Year 6 – Animals including humans

NB – Parts of this unit will need to be taught in accordance with your school's drug education policy.

Reference to the Programme of Study, 2014

Pupils should be taught to:

- Identify and name the main parts of the human circulatory system, and explain 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.

The learning journey: Animals including humans

Year group	Statutory Requirements from the Programme of study
1	• Identify and name a variety of common animals that are birds, fish, amphibians, reptiles and mammals • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles and mammals, and including pets). • Identify, name draw and label the basic parts of the human body and say which parts of the body is associated with each sense.
2	• Notice that animals, including humans, have offspring which grow into adults • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
3	• 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 • Identify that humans and some animals have skeletons and muscles for support, protection and movement.
4	• Describe the simple functions of the basic parts of the digestive system in humans

	• Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey.
5	• Describe the changes as humans develop from birth to old age.
6	• Identify and name the main parts of the human circulatory system, and explain 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.

How the children should learn science at Upper Key Stage 2

The principal focus of science teaching in Upper Key Stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At Upper Key Stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

Suggestions for Working Scientifically

Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Further guidance

These opportunities for working scientifically should be provided across Years 5 and 6 so that the expectations in the programme of study can be met by the end of Year 6. Pupils are **not** expected to cover each aspect for every area of study.

Planning enquires. Children should plan different types of enquiry to answer questions.

Identifying variables. Children should recognize and control variables where necessary.

Secondary sources. Children should recognize when secondary sources will be most useful to research their ideas and begin to separate opinion from fact.

Using equipment. They should choose the most appropriate equipment. Children should take measurements, using a range of scientific equipment with increasing accuracy and precision.
Collecting data. They should make their own decisions about what observations to make, what measurements to use, and how long make them for.
Recording. They should choose how to record data. Children should record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs. They should report and present findings from enquires, including conclusions, causal relationships and explanations of results (in oral and written forms).
Analysing data. Children should use test results to make predictions to set up further comparative and fair test. They should use simple models to describe scientific ideas. They should identify scientific evidence that has been used to support or refute ideas or arguments.
Making Improvements. They should use their results to identify when further tests and observations might be needed

Preparation for this unit of study

Ensure that you have gathered plenty of secondary sources for children to do their research. These will need to include information on drugs, lifestyles and diets.

Resources

- Red and blue tape
- A drum
- Transparent jars
- Balloons
- Skewer
- Straws
- Pulse meters
- Red coloured sweets
- Corn syrup
- White marshmallows

- Smarties
- Bowls
- Red food dye
- Gelatin

Key vocabulary

Circulatory system – heart, blood, veins, arteries, pulse, clotting

Diet – balanced, vitamins, minerals, proteins, carbohydrates, sugars, fats

Drugs – caffeine, nicotine, alcohol, cannabis, cocaine, heroine

Lifestyle – healthy

Key information for teachers

The Heart - The two halves of the heart are separated by a membrane called the septum. This wall prevents the flow of blood between the two atria or the two ventricles.

The heart pumps blood in two phases. In the systolic phase, the ventricles contract, pumping blood into the arteries. In the diastolic phase, or second phase, the ventricles relax and blood flows into them from the atria. These two phases of the heartbeat are measured when the blood pressure is taken.

The valves within the heart are one-way valves. This means that blood can flow into the heart but not back into the arteries or ventricles.

The heart is a hollow muscle. It is about the size of your fist. It is located slightly to the left of the centre of your chest. The hollow inside is divided into four sections. These sections are called chambers. Two chambers are on the left and right side. Each side has an upper and lower chamber. The right upper receives blood from the body. The right lower pumps blood to the lungs. The left upper receives blood from the lungs. The left lower pumps blood to the rest of the body.

Nutrients and water transportation

Water serves as the body's transportation system

Water, after oxygen, is the second most important substance for human health. Water is a universal solvent and transport medium, and because of that it is the basis of all biological processes in the human body.
Water is mainly important for the digestive system, because it contributes to the constant supply and export of products and substances. The transport of nutrients can only take place through a solvent, and as such water acts as the main transport medium of nutrients.
Water also attends heat regulation in our bodies. For humans it is of vital importance that the body temperature stays at a standard level. That is why we have to drink water, when we are infected with a fever. Water takes up heat and transports it out of the body while we are transpiring.
We can survive without food for about 30 to 40 days, but we can only survive a few days without water. This is a factor that proves how important water is for us.

Drugs effects on the human body

Up-to-date information on how drugs affect the human body can be found on the NHS website:
http://www.nhs.uk/Livewell/drugs/Pages/Drugsoverview.aspx

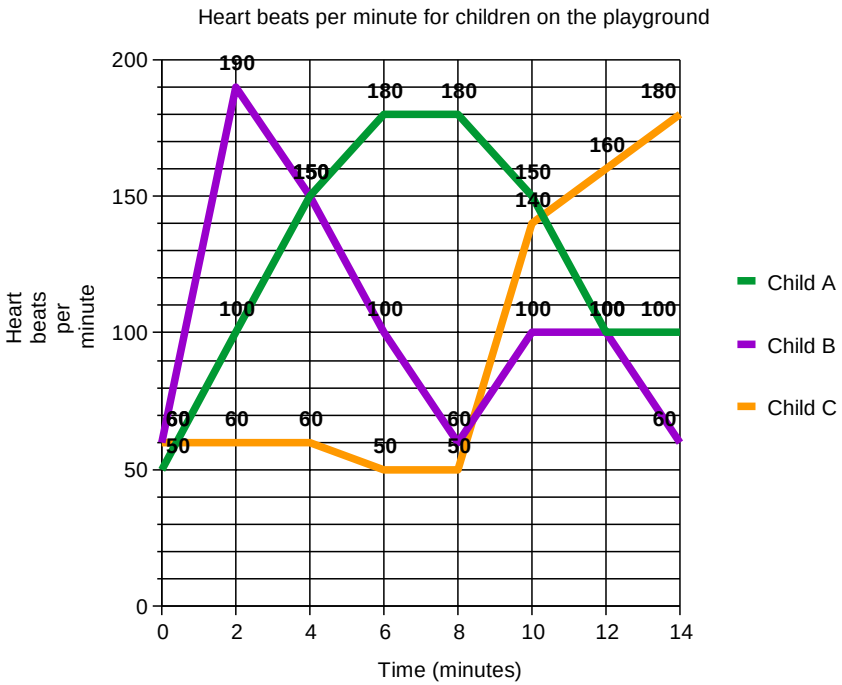
Key scientists

William Harvey (1578 – 1657) Discovered the circulatory system. http://www.bbc.co.uk/history/historic_figures/harvey_william.shtml

Learning Expectations	Possible Tasks	Resources
To be able to identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood.	**Hook – The Fitness Club!** This entire unit of work could be set within the context of a fitness centre. Through all their enquiries the children will be developing their knowledge of the human body. At the end of the term you could set up mini information stations. Other children could be invited to the 'fitness club' to find out more about how to look after themselves. This will include information on diet, drugs, exercise, lifestyle, the importance of water, and the affects that exercise has on our hearts. **Explore - What is the function of the heart?** Allow the children to place their hand over their chests. Ask them what they can feel. The children can do this again after jogging on the spot for 30 seconds. Ask them to discuss what is happening. **Video** – The circulatory system There are plenty of good video animations describing the circulatory system. http://www.youtube.com/watch?v=NF68qhyfcoM **Modelling the heart and circulatory system** **An analogy** Get the children to place a closed fist on the table. Ask them to count how many times they can open and close this fist in just one minute. Ask the children to explain why this action is like that of the heart. **Drama – Be the heart** Use red and blue tape to mark out the heart, veins and arteries on the hall floor. Some of the children could be blood; others could be valves in the heart. A child could hit a drum to represent the heart rate. This could quicken or slow according to the scenario being created. **Modelling - Make a heart – a model of one of the chambers**	• Red and blue tape • A drum • Transparent jars • Balloons • Skewer • Straws

Learning Expectations	Possible Tasks	Resources
	1. Fill a jar half full of water. 2. Cut the neck of the balloon off at the part where it starts to widen into a balloon. 3. Stretch the balloon over the opening of the jar, pulling it down as tightly as you can. 4. Carefully use the tip of a skewer to poke two holes in the surface of the balloon. Make them about 2 centimetres apart from each other and near opposite edges of the jar. 5. Stick the long part of a straw into each hole. The straws should fit securely in the holes so no air can get through around the straws. 6. Slide the uncut end of the balloon neck onto one of the straws and tape it around the straw. 7. Set your pump in a washing up bowl to catch the pumped water. Bend the straws downward. Gently press in the centre of the stretched balloon and watch what happens to the water in the jar.  This is a simple pump that moves water from the jar through the straws and into the washing up	

Learning Expectations	Possible Tasks	Resources
	bowl. The cut end of the balloon worked as a valve to stop the water from going back down the straw. Your heart pumps blood out into your body through your arteries in a similar way. Human hearts have four separate chambers inside. This pump shows how one chamber and its valve works. A valve is used to keep blood that has been pumped from one chamber to another from flowing back into the chamber it came from. Try taking the balloon valve off of the straw and pump water again. You likely saw that water still came out of the straw, but without the valve, there was nothing to keep some water from going back down the straw. In order to keep blood moving through your heart and into your body, your heart needs valves to separate its chambers **Recording** The children could draw a human heart and use labels to explain its function.	
To be able to identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood. To be able to plan pattern-seeking enquiry. To be able to report causal relationships. To be able to record results using a line	**Comparative test – What happens to the rate at which our hearts beat when we perform different exercises?** **Hook – Begin with evidence** Show the children the line graph below. Ask them to try and explain what they think each of the children might have been doing during the playtime**.**	• Pulse meters

Learning Expectations	Possible Tasks	Resources
graph.		

Observation – How many times does your heat beat every minute?
Using a home-made stethoscope (a cardboard tube), the children can listen to each other's hearts. Count how many heart beats there are in 30 seconds. Double this to find out how many beats per minute.

Pattern-seeking – Is their a relationship between the type of exercise that you do and the number of heart beats per minute?
The children must plan their own investigation. They can decide upon the types of exercise that they will do, how they will measure the number of beats, and they will record their results. However, this is a great opportunity for the children to record using a line graph

Learning Expectations	Possible Tasks	Resources
	They could use heart monitors/pulse meters to measure their pulses. **Recording – An explanation** Help the children to develop a good explanation. First, allow them to actively communicate what they think the heart was doing during the different exercises, and why it was doing this. They could do through drama, discussion on talking about a sketch that they have made. Then, ask the children to identify some key science words that will help them to explain what happened. Finally, ask the children to explain what happened, referring back to their results.	
To be able to identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood.	**Researching using secondary sources – What are the functions of blood?** http://www.e-learningforkids.org/Courses/Liquid_Animation/Body_Parts/Blood/ This website animation will introduce the children to the functions of blood: carry oxygen, food and chemical messages around the body, and defend against infection. Other animated videos can be found on the internet: http://www.youtube.com/watch?v=R-sKZWqsUpw **Modelling the components of blood - Make your own 'blood'** Provide the children with the following information about the components of blood. They can then create their own models of the blood, carefully trying to get the correct proportions. 1. Red blood cells (red-coloured sweets): 44% of blood volume. Carry oxygen and carbon dioxide around body. Only live for about 3 months, but are continuously produced in the bone marrow. 2. Plasma (syrup): 55% of blood volume. Syrups, thick, clear, yellowish liquid that carries dissolved food and wastes. 3. White blood cells (white jelly beans or marshmallows): 0.5% of blood volume. Bigger than red blood cells, oddly shaped cells that "eat" bits of old blood cells and attack germs. 4. Platelets (smarties): 0.5% -bits of cells and cytoplasm that help clot your blood.	• Red coloured sweets • Corn syrup • White marshmallows • Smarties • Bowls • Red food dye • Gelatin

Learning Expectations	Possible Tasks	Resources
	Interesting Fact: There are 5 million red blood cells, 10 thousand white blood cells, and 250 thousand platelets in a pinhead-size drop of blood. **Recording** The children can draw blood with all its different components. They can label the components and explain the function of each one. **Teacher modeling the function of platelets** Health and safety - This will need to be demonstrated by the teacher as it involves boiling water. 1. Heat about 120ml of water until it is boiling. 2. Add 1/2 teaspoon of gelatin 3. Keep stirring until it dissolves – it does tend to stick to the pan. 4. Take off the heat and leave to cool for 15 minutes 5. Add a few drop of red food dye until you get the colouring you would like. These 5 steps will be carried out by the teacher 6. Over the next course of hour it will thicken showing how blood coagulates and sticks together. If your pour it into a clear glass you will see that happen easily. 7. If you take some of the sticky blood out and smear it on grease proof paper, it will set hard like	

Learning Expectations	Possible Tasks	Resources
	a scab does!	
To be able to describe the ways in which nutrients and water are transported within animals, including humans.	**Research – Why do we need to drink water?** Provide children with the resources so that they can find out about the roles that water play in keeping us alive; especially in transporting blood and nutrients around the body. http://www.cyh.com/HealthTopics/HealthTopicDetailsKids.aspx?p=335&np=284&id=1494 http://www.nhs.uk/Livewell/Goodfood/Pages/water-drinks.aspx Recording The children could design a poster to explain why we need water.	•
To be able to recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.	**Hook - Creating a wellbeing clinic** Challenge the children to create their own wellbeing clinic for Upper Key Stage 2 children. In this clinic they will need to be able to provide advice as to how to live a healthy life. This should include information on exercise, lifestyle and drugs. **Researching drugs.** Provide the children with pictures of different drugs and information as to the effects that these have on the human body. They must use this information to create a form of presentation that	•

Learning Expectations	Possible Tasks	Resources
To be able to present findings from enquiries.	children of a similar age would understand. **Researching exercise.** The following short video will introduce to children the idea that there are a range of activities that add to our well being. http://www.nhs.uk/video/pages/sebcoe.aspx The following site provide children with information on what different forms of exercise can do for the human body and how people can get started with them http://www.nhs.uk/LiveWell/getting-started-guides/Pages/getting-started-guides.aspx **Researching diets** Children could use secondary sources to gather information about what makes a healthy diet. 'Showdown at the food pyramid' by Rex Barron is one of many books that children could use in their research	

Year 6 – Animals including humans

Assessing children's knowledge and understanding of the nature, processes and methods of science

Learning expectation	Group 1 (lower ability)	Group 2 (average ability)	Group 3 (higher ability)	Comments
To be able to Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood.				
To be able to describe the ways in which nutrients and water are transported within animals, including humans.				
To be able to plan pattern-seeking enquiry.				
To be able to report causal relationships.				
To be able to record results using a line graph.				
To be able to present				

findings from enquiries.				

Children <u>below</u> the learning expectations	**Children <u>above</u> the learning expectations**