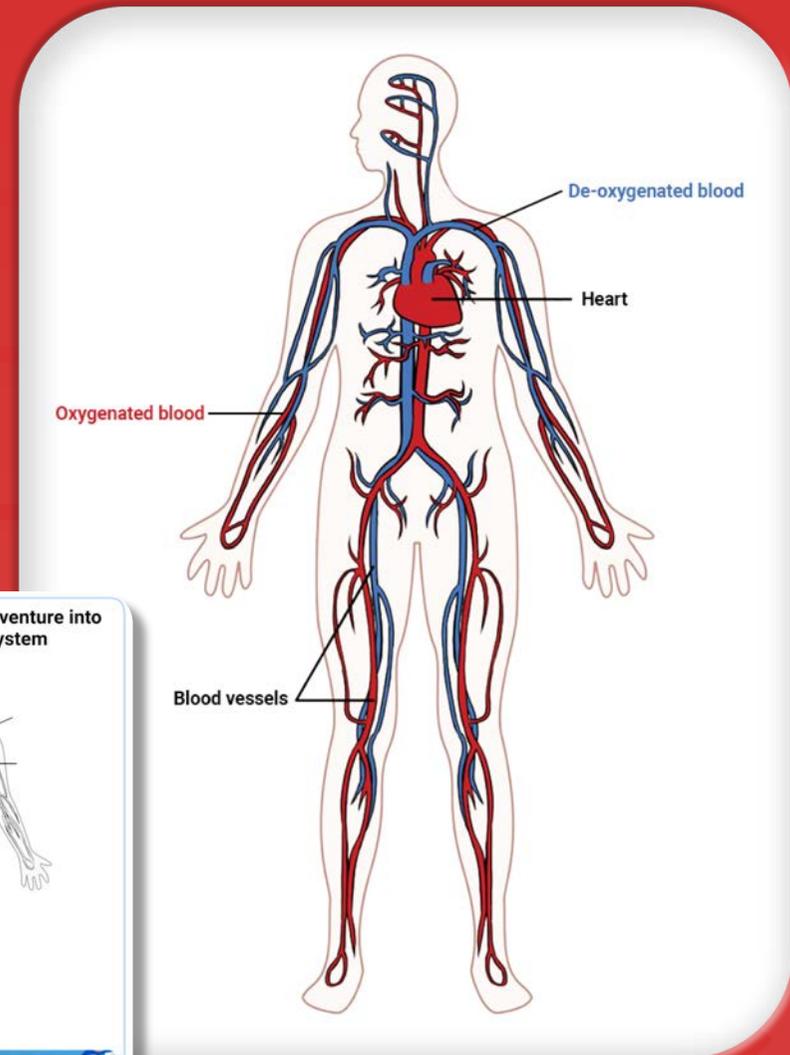
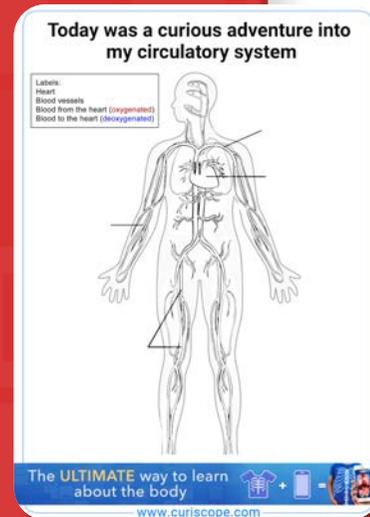
Don't smoke

## Print friendly take home sheet

Students can enjoy colouring in and labelling a circulation diagram, indicating oxygenated blood in red and deoxygenated blood in blue. Arrows to be added to show the direction of blood flow.

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

<https://drive.google.com/drive/folders/17N-hPZnEAdBwevuxAYoTiyasNatYQM9?usp=sharing>

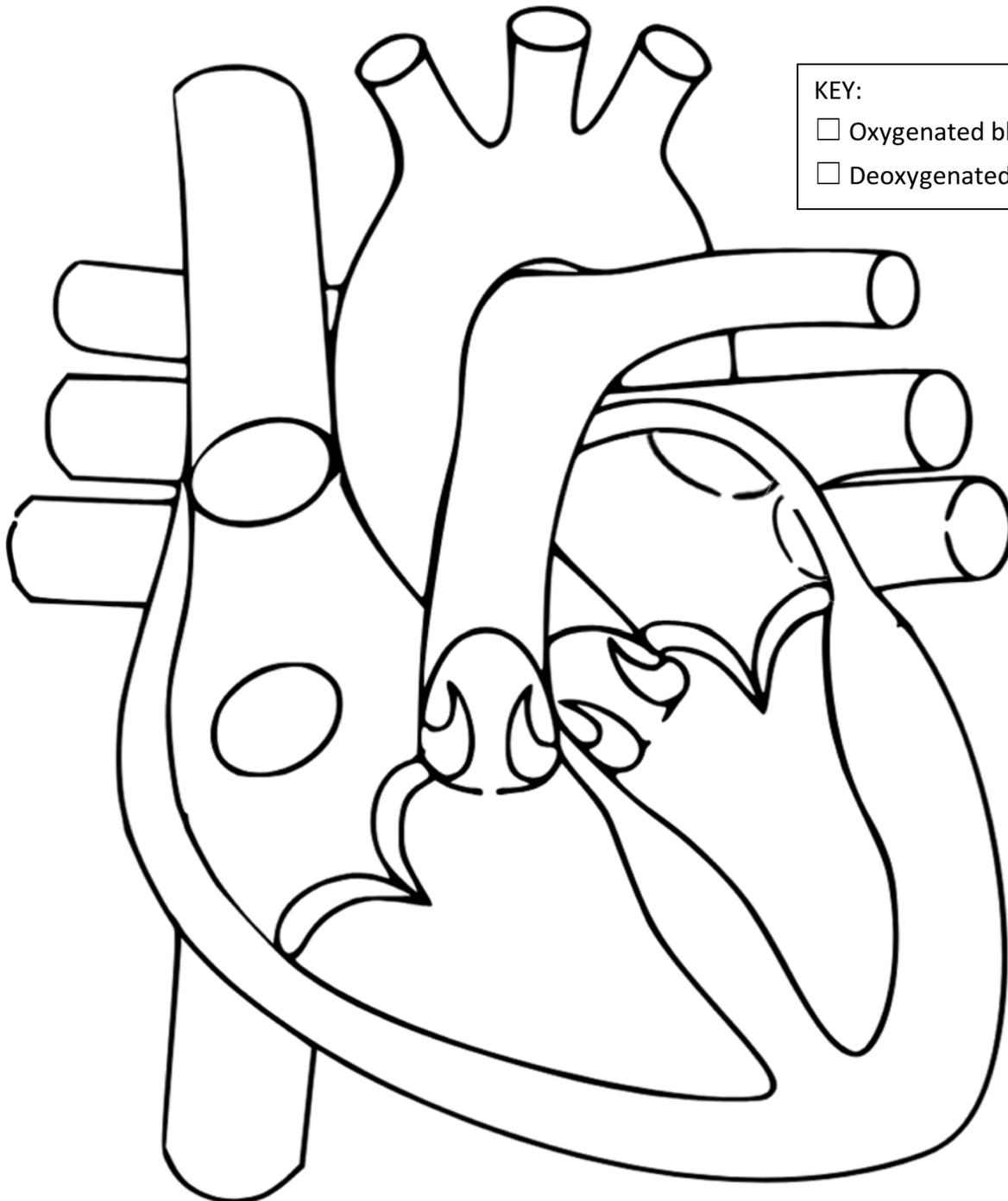


# Blood Flow Around the Heart

Use arrows → to show the complete flow of blood into and away from the heart.

Colour in the oxygenated blood **RED** and the deoxygenated blood **BLUE**.

Label the following: From the body, to the body, to the lungs, from the lungs.



KEY:

Oxygenated blood

Deoxygenated blood

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about the body



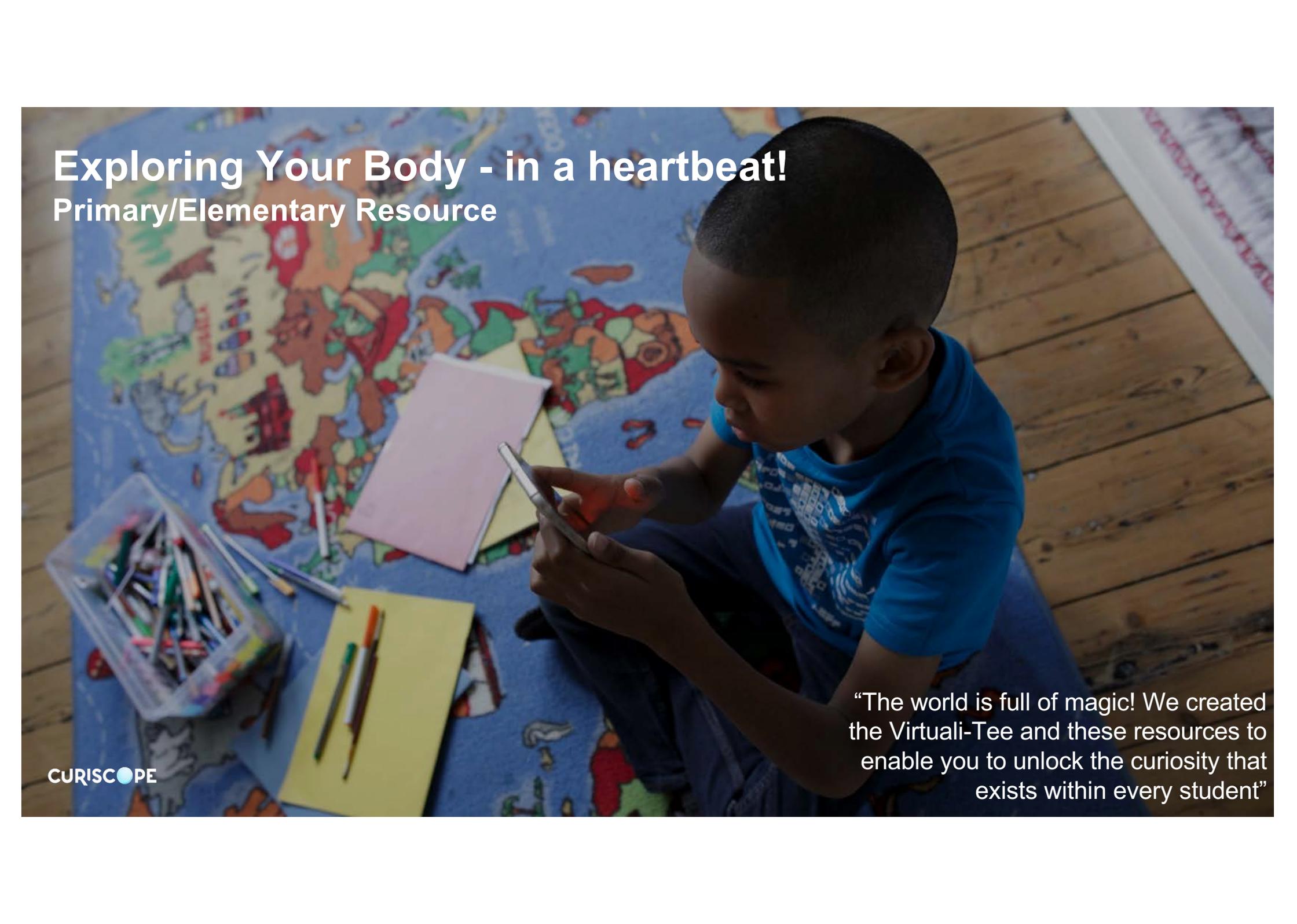
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# Exploring Your Body - in a heartbeat!

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”

# OVERALL LEARNING OUTCOMES

## Heart Rate Activity Objectives

- To investigate how our heart rate changes with exercise
- To collect evidence by making measurements and observations
- To display and explain results

# Your heart.

Can you feel your heart beating?

Place your hand in the middle of your chest.

What is happening when your heart beats?

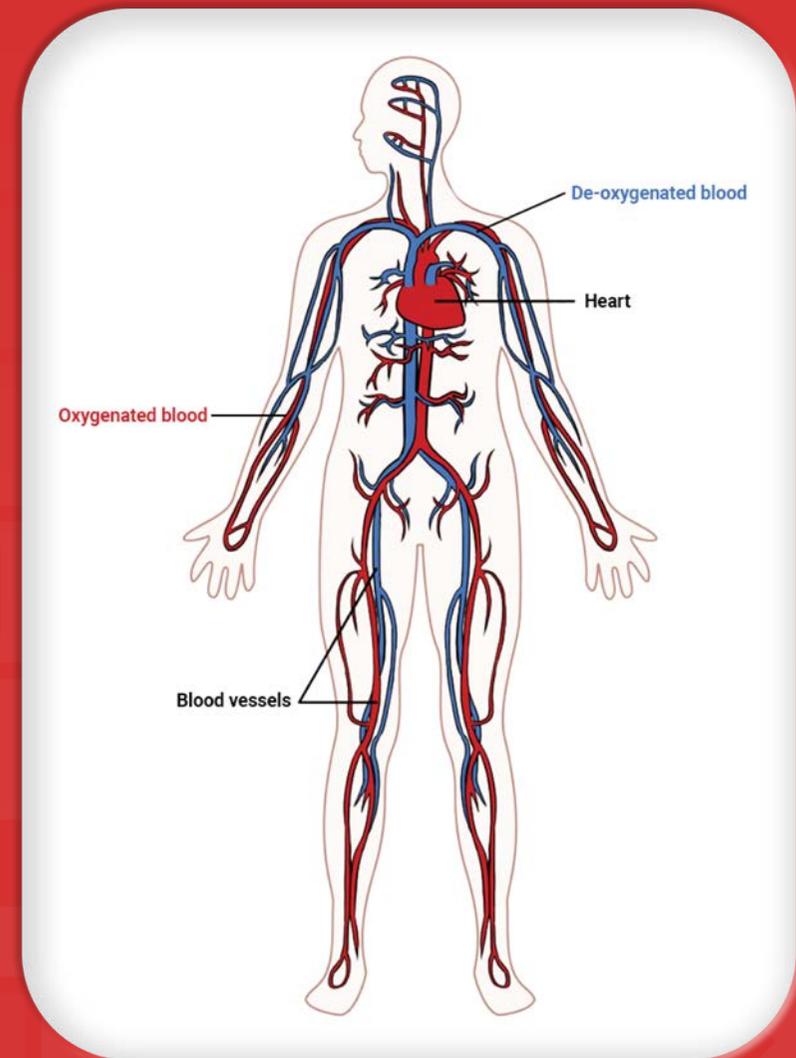
Is it sometimes faster or slower?

Why?



# Your circulation.

- Circulation is the name we give to the journey your blood makes around your body.
- Blood goes from the heart to the lungs where it collects oxygen from the air we breathe in and removes carbon dioxide.
- The blood then carries the oxygen to your muscles and organs to make energy.



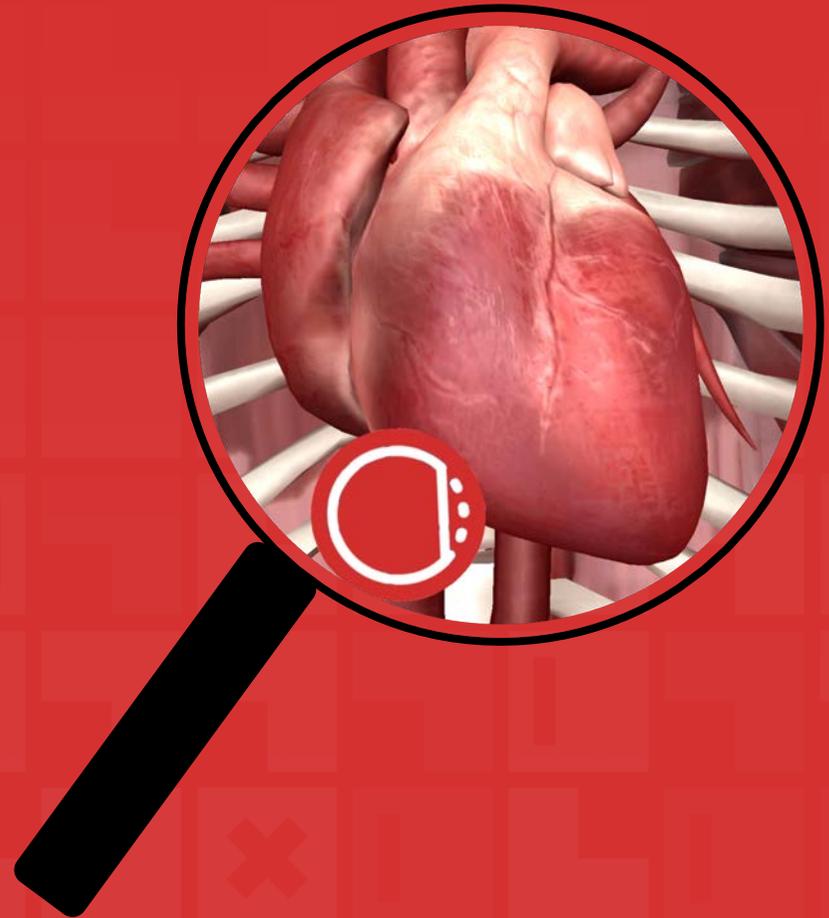
## Your pulse.

- Your pulse is the thump of your blood being pumped by your heart.
- You can feel it by placing two fingers on your wrist or on the side of your neck
- You can often feel it in your chest after exercise.
- Heart rate monitors and stethoscopes are used by doctors to listen to your heart rate
- In young people your heart rate or pulse is about 70 to 90 beats per minute (BPM)



# Investigating the heart

- Your heart never takes a rest and keeps beating day and night for your whole life!
- How fast is your heart beating now?
- How could you measure your pulse?
- You could set a timer for one minute and count very carefully or...



## Use the Virtuali-Tee app to explore heart rate

Today we are going to be using a very special app to explore your circulatory system

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

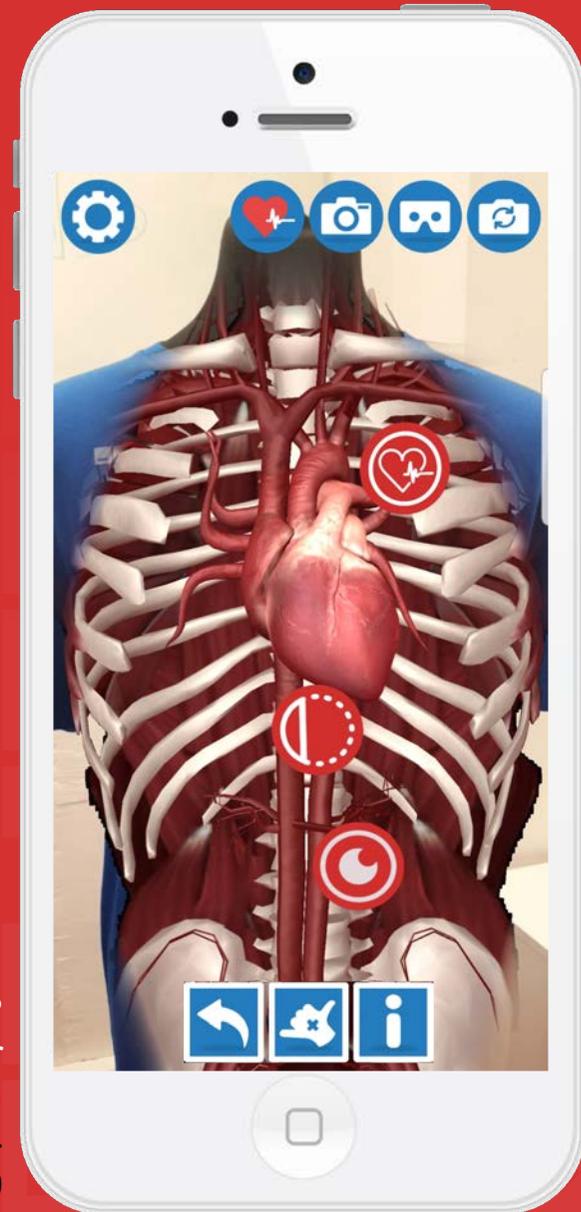


# Step 1 - Take a look inside your body!

- Firstly open up the 'Virtuali-Tee' app
- Then click on the  button in the top right corner. This should open up the heart tracker functions.
- If you need subtitles or help then click this  in the top left of the screen.

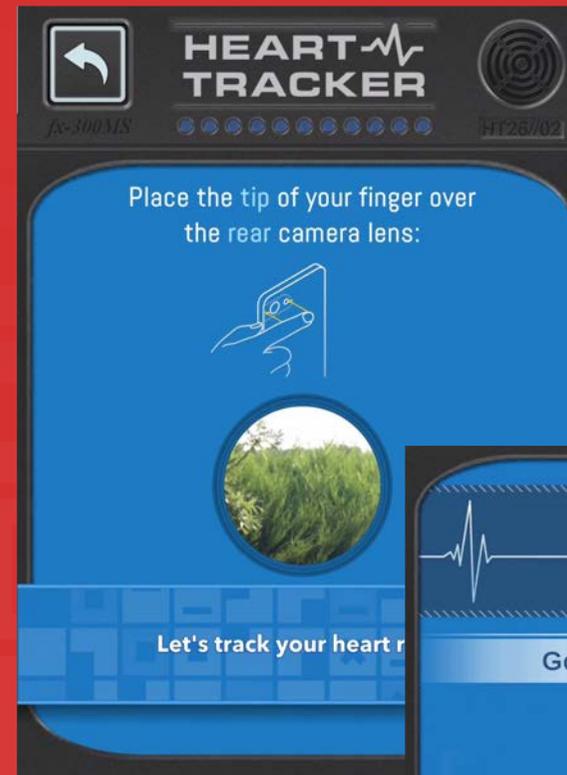
Not used the Virtuali-Tee before?  
Check out our circulation or digestion lessons in the teacher  
resources repository for an introductory look at the app!

<https://drive.google.com/drive/folders/17N-hPZnEAdBwevuxAYoTi-yasNatYQM9>



## Step 2 - Finding your heart rate

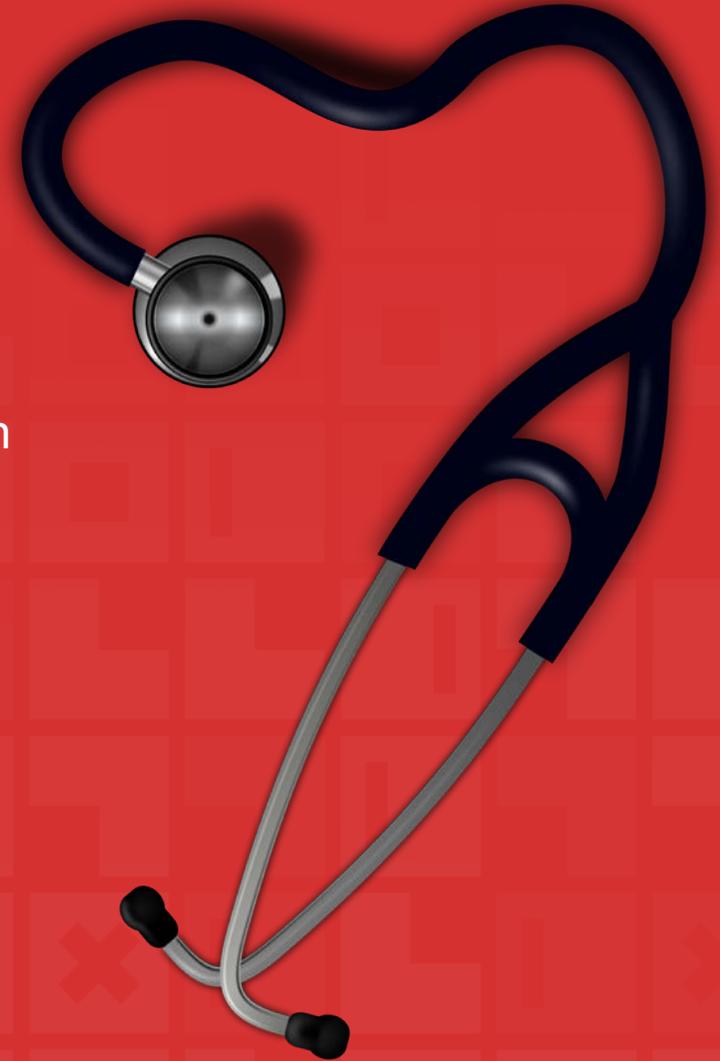
- Now there should be instructions on screen to help you!
- Place the tip of your finger over the lens of the back camera and hold really still!
- Using really clever technology, the app will then work out your heart rate for you, the number of beats per minute.
- Once it tells you what number that is, you can click the back arrow in the top left corner to go back to the app if you are using the Virtuali-Tee.
- The heart you see should now beat in time with your heart!



# The Virtuali-Tee to explore heart rate

Today we are going to:

- Measure our resting heart rate
- Experiment to see what happens to our heart rate when we exercise
- Discover what happens to our heart rate when we stop exercising and recover
- Display and explain our results



# Recording Your Heart Rate

- Your teacher will give you the experiment worksheet and explain how the groups will work.
- First we will need to take a resting heart rate using the 'Virtuali-Tee' app. You should have been sitting nice and still in class for at least 10-minutes.
- After recording your resting heart rate, you will need to do 1-minute of intense exercise. As a class, you can decide what type of exercise this is. We suggest star jumps!
- Immediately after the 1-minute of exercise, record your new heart rate and sit down to recover.
- Exactly every 1-minute after this exercise reading, you need to take a recovery heart rate reading.

## Learning about circulation... in a heartbeat!

**Aim** Let's investigate what happens to our heart rate when we rest and exercise.

### Method

Use the Curiscope 'Virtuali-Tee' app to take heart rate measurements and then note them down on the table. Measure your heart rate every minute until it has returned to near the resting rate, this should be less than 10 minutes.

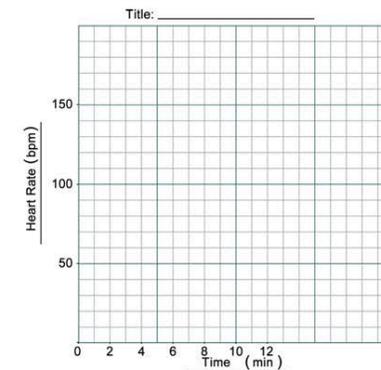
### Materials

Timer or stop watch  
Curiscope 'Virtuali-Tee' app heart rate monitor



### Results

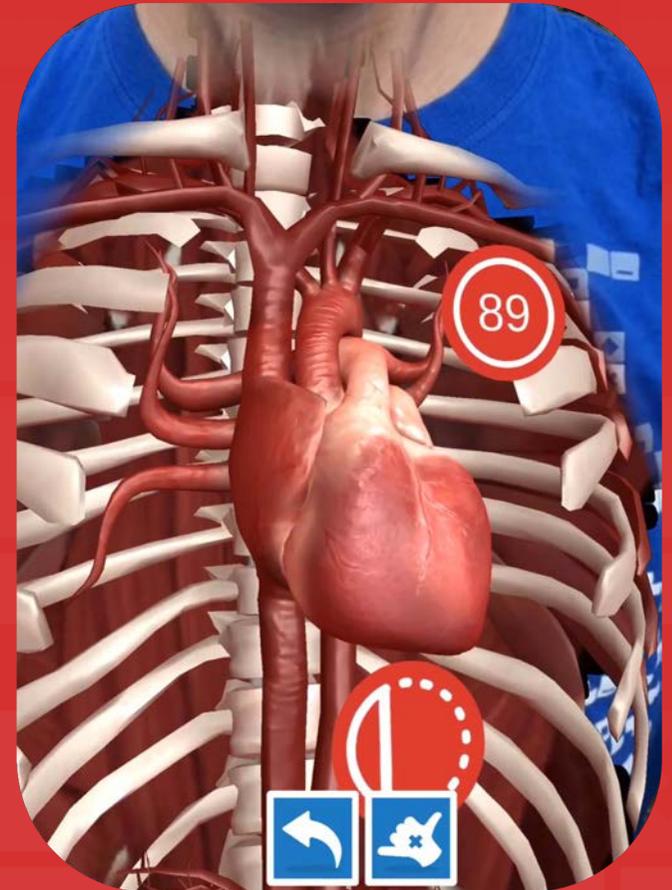
Time (minutes)	Activity	Heart rate (BPM)
0	Resting	
1	Complete 1 minute of exercise (e.g. star jumps)	
2	Recovering	
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		



Worksheet available in teacher resources repository:  
<https://drive.google.com/drive/folders/17N-hPZnEAdBwevuxAYoTi-yasNatYQM9>

# Well Done! You have successfully measured your resting heart rate and investigated it's impact!

- Was there anything you found difficult with the activity?
- Can you think of ways to improve it?
- How long did your heart rate take to recover?
- Why did results vary from group to group?
- Can you think of any ways you could help your heart rate slow down more quickly?



# Extension

- Can you devise another experiment to investigate the impact on heart rate of different activities - it doesn't have to be sports.
  - Can you make predictions?
  - How will you make it a fair test?

Hint: To make sure that your experiment is a **fair test**, you must change only one factor at a time while keeping all other conditions the same.



# Learning about circulation... in a heartbeat!

## Aim

Let's investigate what happens to our heart rate when we rest and exercise.

## Method

Use the Curiscope 'Virtuali-Tee' app to take heart rate measurements and then note them down on the table.

Measure your heart rate every minute until it has returned to near the resting rate, this should be less than 10 minutes.



## Materials

- Timer or stop watch
- Curiscope 'Virtuali-Tee' app heart rate monitor

## Results

Time (minutes)	Activity	Heart rate (BPM)
0	Resting	
1	Complete 1 minute of exercise (e.g. star jumps)	
2	Recovering	
3		
4		
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The **ULTIMATE** way to learn about the body



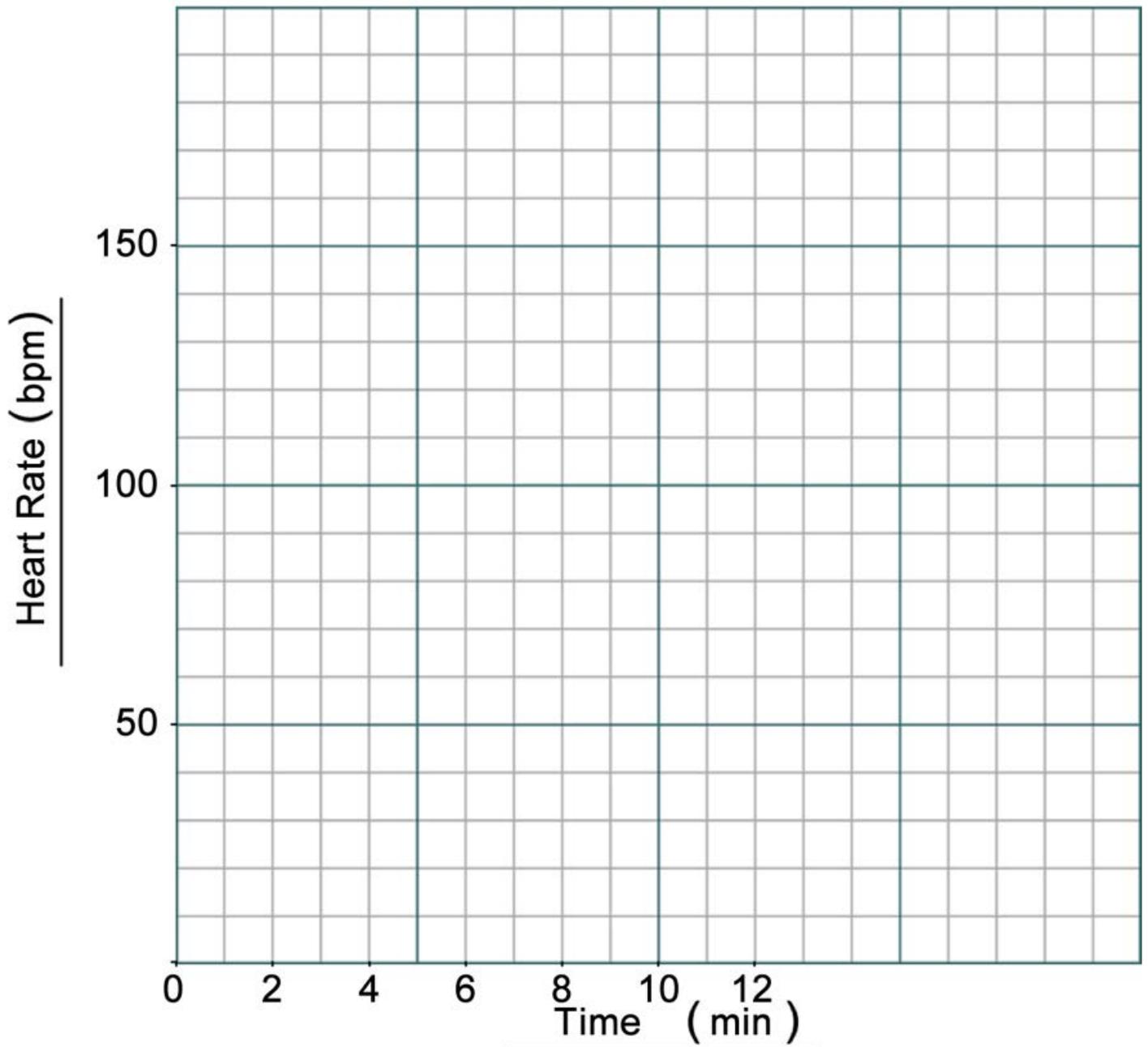
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Title: \_\_\_\_\_



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



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## Discussion

1. What happened to your heart rate when you exercised?

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2. Did your heart rate stay the same after exercising? Describe what happened.

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3. Did you notice anything different about your breathing rate while you were doing the experiment? Describe what happened.

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## Conclusion

What did you discover about your heart rate when you rest, exercise and recover?

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## Extension

Can you devise an investigation to show the effects of different activities on heart rate? Does not need to be sports!

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



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## Group organisation – 4 students per group

**Student 1: The Human Subject**  
Does the exercise activity and has heart rate read as instructed.

**Student 2: The Timer**  
Times the activity and informs other group members when to take measurements.

**Student 3: Heart Rate Measurer**  
Takes the heart rate of the Subject when instructed.

*Warning: the heart rate monitor can get hot and the Subject must be free to move away from the light.*

**Student 4: The Recorder**  
Writes down measurements as taken by the Heart Rate Measurer.

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



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## Group organisation – 3 students per group

### **Student 1: The Human Subject**

Does the exercise activity and measures heart rate when instructed.

*Warning: the heart rate monitor can get hot and the Subject must be free to move away from the light.*

### **Student 2: The Timer**

Times the activity and informs other group members when to take measurements.

### **Student 3: The Recorder**

Reads the heart rate and writes down measurements as taken by the Heart Rate Measurer.

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



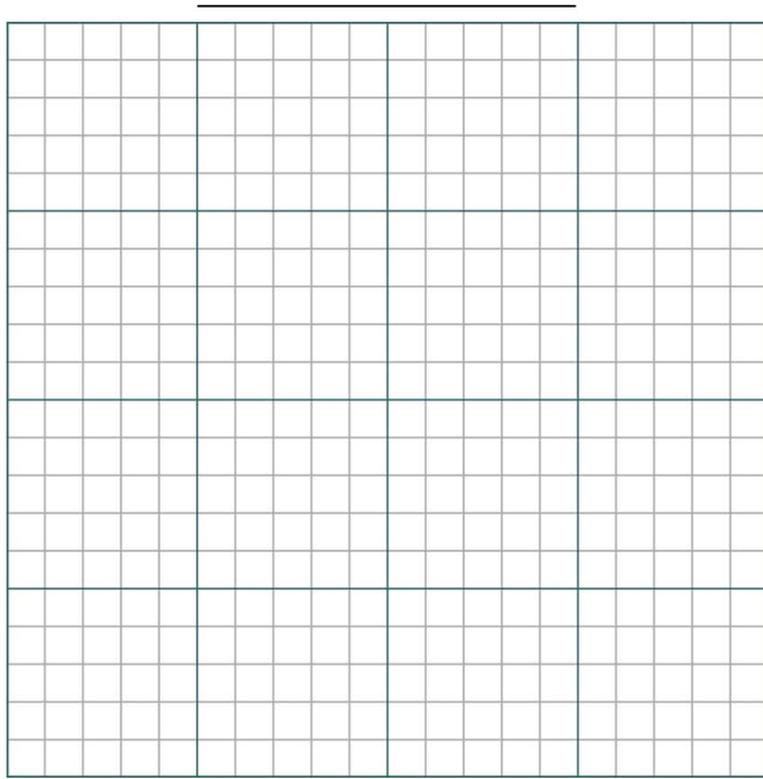
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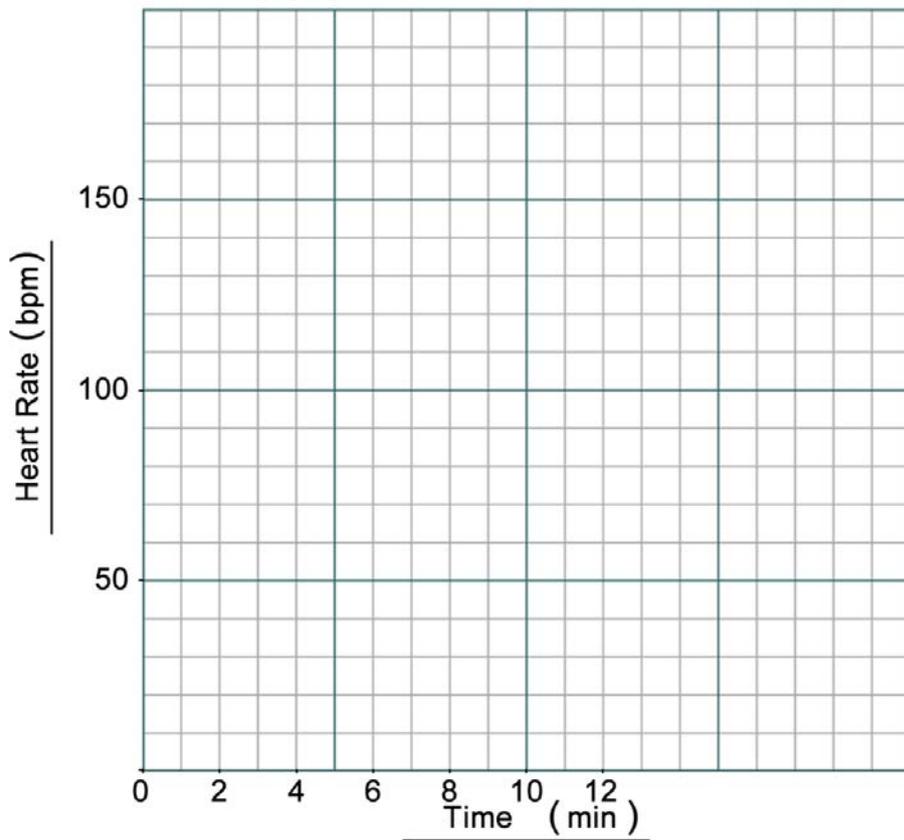


*Dependent variable* Heart rate (bpm)



*Independent variable* Time (min)

Title: \_\_\_\_\_



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

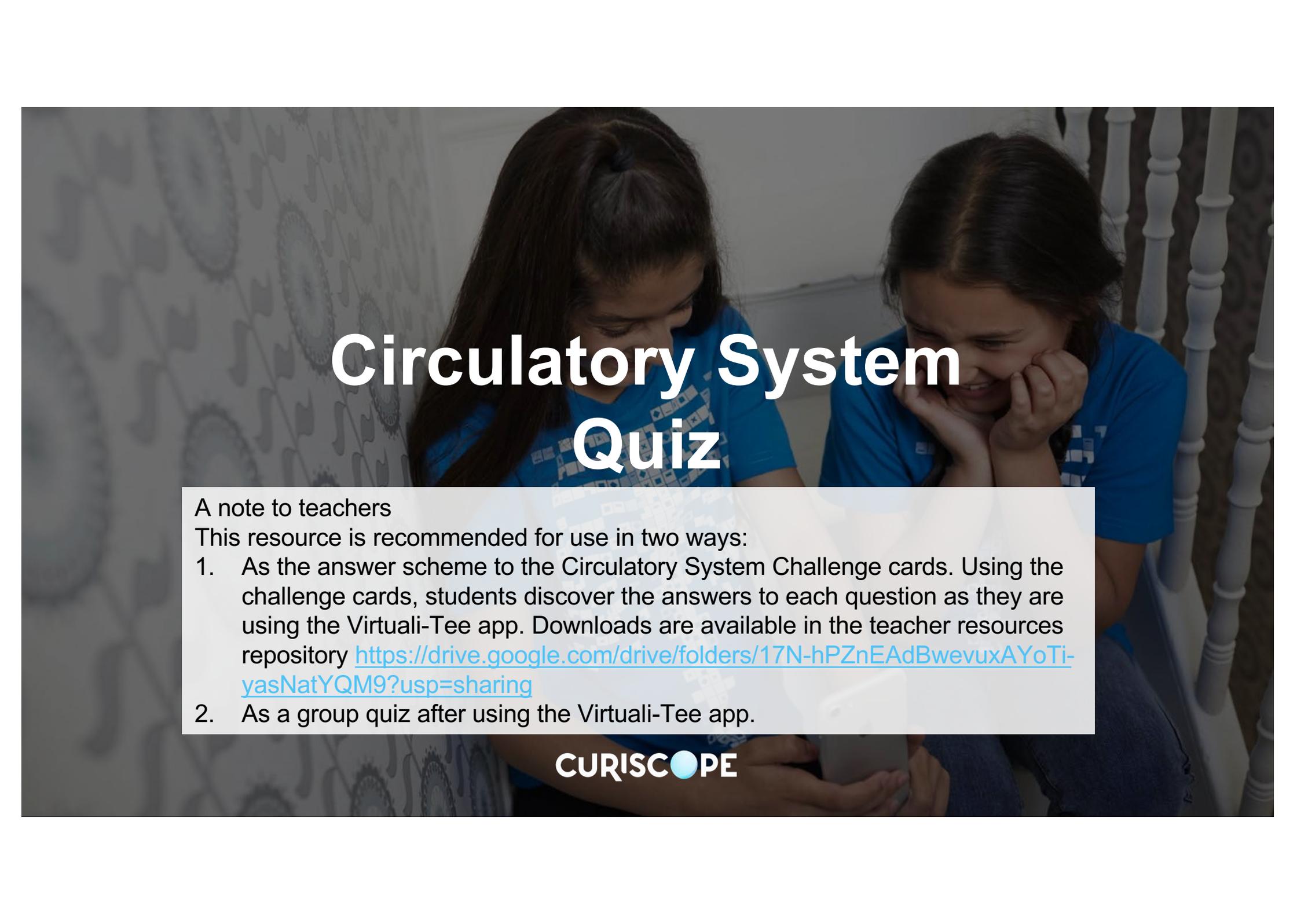


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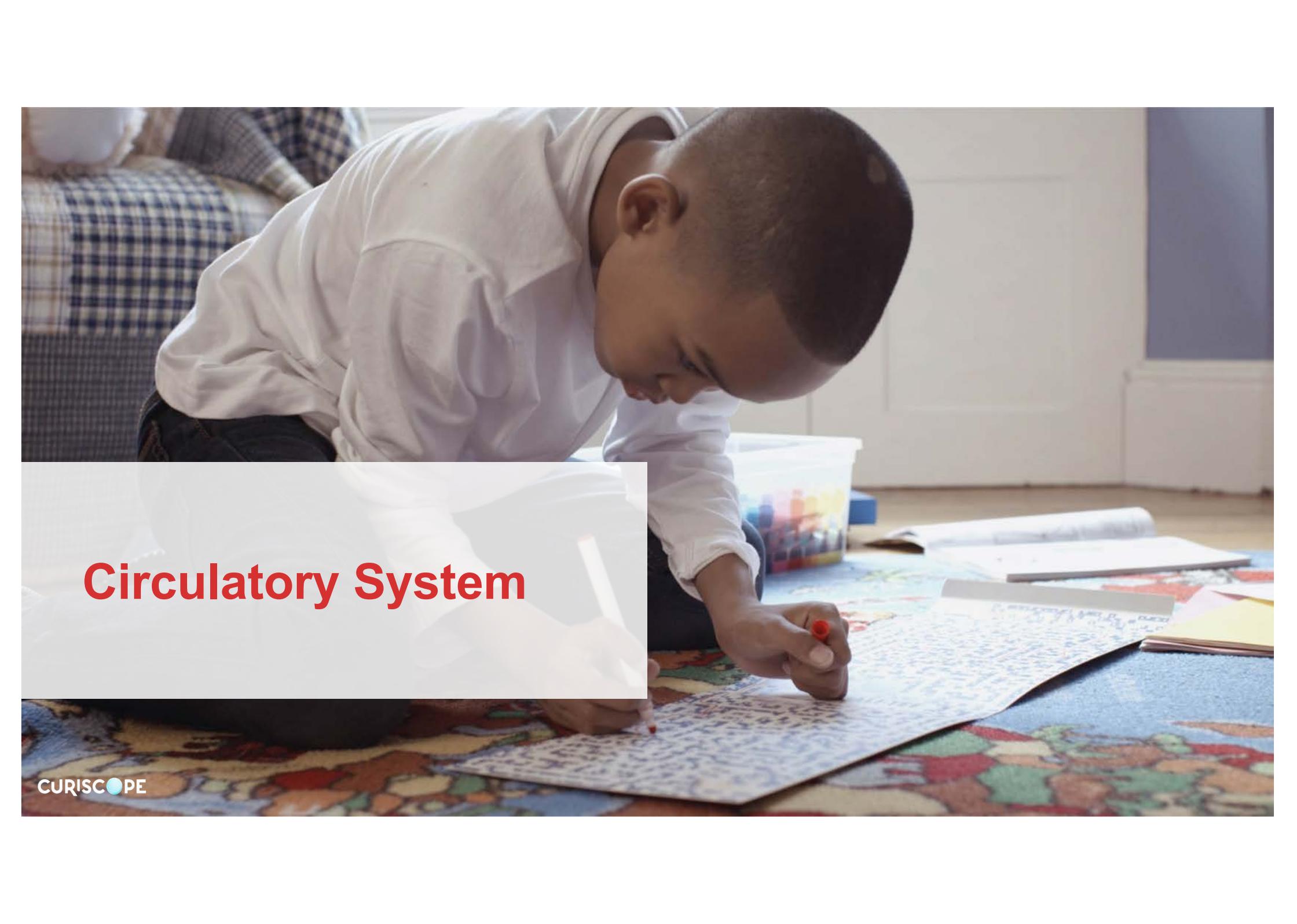
A photograph of two young women with long dark hair, wearing blue t-shirts, looking intently at a tablet held by the woman on the left. The woman on the right has her hand to her chin, appearing thoughtful. The background is slightly blurred, showing a white wall and a white chair with a decorative backrest.

# Circulatory System Quiz

## A note to teachers

This resource is recommended for use in two ways:

1. As the answer scheme to the Circulatory 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.



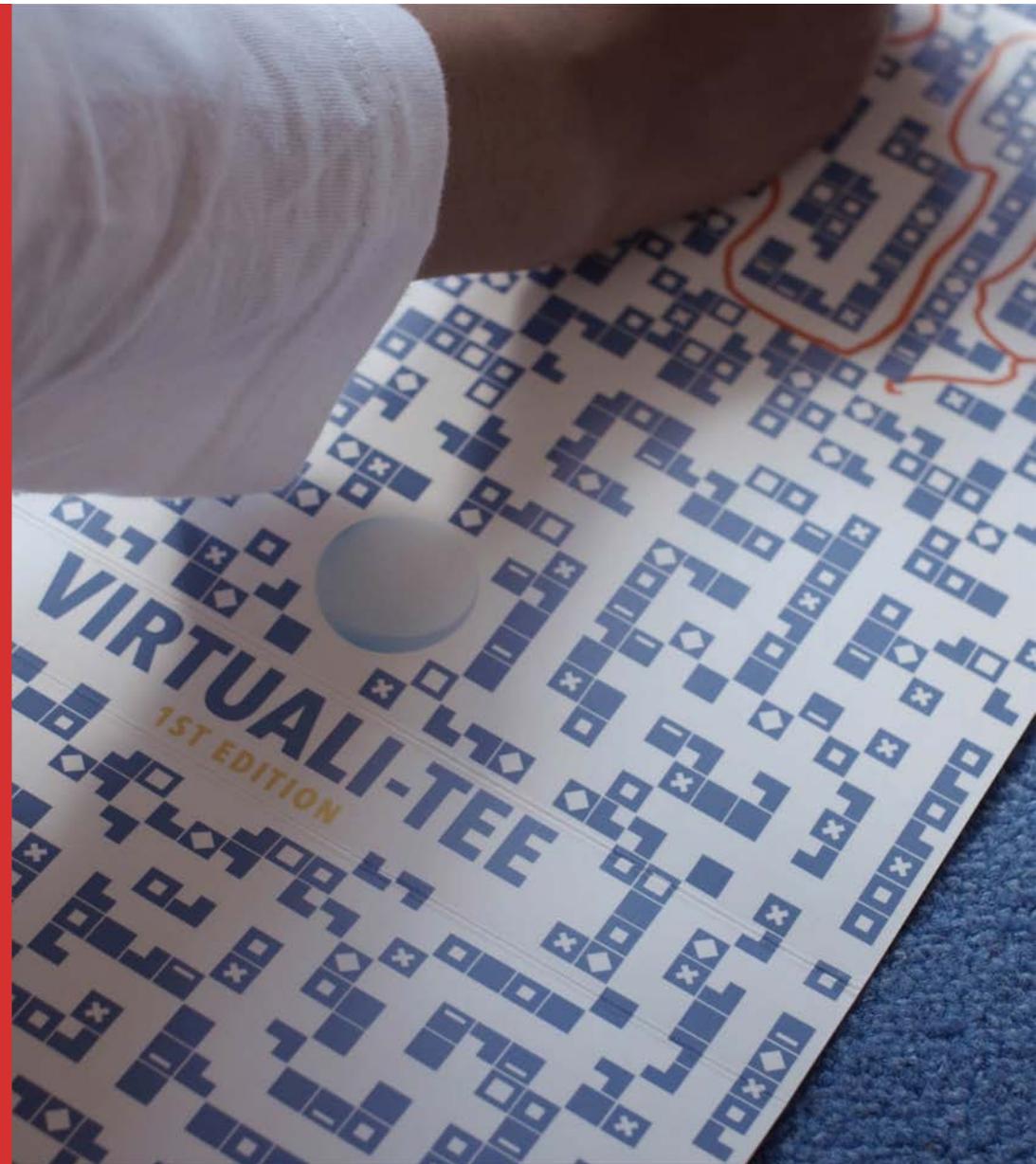
# Circulatory System

# Question 1

How many miles (or kilometers) of blood vessels are in the average human body?

- A. 10 miles (16 km)
- B. 100 miles (160 km)
- C. 6000 miles (9,656 km)
- D. 60000+ miles (96,560 km)

Compare that to the earth's circumference of only 24,000 miles! (38,600 km)

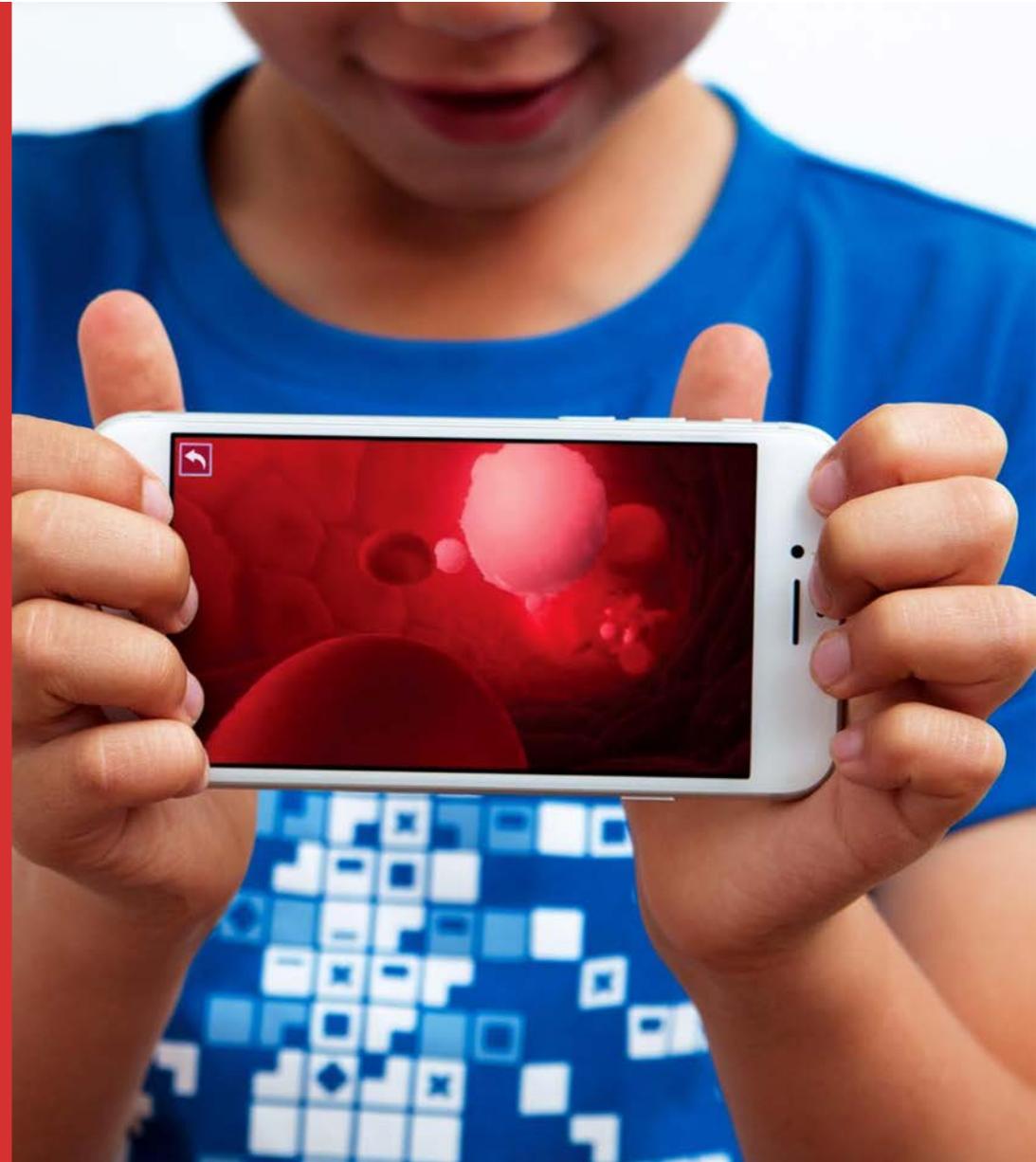


## Question 2

Blood that enters the lungs to receive oxygen is known as ...

- A. Deoxygenated blood
- B. Oxygenated blood
- C. Detoxified blood
- D. Retoxified blood

The blood has had oxygen removed and is therefore “de” oxygenated.

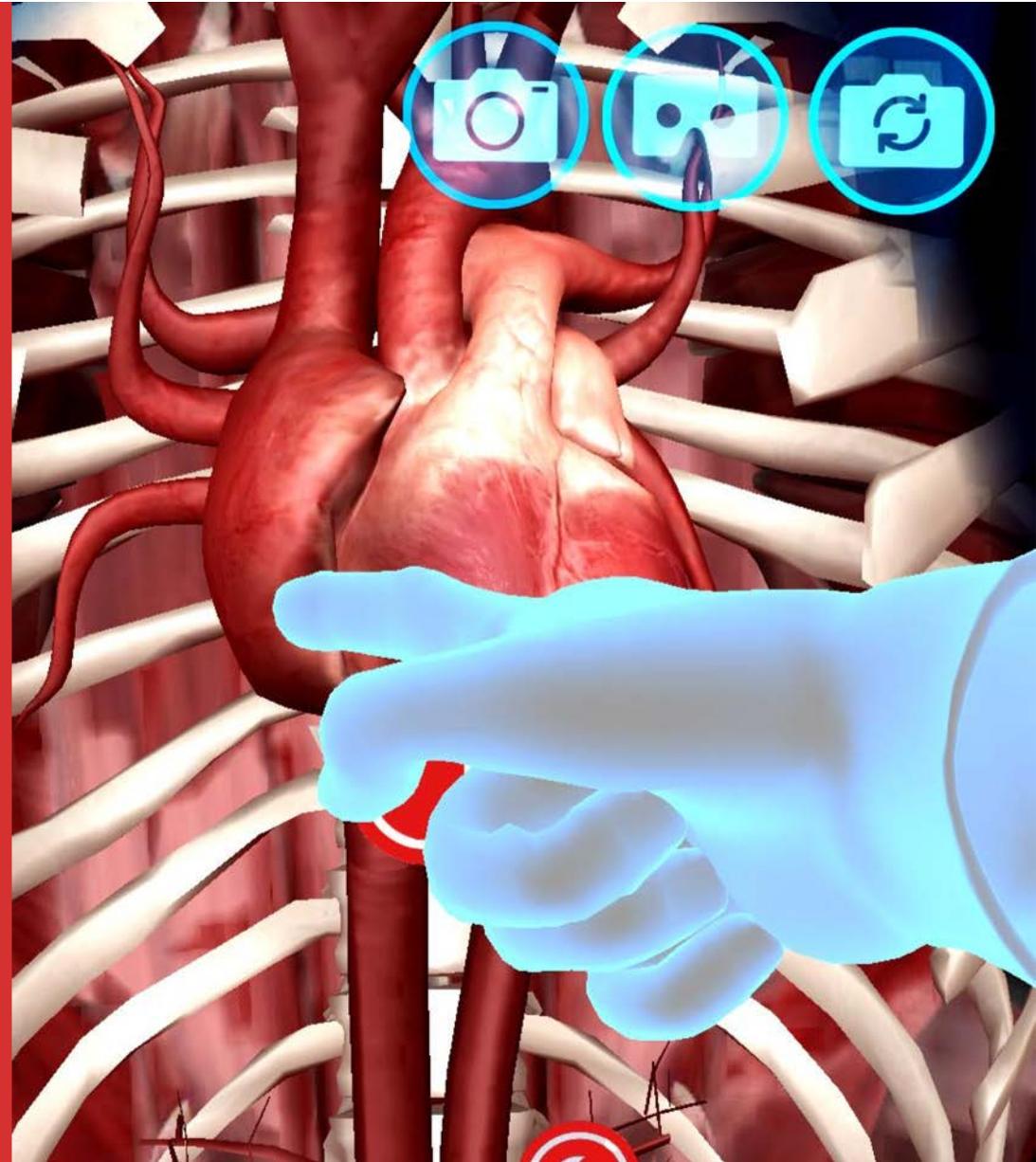


## Question 3

Which of the following is smallest in diameter?

- A. Veins
- B. Arteries
- C. Capillaries
- D. Arterioles

“Capillar” comes from the Greek for “hair-like”.

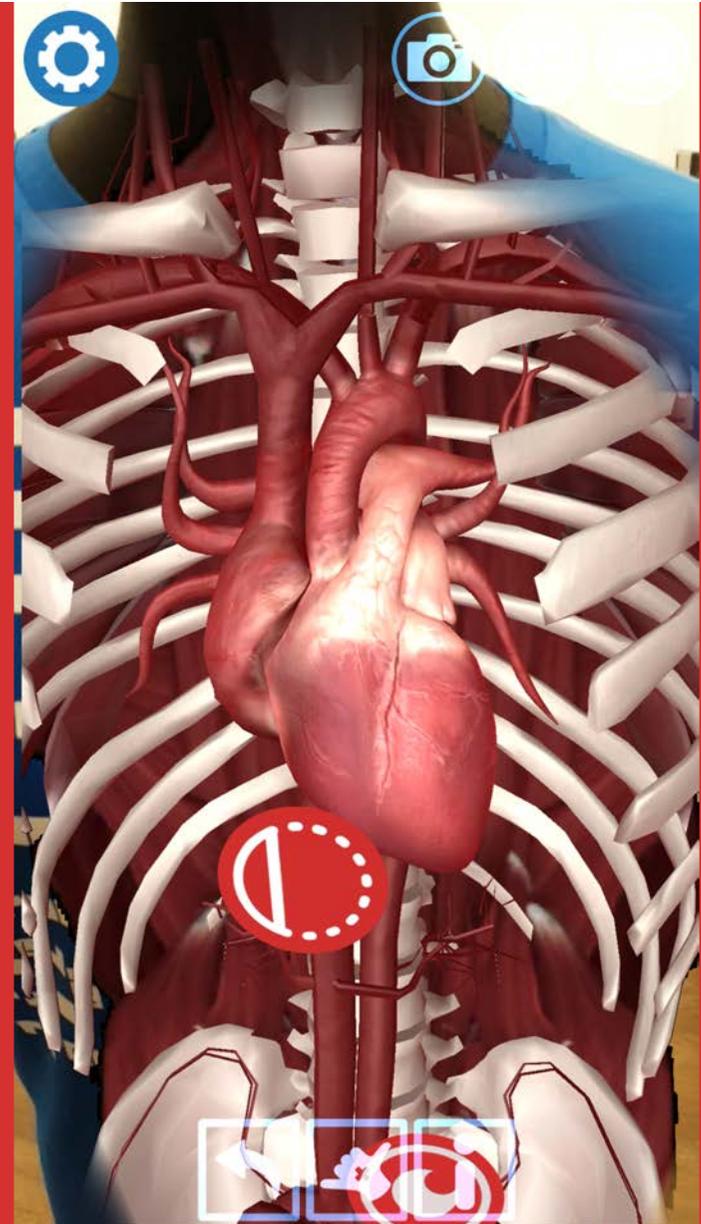


# Question 4

How often does the heart beat?

- A. Every time you blink
- B. 1 million times a day
- C. Every time you breath in
- D. 100,000 times a day

Your heart is busier than you, beating even when you are resting; between 60 and 100 times a minute!

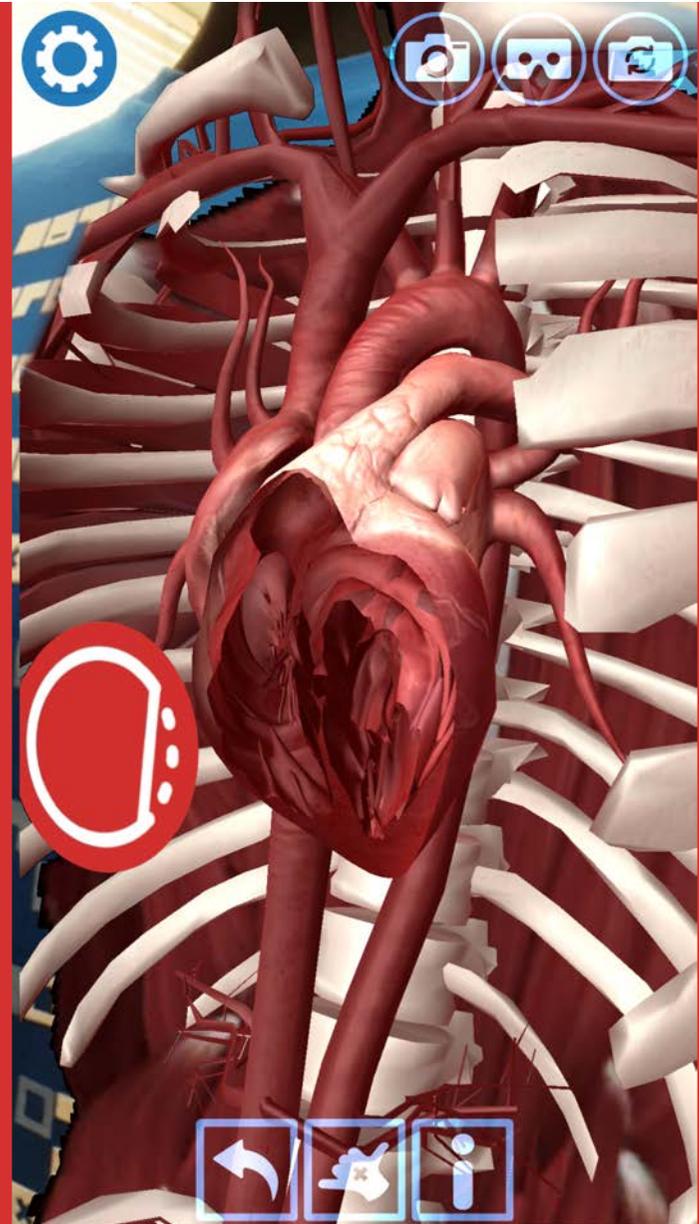


# Question 5

What is the name of the upper chambers of the heart?

- A. Ventricles
- B. Atria
- C. Valves
- D. Veins

Atria is also the name used for large open spaces in a building, and comes from the Latin “Atrium”, which was the word for the central court in a house.



## Question 6

What stops the blood in your heart from flowing the wrong way?

- A. Gravity
- B. Pistons
- C. Valves
- D. Cogs

Just like in a bicycle pump, valves control the direction of blood flow in the heart.

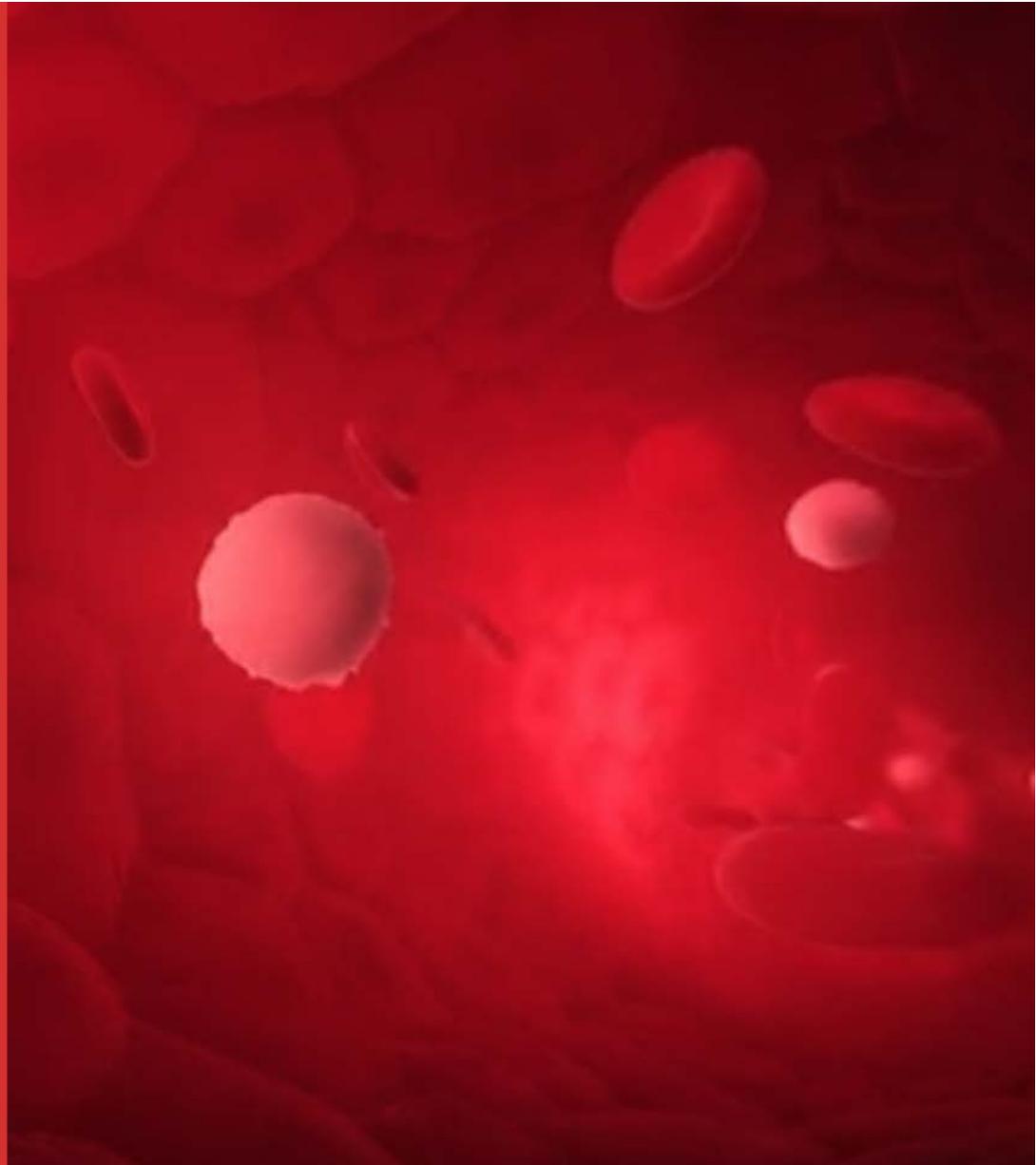


# Question 7

What do red blood cells carry?

- A. Carbon dioxide to the lungs
- B. Nutrients to the muscles
- C. Instructions from the brain
- D. Oxygen around the body

Red blood cells carry oxygen to tissues and organs in the body, and that oxygen is used to clean the blood.



## Question 8

Which of the following carry nutrients to the tissues and organs?

- A. Platelets
- B. White blood cells
- C. Plasma
- D. Green blood cells

Plasma is also the coolest name in the body! It is a clear, straw-coloured fluid. It also helps carry the blood cells around your body.



## Question 9

Which of the following carries waste away from tissues and organs?

- A. Platelets
- B. White blood cells
- C. Plasma
- D. Green blood cells

Plasma makes up for approximately 55% of total blood volume.



# Question 10

Blood flows away from the heart via ...

- A. Arteries
- B. Veins
- C. Esophagus
- D. Bronchioles

Veins carry blood back to the heart; they are darker than arteries as they carry back deoxygenated blood.





# WHAT TO DO WHEN SOMEONE IS HAVING A HEART ATTACK

## 1. Call 999/112 for emergency help

- Tell them you suspect a heart attack



## 2. Sit them down

- Comfortably, with knees bent



## 3. Give them aspirin

- 300mg dose to chew.\*

\*Do not give aspirin if the person is under 16 or allergic.  
Help them use their angina medication if they have it.



Learn first aid.

Help save lives.

Be the difference.

[sja.org.uk](http://sja.org.uk)

Make sure you always have life saving knowledge at your fingertips. Download our free first aid app from your app store today.