Animals – The Circulatory System

Name_____ **Class**_____

What you will need for this lesson: You just need yourself but if you have a timer and a calculator, it might help you!

You will also need a pen, a pencil and if you have it, access to a computer, tablet or iPad.

LESSON STARTER

The circulatory system is the system that takes blood to our heart around our bodies and back again to the heart. In the blood, it carries oxygen, nutrients and hormones to cells all over our body and also takes waste products like carbon dioxide away from the cells.
The average human body contains over 60,000 miles of blood vessels.

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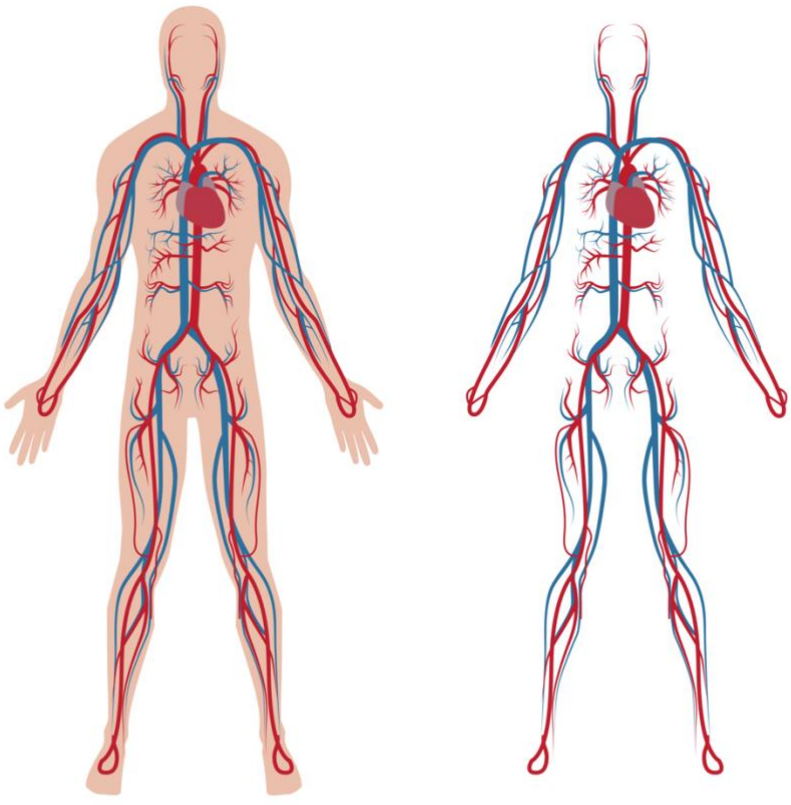


CIRCULATORY SYSTEM

Try and answer the questions on the next page. You may not know the answers but put down what you think.

What happens to the oxygen in the when you breathe it in?

How do you think the nutrients from our food gets from the digestive system to our big toes?

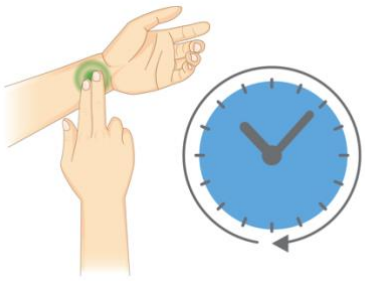
You can feel your pulse when you press down on some parts of your body. What do you think your pulse is and what makes it happen?

When you've finished, watch the video to see whether you were right!

The Investigation

In our investigation we are going to explore our heart rate. We are going to investigate whether exercise affects our heart rate.

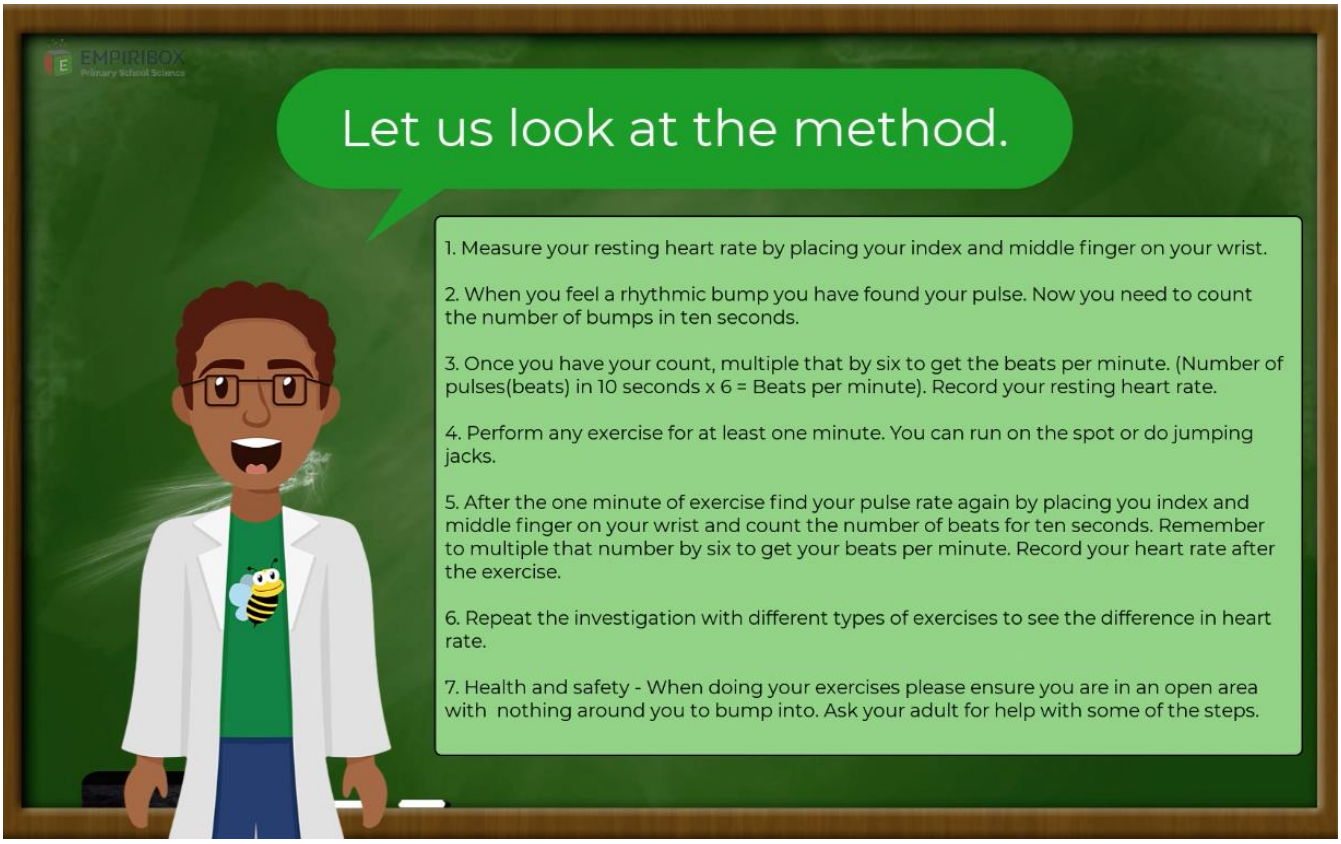
First you will have to find your pulse.



Place two of your fingers on your wrist as in the picture. You may be able to see an artery (this looks thicker than one of the smaller veins) under your skin on the thumb side of your wrist. Press your fingers down here. You should be able to feel a beat. This is your pulse.

Count the number of beats you feel in 15 seconds and then multiply that by 4. This will give you your resting heart rate.

You are going to do some exercises. So make sure you find a safe place to complete them, where you can see a clock.
Make sure you have a pen and a piece of paper ready to note down your numbers.



WORKING SCIENTIFICALLY

Our next focus is about working scientifically. All scientists apply these principles whenever they are investigating anything and we've divided them into different skill units.

Find the section your teacher has asked you to focus on and answer the questions in the relevant section.

A. Planning or

B. Presenting and analysing data or

C. Evaluation

A. Planning

Every scientist wants to solve a problem and so takes the following steps:

1. **Decides on a question that needs answering.** e.g. Does the length of time I do the exercise affect the heart rate?
2. **Decides what the independent variable (the thing that is changed) might be in order to work out the answer to the question** e.g. I will change the length of time I exercise – 1 minute, 2 minutes and 3 minutes.
3. **Decides what the dependent variable might be (how to measure the differences in each different example**) e.g. I will measure my heart rate/pulse after each minute.
4. **Last of all decide what elements have to stay the same in order to make it a fair test e.g.** I will keep the exercise the same for the whole time.

Now using this knowledge, see if you can answer the questions below!

Years 3 and 4 – Design the question you would ask if the following were your independent and dependent variables.

The Independent variable is **the types of exercise.**

The Dependent variable is the **heart rate.**

My question is:

_____

_____

_____

Years 5 – Look at the following question:

Does increasing the time for the exercise affect the number of beats per minute?

What do you think will happen? Write your **prediction** below.

Scientists will always write a **prediction** when they are carrying out an investigation.

Planning continued..

My prediction is: _____

_____

_____

_____

Year 6 – Look at the following question:

Does increasing the time for the exercise affect the number of beats per minute?

What do you think will happen? Write your **prediction** below.

My prediction is _____

_____

_____

_____

Now **justify your prediction**. Why do you think that will happen?

_____

_____

_____

_____

B. PRESENTING & ANALYSING DATA

When scientists carry out investigations, it is really important that they capture data to make sure they can then answer the questions that they have set themselves.
The scientist on the video has asked you to complete the following:

Year 3 pupils – You are carrying out experiments to answer the following question:

Does increasing the time for the exercise affect the number of beats per minute?

Think about how you would create a table to show your results? Draw your table in the space at the end of the Presenting and analysing data section and then record your results within it.

Year 4 & 5 pupils – You are carrying out experiments to answer the following question:

Does the type of exercise you do affect the number of beats per minute?

Draw a table in the space at the end of the Presenting and analysing data section and then record your results within it.

After you have recorded your data in your table, can you see if there is a pattern or trend in it?

Year 6 – Look at the following question:

Does the age of the person carrying out the exercise affect the number of beats per minute?

Draw a table in the space at the end of the Presenting and analysing data section and then record your results within it.

After you have recorded your results, see if you can present your data in a graph of some kind, e.g. bar chart or line graph. There is some squared paper at the end of the Presenting and analysing data section to do this.

PRESENTING & ANALYSING DATA continued

My Table

EMPIRIBOX
Primary School Science

C. EVALUATION

Evaluating how an investigation went as well as the data that comes from a science experiment is a really important part of science. It may be that you feel your experiment could have been done better or more thoroughly and it is important to understand this.

Answer the questions below:

Year 3, 4, 5 and 6 pupils: You are going to carry out an investigation. It might be that you want to ask this question:

Does the type of exercise you do affect the number of beats per minute?

Or you might want to choose your own question. **Record the data carefully in a table or by writing the results down. Us the space below to do this.**

EVALUATION continued

Can you see any anomalies or odd results? Circle or underline any you see. If there are none then just say that there weren't any.
Anomalies are results that stand out because they don't fit into a pattern.

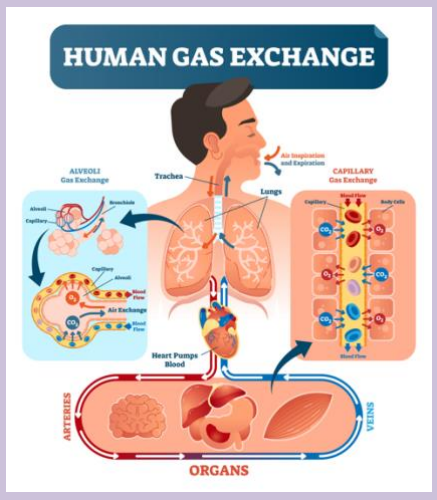
Year 4,5 and 6 Can you work out why there were any anomalies? Explain below what you think caused those anomalies.

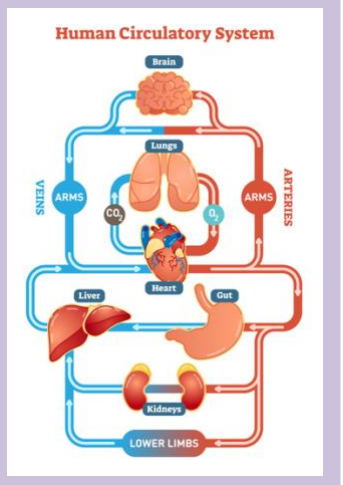
Year 5 and 6 Can you explain what you could do to prevent any anomalies? Think about how to carry out a fair test.

The science behind the investigation

The human circulatory system carries blood, energy and water around the body. There are 4 main parts to the circulatory system:

1. The heart
2. The lungs
3. The blood vessels
4. The blood itself.



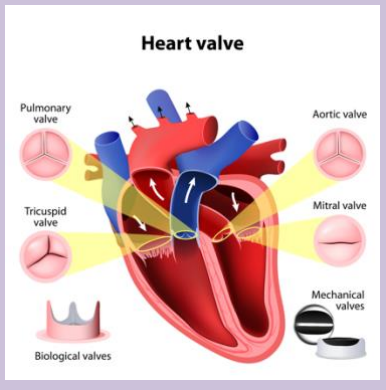


Our lungs allow us to breathe. They bring in oxygen into the body which we need to stay alive and they also get rid of carbon dioxide which we do not want in our bodies. The blood carries the oxygen that we breathe in, from our lungs to our all parts of our body. It also carries back to the lungs the carbon dioxide that we need to breathe out.

The vessels that carry the blood with the oxygen in it are called arteries. They carry oxygen filled blood **from the heart to the rest of the body**. The vessels that carry the carbon dioxide filled blood back **from our body to the heart** are called veins.

The heart pumps the blood around the body. It is a large muscle that sits very near the middle of your chest. It contracts and relaxes just like any other muscle in your body. When you feel your pulse it is the contraction and relaxation of your heart that you can feel.

Valves in your heart keep the blood pumping at all times but sometimes we need more oxygen than at other times like when we do exercise. When this happens the heart pumps a little harder and faster to get the oxygen to the parts that need it.



Your challenge!

Your challenge is to research the heart rates of different animals. Record the heart rates in a table. You can use the one below. If you prefer you can draw a graph to represent your data on a separate piece of paper.

Animal	How is it useful or not useful?

When you look at your data can you make any connection between the animals' heart rate and their size?

_____

_____

What was your score?

_____