LIFE PROCESSES AND LIVING THINGS
Age 7-8 (year 3)

A. Living things and their environment
B. Plants
C. Humans

15 lessons

A. Living things and their environment

6 lessons
Things are living or non-living
Common characteristics of living things
All animals movement
All animals feed
All animals breathe
All animals grow and reproduce

1. Things are living or non living

Discuss what make things 'alive'. Steer the discussion until you have identified seven basic characteristics:
movement; respiration; sensitivity; nutrition (need to feed); excretion; reproduction; growth
(these are often taught using the mnemonic MRS NERG!)
Make sturdy cards with these labels as you will need to refer to them often.

Give cards or a sheet of paper showing a variety of living and non-living things. Place each in the correct group/label correctly, discussing reasons for choice along the lines of 'Why do you think this object is living/non-living?'

Extension: Make a matching chart (or game using cards) labelled with the seven living characteristics of a living organism and their definitions.

2. What do living things have in common?

You will need an example of a small animal (e.g. woodlice, spider, hamster, goldfish) and a plant (e.g. a potted house plant). The aim is to discover what these two types of living organism have in common.
Recall seven characteristics already mentioned. Make some basic observations (e.g. describe how the animals breathe, move, feed, excrete, respond to stimuli; how the plants grow and respire– whatever can be observed or you can explain to the child). Is there anything the animals appear to do that the plants don't do? Do plants move? (Yes, but in a different way.)

Once this is done, make a colourful chart with drawings or pictures of the animals and plants you've studied, all labelled. Display them in their two groups (plant and animal), and in between the two groups write the common characteristics shared by plants and animals which you have observed.

Extension: Choose one plant and/or one animal and research more closely a few of the seven 'life' characteristics in relation to each.

3. Movement in animals

Provide a selection of 'minibeasts' (e.g. woodlice, snails, worms) in small see through containers for observation. Also provide nature study books on 'minibeasts'.

Observe which parts of the animal are used in movement. Ask your child to draw the animal and label the moving parts. Prompt with questions such as: do all the moving parts move in the same way? Can the animal move backwards or forwards or sidewards? Does it move quickly, slowly, in an undulating way?

Ask why the animal might need to move. What might happen if it couldn't (food/predators)?

Extension: Compare movement of similar animals on different surfaces. How do differently sized animals of the same species compare for speed? (How about a snail race?)

4. Feeding in animals

Have a preliminary discussion about why animals need to eat (why do *we* need to eat)?

Have to hand a selection of nature study guides with information about feeding habits for a wide selection of animals (e.g. 2 mammals, 2 birds, 2 fish, 2 insects, 2 reptiles, 2 amphibians etc.).

Make a chart listing characteristics such as:

Name of animal
habitat
mouth type (e.g. beak, mouth, tube etc.)
Teeth
Preferred food
How often it eats
Size of animal

When you have about ten or twelve, you can compare the data and try to identify patterns. e.g. size of animal in relation to frequency of feeds; relationship of mouth parts to type of food eaten; relation between habitat and type of food eaten.

Extension: Try to set up a bird feeder. Beforehand, identify which birds visit your garden and what is their preferred food? Try to observe daily if possible.

Research types of beaks in relation to preferred foods. If you have any pets, record observations about their feeding habits.

5. Breathing in animals

Why do animals need to breathe? Discuss the use of oxygen in the body to release energy from food and the need to get rid of carbon dioxide.

If you do not have access to any fish and mammals, you might be able go to a pet shop to make some real observations. Otherwise you will need to just use books.

Explain that all animals need to breathe but they do it in different ways:

Most larger land animals (and birds) have lungs which take in oxygen so it can be used by the

body, and expel carbon dioxide. We have lungs too.
Fish have gills which look like slits in the side of the head. Oxygen is taken (and carbon dioxide removed) in from water passing through the gills.
In *worms*, gases are passed in and out through the skin.

Using the reference books, draw diagrams of lungs, gills and tracheal systems

Extension: Dissect a fish from a fish market if you were feeling very keen.

6. Animal life cycles

Have some reference books available which have information about life cycles/young. Choose a couple of animals from each of mammals, amphibians, reptiles, birds, fish and insects for which you have enough information, but do not sort them into these groups yet. It would be helpful if you had a sheet/cards with each of your chosen animals on.

Have a data sheet for each animal with the following or similar categories:

Lays eggs
gives birth to live young
Feeds young
babies look like parents
babies take a long time to grow into adults
both parents look after their young
builds nests
carries young around
spends part of life in water and part of land

When the data is collected, compare the sheets and try to find patterns. Lead into a discussion of similarities between the way animal groups grow and reproduce (e.g. mammals all produce live young whom they feed and care for, young look like adults etc.).

Extension: Choose some animals of interest and look more closely at their life cycles. Draw diagrams of various life cycles (e.g. butterfly, ladybird, frog).

B. PLANTS

7 lessons
Variety in plants
Using keys to classify plants
Plants need water to grow
Plants need sunlight to grow
Plants need nutrients to grow
Temperature affects growth
Plants can move

1. Variety in plants

Give the child a bag and set him loose in the garden/park. Have him collect ten or so different plant specimens with as much variety as possible (or, give him a list to tick of each as he finds it e.g. flower petal, green leaf with smooth edges, green leaf with jagged edges, twig, seed, moss, brown,

yellow or red leaf, grass and so on. For some samples he might need to draw a picture (e.g. instead of picking a living flower) or take a rubbing (e.g. bark or leaf skeleton)

When he has collected his specimens have him either tape or stick them onto paper along with any drawings of rubbings and label them.
Discuss differences and similarities and help him to choose categories by which the specimens might be grouped. Keep it very simple at this stage e.g. colour, size, texture.
Have the child choose his favourite sample and make a special information sheet for it, with a drawing, a description of size, shape, colour, texture, place it was found and any extra information of interest found in a guide book.

Extension: Make information sheets for the other specimens.

2. Using keys to classify plants

Gather a good selection of leaves from a variety of trees.

Discuss similarities and differences and ask the child to try to group similar leaves together, explaining his choices. Encourage him to look at shape, texture, colour, edges, size, smell, number of leaves on the stem.

Can he find more than one way to classify his collection? (At this point it is not important to identify the name of the tree from which the leaf came.) If he is keen, encourage him to draw the leaves in each of his groups and label the groups with their identifying characteristic (e.g. 'these leaves all have jagged edges').

Now provide him with a nature book which has a simple key showing how to identify leaves. Help him use the key to identify his own leaves.

Extension: Create your own 'key' based on your own classifications.

3. Plants need water

Have a handful of bean seeds, some soil and five yoghurt pots or similar. Fill each pot with soil and label then as follows:

no water
very wet always
water only when soil dry
5 mls every four days
10 mls every four days

Plant a bean in each and make a prediction sheet for each one. Then make a table to record your findings. Be sure to water the plants as instructed and record the results each day. Once the first seed germinates, keep watering for a few more days.

Discuss the results. How good were your predictions? Do the results show that seeds need water to germinate and/or that plants need water to grow? What about too much water?

Extension: Research in more detail how over-watering can kill both seeds and plants (rots seeds and prevents roots from getting enough oxygen).

4. Plants need light – but seeds don't

As before, you will need bean seeds, plastic pots, soil etc., just two this time. Plant a bean in each pot. Tell the child he is going to place one pot on the windowsill and the other in a cupboard. Ask him to predict what he thinks will happen.

Watering the plants if the soil become dry, observe and record their progress over several days. If the plants grow, measure the growth and keep a comparison chart. When the experiment is complete, ask some questions. How accurate were the predicted outcomes? Why did the plant in the cupboard not grow as well? How can other differences be explained? (e.g. presence/absence of green colour). Did both seeds germinate? What does this tell you about the need for light? (plant need light to grow but seed does not need light to germinate).

If there is interest, extend the activity. Plant several beans and label the pots as follows:

in light all day; in light five hours per day; in light two hours per day; in light one hour per day; no light.

Have him observe and record his results. Discuss how plants need light to make their own food so that they can grow: the more light, the more growth.

Extension: Research photosynthesis and relate it to the experiment (photosynthesis cannot take place in the dark, therefore the plant has no food and cannot grow). Why do seeds not need light to germinate? (they use their own stored energy). Why is this useful? (they are placed in the ground to grow and have no access to light).

If there is enough interest, explain *phototropism* (the tendency of plants to grow towards the light - more light, more food, more growth)

5. Plants need nutrients to grow

Again, have a handful of bean seeds and some plastic pots. This time, you need different potting materials: compost, sand, sawdust, blotting paper, cotton wool, cloth – and anything else you can think of which is suitable.
Make predictions about what will happen to the seeds. Which do you think will grow the best. Why? Does 'best' mean tallest, strongest, greenest, thickest stem, most leaves – you decide: what are your criteria? Which is likely to grow the least. Why?

Observe the plants, keeping them watered and in the light, for as long as necessary to obtain results (discuss how long this might take and how you will decide when the experiment is finished). Keep records of the results. How do the results measure up to your predications? Were there any surprises? Do the results show that plants need anything other than water and light to grow well? (yes, they need nutrients from the soil).

Discuss the need for nutrients found in the soil (nitrogen, sulphur, phosphorous, potassium, calcium, boron, zinc, copper and others). Explain briefly that nutrients are taken up through the roots of the plant.

Extension: Find out what all or some of these minerals actually do for the plant. Use books to identify what happens to plants when one or more is missing.

6. Plants and temperature

Plant three bean seeds. Place one pot on a sunny windowsill, one pot in the fridge and one in the freezer. Predict whether or not the seeds will germinate (you would not expect the plants to grow in the fridge or freezer – why?.) This experiment is not about plant growth but about whether or not temperature affects germination. Discuss how often the seeds should be watered (only when the soil feels dry? Refer back to the experiments with watering). If possible, use a thermometer to record the temperatures in each of the three places.

Record your observations and discuss the results. Did some seeds germinate faster than others? How accurate were your predictions? Do your results show that temperature affects germination? Explain your results to someone.

Extension: Try this experiment with different types of seeds. Compare the rates of germination between the different types. Graph them if you like.

7. Plants can move

This experiment is about *phototropism* (bending towards light). Explain that movement in plants is not so obvious as in animals, but it does occur.

Take a shoe box or similar and cut a hole in one side about the size of a penny. Take two small saucers, place on them some wet cotton wool sprinkled with cress seeds. Put the saucers in a sunny place and position the shoe box like a lid over one of the saucers, with the hole facing the window. Predict how the plants will grow (will there be any differences?). Why do we need two saucers with seeds? (because we need to be able to make a comparison).

When the plants have grown and the results recorded (did they grow as predicted?), turn the shoe box around so that the hole is facing away from the light (though ensure some light can still enter). What do you think will happen? Record what actually happens over the next day or so. Ask why we needed two saucers.

Extension: Investigate plants which have more obvious movements such mimosa and Venus Fly Trap.

C. Humans

2 lessons
What do our teeth do?
What are our teeth made of?

1. What do our teeth do?

Using a mirror, try to draw your bottom set of teeth (if it's too difficult, use a diagram in a book). How many are there? Are they all the same shape and size? Are any missing? Do you know if they are all milk teeth or if some are adult teeth?

Explain the difference between milk teeth and adult teeth: there are 20 milk teeth, and these are eventually replaced with 32 adult teeth. Incisors grow first, first molars appear at about six years old, second premolars appear at about age twelve.

Look at the difference in shape of the teeth, and try to suggest what each might be best used for. When this has been discussed, draw a picture of each type and label it. Draw a diagram of a mouth with the correct number of teeth for a) a child b) an adult

Incisors: flattened from front to back, sharp and chisel like, good for biting and cutting.

Canines: Sharp and pointed to hold and tear food

Premolars: four in each jaw with ridged cusps on their flat surfaces, good for griding and crushing food

Molars: like pre-molars but larger (six in each jaw).

Extension: Compare human teeth to the teeth of a variety of animal teeth. Explore the differences in relation to foods normally eaten by humans and animals (e.g. cooked meat versus raw meat).

2. What are our teeth made of?

Provide a diagram of a tooth. Explain that all human teeth have three outside parts:

The crown – the part which is exposed above the gum
The neck – the part just below the gum
The root – the part which anchors the tooth to the jawbone

Explain that inside the tooth there are also three important areas:

The pulp cavity – this is filled with blood vessels and nerves (it receives nourishment for the tooth to grow)
The dentine – this surrounds and protects the pulp
Enamel – a hard surface covering the dentine in the crown

Copy the diagram (or print off a blank one) and label all the parts of the tooth.

Discuss tooth decay. What causes holes which are then filled? Explain that acids form in the mouth from the sugars and starches in our food, hence the need to brush teeth after eating and avoid sugary snacks between meals.

Extension: research causes of tooth decay and exactly how teeth decay. What happens to the enamel, the dentine and the pulp when a tooth decays? When does tooth decay begin to hurt and why? Why does most toothpaste contain fluoride (what is it and what does it do?)