



**Enquiry: How do our choices affect how our bodies work? Why does my heart beat?**

**Year: 6**

**Strand: Biology**

### Prior Knowledge

- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans)
- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. (Y3 - Animals, including humans)
- Describe the simple functions of the basic parts of the digestive system in humans. (Y4 - Animals, including humans) Identify the different types of teeth in humans and their simple functions. (Y4 - Animals, including humans)

### What will I know by the end of the unit? Substantive Knowledge

What is the circulatory system?	The circulatory system is made of the heart, lungs and the blood vessels. Arteries carry oxygenated blood from the heart to the rest of the body. Veins carry deoxygenated blood from the body to the heart. Nutrients, oxygen and carbon dioxide are exchanged via the capillaries.
Choices that can harm the circulatory system	Some choices, such as smoking and drinking alcohol can be harmful to our health. Tobacco can cause short-term effects such as shortness of breath, difficulty sleeping and loss of taste and long-term effects such as lung disease, cancer and death Alcohol can cause short-term effects such as addiction and loss of control and long-term effects such as organ damage, cancer and death
Why is exercise so important?	Exercise can: tone our muscles and reduce fat increase fitness make you feel physically and mentally healthier strengthens the heart improves lung function improves skin

### Learning Objectives

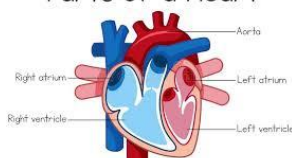
- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
- Describe the ways in which nutrients and water are transported within animals, including humans.

### Diagram – The Heart

The heart is composed of four chambers; the right atrium, the right ventricle, the left atrium and the left ventricle.

How often your heart pumps is called your pulse.

Parts of a Heart

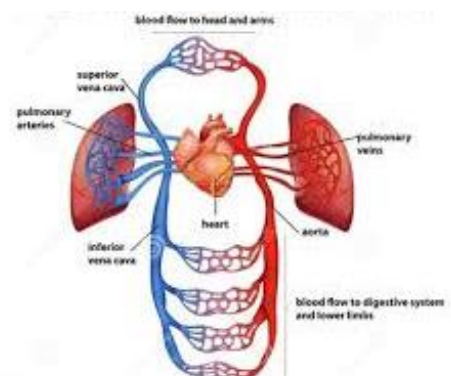


### Vocabulary

aorta	the main artery through which blood leaves your heart before it flows through the rest of your body
arteries	a tube in your body that carries oxygenated blood from your heart to the rest of your body
atrium	one of the chambers in the heart
Blood vessels	the narrow tubes through which your blood flows. Arteries, veins and capillaries are blood vessels.
capillaries	tiny blood vessels in your body
Carbon dioxide	a gas produced by animals and people breathing out
Circulatory system	the system responsible for circulating blood through the body, that supplies nutrients and oxygen to the body and removes waste products such as carbon dioxide
deoxygenated	blood that does not contain oxygen
heart	the organ in your chest that pumps the blood around your body
lungs	two organs inside your chest which fill with air when you breathe in. They oxygenate the blood and remove carbon dioxide from it
oxygen	a colourless gas that plants and animals need to survive
pulse	the regular beating of blood through your body. How fast or slow your pulse is depends on the activity you are doing
respiration	process of respiring; breathing ; inhaling and exhaling air. In KS3 Science, this process is referred to as ventilation
veins	a tube in your body that carries deoxygenated blood to your heart from the rest of your body
ventilation	The exchange of air between the lungs and the atmosphere so that oxygen can be exchanged for carbon dioxide
ventricle	one of the chambers in the heart

### Diagram – The Circulatory System

- The right atrium collects the deoxygenated blood from the body, via the vena cava. It sends the blood to the right ventricle.
- The right ventricle pumps the deoxygenated blood to the lungs. Here the blood picks up oxygen and disposes of carbon dioxide.
- The lungs send oxygenated blood back to the left atrium which pumps it to the left ventricle.
- The left ventricle pumps the blood to the rest of the body, via the aorta.



Possible Activities	Possible Misconceptions
<ul style="list-style-type: none"> <li>How does your pulse change with exercise? What is the most efficient way of presenting this data?</li> <li>Which exercise produces the fastest pulse? How would you make this a fair test?</li> <li>Create a role play model for the circulatory system.</li> <li>Carry out a range of pulse rate investigations:               <ul style="list-style-type: none"> <li>fair test – effect of different activities on my pulse rate</li> <li>pattern seeking – exploring which groups of people may have higher or lower resting pulse rates</li> <li>observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate)</li> <li>pattern seeking – exploring recovery rate for different groups of people.</li> </ul> </li> <li>Research the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources.</li> </ul>	<p>Some children may think:</p> <ul style="list-style-type: none"> <li>your heart is on the left side of your chest</li> <li>the heart makes blood</li> <li>the blood travels in one loop from the heart to the lungs and around the body</li> <li>when we exercise, our heart beats faster to work the muscles more</li> <li>some blood in our bodies is blue and some blood is red</li> <li>we just eat food for energy</li> <li>all fat is bad for you</li> <li>all dairy is good for you</li> <li>protein is good for you, so you can eat as much as you want</li> <li>foods only contain fat if you can see it</li> <li>all drugs are bad for you.</li> </ul>
Possible Evidence & assessment opportunities	Future Learning
<ul style="list-style-type: none"> <li>Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do</li> <li>Produces a piece of writing that demonstrates the key knowledge e.g. explanation text, job description of the heart</li> <li>Use the role play model to explain the main parts of the circulatory system and their role</li> <li>Can use subject knowledge about the heart whilst writing conclusions for investigations</li> <li>Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body</li> <li>Present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body</li> <li>Why does my heart beat?</li> <li>How have our ideas about disease and medicine changed over time?</li> <li>How does my heart rate change over the day?</li> <li>Which organs of the body make up the circulation system, and where are they found?</li> <li>Which type of exercise has the greatest effect on our heart rate?</li> </ul>	<p>The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. (KS3)</p> <p>The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. (KS3)</p> <p>The structure and functions of the gas exchange system in humans, including adaptations to function. (KS3)</p> <p>The mechanism of breathing to move air in and out of the lungs. (KS3)</p> <p>The impact of exercise, asthma and smoking on the human gas exchange system. (KS3)</p>
Working Scientifically (Disciplinary Knowledge)	Questions
<p>Know which type of investigation is needed to suit a particular scientific enquiry</p> <p>Plan different types of scientific enquiries to answer their own or others' questions.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>Group and classify things and recognise patterns using appropriate ways of presenting</p> <p>Find things out using a wide range of secondary sources of information</p> <p>Use results to draw conclusions. Is evaluative when explaining findings from scientific enquiries and is clear about what has happened in recent enquiries and can relate this to other enquiries where appropriate</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments</p>	<p>Why do we need oxygen?</p> <p>How do we breathe?</p> <p>Do fish and plants breathe?</p> <p>Do all living things need oxygen?</p> <p>How does the size of a person's lungs affect their lung capacity?</p> <p>Are there ways to increase/decrease our lung capacity? Is lung capacity fixed?</p> <p>Why do we have blood?</p> <p>How does our heart work?</p> <p>How does size of muscle affect our pulse rate?</p> <p>How does exercise effect our pulse rate?</p> <p>How might the circulatory system of an elephant, a hummingbird, or a polar bear differ?</p> <p>Is the air you breathe out, the same as that you breathe in?</p>
	<p><b>Possible Texts</b></p> <p>Pig-Heart Boy (Malorie Blackman)</p> <p>Skellig (David Almond)</p> <p>A Heart Pumping Adventure (Heather Manley)</p> <p><b>LINKS TO THE WORLD OF WORK</b></p> <p><b>Personal Development</b></p> <p>The Yes Program - Science - cardiologist (the heart is a pump)</p>

## Possible Adaptations for SEND & EAL

Watch this episode of Operation Ouch - all about the heart. <https://www.youtube.com/watch?v=DB5HxSPGVp0>

Doctors use a stethoscope to hear people's hearts. Make a stethoscope to hear hearts (you might be able to put it on someone's back). You will need to listen carefully.

Put a toothpick into a marshmallow. Put the marshmallow on your wrist and watch it move up and down as your pulse beats!

Keeping your heart healthy... by skipping with a rope. Try skipping with a rope every day to help your heart get healthy!

Fill syringes with water and see how far you can squirt it. The heart can pump blood up to 10 metres away!!

## End Points and Assessment of Core Learning

Working Scientifically:
I can plan different types of scientific enquiry.
I can recognise and control variables in an enquiry.
I can measure accurately and precisely using a range of equipment. Taking repeat measurements if necessary.
I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
I can use the outcome of test results to make predictions and set up a further comparative fair test.
I can report findings from enquiries in a range of ways.
I can explain a conclusion from an enquiry.
I can explain causal relationships in an enquiry.
I can relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.

Animals, Including Humans:
I can identify and name the main parts of the human circulatory system.
I can describe the function of the heart, blood vessels and blood.
I can discuss the impact of diet, exercise, drugs and life style on health.
I can describe the ways in which nutrients and water are transported in animals, including humans.

Question 1: The heart, blood vessels and lungs make up the...	Start of unit:	End of unit:
digestive system		
circulatory system		
skeletal system		

Question 2: Which one of these is <b>not</b> an organ?	Start of unit:	End of unit:
heart		
lungs		
blood		

Question 3: The most effective way to show the change in pulse rate over time is by using a...	Start of unit:	End of unit:
picture		
bar chart		
pie chart		
line graph		

Question 4: The veins carry ..... blood.	Start of unit:	End of unit:
deoxygenated		
oxygenated		
blue		
Question 5: Tick two boxes below to show the two activities that would increase pulse rate the most.	Start of unit:	End of unit:
reading a book		
playing football		
drinking water		
going for a walk		

Question 6: Which of these can harm our bodies? Tick <b>two</b> .	Start of unit:	End of unit:
smoking		
all drugs		
alcohol		
exercise		

Question 7: The function of the blood is to provide the body with...(tick <b>three</b> )	Start of unit:	End of unit:
nutrients		
water		
carbon dioxide		
oxygen		

Question 8: Arteries, veins and capillaries are examples of...	Start of unit:	End of unit:
blood		
blood vessels		
blood types		
nutrients		