ACET Junior Academies'

Scheme of Work for Science

Big Idea – Living Things

Year 4 – Classification

About this unit:

PoS – Living things and their habitats

The class year book will be key to success in this unit. The students will make lots of observations during this term, and then come back to review them, and see what changes have happened, later in the year.

A common theme throughout year 4 is grouping and classifying, and how we do this – emphasising the importance of identifying features and properties, and using key terms to define them. This should be particularly reinforced in this unit – we always have reasons for grouping things, and we need to be able to describe those reasons. There is a similar unit taught in Y6, where students will build on what is learnt here.

There is a significant crossover with Geography, particularly in the second half of this unit. Much of what the students do in Science can be taught in the context of the things they are learning in Geography.

Unit structure

This unit is structured around seven science enquiries:

1. What habitats are there in the school grounds?
2. Can you make keys?
3. What are vertebrates and invertebrates?
4. What groups do plants have?
5. Can habitats change?
6. How do humans change habitats?
7. How much do you know about your favourite living thing?

Links to previous and future National Curriculum units

Y1 – Identifying animals
Y2 – Living things and habitats
Y3 – Plants

- Y5 – Life cycles
- Y6 - Classification

<table>
<tr><th colspan="5">Enquiry 1: What habitats are there in the school grounds?</th></tr>
<tr><th>Links to previous learning</th><th colspan="2">Scientific skills</th><th>Assessment criteria</th><th>Curricular links</th></tr>
<tr><td rowspan="3">Y2 – Living things and habitats
Y3 - Plants</td><td colspan="2">EA – Identifying, grouping and classifying

Asking questions
Making predictions
Observing</td><td rowspan="3">Can your children:
- Describe what a habitat is
- Tell you what features to look for in order to identify a plant</td><td rowspan="3">Horizontal:

Vertical:
Y6 - Classification</td></tr>
<tr><td colspan="2">Key concepts:</td></tr>
<tr><td colspan="2">A habitat is an area where a certain group of things live.
All living things have features which are like clues to help us identify them.</td></tr>
<tr><th colspan="2">Key terms</th><th colspan="3">Common misconceptions</th></tr>
<tr><td colspan="2">Habitat, food, shelter, light, dark, warm, dry, wet, exposed, sheltered</td><td colspan="3"></td></tr>
<tr><th colspan="2">Suggested activities</th><th>Resources</th><th colspan="2">Useful links</th></tr>
<tr><td colspan="2">Class year book

Go outside and choose 2 habitats* that you are going to study this year. By the end of the year, you should be able to name the plants and animals that live there, and describe how the habitat changes across the seasons. Take photographs, draw pictures, make descriptions – make sure you have a detailed record of the date and what is there.

*Choose a habitat by choosing a living thing (a plant or an invertebrate is easiest – larger animals have large habitats that are likely to be bigger than the school grounds), and identifying its habitat. What are the things around it that provide it with food & shelter? Is the habitat light, dark, warm, dry, wet, exposed, sheltered? Where does the food come from? What else does the habitat provide for your living thing?</td><td>Class year book

Identification keys
Hand lenses</td><td colspan="2"></td></tr>
</table>

<table>
<tr><th colspan="4">Enquiry 2: Can you make keys?</th></tr>
<tr><th>Links to previous learning</th><th>Scientific skills</th><th>Assessment criteria</th><th>Curricular links</th></tr>
<tr><td></td><td>EA - Identifying, grouping and classifying

Asking questions
Making predictions
Interpreting and communicating data

Key concepts:
We can use keys to tell us what group something is in.
We need to know about the features of living things in order to make a key.</td><td>Can your children:
- Use a key to identify a living thing
- Choose features of a living thing that would enable them to be grouped</td><td>Horizontal:

Vertical:</td></tr>
<tr><th colspan="2">Key terms</th><th colspan="2">Common misconceptions</th></tr>
<tr><td colspan="2">Identify, group, key, feature, yes, no</td><td colspan="2"></td></tr>
<tr><th colspan="2">Suggested activities</th><th>Resources</th><th>Useful links</th></tr>
<tr><td colspan="2">Making keys

In order to be able to study things and name them, scientists put similar things into groups – compare this with putting school children into year groups so that they can be taught appropriately.

You have studied different groups of plants and animals before – but the emphasis in Y4 is understanding how we can use keys to help us to identify different living things.

Show examples of simple keys. Can you make a key for the students in the class?

There is lots of scope here – look at a range of cats, or some made-up aliens, or characters from a book, or invertebrates from outside, or vertebrates that were studied in Y1.

Students should make a yes/no key.</td><td>Examples of keys</td><td>https://www.bbc.co.uk/bitesize/topics/zxjj6sg/articles/z9cbcwx - how keys work</td></tr>
</table>

<table>
<tr><th colspan="4">Enquiry 3: What are vertebrates and invertebrates?</th></tr>
<tr><th>Links to previous learning</th><th>Scientific skills</th><th>Assessment criteria</th><th>Curricular links</th></tr>
<tr><td rowspan="2">Y1 – Identifying animals
Y2 – Uses of everyday materials - properties</td><td>EA – Identifying, grouping & classifying

Asking questions
Making predictions
Observing</td><td rowspan="2">Can your children:
- Classify an animal either as an invertebrate, or as one of the 5 vertebrate groups
- State that vertebrates have a backbone, invertebrates do not</td><td rowspan="2">Horizontal:

Vertical:
Y6 - Classifying</td></tr>
<tr><td>Key concepts:
All animals that we can see are either vertebrates or invertebrates.
Vertebrates have a backbone, invertebrates do not.</td></tr>
<tr><th colspan="2">Key terms</th><th colspan="2">Common misconceptions</th></tr>
<tr><td colspan="2">Vertebrates, invertebrates, backbone, mammals, amphibians, reptiles, birds, fish,</td><td colspan="2"></td></tr>
<tr><th colspan="2">Suggested activities</th><th>Resources</th><th>Useful links</th></tr>
<tr><td colspan="2">Recap vertebrates. Students should be able to identify the amphibians, reptiles, fish, mammals and birds. Most should be able to explain why they are in those groups.

Consider a range of invertebrates – spiders, slugs, snails, centipedes, worms, woodlice, harvestmen. Make sure that the students understand that these are all animals – they need air*, water and to eat food. Do they fit into the same groups as the animals above?
*some animals are adapted to live in water, and get ‘air’ that way

Get the students to feel their own backbone, and explain that the first 5 groups of animals they studied are called ‘vertebrates’ (make sure they know that humans are in the mammals group). Today we’re going to look at invertebrates.

Get the students to look at a range of pictures – how would they group them? It’s not really important whether they are correct or not, what’s important is that they have reasons for grouping similar creatures together.</td><td>Invertebrate identification sheets</td><td></td></tr>
</table>

Use the FSC identification sheets to help with any issues the students have. *GD – explore the invertebrates – how many different types can they identify? Do they know why they are in their groups? Research – can they find more types of invertebrates? What can they find out about them? How many groups of them are there?*		

<table>
<tr><th colspan="4">Enquiry 4: What groups do plants have?</th></tr>
<tr><th>Links to previous learning</th><th>Scientific skills</th><th>Assessment criteria</th><th>Curricular links</th></tr>
<tr><td rowspan="2">Y3 Plants</td><td>EA – Identifying, grouping and classifying

Asking questions
Observing</td><td rowspan="2">Can your children:
- Tell you what features to look for in order to classify plants
- Name some common plant groups</td><td rowspan="2">Horizontal:
Art

Vertical:
Y6 -Classification</td></tr>
<tr><td>Key concepts:
Plants can be put into groups in the same way that animals are.
We use their common features in order to group them.</td></tr>
<tr><th colspan="2">Key terms</th><th colspan="2">Common misconceptions</th></tr>
<tr><td colspan="2">Identify, group, plants, leaves, stem, trunk, bark, pattern, branches, bud</td><td colspan="2">Remember that plants make their food in the leaves – they just get some extra nutrients from the soil. The roots mostly absorb water and anchor the plant.</td></tr>
<tr><th>Suggested activities</th><th>Resources</th><th colspan="2">Useful links</th></tr>
<tr><td>Are plants all in the same group?

Recap – structure of plants, and the structure and purpose of flowers. Consider a deciduous tree (preferably one the students can see), and grass. These are the SAME as the ‘classic’ flowering plant that we have studied.

The flowers can be difficult to see, and often don’t look like flowers (remember that the grass on the school field/lawn is cut – if left to grow, it would have ‘flowers’ on the top. Arrangements could be made to leave a small patch of grass unmowed to illustrate this).

Look at pictures of conifer trees (be specific – they’re not pine trees!), mosses and ferns. These are non-flowering plants – they are in a different group. This is a difficult concepts for students to grasp, even at secondary level. Emphasise that most of the plants we see around us are flowering plants, but that plants can be put into different groups, the same as animals.

Look at a range of different plants – how would the students group them? What reasons do they have? Use this to review the seasons and how plants change – have they considered all the characteristics of the plant, or are they just looking at what it looks like now?</td><td>FSC Plant identification sheets

Pictures of a range of different plants</td><td colspan="2"></td></tr>
</table>

Students should 'invent' their own groups of plants. They should all have the common features of plants, but can have any other features the students want. The students should state what features cause the plants to be in different groups.		

<table>
<tr><th colspan="4">Enquiry 5: Can habitats change?</th></tr>
<tr><th>Links to previous learning</th><th>Scientific skills</th><th>Assessment criteria</th><th>Curricular links</th></tr>
<tr><td rowspan="2">Y1 – Seasons
Y2 – Living things and their habitats</td><td>EA – Pattern seeking

Asking questions
Making predictions
Observing and measuring</td><td rowspan="2">Can your children:
- Recognise that the conditions in a habitat may change over a year
- Describe possible changes in a given habitat</td><td rowspan="2">Horizontal:
Geography

Vertical:
Y5 – Life cycles
Y6 - Classification</td></tr>
<tr><td>Key concepts:
The conditions in a habitat can change over the year.
Habitats usually get drier and hotter in summer and wetter and colder in the winter.</td></tr>
<tr><th colspan="2">Key terms</th><th colspan="2">Common misconceptions</th></tr>
<tr><td colspan="2">Habitat, environment, living, food, shelter, change</td><td colspan="2"></td></tr>
<tr><th colspan="2">Suggested activities</th><th>Resources</th><th>Useful links</th></tr>
<tr><td colspan="2">Go outside and look at the habitats you chose at the beginning of the topic. Can you draw or describe what may be different in that habitat in the different seasons? Think about as many factors as you can.

What lives in your habitat? How do they cope with the changing seasons? Do they have ways of dealing with lack of water in summer? Lots of rain in spring and autumn? Cold in winter? What about food – does the amount of food they can get vary over the year?

Most students should have an awareness of the changes that can happen during the year – try and make them specific to a known habitat.

Greater depth – should consider the impact on living things, and how they deal with the changes. Emphasise that these are normal changes that happen every year – the living things are adapted to deal with them.</td><td></td><td></td></tr>
</table>

<table>
<tr><th colspan="4">Enquiry 6: How do humans change habitats?</th></tr>
<tr><th>Links to previous learning</th><th>Scientific skills</th><th>Assessment criteria</th><th>Curricular links</th></tr>
<tr><td></td><td>EA - Research

Asking questions
Making predictions
Interpreting and communicating data
Key concepts:
Humans can make changes to habitats which are beyond the normal seasonal changes.
The changes humans make to habitats can be damaging to the living things that depend on them.</td><td>Can your children:
- Describe some changes that humans can make to habitats
- Describe the effect that habitat change has had on a living thing</td><td>Horizontal:
Geography

Vertical:
Y5 – Life cycles
Y6 - Classification</td></tr>
<tr><th colspan="2">Key terms</th><th colspan="2">Common misconceptions</th></tr>
<tr><td colspan="2">Habitat, change, pollution, deforestation, urbanisation, climate change</td><td colspan="2">Try and link the change in habitat with the effect on the living thing. Avoid students saying ‘climate change kills polar bears’, or ‘pollution is bad for seabirds’.</td></tr>
<tr><th>Suggested activities</th><th>Resources</th><th colspan="2">Useful links</th></tr>
<tr><td>Link with geography – what habitats are being studied?

Look at the impacts of humans on habitats – climate change, pollution, deforestation, urbanisation. For each example, try and be as specific as possible about the impact of the change on a living thing in its habitat.

Deforestation – impact on orang-utans – they live up in trees. Without trees they don’t have the space or food they need to live.
Climate change – polar bears. They live on ice caps. They hunt in the sea, but need to return to the ice caps to rest and breed. Swimming in the sea makes them very tired.
Urbanisation – the great crested newt is a protected species in the UK. If we build on their habitats, they will die out. It is illegal to build on, or disturb, the wetlands that they use as habitats.

Students should produce something which shows an understanding of how humans can have an impact on the habitats of living things.</td><td></td><td colspan="2">https://www.youtube.com/watch?v=RqiEcOreZLA – using sniffer dogs to make sure there are no great crested newts in a habitat, before building on it</td></tr>
</table>

<table>
<tr><th colspan="4">Enquiry 7: How much do you know about your favourite living thing?</th></tr>
<tr><th>Links to previous learning</th><th>Scientific skills</th><th>Assessment criteria</th><th>Curricular links</th></tr>
<tr><td rowspan="2">Y2 – Living things and their habitats
Y3 - Plants</td><td>EA – Research

Asking questions
Making predictions
Interpreting and communicating data</td><td rowspan="2">Can your children:
- Identify the best features for making a key
- Identify links between changes to a habitat and the effect on a living thing</td><td rowspan="2">Horizontal:

Vertical:
Y6 - Classification</td></tr>
<tr><td>Key concepts:
We have to know about the features of a living thing in order to make a key.
When a habitat is changed, there will be an impact on the things that live there.</td></tr>
<tr><th colspan="2">Key terms</th><th colspan="2">Common misconceptions</th></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><th>Suggested activities</th><th>Resources</th><th colspan="2">Useful links</th></tr>
<tr><td>Students to choose their favourite living animal or plant. Students who are unsure could choose living things from the habitats in the school ground.

They can make an identification key to differentiate it from one that is similar.

They can make a study of its habitat. Review Y2/3 and the ‘needs of living things’ – how does the habitat provide food, space, somewhere to breed?

What impacts are humans having – or might they have – on the habitat? How will this affect the living thing? Try and get students to emphasise this link between the habitat and the living thing.

Are there any measures in place to protect the habitat and your living thing? What is happening to try and stop any negative effects?</td><td></td><td colspan="2"></td></tr>
</table>

Enquiry				
Links to previous learning	**Knowledge and second order concepts**	**Scientific skills**	**Assessment criteria**	**Curricular links**
	Substantive knowledge: *(What students should know)* **Second order concepts:** *(What students should understand)*	**Key concepts:**	**Can your children:** -	**Horizontal:** **Vertical:**
Key terms		**Common misconceptions**		
Suggested activities		**Resources**	**Useful links**	

Enquiry				
Links to previous learning	**Knowledge and second order concepts**	**Scientific skills**	**Assessment criteria**	**Curricular links**
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Key terms		**Common misconceptions**		
Suggested activities		**Resources**	**Useful links**	

Enquiry				
Links to previous learning	**Knowledge and second order concepts**	**Scientific skills**	**Assessment criteria**	**Curricular links**
	Substantive knowledge: *(What students should know)* **Second order concepts:** *(What students should understand)*	**Key concepts:**	**Can your children:** -	**Horizontal:** **Vertical:**
Key terms		**Common misconceptions**		
Suggested activities		**Resources**	**Useful links**	