

National Curriculum Objectives:*(Statutory Requirements)*

- a) 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
- b) identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Experimental and investigative work focuses on:

Planning an investigation:	Obtaining and evaluating evidence:
<ol style="list-style-type: none"> 1. Asking relevant questions and using different types of scientific enquiries to answer them. 2. Setting up simple practical enquiries, comparative and fair tests. 	<ol style="list-style-type: none"> 3. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment. 4. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. 5. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. 6. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 7. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. 8. Identifying differences, similarities or changes related to simple scientific ideas and processes. 9. Using straightforward scientific evidence to answer questions or to support their findings.

Most children will:

- **Explain** the common food groups and name a variety of food within the main food groups.
- **Draw** and label a healthy balance meal.
- **Understand** how the different food groups benefit the body.
- **Identify** the main organs of the digestive system.
- **Describe** the main functions of the human skeleton and name most of the bones of the body.
- **Understand** the different types of skeleton.
- **Make** a model of the elbow and muscles around it.

Some will progress less and will:

- **Identify** the common food groups
- **Know** that different food groups benefit the body.
- **Recognise** the bones of the human skeleton.
- **Explain** how muscles work.

Others will progress further and will also:

- **Explain** the job of carbohydrates, protein etc.
- **Draw** and label a healthy balanced meal for a vegetarian.
- **Explain** the digestive system and what is happening at each stage.
- **Know** the scientific names of the bones of the human skeleton.
- **Name** animals that are vertebrate and invertebrate.

Key vocabulary:**Previously taught:** Food groups, fat, sugar, diet, carnivore, herbivore, survival, senses, feeding, healthy, salt, water, exercise

New: Vegetarian, vegan, fruit, vegetables, starch, meat, dairy food, ribs, spine, skull, skeleton, muscle, contract, relax, vertebrate, invertebrate.

Session	Learning Objectives	Introduction	Main activity	Application and review	Resources
1	<p>To be able to name the common food groups.</p> <p>To be able to name a variety of foods within the main food groups.</p>	<p>Begin by showing a picture of a plant, an animal and a human. What do they have in common regarding food? What is different about the way they source food? Complete task 1.</p> <p>What food groups do you know? (Recap of year 2 previous learning) Display a picture of a packed lunch – what food groups can you see? What do you think the job is of carbohydrates/protein etc?</p>	<p>Task 1: Complete KWL grid to assess children's prior knowledge.</p> <p>Task 2: Match the descriptions of each of the food groups to the healthy plate.</p>	<p>What food have you had in your lunch box? What group does it belong to?</p>	<p>KWL grid</p> <p>Food plate to label</p> <p>Matching sheet for food groups.</p>
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2	<p>To understand what a balanced diet means.</p> <p>To understand that some people may have different diets (due to allergies, beliefs etc.)</p> <p>Assessment: a</p>	<p>Starter: in groups complete grid on food groups to recap previous learning.</p> <p>Show some food on IWB or if possible bring it in. Which group does it belong to? Is it from an animal or a plant?</p> <p>Explain most people eat both plants & animals, but some people have special diets; such as vegetarian, vegan, religious background.</p> <p>Discuss in more detail why the foods in the different food groups are important for a balanced diet. Use the Food Group Vocabulary sheet. Explain that we need food for energy and food for growth and discuss the health issues. This discussion needs to be handled carefully as chn sometimes do not have much control over what they eat. Watch video about a balanced diet at http://www.bbc.co.uk/learningzone/clips/a-balanced-diet/10609.html. Individual food groups are also described in clips such as http://www.bbc.co.uk/learningzone/clips/fats-in-our-diet/10611.html(fats), http://www.bbc.co.uk/learningzone/clips/carbohydrate-and-fibre/10610.html (carbohydrates & fibre) & http://www.bbc.co.uk/learningzone/clips/the-</p>	<p>Independent activity: Complete differentiated sheet matching food groups and what they do for the body.</p> <p>Using ideas from the food pyramid and the school dinners from last session design and label a healthy balanced meal that you would enjoy (session resource).</p> <p>Extension: Design & label a healthy balanced meal for a vegetarian (session resource).</p> <p>Plenary: Discuss what 'going on a diet' means. Ask Why do some people do this? How can they ensure they are still eating a balanced diet? Explain that other people have to be careful about what they eat due to allergies, e.g. peanut allergy, or due to food intolerance, e.g. gluten (coeliac disease), when the body isn't producing enough of the chemicals needed to breakdown particular foods. There may be chn in the class with allergies that they would be willing to discuss or you can see Rebecca's story at http://www.bbc.co.uk/learningzone/clips/nut-allergy-rebeccas-story/13704.html (longer than normal clip at over 7 min).</p>	<p>How do the different food groups benefit the body?</p> <p>What should be included in a healthy meal?</p>	<p>Food group sheet</p> <p>Healthy meal plate</p>

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3	To be able to explain how nutrients, water and oxygen are transported within animals	<p>role-of-protein/10612.html (proteins).</p> <p>Tell chn that we have found out about the different foods that we need to eat for a balanced diet, but we now need to think about how the nutrients, water & oxygen are transported within animals (including humans). What do chn think?</p> <p>Teach: Our blood (circulatory system) transports nutrients, water & oxygen around our bodies! It is ideal as a transport system because it reaches all parts (all the billions of cells) of our bodies. About half of the volume of blood in human bodies is water. Food is broken down into smaller bits in our mouths, stomachs & small intestine and nutrients such as glucose (sugar), amino acids (small molecules that make up proteins) & fatty acids & glycerol (broken down fats) are absorbed into the blood from the digestive system. Vitamins, minerals & water are all small enough to be adsorbed without being broken down further. The oxygen is transported from the lungs via the heart to the cells of the body & then carbon dioxide (a waste gas) is transported back to the lungs again via the heart. The blood also carries other waste materials to the liver & kidneys which break them down & get rid of (excrete) them from the body. Hormones (chemical messengers) are also carried by the blood around the body, so it is a very important transport system!</p> <p>Water is also useful as a method of transporting waste materials from our bodies when we go to the toilet. We also lose water through sweating. Animals that live in the sea (salty water) have particular problems. They have to make sure that water does not flow from their bodies into the saltier sea & if they drink the salty water they have excess salts to get rid of, e.g. a turtle has a salt gland by each eye that gets rid of excess salt.</p>	<p>Drama activity: Divide the class into 3 groups & name them as carbohydrate, protein or fats. Divide the hall into three separate areas – mouth, stomach & small intestine. Drama involving pieces of food (several chn with arms linked) being broken down by chewing in the mouth. The carbohydrates are broken down further by special chemicals called enzymes into smaller pieces in the mouth too. The food then moves to the stomach where churning acid & other enzymes break down the proteins & carbohydrates further. The food then passes to the small intestine where bile from the liver helps other enzymes break down the fats. The proteins & carbohydrates are broken down more too. Eventually all chn are separated from each other & can gradually be absorbed into the blood stream. Repeat the process – chn will know how to behave in role better at the second attempt! Can chn remember what the smaller molecules are called? Sugars, amino acids, fatty acids & glycerol.</p> <p>Independent activity: Draw on the main organs in the digestive system on blank body outline. (enlarge sheet to A3)</p> <p>Expected and exceeding: Explain what is happening at each stage.</p>	What are the main organs of the digestive system?	Blank body outline (A3)

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4	<p>To describe the main functions of the human skeleton</p> <p>To understand that bones & muscles are needed for movement</p> <p>Assessment: b</p>	<p>Why do we need a skeleton? – <i>Hold a paper pupil and allow him/her to fall to the ground.</i> What do the children know about their skeletons? Tell the children that we would be floppy too like this without our skeleton.</p> <p>But what else does our skeleton allow us to do? Tell the children that not only does our skeleton give us a shape it also allows us to move. Point out that our skeleton is made up of many separate bones (206) so that we can bend. Imagine life with a back bone that was rigid rather than our backbone, which is made up of many smaller bones that are held together but allow us to touch our toes! Interestingly children are born with more individual bones than an adult! – <i>Babies need to be more flexible to help them through their mother's pelvis when they are born. Separate bones grow in the baby's skull before fusing later (after birth).</i> Discuss how muscles attached to these bones enable us to move (more about muscles in the next session!). Without muscles to help us move our bones and hold up our skeleton, we would have little more shape than the paper pupil. Show children some bones (preferably from a human skeleton if one is available), pointing out where muscles attach & where bones move against one another at joints.</p> <p>Finally tell the children skeletons protect their bodies. Look back at the paper pupil – look at any of the soft organs the children suggested. Tell the children that these vital organs need to be protected. Point out that the skull protects the brain with a covering of hard bone & compare with a child's cycle helmet (cycle helmets provide additional protection and still need to be worn!!). Discuss the rib cage and how this protects the lungs and heart but has enough flexibility to rise and fall as we breathe.</p> <p>Tell the children that they may have sung the 'Dem Bones' song before but now that they are in Year</p>	<p>Independent activity: Provide children with 'bones' to cut out and put in place to create a skeleton. Provide children with an outline of a human body to sketch the bones into place. Which bones can they feel on their own bodies? - <i>How many ribs can they feel? How many bones make up the hands and feet?</i> Differentiated sheet: Children label the skeleton resource with common names for the bones to the Children label the skeleton resource with scientific names for the bones?</p> <p>Show children a human skeleton if available &/or watch video clip at http://www.bbc.co.uk/learningzone/clips/skeletons/2302.html.</p> <p>Plenary: Have any of the children ever broken a bone? Or have other members of their family or their friends? Discuss how bones get broken. Allow time to share experiences. What happens after a bone is broken? Explain that the bone is X-rayed to locate where the fracture has occurred. X-rays are like photographs that can see through the skin & muscle. Look at an X-ray of a hand at http://www.colorado.edu/physics/2000/xray/index.html Discuss how the bone mends & how it is usually immobilised using Plaster of Paris (a special bandage that is soft when wet but then sets & becomes stiff). Have children had an X-ray? Did they see it? Perhaps children have had an X-ray at the dentists. Show children an X-ray if one is available or use <i>session resource</i>.</p>	<p>Children to be able to name most bones of the body and some with the scientific name.</p>	<p>Bones to put into blank body outline.</p> <p>Bones to label sheet (Differentiated)</p>

		It would be a good idea to start learning some of the scientific names! Visit http://www.songsforteaching.com/intellitunes/bone_s.htm and learn the song. Listen to the tune and start to sing along...			
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5	<p>To understand the different types of skeletons.</p> <p>Assessment:b</p>	<p>Remind children of the functions of the human skeleton – <i>protection, support, movement</i> and revise the scientific names learnt in the previous session. Tell the children that humans share many common characteristics with other animals including skeletons. Explain that not all animals have their skeletons inside their bodies (internal or endoskeletons) – <i>vertebrates, e.g. armadillo & tortoises have an endoskeleton & exoskeleton & invertebrates, e.g. insects, crabs, have exoskeletons</i>. See http://www.bbc.co.uk/learningzone/clips/invertebrate-skeletons/2304.html. What functions do these external skeletons have? – <i>Protect the softer insides, give structural support to the organs & muscles & facilitate movement of limbs</i> (same as endoskeletons!).</p> <p>Discuss how some animals with exoskeletons need to moult (shed) their exoskeleton & replace it so that they can grow, e.g. <i>lobsters</i>. Explain how the new exoskeleton is soft & pliable to start with & the animal pumps itself up using air or water to stretch the exoskeleton to maximum size before it hardens. Some other animals shed their skeletons completely before finding another, e.g. <i>hermit crab</i>! Other animals grow their shell at the opening as they grow (e.g. <i>snails</i>). Show some examples of exoskeletons if available.</p>	<p>Children to complete differentiated animal skeleton sorting activity independently.</p> <p>Ext: Write an explanation about each different type of skeleton.</p>	<p>What different types of skeleton are there?</p> <p>What is unique about each type?</p> <p>Name an animal that is a vertebrate etc.</p>	Animal skeleton sort sheet
Session	Learning Objectives	Introduction	Main activity	Application and review	Resources
6	To understand the role of muscles in the human body.	In the second session chn discovered that the skeleton has three main functions – support, protection and movement. Animal (including human) endoskeletons are jointed so that one part of their body can be moved against another. Muscles enable us to move our bones, because they	Ask the chn to investigate the range of movements at different points around their bodies, e.g. legs, abdomen, and turn their attention to the muscles surrounding them. Ask chn to look closely at their upper arm as they curl their arm towards their chest from their side – <i>the muscle bulges!</i> As the	What happens when you move your arm/leg to the muscles around it?	Card strips (2 each) Elastic (or elastic bands) in

	<p>Assessment: b</p>	<p>are attached to the ends of the bones and can shorten or lengthen. When muscles contract (shorten) they allow us to move, tell the chn that when any part of our body moves, muscles are in action! Muscles act in antagonistic pairs and can only pull; they cannot push. Often many muscles work together to have a single effect, e.g. it takes 17 muscles for humans to smile (with 17 antagonist muscles relaxing) & 43 to frown – so smile, it’s easier!! Ask chn to make various faces – anger, surprise, happiness – feel their face – which muscles are hard (contracted) and which are soft (relaxed)?</p> <p>Human bodies have over 650 muscles and many different types of joints to allow our bodies to move in different ways. Take a look at http://insideout.rigb.org/insideout/anatomy/casing_the_joint/index.html to find out more about the hip, shoulder and knee joints. Tell the chn that ligaments and tendons at the ends of the muscles hold the bones together at the joints, while cartilage between the bones stops them from rubbing against each other. Discuss the different kinds of joints, pausing to allow chn to investigate the range of movement they have at each: Hinge (<i>elbow, knee, fingers, etc</i>) – <i>like a door hinge</i>; Saddle joints – <i>base of thumb</i>; Ball and Socket - <i>hip, shoulder</i>; Gliding joint – <i>wrist</i>.</p>	<p>arm is raised the biceps (on the front of the arm) contracts, at the same time a muscle on the back of the arm, the triceps, relaxes! They work together to control the lifting arm. As the arm is lowered the opposite happens, the biceps relax and the triceps contract.</p> <p>Children to make a model of the elbow and muscles around it. When complete chn should be encouraged to use the model to aid their description of what is happening as we move. Tell the chn that if a movement is repeated over an over again the body creates more muscle to help make things easier, in this way keep fit activities help build muscles and make joints stronger.</p> <p>Children to complete joints and bone sheet</p> <p>Plenary: Tell the chn that joints can easily be damaged or diseased which can then make movement difficult & painful, <i>e.g. rheumatism, arthritis, etc</i>. Stress the importance of exercise in keeping joints and muscles supple; warming up is also very important so that the amount of pressure we put on our joints and muscles increases slowly. Science now allows artificial joints to be fitted to people whose joints have been damaged or diseased. Take a look at http://www.bbc.co.uk/science/humanbody/body/fa_ctfiles/joints/gliding_joint.shtml to see and move some examples</p>	<p>Explanation of the muscle movement using the diagram.</p>	<p>two colours to show muscles relaxing and contracting</p> <p>Split pins</p> <p>Sticky tape</p> <p>Joints and bones sheet</p>
Session	Learning Objectives	Introduction	Main activity	Application and review	Resources
7	<p>To understand the affect exercise has on the body.</p>	<p>In the previous session chn discovered that muscles are essential for movement in every day life. Explain that the heart is a muscle (cardiac muscle) and that blood is pumped around the body by the heart muscles contracting and relaxing. The rise and fall of our chests when we are breathing is also muscle controlled. Behind every movement we make is a muscle (two as a pair) working.</p> <p>When we are at our most active muscles really come into their own; this is also when they have to work the hardest.</p>	<p>PE type session How many breaths are they taking in a minute? Demonstrate how to measure pulse rates using two fingers at the wrist. Explain that they are measuring the number of times their heart beats, because the pulse is the surge of blood that happens when the heart muscles of the right ventricle contract. How many beats in 15 seconds? Multiply this figure by 4 to calculate beats per minute. Record this figure on the sheet.</p> <p>Take the chn through a warm up routine gradually lengthening muscles and warming the body ready for exercise. After the warm up quickly complete</p>	<p>What have you noticed about your heart rate and exercise?</p>	<p>Tracker sheet for heart rate</p> <p>Timer</p> <p>PE space & resources</p>

		<p>After PE Session: Discuss the effects of the different levels of activity on the body - <i>the breathing rate increasing as the muscles require more oxygen, the heart rate increases to speed up the delivery of oxygen to the muscles, the heat generated as muscles burn the energy stored in our bodies from the food we eat, sweating which aims to cool us down.</i></p> <p>Discuss the effects of over exercise (useful website http://www.childrensuniversity.manchester.ac.uk/interactives/science/exercise/). Have the chn experienced cramp or a stitch during exercise? Explain that cramp occurs when waste products from the working muscles cannot be transported away quickly enough which leaves the muscle contracted (which is very painful). A stitch occurs when oxygen needed by the muscles doesn't get there fast enough.</p>	<p>the feelings, breaths and pulse rate boxes on the sheet (it is important here that you move quickly into the most active part of the session while the chn are still warm). In the main part of the session you can include any physical activity that may be your current focus in PE or why not try a circuit of high intensity activities, get some music blasting out and get moving! You could try gentle walking to start with (then take measurements) followed by more intense exercise (take further measurements). See <i>session resource</i> for suggested ideas. When the chn are really working hard, pause and ask them to return to their recording sheets. How do they feel now? How has their body changed? Has their breathing rate increased or decreased? What about their pulse rates? Finally begin a cool down which is as important as the warm up. It allows the body to slowly recover and gives those muscles a gentle stretch as they recover.</p>		
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