CHAPTER IV - BIOLOGY

1. Introduction

Biology is a natural science which studies living organisms. It has two distinct disciplines, the study of animal life which is called Zoology and the study of plant life known as Botany.

The child encounters biology through spontaneous exploration of the environment; Chapter II of this module focuses on the importance of the first hand experiences which spark the children's curiosity. Much of your work with young children (two to four/five year olds) in this area of learning will be based on their curiosity and their spontaneous discoveries of the environment.

As a teacher you will need to be observant and vigilant not to miss opportunities when children express their interest in nature and their environment and when they share with you what they already know. You will need to engage in conversation with the child; story telling will be your most useful tool which will enable you to build on what the child knows and to share many interesting facts about the plant, creature or phenomenon of interest. This is where your personal interests and general knowledge of the world will be invaluable. You will also need to continue to study and research to ensure your knowledge is accurate and current. We hope you will find it as exciting as the children and that you will enjoy the learning opportunities Knowledge and Understanding of the World provides for sharing the treasures of this planet with children.

You should continue to add to the nursery's resources in this area of learning, to enable you to extend your initial stories and give the children opportunities for further learning. In a well resourced setting many of these activities and materials will not be on permanent display, but will be added to the classroom shelves, the interest table, the book area or to the outdoor classroom to reflect and extend the child's initial interest. It is vital that these resources are freely available and facilitate cycles of activity like any other activities on offer in the favourable environment. Observing the use of resources available in the classroom will give you an opportunity to realistically assess not only the child’s interest but the learning which has taken place.

A word of caution; there is a tendency for adults to want to share “their own knowledge” with the child - in other words, to teach what they know, following their own agendas, rather than building on
what the child knows or that in which s/he is interested. Being a careful observer and a listener should help you in avoiding this pitfall.

2. The Sun game

| Materials       | One sun, 109 cm diameter, made from paper or fabric.  
|                 | Set of pictures:  
|                 | 18 plants on dark yellow card  
|                 | 12 herbivores on mid yellow card  
|                 | 8 carnivores on pale yellow card  
|                 | 2 seedlings  
|                 | Bucket/cupboard  
| Objectives      | To see the value of the sun  
|                 | To see diversity of species  
|                 | To show interdependence, i.e. how we all rely on the sun  
|                 | To develop vocabulary and learn new information  
|                 | To demonstrate the pyramid of life/food chains  
|                 | To begin to classify  
| Vocabulary      | Names specific to the images used in the activity as well as any conversation initiated by the child.  
| Control of error| The colour of the cards.  
| Stage           | After initial interest, and having explored the initial stages of any food chain, by observing the interrelationship between insects and plants you may introduce this activity to the older child.  
| Presentation    | The Sun game is usually presented to a small group of children.  
|                 | **Step 1**  
|                 | Go outside on a sunny day. Talk about the sun using conversation prompts such as: ‘Do you like it when it is sunny?’ ‘Is it safe?’ ‘What do we need it for?’ During the discussion, introduce the fact that plants need the sun to live. Tell the children that you are going to do an experiment when you get back inside.  
|                 | Take two plants, both the same. Put one in the sun on your window-sill; put the other plant in the dark under a bucket or in the cupboard. Make sure that both plants have water. The teacher and the children observe the covered plant and watch out for signs of yellowing within the next few days. When it is showing signs of yellowing, discuss the fact that it is the lack of light that is killing it. The other plant will be healthy. Rescue the sickly plant!  
|                 | **Step 2** (on same or following day)  
|                 | Bring out your large yellow sun. Lay it on the floor and invite the children to sit around it. Bring out the eighteen plant pictures and ask the children to lay them directly around the edge of the sun. Discuss the pictures, naming any unfamiliar plants (there should be some unusual as well as familiar pictures). Explain what they all have in common: they are all plants and so all need the sun to live. (Recap plant experiment.)
**Step 3** (on same or following day)
The children lay out the sun and plant cards. The teacher introduces the next set of cards; the children lay them around the plant cards. (No specific match between plant and herbivore is made. This means that an elephant may be paired up with seaweed, unless you are meticulous in preparation of this game and ensure that you do have relevant sets such as a rose in aphid and a ladybird.) Discuss the pictures, naming and giving relevant information about the animals. Explain that all these animals have something in common. They all eat plants so are known as herbivores. They also need the sun - no sun means no plants; no plants means no food for the herbivores. You may link this with vegetarianism if some of the children in your setting are vegetarian.

**Step 4** (on same or following day)
The children lay out sun, plant and herbivore cards. The teacher introduces the new set of cards and the children lay them around the herbivores. Discuss names; give information. Explain what they have in common. They all eat other animals to live; they are carnivores. They too need the sun — no sun means no plants and no herbivores thus no carnivores. The teacher sums up - we all need the sun to survive.

**Activity**
Children can take out the materials and explore the pictures.

**Point for discussion**
What would happen to us if there was no sun?
Why are some of us vegetarian and others are carnivores?
What would it be like without the sun?

**Variations**

**Variation for the older child**
You could also introduce omnivores that eat both plants and meat; most of us are omnivores. Think about where you might place them on your layout.

**Variation for the younger child**
You could create a small food chain (more accessible) activity for the younger child by using a plant and models of insects and animals such as having a small rose bush, a model of green fly, a ladybird, a black bird, and an owl. Ideally you would do this in the outdoor classroom.

**Note**
**Teacher’s notes**
Try to have a wide selection of pictures. Plants could include trees, grasses, flowers, fruit, vegetables, meadows, and seaweed. Herbivores could include elephants, bees, hummingbirds, kangaroos, and donkeys. Carnivores could include ladybirds, kingfishers, frogs, snakes, tigers, and blue whales. Have big, small, furry, scaly, feathered, fierce and gentle. Be careful that they are true carnivores/herbivores.
The pictures should be clear and beautiful, showing only one species and mounted on cards of the same size approximately 6 x 8 inches (15 x 20 cm).
| Sun Game - pictures of plants displayed and talked about | Sun Game - pictures of plants and herbivores displayed and talked about | Sun Game - pictures of plants, herbivores and carnivores displayed and talked about |
### 3. Animal families

| **Materials** | Basket containing a selection of models of four to six animal families such as:  
| | - a hen, a cockerel and a chick  
| | - an ewe, a ram and a lamb  
| | - a cow, a bull and a calf  
| | - a duck, a drake and a duckling  
| | A large felt mat. |

| **Objectives** | To make the child aware of families of farmyard animals  
| | To extend the child’s knowledge of the natural environment  
| | To extend the child’s powers of observation  
| | To expand the child’s vocabulary |

| **Vocabulary** | Names specific to the animals used in the activity and their collective names such as cow, calf, bull and cattle as well as any conversation initiated by the child. |

| **Control of error** | A photograph of the animals correctly grouped together. |

| **Stage** | When the child is interested, this activity reflects the child’s own family relationships. Children can explore the families before they learn the specific names of the family members. |

| **Presentation** | This is an individual exercise undertaken at a table or on a floor mat.  

**Step 1**  
Follow the usual cycle of activity. The teacher invites the child to take the animals out of the basket. The child groups the animals into families, with help from the teacher if necessary. (If there is a photograph as control of error, the child is shown how to use it.) The teacher asks the child if s/he knows about the animals in the families. The child chooses one family and the teacher tells the child something about each member, e.g., ‘This is the mother pig, she is called a sow. She has teats on her tummy where the piglets can suck milk.’ When the child has finished looking at, and talking about the animals, the teacher asks if the child wants to look at another family. When the child is finished, s/he puts the animals back in the basket and returns it to the shelf.  

**Step 2**  
On later occasions the teacher teaches the names of the family members, taking one family at a time. The names are taught using the ‘Three Period Lesson’.

| **Activity** | The child can take the basket from the shelf any time s/he likes and can explore them. It is quite usual that two children look at the animals together and share what they know about them. |

| **Point for Interest** | It is very helpful to have a book on farmyard animals nearby to encourage further exploration of animal families. |

| **Variations** | - You can also make collections of sea families, or wild animal families.  
| | - Cards with photographs or pictures of farm or wild animals may be used as a variation.  
| | - The children could be introduced to the collective nouns for the animals, |
for example, a parliament of owls; a charm of finches.

- An introduction to the names of the animal homes could also be included, for example: barn, stable, coop, pigsty.

**Note**

This is an excellent follow up activity after a farm visit and a favourite of many two and three year olds.

| Animal families - all animals taken out of the basket, identified and mixed | Animal families - all animals taken out of the basket and grouped into families. Families are discussed in detail before naming each member of a particular family |
4. Matching and pairing objects to cards/cards to cards

In the next step we introduce the child to pairing activities. Through these the child learns to identify the similar features and to name animals or plants in the picture. The variety of the activities is endless; wherever possible the children will start by pairing real fruits, vegetables, plants to photographs or printed images mounted on card. If it is not possible to use “real things” such as in the case of animals, use carefully chosen models (remember that size and realistic representations are very important at this stage of learning). A well-established school will have a comprehensive selection of pairing cards. They will be made available to the children for whatever topic they may be working on or whatever interests them.

Some examples for pairing cards:

**Zoology:** insects, spiders, birds, amphibians, reptiles, fish, mammals, etc.

**Botany:** trees, flowers, bushes, vegetables, fruit, etc.

The pictures are usually mounted on cards of specific colours to help the child identify a particular group of animals or plants. See Appendix 1.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Please see note above recommending use of real objects or models as a starting point when matching and pairing.</th>
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</thead>
<tbody>
<tr>
<td>A collection of six to eight pairs of pictures of animals or plants belonging to the same group. For example:</td>
<td></td>
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<tr>
<td>• fish</td>
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<tr>
<td>• amphibians</td>
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<tr>
<td>• reptiles</td>
<td></td>
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<tr>
<td>• birds</td>
<td></td>
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<tr>
<td>• mammals</td>
<td></td>
</tr>
<tr>
<td>• vegetables</td>
<td></td>
</tr>
<tr>
<td>• flowers</td>
<td></td>
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<tr>
<td>One set of pictures should be mounted on white card with a dot of identifying colour on the reverse side, e.g. pale blue for birds, green for vegetables etc. The other set is mounted on the specified colour card. (See Appendix 1.) The name of the plant/animal should be neatly written on the back of the white card.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectives</th>
<th>To introduce a simple pairing exercise</th>
</tr>
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<tbody>
<tr>
<td>To prepare the child for future exercises in the classification of animal and plant kingdoms</td>
<td></td>
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<tr>
<td>To expand the child’s vocabulary</td>
<td></td>
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<tr>
<td>To further refine the child's power of observation</td>
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<tr>
<td>To extend visual memory</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Names of the species used in the specific set of pairing materials and any conversation initiated by the child.</th>
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</thead>
<tbody>
<tr>
<td>Talks about the specific characteristics of individual species as well as observations made by the child in the natural environment.</td>
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</table>

<p>| Control of error | One to one correspondence and also colour-coding on the reverse of the cards. |</p>
<table>
<thead>
<tr>
<th><strong>Stage</strong></th>
<th>Using objects and models can be an early activity, appropriate for two and three year olds. The activities described below are more suited to mature three and for year olds, whereas those in step 3 are appropriate for five and six year olds.</th>
</tr>
</thead>
</table>
| **Presentation** | **Step 1**  
Follow the usual cycle of activity. The child chooses where to work, on a table or on a mat on the floor. The teacher invites the child to lay the objects or pictures mounted on the coloured card out in a row or a column leaving some space between them. As they are being laid out the teacher and child talk together about the individual species and share what they know about them. The teacher should try and build on what the child knows and extend their knowledge or understanding of the plant or an animal.  
When all the cards are laid out and the discussion has finished the teacher encourages the child to match the second set of cards (mounted on white card) to the objects/pictures already laid out.  
**Step 2** Sorting cards into groups.  
**Material:** sets of images mounted on the white card from three or four sets of pairing cards.  
Teacher and child examine the cards and sort them into groups using the child’s own ideas for classification. Once all the cards are sorted, discuss with the child the different groups and how and why they have been divided. Note that there is no ‘right’ way for them to be grouped as the child is leading the learning.  
**Step 3** Sorting pairing cards from one set into groups by specific features.  
**Material:** one set of images mounted on coloured card from one set of pairing cards.  
Teacher and child examine the cards and sort them into groups by looking at one specific feature (it could be feet, beak, wings, covering - fur skin feathers - or other appropriate feature).  
At the end, invite the child to discuss the groups, the variety and why there are differences. |
| **Activity** | The children are free to select any set of models and cards, or sets of cards; usually these will reflect the season or topic discussed. |
| **Point for Interest** | Make sure that you have an appropriate pairing activity ready for children to explore when focusing on a specific topic which is featuring on the interest table. |
| **Variations** | Apart from working with identical sets of images you can begin to extend these materials by making matching cards where children match, for example, the baby to the mother; the animal to the home; or the vegetable to where it grows - under the ground, on the soil, on a bush. You can also match the whole fruit or vegetable to the cross section or to the seed/pip; mammals to their footprints; or birds to their feathers or eggs. |
| **Note** | The possibilities are endless but always be sure to use high quality models and images. If you use cards the images need to be neatly mounted on cards of uniform size. |
| Pairing vegetables - fresh vegetables are laid out in a row and talked about | Pairing vegetables - the child matches pictures to the fresh vegetables | Pairing insects - older children who have experienced many aspects of natural life can use any sets of pairing card made by the nursery, such as the insects. They pair them first, learn the names of the species and later can play a variety of games with the picture cards |
5. Terminology cards

Once again we focus on the matching and pairing of images, but this time the focus is on one specific animal or plant and the features which make it unique by highlighting the specific features of that species. As we are working only with paper based materials this activity is not usually suitable for young children and is recommended for five and six year olds’ use; it contributes to their knowledge of specific species and will help them when being introduced to the Classification of the Animal Kingdom when they are older.

### Materials
Sets of terminology cards can include parts of a tree, a leaf, an insect, a fish, a frog, a tortoise, a bird, a rabbit, a cow etc.

**Example set**
- Fish - use identical outline images of fish mounted on light green card. (See Appendix 1 for colour coding.)
- **Two outline images** of a fish coloured as in real life, one with the word ‘fish’ written below the outline and the other with no wording.
- **Set of outlines and word cards** featuring different part of the fish (such as head, eye, mouth, gills, body, tail, fins) coloured in red or natural colour so as to highlight the part. The name of the part is written below each outline.
- **Set of outlines only cards** A second set of outlined pictures matching the first set, but this time the words are not written on the cards.
- **Set of name cards**

### Objectives
- To make the child aware of the component parts of different animals or plants
- To increase the child’s powers of observation
- To introduce the child to the function of these different parts
- To increase the child’s vocabulary
- To prepare the child for the study of biology

### Vocabulary
Extend the child’s vocabulary by learning the specific names of the parts of an animal or plant and linking the names with the function of these parts. A ‘Three Period Lesson’ can be used to teach the names.

### Control of error
One to one correspondence - the sets or outline images are matching, as are the name cards.

### Stage
As mentioned above this activity is suitable for the older child who is beginning to read and is interested in working with paper based activities.

### Presentation
Follow the usual cycle of activity.
- This is an individual floor or table activity.
- The teacher invites the child to take out the set of cards with pictures and names on the bottom. The labelled set is laid out first (it might be connected into a sequential freeze) and each image is discussed, pointing out, naming and describing highlighted parts.
- When all the images have been discussed, the child is invited to match the second set of images to the set discussed; the labels may be also added depending on the child’s interest.
### Activity
Once the child knows how to use a set of the terminology cards they can select any set available on the shelf.

### Point for Interest
Once again it is important that older children have access to terminology cards which relate to the topic featured on the interest table.

### Variations
For the “reading and writing” child the name labels will also be supplemented with written definitions, explaining the functions of the highlighted parts or the body.

### Note
Children can make their own set of labelled terminology cards.

#### Terminology cards - matching and naming parts of a tree, learning about the functions of each part
6. Life cycles

These are studied to give children a better understanding of plant and animal life and prepare them for classification of animals and plants. Through this activity the child becomes familiar with the progression of life. Life cycles are suitable for introduction to younger children because they can be introduced by first hand experiences such as watching chicks hatch in an incubator, planting broad beans or observing the metamorphoses of a butterfly using butterfly eggs (available through companies such as Insect Lore).

**Materials**

Different types of life cycle cards showing, in a series of pictures, the life cycle of a flower, a tree, a fish, a bird, a mammal, a common pet, or a human. They are mounted in sequence on appropriate colour card (see Appendix 1) along with a separate set of identical cards individually mounted on the same colour card.

**Objectives**

To make the child aware of the life cycles of the many different types of living creatures.
To discuss subjects such as migration, hibernation, pollination, etc.
To continue to make the child aware that living creatures are interconnected and that life is a never-ending cycle, even though individuals die.
To provide more practice at observation skills required for any matching activities.
To extend the child’s vocabulary.

**Vocabulary**

The story told must be accurate but colourful and engage the child’s imagination.

**Control of error**

The master card of the life cycle enables the child to check whether s/he has placed the individual cards in the right place.

**Stage**

Children are introduced to life cycle stories using models first; these are followed by cyclical life cycles, with linear ones being used with older children only.

**Presentation**

It is best to engage individual children or a small group of two or three; it is not advisable to present a life cycle to a large group.

Whenever possible, observing life cycles first hand is also supported by using models which illustrate the key stages of the transformation from a seed/egg to a young plant or animal. These activities are shared with young children before they are introduced on life cycles illustrated with photographs or drawings which are described below. The models are used to illustrate the story which is being told by the adult describing the changes in an engaging way with rich language.

Using paper based materials follow the cycle of activity. Ask the child to place the life cycle master card on a table or on a mat on the floor. Once again tell the story of the plant/animal, relating it to the pictures, starting with the seeds! eggs. If the child is already familiar with the story s/he may try to tell it to the adult.
<table>
<thead>
<tr>
<th><strong>Activity</strong></th>
<th>When ready, the child builds the life cycle without looking at the master card, then uses to check.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Point for Interest</strong></td>
<td>The changes which take place in the plant or animal during the life cycle.</td>
</tr>
<tr>
<td><strong>Variations</strong></td>
<td>Circular life cycles are good for illustrating annual cycles of plants and reproductive cycles of animals, and for showing the migration and hibernation patterns of animals. Life cycles may be also presented in a linear format, such as a time line. They must represent time accurately. This approach is appropriate for showing birth to death life cycles and when working with older children who have some understanding of passage of time.</td>
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<tr>
<td><strong>Note</strong></td>
<td>Life cycles always engage children and teachers should have several sets of models to support their stories.</td>
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</tbody>
</table>

**Lifecycle of a frog** - all materials are laid out ready for use

**Lifecycle of a frog** - some of the parts of the frog's life cycle have been placed in the pond
7. Natural habitats

It is beneficial for the child to have some ideas about natural habitats. This subject is best explained through topic work devoted to more familiar habitats such as hedgerows, forests, and parks, as well as to deserts, tropical rain forests and polar regions. Within this topic we can make connections with the hibernation and migration of animals and compare this to what happens to plants at certain times of the year.

Seasonal changes to habitats should be discussed and the child should become familiar with environments close to home as well as far away. You may wish to take photographs of your nursery garden once a month for a year, to highlight the changes in a familiar environment. An extension of the topic can be looking at food chains within the particular habitat.

Natural habitats of animals familiar to the child from the zoo can also be discussed. (Please refer to the Animals of the World activity with the puzzle map of the world in the chapter on Geography.)
8. Leaf cabinet

Montessori developed this material in India but some leaf shapes in the cabinet also relate to European trees and plants. In the initial stages the children use the cabinet as a puzzle and may also become familiar with the shapes by finding similar shapes in the garden or during nature walks.

**Materials**

The leaf cabinet consists of three drawers containing green wooden insets representing fourteen basic leaf shapes. The background is yellow. The insets have knobs and may be taken out and replaced.

There are also three sets of leaf cards. Each set has fourteen leaf shapes outlined in green. The first set is a heavy outline, the second is medium and the third is a thin outline.

**Drawer 1:**
- reniform, triangular, elliptical, orbiculate

**Drawer 2:**
- spatulate, aciculate, hastate, sagittate, linear, lanceolate

**Drawer 3:**
- ovate, obovate, cordate, obcordate

**Objectives**

To give the child a muscular impression of the leaf shapes.

To increase the child's powers of observation.

To make the child familiar with many leaf shapes found in nature.

To extend the child's knowledge of plants and trees.

To extend the child's vocabulary, by using the leaves' formal category names as given on the illustration below and/or by naming the tree that the leaf comes from.

**Vocabulary**

**Drawer 1:**
- reniform - kidney shaped with the stem attached to the middle of the inner curve
- triangular - with the stem attached to the centre of the triangle's base
- elliptical - like an ellipse, with the stem attached to one narrow end
- orbiculate - round

**Drawer 2:**
- spatulate - like a spoon
- aciculate - two needles joined at one end
- hastate - shaped like a fish, with the stem attached between the tail fins
- sagittate - like the head of an arrow, with the stem attached where the rod of the arrow would be
- linear - long, thin, straight
- lanceolate - like a thin lance, with the stem attached at the rounded end

**Drawer 3:**
- ovate - egg shaped with the stem attached to the wide end
- obovate - egg shaped with the stem attached to the narrow end
- cordate - heart shaped with the step attached between the curves
- obcordate - heart shaped with the stem attached to the pointed end

*definitions Gettman, 1987*
<table>
<thead>
<tr>
<th>Control of error</th>
<th>Either in the frame or in the outline of the cards.</th>
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</thead>
<tbody>
<tr>
<td>Stage</td>
<td>Young children may use the leaf cabinet as a puzzle and when “leaf hunting” in the garden or on nature walks. Older children will first learn to relate the leaf shapes to trees in their environment, and when studying trees in detail will have the opportunity to learn the Latin names.</td>
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</tbody>
</table>
| Presentation     | **Step 1**  
The child is encouraged to remove the shapes from the tray and place them randomly on the table or floor mat. The child then returns the shapes to the frames working with the materials in the same way in which s/he used the geometric cabinet.  
**Step 2**  
The child may choose one drawer at a time and take out and replace the insets, feeling round them one at a time.  
**Step 3**  
When the child is able to match the shapes well he can learn the names of the leaf shapes. |
| Activity         | The child works with the materials spontaneously using the knowledge of the geometric cabinet as a guide. |
| Point for Interest | Some of the shapes relate to flowers - can you find them? How many of the leaf shapes can you link with trees you know? |
| Variations       | Many schools use a puzzle of leaf shapes found in Europe and start by linking the shape to particular leaves. Look at leaves in the environment. These can be brought back to the classroom, pressed and used to make matching and pairing cards, or a series of cards to show the way the leaves change with the seasons. Carry out a project on leaves, collecting them for the interest table, and using them in art activities (rubbing, printing, etc.). |
| Note             | Learning the names of the leaf shapes is an advanced activity; the children should begin by becoming familiar with a life cycle of a tree, be able to identify the trees in their environment and be able to match leaves, seeds and nuts to the appropriate tree. See Appendix 3 for a plan of a Tree topic. |

| Leaf cabinet - individual draw | Leaf cabinet - leaf shapes to be matched to outlines | Puzzle of leaf shapes found in the British Isles |
9. Classification of the animal kingdom

All the activities listed in this module have prepared the child for this activity, and it also mirrors the evolution of species as described in the pre-historic time line. This is an advanced activity and should only be undertaken by older children or children who are really interested in animals.

The animal kingdom is subdivided into ten groups which we call phyla. Each phylum is then divided into orders and they in turn divide the animal kingdom into classes. For convenience we divide the animal kingdom into eight phyla and omit two phyla of different types of worms.

Materials

Using white cards of the same size as were used for terminology cards, prepare eight cards which will need to be connected to form a sequential freeze. On each card mount an outline of a particular phylum, starting with protozoa and finishing with chordata. Write the name of each phylum under the picture.
Make a collection of animals models representing the various phyla; you can have several models belonging to one phylum to demonstrate the diversity of each phylum.
Prepare a set of matching cards which are shorter and have a separate set of names.
The sequence of phyla is as follows: Protozoa, Porifera, Coelenterata, Annelida, Mollusca, Arthropoda, Echinodermata, Chordata.

Objectives

To introduce the child to the concept of animal classification.
To increase the child's powers of observation.
To give the child the understanding that each phylum has its own particular characteristics.
To introduce the child to the Latin names.
To extend the child's vocabulary.

Vocabulary

Definitions of Invertebrates
Protozoa (Amoeba)
One-celled organism. Can be placed in a separate kingdom of protistas.
Porifera (Sponge)
‘Pore bearer’. Simplest of all animals. The body is an empty sack with a large opening at the top. Sponges have holes or ‘pores’.
Coelenterata (Hydra, jellyfish, corals, sea anemones)
‘Hollow insides’. These animals have hollow bodies with a very primitive nervous system.
Annelida (Earthworm)
‘Ringed’. The animals have ringed bodies and each segment has its own organs. Annelida are the simplest form of animal life to have blood vessels.
Mollusca (Clams, snails, octopi)
‘Soft bodies’. Molluscs have soft bodies and usually also a hard shell or two.
Arthropoda (Insects, crustaceans, centipedes, millipedes)
‘Joint foot’. These animals have jointed legs, exoskeletons (outside skeleton) and simple or compound eyes.
**Echinodermata** (Starfish, sea urchins)
‘Spiny skinned’. These animals have a spiny skin and round bodies, or you could draw a circle around the outstretched arms.

**Vertebrates**
**Chordata** (Fish, amphibians, reptiles, birds, mammals)
‘Having a cord’, i.e., backbone. These animals have an inner skeleton (backbone), eyes, nostrils and mouth on the head, and usually two pairs of limbs.

<table>
<thead>
<tr>
<th>Control of error</th>
<th>The ‘sequential frieze’ acts as control of error.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage</td>
<td>This is an advanced activity usually not available to children under the age of five.</td>
</tr>
</tbody>
</table>

**Presentation**

**Step 1**
Follow the cycle of activity. Working on a mat on the floor ask the child to unfold the sequential frieze starting with the protozoa. Using the models tells the child a story about each phylum, emphasising its distinguishing characteristics and relating it to the prehistoric time line (if the child has already done that), as the child is matching the animal to the frieze.

**Step 2**
After the child has worked with the models many times s/he may match a second set of matching cards to the frieze and is then asked to find the word card to match and place it underneath.

**Step 3**
When really familiar with the materials the child may learn the Latin names of the phyla.

<table>
<thead>
<tr>
<th>Activity</th>
<th>The child matches the models to the frieze.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Point for Interest</strong></td>
<td>The variety of animals belonging to each group.</td>
</tr>
<tr>
<td><strong>Variations</strong></td>
<td>Relate the classification of animal kingdom to the pre-historic time line.</td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>It is very unusual to find this activity in a nursery school.</td>
</tr>
</tbody>
</table>

**Classification of animal kingdom - matching models to sequential frieze**
10. Classification of the Phylum Chordata

All the animals in this group have a back bone and are more familiar to children than some of the animals in the Classification of the Animal Kingdom; therefore, it is more likely to find this activity in a nursery, particularly if the nursery is attended by five year olds.

**Materials**
Five white cards connected in sequential fashion. On each one is mounted an outline of one of the five orders - fish, amphibian, reptile, birds, mammal. In this sequence, the name of each order is written under the outline.
A set of matching cards, a set of word cards and a set of models.

**Objectives**
To extend the child’s knowledge and understanding of animal classification.
To refine the child’s observation skills.
To further extend the child’s vocabulary.
To give understanding that each order has its own characteristics.

**Vocabulary**
Names of the orders of chordates: *pisces, amphibia, reptilia, aves, mammalia*

**Control of error**
The ‘sequential frieze’ acts as control of error.

**Stage**
This activity should be introduced after the child is familiar with the classification of the animal kingdom.

**Presentation**

**Step 1**
The child works in the same way as s/he does with the classification of the animal kingdom. The frieze is laid out and models are matched to it first whilst the story of each animal is shared with the child.

**Step 2**
After the child has worked with the models many times s/he may match a second set of matching cards to the frieze and then s/he may find the word card to match and place it underneath.

**Step 3**
When really familiar with the materials the child may learn the Latin names of the orders of chordates.

**Activity**
The child matches the models to the frieze.

**Point for Interest**
Once again there should be a variety of models to match to the images on the frieze to illustrate the rich variety of creatures belonging to this phylum.

**Variations**
Consider how you could link this activity with a more in-depth study of animals with a backbone.

**Note**
The models may be replaced by high quality photographic images of the animals belonging to this group.