

YEAR 6: AUTUMN 2 – TIMECOP

SCIENCE: Animals including humans

UNDERSTAND, DESCRIBE AND EXPLAIN: KEY KNOWLEDGE

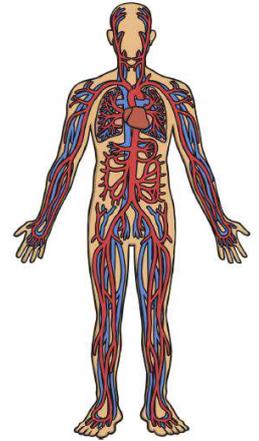
To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood and describe the ways in which nutrients and water are transported within animals, including humans.

Learning links:
Science
Year 3: Animals inc humans – skeletons and muscles
Year 4: Animals inc humans – digestive system

Circulatory System		Circulate	Blood	Nutrients	Hormones	Oxygen (O ₂)	Blood cells
Heart	Lungs	Blood Vessels	Arteries	Veins	Capillaries	Oxygenated	De-oxygenated
Diaphragm	Intercostal muscles	Alveoli (air sacs)	Atrium	Ventricle	Aorta	Pulmonic valve	Pulmonary artery
Nutrients	Water	Chyme	Small intestine	Villi	Bloodstream	Tissue	Cells

The Human Circulatory System:

The circulatory system is an essential part of our body. 'Circulatory' means something that is going on a **continuous circuit**. This is exactly what is happening in our bodies all the time. **Blood** is **circulated** all around your **body**, and it is playing a **really important role**. Your **blood** takes **nutrients**, **hormones** and **oxygen** (O₂) all around the **body** to all the places they are **required**. The **oxygen** gets **collected** into your body when we **breathe in**, and it goes **straight to your lungs**. It is in the **lungs** that this **oxygen** goes **into** our **blood** and **starts** its **journey** around the **body**. You could think of the blood cells a bit like delivery drivers that drop off the oxygen to where it needs to be. **Oxygen** is **delivered** all **around the body** by **arteries** and **veins** to the **capillaries**, which are **fine blood** vessels that **transfer the oxygen** to all the **cells in the body**.



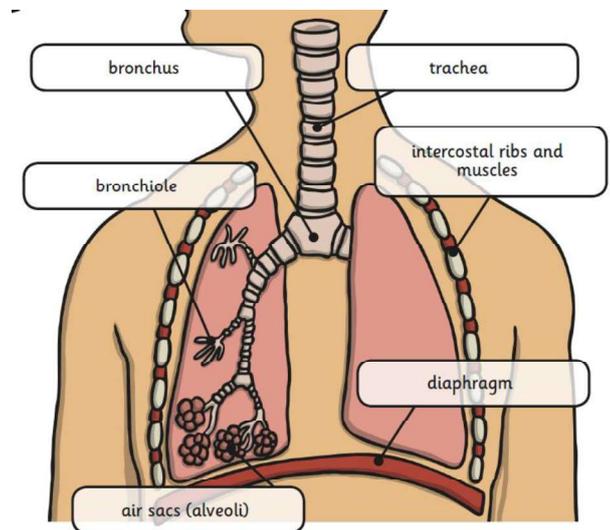
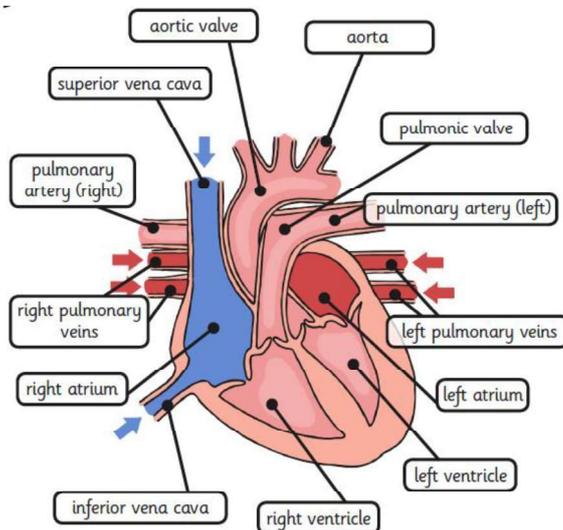
The Main Parts of the Circulatory System:

Heart:

The **heart** plays an important role because it keeps all the **blood flowing** in the **circulatory system**. The process of **exercising** results in the body requiring more **oxygen**, this means that the **heart** has to **circulate** more **oxygenated blood** through the **circulatory system**. That is why your **heart beats faster** when you **exercise**.

Lungs:

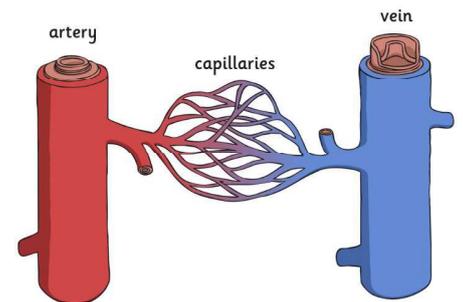
When we **breathe**, we **inhale air containing oxygen** into our **lungs**. It is in the **lungs** that **blood vessels** pick up **oxygen** and leave **carbon dioxide** to be **released**.



Blood Vessels:

Blood vessels are **tubes** that **carry** the **blood** around the **body**. There are **three main types** of blood vessels:

- **Arteries** – these carry **oxygenated blood away** from the heart **to** the rest of the **body**.
- **Veins** – these carry **deoxygenated blood back** to the **heart** to be pumped to the **lungs** to become oxygenated.
- **Capillaries** – these are **blood vessels** that **connect** to both **arteries** and **veins**. They are also connected directly to cells. **Blood** with **nutrients** and **oxygen** passes from the artery, through the **capillary** to a **cell**. Any waste is passed through capillary to the vein.

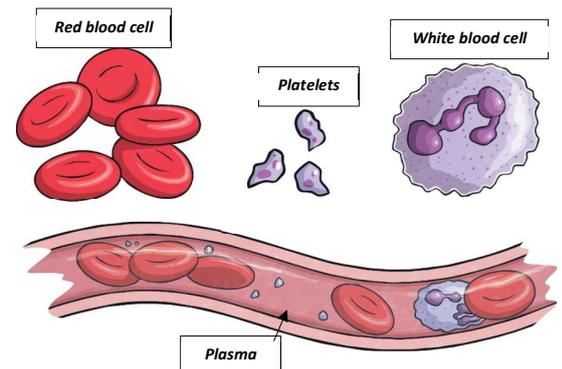


Blood:

Blood is a red substance made up of **4 parts**:

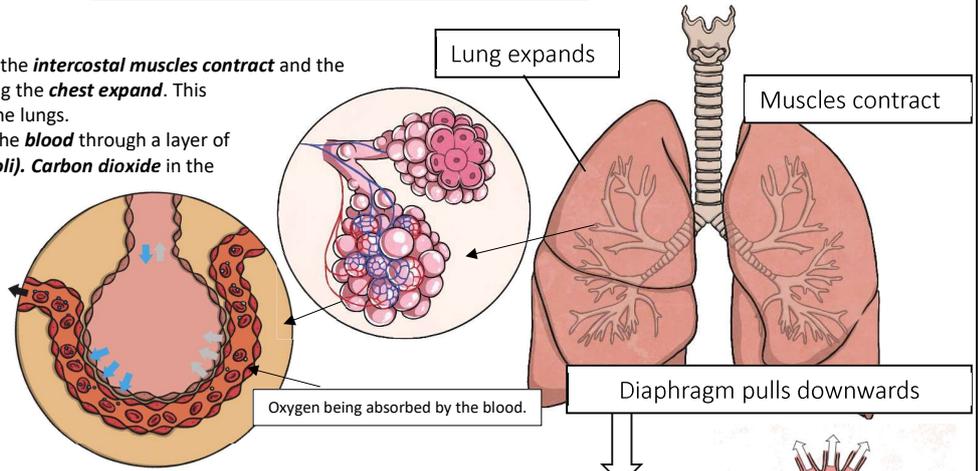
- **Plasma**: the thick liquid which carries the blood cells through the vessels.
- **Red blood cells**: absorb the oxygen from the lungs and transport this to the different parts of your body.
- **White blood cells**: fight infections and illnesses which enter your body.
- **Platelets**: mend broken areas of flesh or skin by 'scabbing'.

The **job of blood** is to **transport oxygen** to all parts of the body, **fight infection** and **mend broken flesh**.

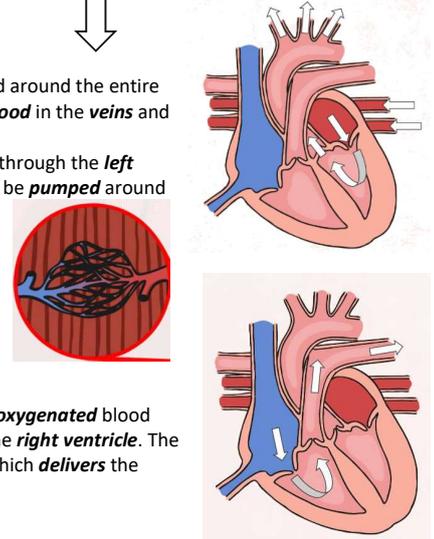


How the Circulatory System Delivers Oxygen:

1. When we **breathe in** (inhale), the **intercostal muscles contract** and the **diaphragm pulls down**, making the **chest expand**. This causes **air to be sucked** into the lungs.
2. The **oxygen is absorbed** into the **blood** through a layer of **moisture** in the **air sacs (alveoli)**. **Carbon dioxide** in the blood is **transferred** back into the **air**, which then **travels** back out of the **lungs**.

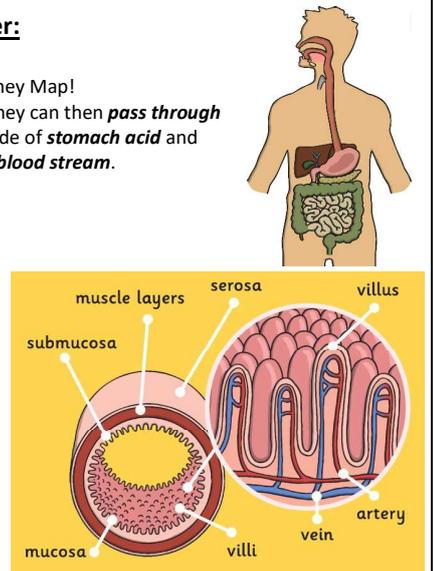


3. The **heart has two jobs**: to **pump oxygenated blood** around the **body**; and to **pump de-oxygenated blood** to the **lungs** to **collect oxygen**. It is **continuously pumping** blood around the entire body. Once the **blood has delivered** its oxygen in the **arteries**, it **returns** as **deoxygenated blood** in the **veins** and to the **heart** to be **pumped towards the lungs** to **collect more blood**.
4. Once **oxygenated**, the **blood** (from the **lungs**) **returns** to the **heart**. From here, it is **pumped** through the **left atrium** in to the **left ventricle** and then through the **aorta** (main artery), in to the **arteries** to be **pumped** around the **body**.
5. The **blood travels** through the **arteries** to **smaller, thinner blood vessels** called **capillaries**. When here, the **oxygen** and **nutrients** from the **blood** is able to **travel through the thin walls** of the **capillaries** in to the **cells** of the **tissue**.
6. Once the **oxygen** has been **delivered** by the **blood** to the different areas of the **body**, the **deoxygenated** blood must **return** to the **heart**. From the **heart**, it is **pumped** through the **right atrium** and in to the **right ventricle**. The **deoxygenated blood** then **travels** through the **pulmonic valve** in to the **pulmonary artery** which **delivers the blood** to **capillaries** in the **lungs** where it **absorbs fresh oxygen**.
7. The process **restarts and is continuous**.



How the Circulatory System Delivers Nutrients and Water:

1. Remember what we learned about **digestion** in **Year 4? Revise** and **re-read** that Learning Journey Map!
2. After the **food and liquids** have been **broken down** in the **mouth, oesophagus and stomach**, they can then **pass through** to the **small intestine**. By this point, the food is in the form of **chyme** – a **pulpy, acidic fluid** made of **stomach acid** and small **bits of food**. It is **here**, in the **small intestine**, where the **nutrients** are **absorbed** into the **blood stream**.
3. The **small intestine** is a **muscular tube** with **several layers** and **lined with tiny hair like villi** which are **attached to arteries and veins**.
4. The **chyme** is **moved** back and forth in the **small intestine**. The **nutrients pass through the villi** and are **absorbed** into the **blood vessels**.
5. **Water is absorbed** in the **small intestine** in the **exact same way** as other nutrients are absorbed – through the **villi** into **bloodstream** via the **blood vessels**.
6. The **nutrients and water**, now in the **bloodstream**, travel around the **body** in the **blood vessels** and are **absorbed** by the **cells** which need them.



EXPLORE AND INVESTIGATE:

HYPOTHESE
ENQUIRE
TEST
RECORD
REPORT
CONCLUDE

KEY ASSESSMENT AND APPLICATION OPPORTUNITIES:

EXS:

•

GDS:

•

UNDERSTAND, DESCRIBE AND EXPLAIN: KEY KNOWLEDGE

To recognise and understand the impact of diet, exercise, drugs and lifestyle on the way human bodies function

Learning links:
Science

Lifestyle	Diet	Exercise	Drugs	Impact	Vitamins	Minerals	Nutrients
Carbohydrates	Proteins	Fruit & vegetables	Dairy	Oils	Sugar	Fat	Excessive
Exercise	Heart rate	Stamina	Drug/Substance	Legal	Illegal	Prescribed	Harmful

The impact of lifestyle on the human body:

It's obvious, if you don't look after a car and don't put in the right petrol, it's not going to work properly. What many people do not realise is that our body is the same and what it becomes depends on how we choose to treat it. We need to think carefully about the areas of **diet, exercise, drugs** and **lifestyle**, as these are the things that can have an **impact** on your **body**. Lifestyle means the way you live your life and this could be anything from your hobbies to what you enjoy doing as a family, understanding of portion sizes or what you tend to eat at mealtimes. People can forget that just a few simple changes to lifestyle can make changes to your body. Remember, a healthy lifestyle is about keeping a good balance!

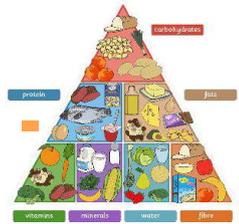


The impact of diet on the human body:

The word '**diet**' simply means all the **food** and **drink** you choose to put into your body.

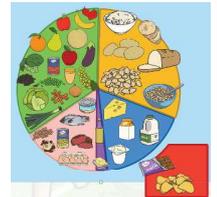
The standard **healthy diet** for a person with no medical needs (such as diabetes) contains a **balanced mix** of different types of **food** and **drink** highlighted in the **Eat-well Plate**.

- **Fruit and Vegetables:** are good sources of vitamins and minerals and fibre. Aim to eat 5 portions a day! Choose from fresh, frozen, tinned, dried or juiced. Fruit juice and/or smoothies should be limited to 110 more than a combined total of 150ml per day.
- **Carbohydrates:** are starchy foods such as potatoes, bread, rice, pasta and cereals should make up just over a third of the food you eat. These are important for giving us energy. Choose higher-fibre, wholegrain varieties, such as wholewheat pasta and brown rice, or simply leave skins on potatoes.
- **Dairy and Alternatives:** are a source of calcium which is important for strong teeth and bones. Choose lower fat and sugar options.
- **Food and Drinks High in Fat and/or Sugar:** eat less often and in small amounts.
- **Oil and Spreads:** Choose unsaturated oils and spreads and use in small amounts. Eat sparingly.
- **Proteins:** such as beans, pulses, fish, eggs, meat are very important for helping us grow and build muscles. Beans and pulses are a good alternative to meat as they contain less fat and are higher in fibre and protein. Try to eat 2 portions of fish a week, and try to reduce intake of red and processed meat.



By ensuring that you eat a **well-balanced, healthy diet**, your body will **consume all of the right nutrients** and **vitamins** that it needs to **thrive**. You will **feel good**, be able to **complete challenging tasks**, have lots of **energy** and **rarely get ill**. On the other hand, if you eat **unhealthily** and eat one food group **excessively**, this will have a **negative impact** on your **body** and **health**:

- By eating **too much fat, oils, sugars or carbohydrates**, your body will **store this as fat** on and inside your body which can lead to **serious health problems**.
- If you eat **insufficient fruit and vegetables**, you may be **missing key vitamins and minerals** in your diet which can also **lead to health problems**.
- By **not eating enough carbohydrates**, you will **lack energy** and be **unable to complete exercise** or **challenging tasks** as well.
- A **lack of protein** in your **diet** will mean that your **body struggles to repair** itself after exercise.

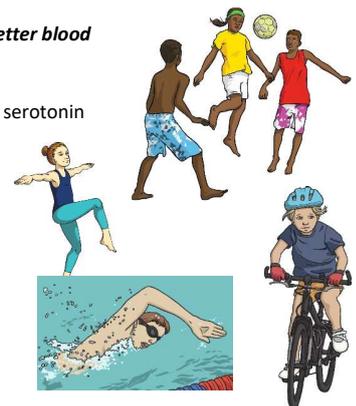


The impact of exercise on the human body:

Exercise is **physical activity** that requires **effort**, raises your **heart rate** and **works your muscles**.

Doing **one hour** of exercise **per day** has a **huge positive effect** on your body. **Regular exercise** results in **better blood circulation**, better **stamina** and **fitness**, **stronger bones** and a whole host of other benefits:

- Helps you **fall asleep faster** and deeper so you are **better rested**.
- **Stimulates** and releases **brain chemicals** – for example endorphins leave you **feeling happier** and serotonin helps keep your **mood calm** and leaves you **feeling relaxed**.
- **Increases** the number of **air sacs (alveoli)** in your lungs.
- **Increases** the amount of **oxygen delivered** to and carbon dioxide removed from the body.
- **Bones** increase in width and **density** (The denser the bone; the **stronger** it is).
- **Increases** the number of **capillaries** in the muscles.
- **Strengthens all muscles**.
- **Increases** the **circulation** of blood – this means that nutrients are delivered and waste taken away faster which improves parts of the body like skin.
- **Increases** the **volume** of blood and **red blood cells**.



The impact of drugs on the human body:

A **drug** is any **substance** that has an effect on your body when it **enters your system**. This effect can be **good or bad**.

Drugs contain chemicals which can come from **natural** sources or are **man-made**. It is important that you follow the **advice of doctors** and responsible adults when taking a drug as even medicines have to be taken in a particular way to keep them **safe**.

Drugs can be **medicines** that are **helping your body** but they can also be **substances**, such as **alcohol** or **chemicals** found in cigarettes that have a very **bad effect on your body**.

Drugs that have a **bad effect** on someone's **body** can also make people **think** that it is having a **good effect**. On top of this, they can also make someone's body **want more of that drug** and this is where someone can become **addicted**.

Legal, non-harmful drugs:

Legal drugs include medicines like **cough syrup** and substances like **tea or coffee**. These can be bought **over the counter in shops**. If used properly, these are **not substances that are considered harmful** or have **serious side effects**.

Legal, harmful drugs:

- **Alcohol** is a **legal drug** but there are **restrictions** and recommended **limits** on its use because, drunk in **excess**, it can **seriously damage health** and can **increase chances** of: **High blood pressure, stomach cancer, liver damage** or **addiction**.
- **Tobacco smoking** is a **legal drug** but there are **restrictions** and recommended **limits** on its use because it poses a **serious threat to health**. **Excessive** tobacco smoking can **increase** chances of: **lung cancer, heart disease, throat cancer, heart attacks** and **strokes**.



Prescribed drugs:

These **drugs** are **legal** but only if you have been **prescribed** them. Only a **doctor** can write a **prescription** and this appears on your **medical record**.

This is due to several factors:

- These drugs can have **serious side effects**.
- These drugs may **not be suitable** for some people, such as children or pregnant women.
- Medicines may not work or may **cause harm** if they are **not taken at the correct dose**.
- Some medicines, for example, sleeping tablets, contain **substances** which could **become addictive**.



Illegal drugs:

Unlike medicines, which are used to treat illness or disease, these **drugs are taken by choice**. They are **illegal to buy, take or sell**. These drugs are **very harmful to the human body** and are **illegal** because of the **dangers associated** with taking them. Some examples include:

- Cannabis
- Heroin
- Cocaine
- Ecstasy

