

ACET Junior Academies'

Scheme of Work for Science

Big Idea – Living Things

Year 3 – Nutrition, skeleton & muscles



About this unit:

PoS – Animals, including humans

In Y2, students learnt how to tell whether something is living, dead or has never been alive. We will be reviewing that in this unit, with an emphasis on how the students know, rather than just being able to identify which of the three groups something belongs to. Once we have established that humans are living animals, we will go on to look at ourselves in more detail. In 'Health & hygiene' in Y2 the students learned about the conditions – primarily hygiene, diet and exercise – that we need to keep humans healthy. They should be reminded of that as we look here at how the human body actually works.

We will be looking in more detail at what they need for a healthy, balanced diet – remember to use the eatwell **guide** from the NHS, as it has some subtle but important changes from the eatwell plate. We will link the needs from their diet to the effects on the body. There is more of an emphasis on teaching knowledge here than in most of the other units, which are more investigative. Fewer scientific skills are being targeted, but students should be encouraged to ask even more questions, and develop knowledge themselves. There are lots of opportunities for research, which can be done collaboratively, but students should be encouraged to come up with the questions that they want answers to.

<https://www.nhs.uk/live-well/eat-well/the-eatwell-guide/>

Unit structure

This unit is structured around seven science enquiries:

1. What do living things need?
2. What are you made of?
3. How can we keep our bodies healthy?
4. What does our skeleton do for us?
5. How do we keep our bones healthy?
6. How does our skeleton work?
7. Are other animals the same as humans?

Links to previous and future National Curriculum units

- Y1 – Human body and senses
- Y2 – Living things and habitats
- Y2 – Health and hygiene
 - Y6 – Healthy humans

Enquiry 1: What do living things need?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 – Health & hygiene Y3 - Plants	EA – Identifying, grouping & classifying Asking questions	Can your children: <ul style="list-style-type: none"> - State that living things need air, water and food. - Name some foods that provide us with energy. 	Horizontal: Vertical: Y6 – Healthy humans
	Key concepts:		
	Recognise that all living things need air, water and food. Recall foods which foods provide us with energy.		
Key terms		Common misconceptions	
Air, water, food, energy, move, pasta, flour, bread, rice, potatoes, carbohydrate		<i>Plants need air, but they don't 'breathe'.</i> <i>'Respiration' is a scientific concept taught at KS3. It does NOT mean breathing.</i>	
Suggested activities		Resources	Useful links
<p>Reviewing health & hygiene –Y2, and the Y3 'Plants' unit</p> <p>Have a potted plant in the classroom. The students should compare it to themselves. What do they have in common, and what is different? Essentially, they should identify that ALL living things need air, water and food. Main differences – plants can make their own food, we can't.</p> <p>Students should understand that humans are animals, so we're comparing plants with animals. <i>Greater depth – are these facts true for all plants, and all animals? Are there exceptions?</i></p> <p>Students don't need to know the details of photosynthesis, but do need to know that the green parts of the plant use sunlight and air to make food for the plant.</p> <p>Carbohydrates – the students should have examples of lots of food that contain carbohydrates. They don't need to be able to call them carbohydrates, but they do need to recognise them, and know that these are the foods that provide our bodies with energy so that we can do things. We need other foods to help our bodies work well, and to grow.</p> <p>Students could consider that eating foods with too much energy (sugars and fats) mean that unless we use up the energy, it will be stored as fat in our bodies.</p> <p><i>Be careful when discussing energy – it is an important scientific concept, which is considered at depth at KS3 & 4. 'Energy' as a concept is not on the ks2 PoS. This lesson should be about carbohydrates, where we find them, and that they give us the energy to move and function.</i></p>		The Eatwell guide – be sure to use the updated eatwell guide rather than the eatwell plate.	https://www.nhs.uk/live-well/eat-well/the-eatwell-guide/

'Respiration' means 'releasing energy from oxygen + glucose' and should NOT be used in any other way. Avoid references to respiration, and any resources that use the term. Living things 'need/use air' rather than 'breathe' (plants don't do this) or 'respire'



Enquiry 2: What are you made of?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 – lifecycles	EA – Problem solving Asking questions Interpreting and communicating data Key concepts: Recognise that our bodies increase in size because they are built out of what we eat Recall which foods help us grow and repair our bodies <i>GD – recognise that repairing our bodies is a similar process to growth.</i>	Can your children: - Name some foods that help us grow - State that when we grow, its because some of the food we ate stayed inside to build us up	Horizontal: Vertical: Y6 - Systems
Key terms		Common misconceptions	
Food, grow, build, repair, animal, meat, fish, milk, cheese, eggs, nuts, beans, protein		<i>Misconception – the 'good' stuff stays inside, and the 'bad' stuff comes out as poo – not the case. What stays inside is just anything that the blood can pick up from the digestive system. No need to teach the children this – just avoid the misconception.</i> <i>Use the Eatwell guide instead of the Eatwell plate – see notes.</i>	
Suggested activities		Resources	Useful links
Review different parts of the body – bones, skin, muscles, hair, nails. What do you think they are made of? Review the eat well guide (Y2) – different foods do different things in our bodies. We need to eat foods to help our body work, and to make new parts. Building our bodies – protein – today's lesson. Look at a small, basic lego building – if you want to make it bigger, you need to use more bricks. If you wanted to make the school bigger, you need more bricks, windows etc. If you want to make a clay model bigger, add more clay*. Look at photos of a baby, and compare the size with the students now. Why are they so much bigger? They are made out of the food they have eaten during their lifetime. Gross fact to consider – when you eat, not all of it comes out as poo. Your blood picks up some of the useful stuff and keeps it inside. See misconception. * some students may suggest that 'stretching' clay is how you make a model bigger – but you can illustrate that although this makes it longer, it also gets thinner. Y3 children are bigger and heavier than babies – they're made from a lot more stuff!		Pictures of humans at different stages of life Lego – a small basic structure, with some lego to make it more elaborate Clay	https://www.nhs.uk/live-well/eat-well/the-eatwell-guide/

Proteins are what make us grow bigger. What kind of foods would you recommend to someone who wants to grow?

Enquiry 3: How can we keep our bodies healthy?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 – Health & hygiene	EA – Research	Can your children: <ul style="list-style-type: none"> - Tell you that water, fruit and vegetables are needed to make our bodies healthy - Describe a deficiency disease 	Horizontal: Vertical: Y6 – Healthy humans
	Asking questions Making predictions		
	Key concepts: We mostly eat for energy and to grow – but we need to keep our bodies working well too. Water, fruit and vegetables all help to do this. If we don't get enough of certain types of foods, we will develop specific diseases.		
Key terms		Common misconceptions	
Food, healthy, enough, fruit, vegetables, vitamins, minerals, water, dehydrated, deficiency, 'not enough', scurvy, rickets		<i>Malnutrition doesn't mean that you don't get 'enough' food. Many children with malnutrition – in the UK and around the world - eat enough to not be hungry, but they don't get enough fruit and vegetables to keep them healthy.</i>	
Suggested activities		Resources	Useful links
Hydration, fruit & veg. What cool things can your body do? Try and think of as many examples as possible – running, jumping, thinking, singing, blinking, reacting etc. Look back at the lego building from lesson 2 – it's a bit boring! Think of all the lego 'extras' you could add to make it look/function better. Consider the school building – it's mostly made from bricks, but it wouldn't work very well without lots of extra things like windows, pipes, electrical cables etc. Your body needs protein to grow, and carbohydrates for energy – it needs LOTS of these things. However it also needs a range of other types of food to keep everything working well. Water – how much do you need? Is it ok to drink it all at once? Investigate some deficiency diseases – Rickets, scurvy, kwashiorkor – some of these may tie in well with History or Geography units. Make the point that in most cases, patients are not 'hungry' – they get <i>enough</i> to eat – but that key nutrients, usually from specific fruit or vegetables, are missing.			

Enquiry 4: What does our skeleton do for us?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 – Health & hygiene	EA – Pattern seeking	Can your children: <ul style="list-style-type: none"> - Tell you why our skeleton is important - Name and describe some of the bones in the body 	Horizontal: PE Vertical:
	Asking questions Observing		
	Key concepts: Our skeleton is what enables us to stay upright above the ground. It is made of a number of different bones, with different shapes and functions.		
Key terms		Common misconceptions	
Suggested activities		Resources	Useful links
<p>Do a mini exercise class – tie in with the 'eatwell guide' again – emphasise that these are the things that we need to do to be healthy. The exercises should involve stretching up tall, bending, twisting, jumping.</p> <p>Show pictures of a jellyfish and a crab – could they do the exercises you have just done? Get the students to be specific – maybe they could do some, but not others. Can they identify why?</p> <p>Introduce the concept of a skeleton to hold us up. Consider the jellyfish, with no skeleton, and a crab which wears its skeleton on the outside. The crab has an advantage in that its inside is protected, but it can't bend and twist like the students can! Make sure the students understand that the shell of a crab is <i>instead of</i> a skeleton like ours – they have no bones inside. <i>You could dissect a crab, or some shell-on prawns. Prawns are good – you can see that their legs and body are covered by a hard shell. If you remove the legs and the hard shell, you will see that the body inside is all soft flesh. Greater depth students can look for the blood system and digestive system. There is no need to teach them what is what inside – get them to explore and try and come up with ideas for what each part does.</i></p> <p>Model skeleton – or at least a good labelled diagram – beware those that are too complicated – see saved resource.</p> <p>Get the students to feel their bodies. Can they feel where the bones are?</p>		<p>Somewhere the students can carry do some basic exercises.</p> <p>Pictures of jellyfish and crab.</p> <p>Resource – picture of skeleton</p> <p>Shell-on prawns & dissecting eqpt</p>	<p>https://www.youtube.com/watch?v=uNtpqxAd3eU How to peel a prawn</p> <p>https://www.bbc.co.uk/bitesize/topics/z9339j6/articles/zqfdpbk BBC bitesize - skeleton</p>

Can they identify what the bones do? Most are either protective, or they work with the muscles to move the arms/legs – see bbc clip above.

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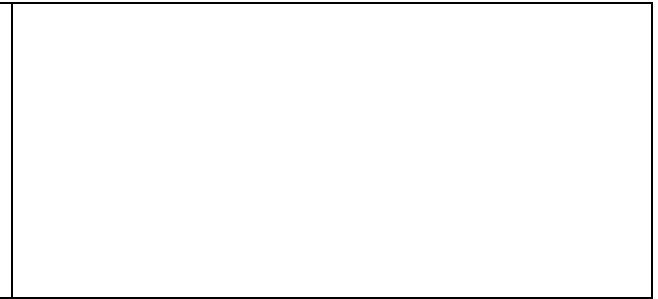
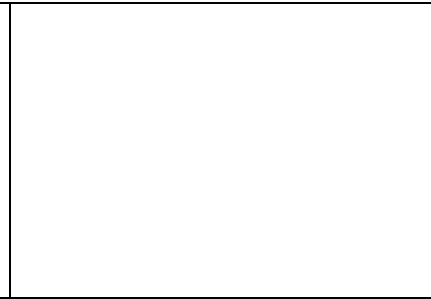
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Enquiry 5 – How do we keep our bones healthy?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 – Health & hygiene	EA – Research Asking questions Making predictions	Can your children: <ul style="list-style-type: none"> - State that their bones need calcium - Name some foods which are sources of calcium 	Horizontal: Vertical: Y6 – Healthy humans
	Key concepts:		
	Our bones need calcium to keep them strong. Foods which contain calcium are milk, cheese, yoghurt, some beans and cabbages.		
Key terms		Common misconceptions	
Food, healthy, strong, calcium, milk, cheese, yoghurt, some beans and cabbages			
Suggested activities		Resources	Useful links
What are our bones made of? Cool facts about calcium – make a fact file for younger children. Which foods have calcium in them? Which parts of your body does calcium help? What does it do to them? <i>Greater depth – you need vitamin D, which comes from the sun, to help the calcium get to your bones.</i> Demonstration – chicken bones – show one 'normal' one, and one soaked in vinegar for 3 days. The vinegar has removed the calcium – this will illustrate the importance of calcium in bones. <i>To remove the flesh from cooked chicken bones, boil them in water for an hour. Treat the bones as you would a 'dissection' in terms of hygiene.</i>			https://sciencebob.com/bend-a-bone-with-vinegar/

Enquiry 6: How does our skeleton work?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 – Health & hygiene	EA – Pattern seeking Asking questions Making predictions Observing	Can your children: - State that muscles attach to bones - Point to which muscle is making a movement happen	Horizontal: PE Vertical: Y6 – Healthy humans
	Key concepts:		
	The muscles that help you move are attached to bones. Different muscles make different parts of your body move.		
Key terms		Common misconceptions	
Skeleton, bones, muscles, attach, move, pull			
Suggested activities		Resources	Useful links
<p>If you have a model skeleton – imagine how it could move. Skeletons can move on their own in scary stories – but can they in real life?</p> <p>Resource – look at the diagram of the muscles in the human body. Look at how they are all long and stringy. They are attached to bones – usually at the top and bottom. Tendons attach the muscles and bones together. <i>You could dissect a chicken leg, to look for the muscles – you will see that they are in groups – and for the tendons that attach the muscles to the bones. There is no 'right' way of doing this dissection – just cut along the leg/thigh, looking for the ends of the muscles, and see what you find. It's worth practising before you do it, so you have an idea of what to find.</i></p> <p>Class exercises – repeat the mini exercise class from lesson 5. Which muscles are you using for each exercise? <i>They don't need to name them.</i> When you jump up, can you point to which muscles are used? When you do a star jump, which extra muscles are used?</p> <p>Use the resource so that the students can make models of their arms. <i>Greater depth – muscles can only contract, therefore they have to work in pairs. Look at the picture of the main muscle groups – why are there so many muscles around the thigh? Why don't they just have one at the top and one at the back? Most students need an understanding that muscles attach to the ends of bones, and that this is how the body is moved. Look at what happens if the string is attached lower down the arm.</i></p>		Diagram of muscles in the human body Chicken leg or wing dissection Space for a mini exercise class	https://www.hillcrestchildrensservices.co.uk/wp-content/uploads/2017/04/BTEC-PE-Homework-Task-Antagonistic-Muscles.pdf Making a model arm

Students could investigate different joints in the body – where they are, what range of movement they have. Hips, knees, shoulders, elbows, jaw, finger joints – these are all examples of different types of joints. Remember to emphasise that it's the muscles attaching to the ends of bones that enables us to move.

Try and encourage students to use push/pull terms from the forces unit, and highlight where forces are being used.



Enquiry 7: Are other animals the same as humans?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y1 – identifying animals	EA – Problem solving	Can your children: <ul style="list-style-type: none"> - State the basic needs of all animals (including humans) - Describe a difference between the diet, and method of movement, of a given animal and a human 	Horizontal: Vertical: Y6 – Healthy humans
	Asking questions		
	Making predictions Key concepts: All animals need air, food and water. Different animals need different types of food, and move differently		
Key terms		Common misconceptions	
Human, diet, nutrition, movement, skeleton, muscles			
Suggested activities		Resources	Useful links
Choose another animal – this could be a pet or exotic animal, but encourage students to choose a range of different animals; invertebrates, or animals that might live in the school grounds. What do they eat? Where do they get their food from? Do they have an exoskeleton? Or is their skeleton inside, like ours? Do they have muscles like ours? Use this to reinforce the students' understanding of the muscle & skeleton systems in humans, and our nutritional needs. Get them to consider similarities and differences between them and another animal.			