

Pathfinder

NATURE

Specialty

Resource Material

March 1997

NATURE SPECIALTY ACTIVITIES

- + This activity has a campout activity component.

- 1,2.+ Utilising two activity periods be able to identify any one of the following groups: 25 trees, 25 rocks and minerals, 25 wild flowers, 25 butterflies, 25 moths, or 25 shells.

- 3.+ Be familiar with the principles of Natural History photography. As a group, make a 10 minute audio visual presentation on a nature topic of your choice.

- 4. Create a diagram outlining a simple scientific classification of the animal kingdom.

- 5.+ Learn the principles of bird watching and spend at least 2 hours in bird observance recording the birds that you observe.

- 6. Participate in a presentation of a Natural History collection.

OR

Participate in a presentation from an environmental or ecology group from your area and become familiar with the work that they are doing.

- 7.+ Select a nocturnal creature that is common to your area and discover its habits. Participate in and keep a log on a night hike to observe your selected creature.

- 8. Learn what to do to attract birds to your backyard.

- 9. Discover and make a list of some of the Endangered and Vulnerable plant and animal species found in your area.

- 10. Participate in an activity and/or view an audio visual on creation. Discuss the arguments for evolution verses Biblical creation, and how life began.

- 11.+ Participate in an expedition into a wilderness area and keep a log, to study the flora and fauna with respect to the terrain. After the expedition and when the log books are completed, participate in a discussion with the group on your observations.

This Specialty was compiled by Arnold Turner and John Behrens

Bibliography

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Frith, C.B. 'Garden Birds - Attracting birds to Australian and New Zealand Gardens.' Quarto Publishing Limited, London, 1985

Robertson, C.J.R., 'Reader's Digest Complete Book of New Zealand Birds'

Schodde, R. 'Reader's Digest Book of Australian Birds'

Schurmann, T, Jennings, W., 'Australian Birdwatcher's Diary', Rigby Publishers, Sydney, 1984.

Slater, Peter, Pat & Raoul, 'The Slater Field Guide to Australian Birds'

Slater, P. 'The Birdwatchers Notebook'

Origin by Design, Harold Coffin

*The Lie: Evolution, Ken Ham

*Stones and Bones, Carl Wieland

*CREATION ex nihilo

Quarterly magazine

Evidences

Video

Pathfinder Honour

No Pathfinder honour can be awarded for completing the Nature specialty alone. However the Nature specialty does infringe upon several nature honours which can be achieved by completing extra activities. These nature honours include: Trees and shrubs, Rocks and minerals, Flowers, Moths and butterflies, Shells and Birds.

Activity 1&2

Utilising two activity periods be able to identify any one of the following groups: 25 trees, 25 rocks and minerals, 25 wild flowers, 25 butterflies, 25 moths, or 25 shells.

Outline

The object of this activity is to open the eyes and minds of the Pathfinders to different aspects of nature. Encourage the Pathfinders to select a group for which no Pathfinder has experience. Where possible invite people who have a collection or expertise to introduce the selected nature group. As well as the two activity periods allocated to this activity, there is a camp-out component. Select a camp site that is best suited for displaying the nature group that has been selected. From books, drawings, photographs or from actual nature items (preferred), the Pathfinders must be able to identify 25.

Resource Material

Trees, rocks and minerals, wild flowers, butterflies, moths, and even shells vary from locality to locality. It would be a daunting and impossible task to provide resource material on these groups, that would be specific enough for instruction for all the possible localities in Australia and New Zealand. Therefore it is recommended that instructors obtain local information on the selected topic.

Suggested places of Information:

- Local Library
- National Parks and Wildlife Service
- Botanical Gardens
- Department of Mine
- Lapidary Clubs
- Natural History Museums
- Forestry Departments

NATURE

Hand-out sheet 1.

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Activity 3

Be familiar with the principles of Natural History photography. As a group, make a 10 minute audio visual presentation on a nature topic of your choice.

Outline

The audio visual can be a video, slide, photographs or an audio presentation. Have the Pathfinders select a nature topic (stationary topics are easier to photograph), ie a bird, animal, insect, tree, flower, fungi, grass, fruit, seeds etc., that has not been covered by other Pathfinder groups in your club before. Present the following resource material, tailoring it to the nature item selected and to the equipment that might be required. When the audio visual is completed, arrange a time with the club Director to have it presented to the club.

Resource Material

Limits on the choice of a natural history subject will be determined by the type of camera being used. If using a print or slide format, large subjects that can be approached fairly closely will be needed, if using an instamatic type camera. The choice widens considerably if a SLR (single lens reflex) camera with macro (close-up) and telephoto attachments is available.

If using video, the choice of subjects is fairly broad since most cameras have a zoom (6X to 12X magnification) and macro features.

The following information is designed to help you take good and interesting pictures and is condensed from *How to take Pictures*' a photo guide by Kodak. Collins 11984 Ed

1. Move close enough to your subject so that you see only the most important elements in the view finder.
2. Make sure your camera is adjusted to give the correct exposure. (Check your camera manual and the film instructions). When buying a film, get 100ASA or 200ASA film and remember to set your camera for this film speed.
3. Carefully observe the background and foreground in your view finder before you take the picture. Keep it simple so that the subject stands out.
4. If using a flash, make sure the subject is within the range of the flash.
5. Hold your camera steady. Shaky hands or punching the shutter-release button may give you blurred pictures. Brace the camera with both hands against your forehead and smoothly press the shutter release.
6. Become thoroughly familiar with your camera. Read the instruction manual carefully so that you'll be comfortable making adjustments under a wide variety of conditions. Have your camera handy for reference.
7. Set your subject slightly off-centre.
8. Rather than posing the subject in a starchy, uncomfortable manner, photograph them in a natural, absorbing activity with their eyes off you and the camera
9. Watch the direction of light on the scene. Pictures taken in the shade, on cloudy days, in the early morning or late afternoon won't have harsh contrasts of light and shadows.
10. Take plenty of pictures.
11. If photographing pets, have all the equipment set up and ready before you bring on the subject. They get bored quickly.
12. Be ready to quickly take pictures when unexpected opportunities come.
13. Get as close as you can to the subject and be at eye level with it. You may have to lie on the ground.
14. If your camera makes audible clicks when you are taking pictures, you may want to muffle the sound by putting the camera inside a padded bag. Camera noise can frighten away nervy wildlife.
15. Be very cautious photographing birds at nests. They may abandon their eggs or chicks. Build the photographic hide a bit at a time over several days. Tie back branches. Do not cut them off. Have two go into the hide. Then your friend leaves making the birds think nobody is there any more.
16. When using a video camera, use the zoom in or out facility sparingly.
17. When panning with a video camera, do it slowly. Take time moving from one subject to another. Otherwise it is very difficult to watch on replay.

When photographing subjects from the animal kingdom, it is best to work at their habitat, ie nest or den, or near their feeding places. This is because it is often possible to predict what the subject is likely to do therefore enabling you to be prepared. However, at either location, a photographic hide is essential in order to get you close enough to the subject for a good photograph. Artificial feeding places can be established by the photographer by laying out feed suitable for the subject of interest at a likely site. This should be done over several weeks and while the hide is being constructed and before the photographer takes a single photograph.

The information given in point 15 above is very important when thinking about building any sort of photographic hide. It is very important to build the hide in small sections over as long a period as possible. This is so the subject will not feel threatened. Do not try to do it in secret. Let the subject know that you are coming and going. Whistle, sing. Spend only a short time at the site during the hide construction phase. Work on the hide in groups of one or two.

When you are ready to start photographing, the two people into the hide and then one out to make the subject think that the hide has been abandoned is a good idea to follow. Subject with a keen sense of smell cause additional problems for the photographer. Only enter the hide when it is down wind of the subject, that is when the wind comes from the subject to you. Artificial scents can be left at the hide to mask the sent of the photographer, but these are usually offensive to the photographer.

Whatever the subject, the life of a natural history photographer is one of patience.

NATURE

Hand-out sheet 2.

For Natural History Photography



Great *PATIENCE* is required

Activity 4

Create a diagram outlining a simple scientific classification of the animal kingdom.

Outline

This activity is designed to open the eyes of the Pathfinders to the great design and diversity of their creator. Using the example of the common Brush-tailed possum have the Pathfinders fill in the handout work sheet as you present the following information.

Resource Material

Taxonomy, the science of classifying forms of life, does two things: it names every animal and plant, and it arranges them in groups according to how people believe they are related.

The modern system of classification stems from the work of the 18th-century Swedish naturalist Karl von Linne' (1707-78), who gave every known plant and animal a Latinised name, and grouped together what appeared to be similar forms of life according to their physical resemblances. Latin was chosen because it was then the international language of science.

The Linnaean system was devised merely to catalogue animals and plants according to their physical similarities. With the advent of the theory of evolution in 1859 with the publication of Darwins book 'On the Origin of the Species', evolutionary pressures resulted in the classification system being also viewed as a summary of animal relationships. There are seven major classification divisions in the Linnaean system. These are:

- Kingdom
- Phylum
- Class
- Order
- Family
- Genus
- Species

All living organisms are classified into each of these major divisions. Most taxonomists create intermediate divisions, such as sub-kingdom, sub-phyla, infra-order and sub-families etc., however the intermediate divisions are not always used.

The only natural grouping in the animal kingdom is the species, a group which is easier to recognise than to define precisely. It is generally taken to mean a group of animals which can interbreed in the wild and produce fertile offspring.

The Linne' system of naming animals is still used today. The two part scientific name of an animal or plant is a combination of the genus and species classifications. It is always printed

in italics, and gives first the genus, with the initial capital letter, then the species. The information immediately conveyed by the name *Canis lupus* is that this is an animal of the species *lupus* (Latin for 'wolf'), and of the genus *Canis* (Latin for 'dog').

It is almost an impossible task to draw a single classification tree structure for all living organisms, using just the major classification divisions. It is an impossible task to draw a single classification tree structure for all living organisms, using the major classification divisions and the intermediate divisions as well. The best way to understand the classification tree is to follow the classification of one species. For this example we will classify the common Brush-tailed possum. The Pathfinders can complete the diagram handout 3 by circling the appropriate classification as the following information is presented.

KINGDOM:	Animalia	An <u>animal capable of independent movement</u> . 3 sub-kingdoms under this kingdom
Sub-kingdom:	Metazoa	<u>Multi-celled</u> animals. 24 phylum under this sub-kingdom
PHYLUM:	Chordata	Animals with a <u>notochord</u> at some time in their development; sea squids, salps, lancelets and vertebrates. 3 sub-phylum under this phylum
Sub-phylum:	Vertebrata	Animals with a <u>backbone</u> ; fish, amphibians, reptiles, birds and mammals. 7 classes under this sub-phylum
CLASS:	Mammalia	Animals which <u>suckle their young on milk</u> from a mammary gland. 2 sub-classes under this class. Other classes; Agnatha-fish with no scales or jaw, Chondrichthyes- cartilaginous fish ie sharks and rays, Osteichthyes- bony fish, Amphibia-amphibians, Reptilia-reptiles, Aves-birds.
Sub-class:	Theria	Mammals whose <u>young develop for some time in the female's reproductive tract</u> (and not enclosed in an egg). 2 infra-classes under this sub-class
Infra-class:	Metatheria	1 order under this infra-class
ORDER:	Marsupialia	These animals have <u>bones to support a pouch</u> , but not all have external pouches. The young are born at such an early stage of development that the short period of gestation in the womb is followed by a further development period in the pouch. 9 families are under this order

FAMILY: Phalangeridae These are the tree-dwelling, plant-eating mammals. This family also includes the Koala. 45 species are under this family. Other families; Didelphidae-opossums, Dasyuridae-native cats, Myrmecobiidae-numbats, Notoryctidae-marsupial moles, Peramelidae-bandicoots, Caenolestidea-rat opossums, Vombatidae-wombats, Macropodidae-kangaroos.

GENUS: Trichosurus

SPECIES: *Trichosurus vulpecula*

Therefore the brush-tailed possum (*Trichosurus vulpecula*) is a multi-celled animal capable of independent movement which has a notochord and a backbone, suckles their young on milk, the young develop for some time in the female's reproductive tract, it has bones to support a pouch, eats plants and lives in trees.

NATURE

Hand-out sheet 3.

Scientific Classification

Brush-tailed possum

(Circle the appropriate classification)

- KINGDOM:** Animalia or Plant
- Sub-kingdom: Metazoa or Protozoa or Porifera
- PHYLUM:** Chordata or one of 23 invertebrate phylum
- Sub-phylum: Tunicata or Cephalochordata or Vertebrata
- CLASS:** Agnatha or Chondrichthyes or Osteichthyes or
Amphibia or Reptilia or Aves or Mammalia
- Sub-class: Prototheria or Theria
- Infra-class: Metatheria or Eutheria
- ORDER:** Marsupialia
- FAMILY:** Didelphidae or Dasyuridae or Myrmecobiidae or
Notoryctidae or Peramelidae or Caenolestidea or
Phalangeridae or Vombatidae or Macropodidae
- GENUS:** Trichosurus
- SPECIES:** *Trichosurus vulpecula*

Activity 5

Learn the principles of bird watching and spend at least 2 hours in bird observance recording the birds that you observe.

Outline

The majority of the 2 hours of bird watching must be completed by the Pathfinders on campout. Use the activity time to discuss with the Pathfinders, bird watching principles. Give the Pathfinders a copy of the observation record sheet for them to use while bird watching. See who can identify the greatest number of different species and the most number of the same species. While discussing with the Pathfinders the principles of bird watching make sure that they obtain an understanding of the tools and techniques used.

Resource Material

Bird watching is a love and a pastime for all seasons.

Birds, like people, live 365 days a year. Like us, they go through seasonal rituals and adjustments.

One of the many joys of bird watching is noting these behavioural changes in the birds about us, observing or hearing the variations in lifestyle, in song, conduct, and appearance of birds, all to suit the time of year.

There is pleasure for the birdwatcher in keeping a diary, a record of the birds observed, and for making comment on observed bird behaviour. Keeping a record of the number of different birds observed for the same species tell the observer about the bird population in the area.

The following information is from: *Slater's Abridged Bird Watcher's Notebook*.

CLOTHES AND MOVEMENT

1. Wear clothes with inconspicuous colours and which have a contrast between top and bottom. eg dark coloured shirt or blouse and light coloured pants or skirt. This breaks up the bodyline.
2. Conceal the movement of the legs and feet as much as possible.
3. If in the open, zig-zag so you are not at any stage moving directly towards the subject nor appearing to look at it.
4. If in timber, keep some bush or tree between yourself and the subject.
5. Move slowly, avoiding sticks and twigs that might snap.
6. If it looks as if the subject is about to leave, do not stop suddenly but ease to a stop. Similarly, do not start suddenly.

TOOLS

Bird watching can be done just using your eyes but a pair binoculars helps greatly bring the subject that much closer. A telescope is best suited to observe wading birds or other birds that are a long way off.

Binoculars 7 X 35 give a good magnification and don't show up the hand wobbles too much, suitable for most bird watching.

Using Binoculars

1. Shorten the strap so it just fits over your head.
2. Hold the binoculars just below your eyes while you search for the bird.
3. When you see movement, put the binoculars to your eyes and look in the direction of the movement. If you don't see anything, lower the binoculars and start looking again. Searching for the bird through the binoculars is fruitless

Bird identification books are a must. Not even the most emphatic bird watcher will know the name of every bird that they see. If you have no books of your own there will be an abundant supply of good bird identification books in the local or school library. Some recommended books are:

The Slater Field Guide to Australian Birds, (2 volumes) Peter, Pat & Raoul Slater
Reader's Digest Book of Australian Birds, R. Schodde
Reader's Digest Complete Book of New Zealand Birds, C.J.R. Robertson

OTHER HINTS

1. Time of Day. Most birds are active two to three hours after sunrise than at any other time.
2. Sound. Often you know a bird is present by its call or song. To locate the direction of the call, use both ears, moving the head slightly from side to side until the song appears to be directly in front of you.
Movement. Watch for movement, the twitch of a tail, the flirt of a wing, the flick of a beak - one of the hardest aspects of bird watching to master.
4. Attracting birds. The simplest method is to 'squeak' through pursed lips, 'kiss' the back of the hand. This 'squeaking' sound is the universal bird distress noise and will attract many bird that hear it to see what is going on. More sophisticated squeakers, wooden gadgets that make a loud squeak when a screw is rotated can be obtained from Bird Observers Clubs or shops like Australian Geographic shops.

Sophisticated squeakers, wooden gadgets that make a loud squeak when a screws is rotated can be obtained from Bird Observers Clubs or shops like Australian Geographic shops.

BEHAVIOUR IN THE FIELD

Private Property. Seek permission before bird watching on private property. respect the privilege when you are granted permission by avoiding lighting fires, leaving rubbish and litter, damaging fences, leaving gates open, disturbing stock and washing with soap, shampoo or detergent in troughs and water holes.

Rubbish. What you carry in, carry out.

Personal Safety. Carry a first aid kit and a coat to protect you should the weather change for the worse. Let someone know where you are going and how long you expect to be away. Take note of your surroundings as you go so that you can find your way back, particularly if in unfamiliar territory. Use prominent features such as a mountain bluff, creek or river or a road as marker to help find your way back. If you do get lost, stay put. Don't panic. Think. If you work out a way to get back set markers to make sure you don't go around in circles. Otherwise stay put until you are found. Use smoke signals, mirrors etc to attract attention. Use a small fire. It is less likely to get out of hand and doesn't require as much fuel.

BIRD WATCHES DIARY PAGE - Hand-out sheet 4.

There is no minimum number of birds to observe. It is possible however to observe 20 to 30 different bird species in the 2 hours under the right conditions. When it is time to start the bird watching, give several copies of hand-out sheet 4 to the Pathfinders (preferably on a clip board). Write the date and your location on each sheet. In the first column, the Pathfinder is to write the name of the observed bird. If they are unable to give it a name or if they are unsure then they can write a brief description or draw a picture of the bird. Also in the first column the Pathfinder can write any interesting features that they observed about the bird. In the second column the Pathfinder should write the time of day that the bird was first observed. In the last column the Pathfinders can place a tick if they observe another bird of an already observed species. Pathfinders should be encouraged to spend free camp time and/or time at home in observing as many birds as possible.

Hand-out sheet 4.

Hand-out sheet 4.

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Activity 6

Participate in a presentation of a Natural History collection.

OR

Participate in a presentation from an environmental or ecology group from your area and become familiar with the work that they are doing.

Outline

When studying natural history, environment and ecology awareness needs to be foremost in our minds. Therefore it is not recommended that natural history collections be produced by taking things out of their natural environment. It is much better these days to make a collection of natural history objects on photographs, slides or on video tape. There are many people who have an interest in photographing things in nature who will be more than willing to share them with you. **OR** Contact your local branch of an animal carers group (ie Wires), Greening Australia, Land Care, Soil Conservation, National Parks, Forestry etc. and ask them to give a talk on their work.

Resource Material

Activity 7

Select a nocturnal creature that is common to your area and discover its habits.
Participate in and keep a log on a night hike to observe your selected creature.

Outline

Many mammals and some birds are nocturnal. You will need a good torch with a strong narrow beam, and a quiet group of Pathfinders. Only one or torches are necessary if the group is under twelve people. During a hall activity discuss with the Pathfinders, and then have them practice the techniques presented below.

Resource Material

National Parks and Wild Life Service (or the equivalent) and some Shire Councils conduct spotlight walks for the public. Book your unit into such a walk.

If they are not available here are some suggestions explaining how to go about it.

Choose an area that:

1. has low undergrowth under trees
2. passes near water
3. has native trees in flower or with fruit (eg native fig)

Equipment needed; a bright torch such as a Mag light or a hunting spotlight with a portable battery such as a motor bike battery carried in a small back pack.

The aim is to locate animals by their eye shine (if they happen to be looking at you). Hold the torch or spot light against your temple. Scan from the base of the tree, up its trunk, through its branches and then down the next tree. When you pick up eye shine, it looks like two red pinpoints of light shining back at you.

Participants should walk quietly, listening for rustles or any sound that will give away the presence of an animal. If any noises are heard, shine the light in the direction of the sound. To increase the chance of locating the animal making the noise, have two spotters working together 10 metres apart. Each shine their light at where they think the animal is. Where the beams cross will be very close to where the animal is.

Activity 8

Learn what to do to attract birds to your backyard.

Outline

Discuss with the Pathfinders the thing that they can do to attract birds to your back yard. If possible have this discussion while you(or someone else) demonstrate how to build a simple bird feeder.

Resource Material

There are many reasons why you may want to attract birds to your backyard.

Birds will add colour, beauty and enjoyment to your back yard simply by their presence. You may wish to attract birds to your backyard so that you can sketch or photograph them, or in order so that you can do something nice for them.

HOW TO ATTRACT BIRDS.

Birds will come to your backyard if you provide for them the things that they need. These things can be provided through natural objects, ie the plants growing in your back yard, or artificial objects that you provide, ie bird baths, feeders and nest boxes etc. The size and location of the backyard will affect the type of birds that can be attracted, however even if your backyard is a terrace on the 9th floor with potted plants, certain birds will be attracted if their needs are met.

To attract birds to your backyard you will need to provide an environment with one or more of the following bird needs;

- Food (natural or provided)
- Water
- Shelter
- Nest-sites (natural or provided)
- Song-pouches

And at all times SAFETY from predators!

When providing for bird needs, a knowledge of the bird is a necessity. You must also be aware of the type of birds that are in your area and that might frequent your backyard. It is no good planting copious numbers of nectar producing flowering plants to attract honey eaters when the only birds that you have in your area are seed eaters.

TREES

Trees in the backyard are a real asset for attracting birds. Trees provide food (leaves, flowers, seeds, fruit, and insects), shelter, song posts, and nesting sites.

Eucalypts are the native trees that are most used by birds. High nectar producing trees like the tall grevilleas and banksias are good for attracting birds. Conifers and maples are of limited value to birds except for the occasional nesting site. Wattles also hold little value for birds. Their flowers are low in nectar but do attract insects which birds can eat. All trees that bear fruit ie lily pillies, figs, palms etc are good for attracting birds. Domestic fruit trees also will attract birds. This however is not always desirable.

FLOWERS AND WEEDS

A backyard that is rich in flowers is also rich in insects and there is one that will attract a good number of nectar and insect eating birds. A well mown lawn will attract many birds for the invertebrates (worms) that live there.

GARDEN CHEMICALS

The use of garden chemicals can have a detrimental effect on garden birds and should only be used when alternative methods have been tried and failed. Insecticides and pesticides used in the garden can kill birds directly through contaminated nectar and seeds etc, and indirectly through birds eating the pests (insects and snails etc) that you have poisoned.

Frequently garden pests can be caught and destroyed by simple traps. Insect traps and snail and slug traps work effectively and are a much better way to dispose of pests. Rodenticides for the control of mice and rats should always be placed in pipe or inside a pile of stones or bricks where birds cannot get at them.

If you want to keep birds out of certain parts of your garden, like your vegetable garden or from your fruit trees, netting is the recommended procedure.

PREDATORS

If the garden is not safe, the birds will not come. Predators that may cause risk to the bird itself or to its nest will cause the bird to look somewhere else to inhabit.

Natural bird predators are scarce in the backyard. The family or neighbourhood cat is the biggest predator of birds in the backyard. It is extremely difficult to keep cats out of your backyard (and still stay friendly with your neighbours). Probably the best and simplest thing to do is fit the cats with a collar and bell.

Kookaburras, currawongs and ravens are expert nest finders and for part of the year take eggs and young. Controlling these birds however, is hardly justifiable in the majority of situations, although exceptional circumstances can sometimes make it necessary.

FEEDING BIRDS

Birds will very quickly find regular and reliable sources of food and will return to them again and again.

Many people resent the bullying, over-confident attitudes of currawongs or the abundance of house sparrows and feral pigeons at feeders. You cannot seriously hope to exclude any of these birds altogether, but you can manage them to some extent. Some feeders are accessible by holes only, or by spaces in mesh surrounds, which can exclude pigeons and starlings at least, and sometimes house sparrows. A rather better solution is probably to try to maintain two or three different feeding stations at once, well spaced out if possible, and to separate different kinds of food.

It is important to keep feeding stations reasonably clear of rotting food and to clear away old scraps so as to avoid the risk of disease and infection.

Many people believe that white bread is bad for birds- this is not so, but it can be hard and therefore difficult for birds to break up and swallow, so it should be soaked in water first. The same general rule applies to other kinds of bread, all of which are very acceptable to many species. Biscuits, cake remnants, cooked pastry leftovers and all the crumbs which accumulates in bread bins, biscuit barrels etc are all well worth putting out. Remember that most garden birds have very small mouths, so break it up.

The list of kitchen scraps you can put out is almost endless. Small pieces of cheese are a favourite with many birds, especially blue wrens; so are bits of fat. Bones too attract a great variety of birds, as well as starlings, either for the fat and meat left clinging to them or for the marrow inside. They are best hung up, and care should be taken with broken bones left on the ground if you have a cat or dog. Odd pieces of meat are relished by many birds. At least some should be minced up for small insectivorous birds like scrub wrens.

Artificial nectar is very popular among the many birds that come to your backyard for the nectar of flowers. Pure honey, even honey mixed with water, attracts bees and is illegal so use a mixture of sugar and water. Be careful though to add a few drops of a vitamin or mineral mixture as these will be lacking from the sugar.

FEEDERS

Ideally, a bird table should sit securely on a firm post approximately 1.5 metres above the ground, not too far from cover, but out of jumping range (from walls and trees) of cats and possums. It should be roofed to keep the food fairly dry (the roof can include a food hopper).

Gaps in the rim or holes bored in the table itself will assist in draining off rain water. See the following handout sheet for ideas on bird feeders.

NEST BOXES

Nest boxes can be fitted to walls or trees, according to what is available. There is no hard and fast rules about how high they should be placed, but out of reach (of humans and cats) is a good rule of thumb. Around 3m up is fine, but probably no lower than 2m. It is also best to place the box so that it faces away from the prevailing wind or rain direction and also away from the greatest heat of the sun, in other words not facing due north.

Direct predation from cats, rats, goannas, snakes and even from other birds is also possible. Strategically placed wires or obstacles may deter cats, rats and goannas but, in some areas, snakes are hard to keep away from nest boxes. It is best to accept that a certain amount of predation is inevitable. Wasps, bees and earwigs may colonise a nest box. Earwigs cause the birds no problem and can be left alone; wasps and bees are probably best left alone too. Once a box has been used, there remains the question of whether or not to clear it out. The nest debris, plus perhaps old food remains will attract insects and bird parasites, some of which may be harmful to next years chicks, so it is best to clean out used boxes. Remove the box completely, clear out all the contents and pour boiling water over the interior to kill off any remaining parasites. Make any repairs that might be needed. Clean the box at the end of autumn and replace it as quickly as possible. If you are very lucky it might become the winter home of a pygmy possum or may be used as a roosting site for a tree creeper.

The nest box is about 250mm high and 150mm deep, with a sloping, hinged roof (or removable panel) and an entrance hole, near the top on either the front or a side. The boards should be at least 15mm thick. The floor should be at least 100mm x 100mm and the entrance hole about 125mm from the floor. The box is best secured by battens, or via an elongated rear panel, preferably by screws. The size of the entrance hole will depend on the birds you want to attract. A little lorikeet needs a hole only 4-5cm across whereas one of the big cockatoos may look at nothing with a diameter of less than 30cm. Aviculturalists breed many different parrots as ask their advice. See the following handout sheet for different type of nest boxes.

NATURE

Hand-out sheet 5.

Bird Feeds

blackbird

animals; fruit;
earthworms; spiders;
insects

bowerbird

fruit; leaves; flowers;
animal food; insects

bulbul

insects; fruit; buds;
flowers

butcherbird

insects; small reptiles,
birds, mammals

cockatoo

eucalypt and acacia
seeds; berries; fruit;
insects; roots; buds;
blossoms

cuckoo

caterpillars; insects

currawong

insects; fruit; carrion

drongo

insects; nectar; pollen

fantail

flying insects

figbird

figs and other fruit

finch

seeds; insects; spiders;
berries

flycatcher

insects

friarbird

nectar; insects; fruit

gulls

fish; grasshoppers;
insects; invertebrates

herons

grasshoppers;
tadpoles; frogs;
lizards; fish; aquatic
vegetation

honeyeater

nectar; pollen; fruit;
berries; insects;
invertebrates

kookaburra

snakes; lizards;
rodents; insects;
earthworms

lorikeet

nectar and pollen;
fruits; berries; seeds;
insects; blossoms

magpie lark

insects; worms;
spiders; snails; seeds

magpie

animals, lizards; frogs;
nesting birds; seeds;
carrion, scraps

mannikin

seeds; insects

miner

insects; spiders;
nectar; pollen; fruit

mistletoe bird

mistletoe fruit

mynah

insects; fruit; almost
anything

oriole

fruit; berries; insects

pardalote

insects; spiders

parrot

seeds; fruit; berries;
nuts; buds; blossoms;
nectar; insects; leaf

pigeon/dove

bread; seeds; buds;
fruit; scraps; wheat

plovers/lapwings

earthworms; insects;
seeds; vegetation

raptors

carrion; human refuse;
smaller birds, reptiles,
mammals; large
insects; spiders

raven

insects; other small
animal foods

robin

insects; moths;
invertebrates; spiders

rosella

seeds; leaf; buds;
blossoms; acorns;
berries; fruit; nectar;
insects

shrike

insects; beetles;
grasshoppers; berries;
fruit; seeds

sparrow

seeds; insects; scraps

starling

insects; scraps

sunbird

insects; spiders; nectar

swallow

insects

thornbill

insects; spiders;
invertebrates

thrush

earthworms; snails;
fruit; berries; spiders

tree creeper

insects; spiders

wattlebird

nectar; insects; fruit;
berries

whistler

insects; berries

wood swallow

insects; nectar; pollen

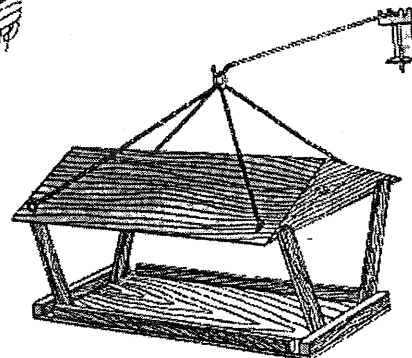
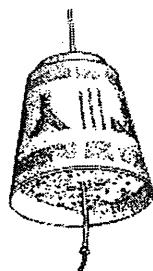
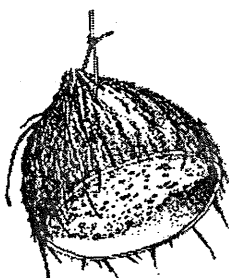
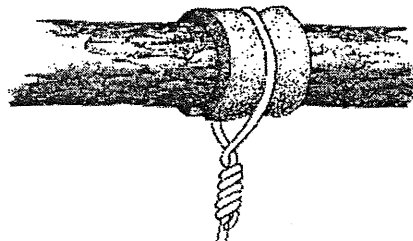
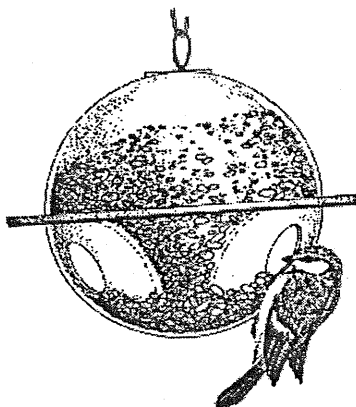
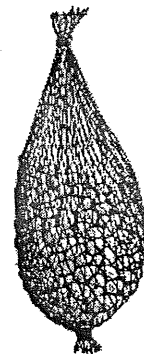
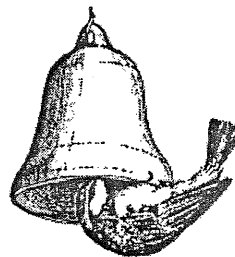
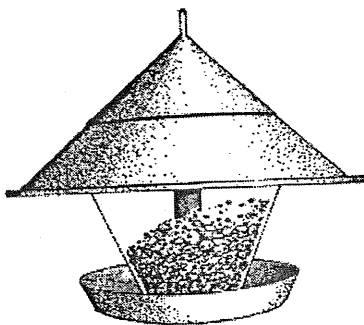
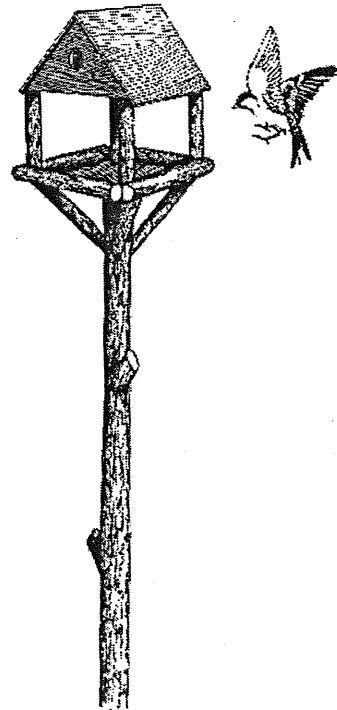
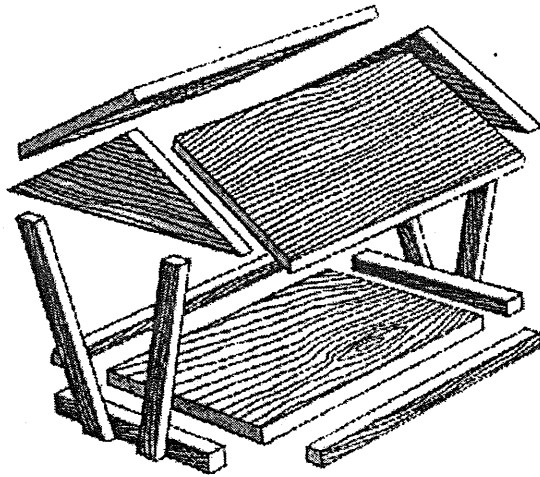
wren

insects; worms;
spiders; flowers;
nectar; fruit

NATURE

Hand-out sheet 6.

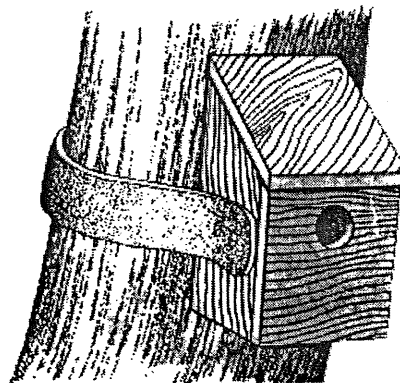
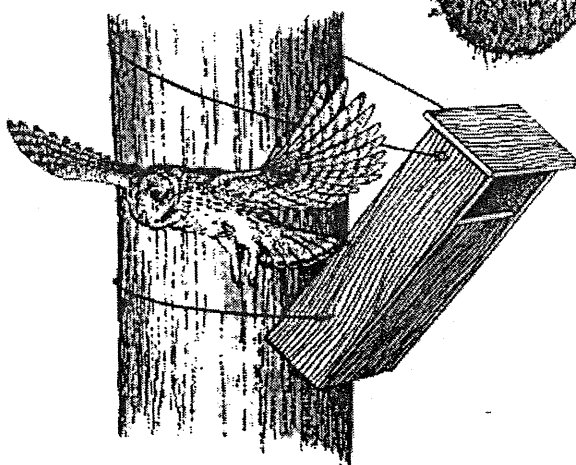
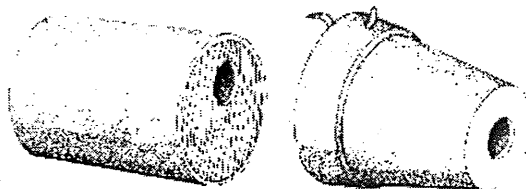
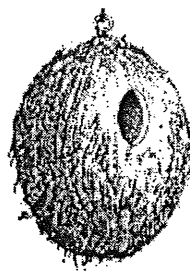
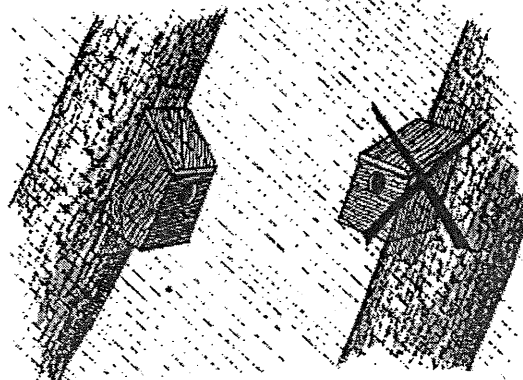
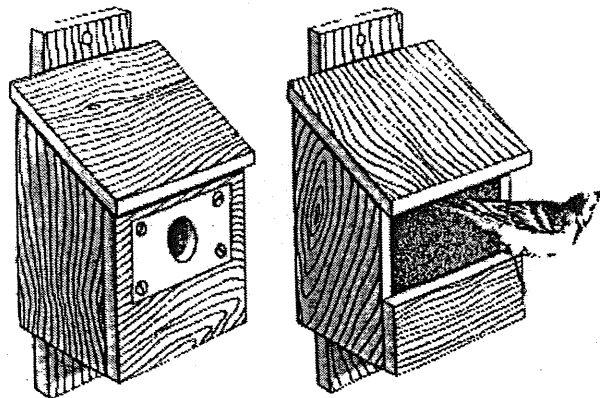
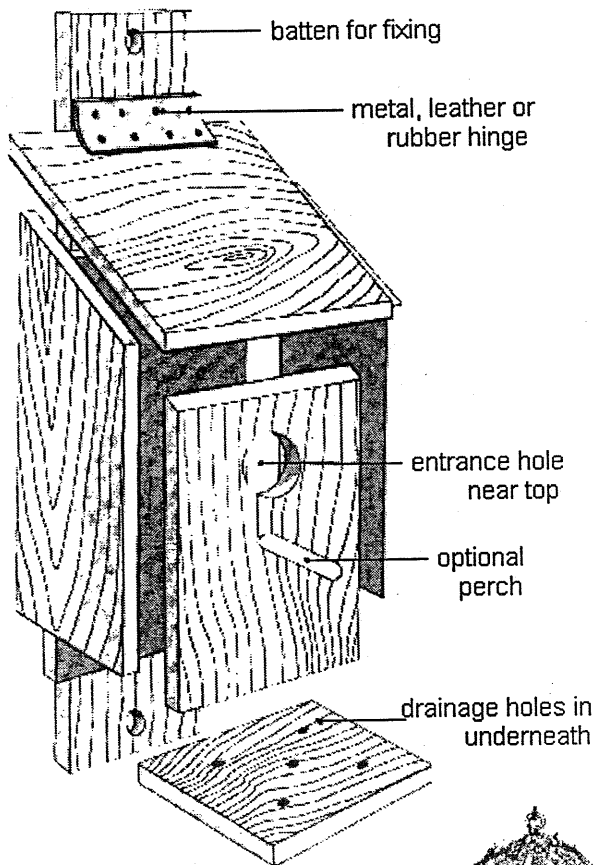
Feeders



NATURE

Hand-out sheet 7.

Nest Boxes



Activity 9

Discover and make a list of some of the Endangered and Vulnerable plant and animal species found in your area.

Outline

This activity is designed to make the Pathfinders aware that they have a responsibility to aid in the preservation of our native flora and fauna. Discuss with them the introductory information below. Select from the provided list several (or as many as time allows) endangered plants and animals species that are reportedly found in your area. Gather as much information as possible especially pictures on these species and present it to the Pathfinders. The local branch of the National Parks and Wildlife Service is a great place to gather this information.

Resource Material

Since the settlement of Australia by Europeans in 1788, thirty species of mammals and birds and about 100 species of plants have become extinct. A further 57 species of mammals, birds, reptiles, frogs and fish, many hundreds of species of invertebrates, and 209 plants are considered endangered and could become extinct within ten to twenty years.

Life on Earth is a complex web of interactions between animals and plants, earth, and atmosphere. Without the contributions of various species planet Earth might not be habitable by humankind. Plants and animals help to maintain the chemical balance of the atmosphere. Forests help to regulate water supplies. Plants and animals help to make soil and break down waste. They provide food, control pests and diseases, and pollinate crops. They provide a constant source of wonder and enjoyment.

The whole community must be prepared to take action now if we are to prevent more species from becoming extinct. The most important way to save a species is to protect its habitat. This may require setting aside land as nature conservation reserves, removing introduced animals and plants, planting trees and shrubs, and stopping pollution. It may also be necessary to stop people collecting, trapping or hunting a species.

But these actions may not be enough to save some species whose numbers are extremely low. Their only chance of survival is to breed them in protected areas such as botanical gardens and wildlife sanctuaries.

The Commonwealth Government is implementing many of these actions through the National Endangered Species Program. As part of this Program, scientists are carrying out many projects aimed at saving Australian plants, animals and ecological communities from extinction.

Government action is being complemented by individual Australians who are becoming aware that the resources they use every day affect wildlife, including endangered species and habitats. In general, the more resources used, the greater the damage to the environment.

Governments and individuals like you and I, working together we can ensure the survival of Australia's wildlife.

WHAT CAN YOU DO?

- Learn more about endangered species.
- Buy environmentally friendly products.
- Help reduce the demand on our native resources.
- Recycle: bottles, cans, metal, paper and oil.
- Use less chemical herbicides and insecticides.
- Dispose of old chemicals properly.
- Plant native trees and shrubs in your garden.
- Attach a collar and bell to your cat.
- Depose of unwanted pets correctly. Do not dump animals, do not release birds, do not flush fish. Give them another home with a friend or contact your vet or RSPCA for advice.
- Watch for animals and birds on the road.
- If you are an angler, dispose of unwanted nets and lines properly.
- Leave bush rocks in the bush
- Do not interfere with bird nests.
- Help to save endangered species by not buying souvenirs made from them.
- If you have property, fence off bush areas.
- Leave dead trees standing. Many birds and animals live in them.
- Join an environment recovery team.

An up to date list of Endangered and Vulnerable plant and animal species can be obtained from your nearest National Parks and Wildlife Service or equivalent. The National Parks and Wildlife Service list is call Schedule 12 for fauna, and Schedule 13 for flora.

ANIMALS - Schedule 12

ENDANGERED.

Amphibians:

Green and Golden Bell Frog

Birds:

Bustard, Australian

Fantail, Lord Howe

Finch, Black-throated

Star

Gallinule, White

Goshawk, Red

Grasswren, Thick-billed

Honeyeater, Regent

Malleefowl

Miner, Black-eared

Owl, Lord Howe Boobook

Parakeet, Lord Howe

Parrot, Double-eyed Fig

Paradise

Regent

Night

Pigeon, Lord Howe

Squatter

Flock Bronzewing

Plains-wanderer
Plover, Hooded
Pygmy-Goose, Cotton
Quail, Black-breasted Button
Silvereye, Robust
Starling, Lord Howe
Tern, Little
Thick-knee, Beach
 Bush
Thrush, Vinous-tinted
Warbler, Lord Howe
Whistler, Red-lored
Woodhen

Mammals:

Bandicoot, Golden
 Pig-footed
 Southern Brown
 Western Barred
Bettong, Brush-tailed
 Burrowing
 Tasmanian
Bilby
Kultarr
Mouse, Bolam's
 Desert
 Dusky Hopping
 Fawn Hopping
 Gould's
 Hastings River
 Long-tailed Hopping
 Mitchell's Hopping
 Silky
 Smoky
Mulgara
Numbat
Phascogale, Red-tailed
Potoroo, Long-footed
Quoll, Eastern
 Western
Rat, Greater Stick-nest
 Lesser Stick-nest
 Plain's
 White-footed Rabbit
Wallaby, Black-striped
 Bridled Nailtail

Crescent Nailtail
Eastern Hare
Yellow-footed Rock
Wombat, Northern Hairy-nosed

Reptiles:

Snake, Broad-headed
Fierce

VULNERABLE:

Amphibians:

Toadlet, Sphagnum
 Loveridge's
Frog, Corroboree
 Giant Barred
 Giant Burrowing
 Green Thighed
 Pouched

Birds:

Albatross, Wandering
Babbler, Hall's
Bittern, Australian
 Black
Booby, Masked
Bristlebird, eastern
Brolga
Buzzard, Black-breasted
Calamanthus
Cockatoo, Glossy Black
 Pink
 Red-tailed Black
Currawong, Lord Howe Pied
Dove, Rose-crowned Fruit
 Superb Fruit
 Wompoo Fruit
Duck, Blue-billed
 Freckled
Falcon, Grey
Frogmouth, Marbled
Godwit, Black-tailed
Goose, Magpie
Grasswren, Grey
 Striated

Hen, Bush
Honeyeater, Mangrove
 Painted
 Pied
 Purple-gaped
Hylacola, Shy
Jacana, Comb-crested
Kingfisher, Collared
Kite, Square-tailed
Knot, Great
Lorikeet, Purple-crowned
Lyrebird, Albert's
Monarch, White-eared
Osprey
Owl, Eastern Grass
 Masked
 Powerful
 Sooty
Oystercatcher, Pied
 Sooty
Parrot, Ground
 Scarlet-chested
 Superb
 Swift
 Turquoise
Petrel, Black-winged
 Gould's
 Kermadec
 Providence
 White-bellied Storm
Plover, Mongolian
 Large Sand
Redthroat
Robin, Pink
 Southern Scrub
Sanderling
Sandpiper, Broad-billed
 Terek
Scrub-bird, Rufous
Shearwater, Fleshy-footed
 Little
Shrike, Yellow-eyed Cuckoo
Silvereye, Lord Howe
Snip, Painted
Stork, Black-necked
Tern, Sooty

White
Ternlet, Grey
Thrush, Chestnut Quail
Tropic-bird, Red -tailed
Whistler, Gilbert's
 Lord Howe Golden
 Olive
Wren, Rufous-crowned Emu

Mammals:

Glider, Yellow-bellied
Bat, Beccari's Mastiff
 Common Bent-wing
 Eastern Little Mastiff
 Golden-tipped
 Greater Broad-nosed
 Greater Long-eared
 Hoary
 Large-footed Mouse-eared
 Large Pied
 Little Bent-wing
 Little Pied
 Queensland Blossom
 Queensland Long-eared
 Queensland Tube-nosed
 Yellow-bellied Sheathtail
Bettong, Rufous
Dunnart, Stripe-faced
 White-footed
Flying-fox, Black
Glider, Squirrel
Koala
Mouse, Eastern Chestnut
 Forrest's
 Pilliga
 Sandy Inland
Pademelon, Red-legged
Phascogale, Brush-tailed
Pipistrelle, Great
Planigale, common
Possum, Mountain Pygmy
Potoroo, Long-nosed
Quoll, Tiger
Rat, Broad-toothed
 Long-haired
Wallaby, Brush-tailed Rock

Parma

Reptiles:

Lizard, Centralian Blue-tongued

Mallee Worm

Western Blue-tongued

Python, Stimson's

Snake, Collared Whip

Narrow-banded

Pale-headed

Stephen's Banded

White Crowned

Turtle, Green

Leathery

Loggerhead

Woma

Marine Mammals:

Dolphin, Bottlenose

Common

Fraser's

Humpbacked

Long-snouted Spinner

Risso's

Rough-toothed

Spotted

Striped

Dugong

Sea Lion, Australian

Seal, Australian Fur

Crabeater

Leopard

New Zealand Fur

Southern Elephant

Whale, Andrew's Beaked

Blainville's Beaked

Blue

Bryde's

Dwarf Sperm

False Killer

Fin

Gray's Beaked

Humpback

Killer

Mellon-headed

Minke

Pygmy Killer

Pygmy Right

Pygmy Sperm

Sei

Short-finned Pilot

Southern Bottle-nosed

Southern Right

Sperm

Strap-toothed Beaked

PLANTS - Schedule 13

Seed Plants:

Boronia

Bush, Christmas

Crinkle

Christmas Bells

Crowea

Flannel Flower

Geebung, Pine-leaved

Grevillea, Caley's

Fern-leaved

Lily, Giant

Oak, River

Orchid, all natives

Palm, Bangalow

Cabbage Tree

Pandanus

Restio

Sedge, Curly

Sprengelia

Sturt's Desert Pea

Waratah

Wax Plant

Woody Pear

Fern and Fern Allies:

Fern, Bird's Nest

Hare's Foot

Maiden Hair

Tree

Horn, Elk

Stag

Moss, Mountain

Sphagnum

NATURE

Hand-out sheet 8.

Endangered and Vulnerable Species

WHAT CAN YOU DO?

Learn more about endangered species.

Buy environmentally friendly products.

Help reduce the demand on our native resources.

Recycle: bottles, cans, metal, paper and oil.

Use less chemical herbicides and insecticides.

Dispose of old chemicals properly.

Plant native trees and shrubs in your garden.

Attach a collar and bell to your cat.

Depose of unwanted pets correctly. Do not dump animals, do not release birds, do not flush fish. Give them another home with a friend or contact your vet or

RSPCA for advice.

Watch for animals and birds on the road.

If you are an angler, dispose of unwanted nets and lines properly.

Leave bush rocks in the bush

Do not interfere with bird nests.

Help to save endangered species by not buying souvenirs made from them.

If you have property, fence off bush areas.

Leave dead trees standing. Many birds and animals live in them.

Join an environment recovery team.

(Used with Permission, National Parks and Wildlife Service, NSW Australia)

NATURE

Hand-out sheet 9.

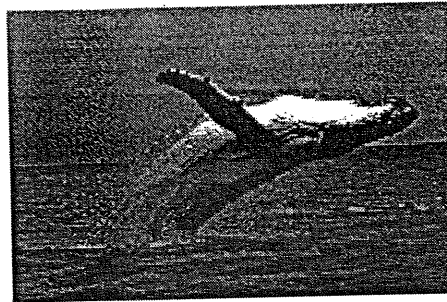
Endangered and Vulnerable Species

S.O.S.

(Save Our Souls)



Brush-Tailed
Rock-Wallaby



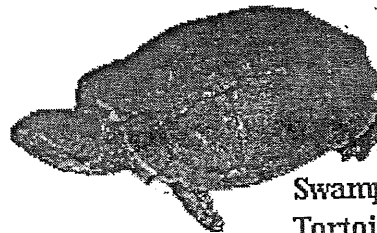
Humpback Whale



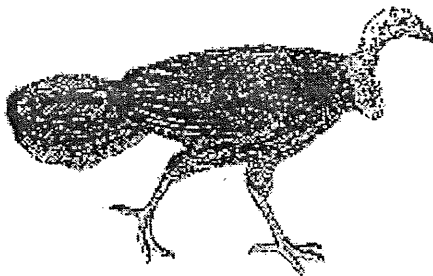
Waratah



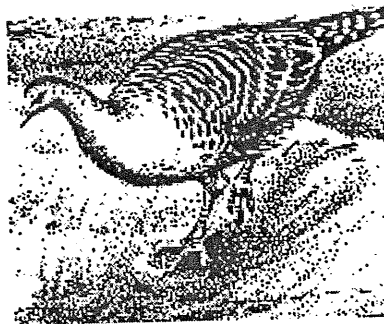
Platypus



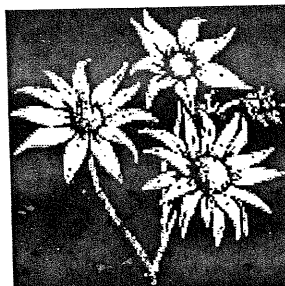
Swamp
Tortoise



Brush Turkey



Malleefowl



Flannel Flower

Activity 10

Participate in an activity and/or view an audio visual on creation. Discuss the arguments for evolution verses Biblical creation, and how life began.

Outline

Be creative with this activity. Try and have the Pathfinders create their own audio/visual using their own props to support creation in the creation/evolution debate. Set up debating teams to debate the topic

Resource Material

SOURCES of INFORMATION

Adventist Book Centre

Koorong Book Shops

Christian Book Shops

Creation Science Foundation (Australia) PO Box 6302, Acacia Ridge Qld 4110
(New Zealand) 215 Bleakhouse Rd, Horwick, Auckland

Publications:

Origin by Design, Harold Coffin

*The Lie: Evolution, Ken Ham

*Stones and Bones, Carl Wieland

*CREATION ex nihilo

Scientific, suitable for mature aged reader, ABC
Easy to understand. Very worth having in library
Easy to understand. Worth having in library
Quarterly magazine of Creation Science
Foundation. Children find the articles clear and
easy to understand. Highly recommended

* from Creation Science Foundation. Some titles may be found
at ABC

Evidences

Video available from Koorong Book Shop. Clear
and convincing.

Observations:

1. The fossil record shows organisms (both plant and animal) ranging from simple in the oldest rock layers to complex in the younger rock layers.
2. Species change with time due to the process of Natural Selection. (Within a group of organisms there is a range of ability to withstand such things as disease, environmental changes stored within the genes. Should disease, pesticide or severe weather changes (to name a few factors), affect the group of organisms, most will die except for those which have the genetic ability to withstand the disaster. These survivors reproduce and among their offspring a greater number of individuals can withstand the disaster should it happen again. This is what is meant by the process of natural selection.)

3. Comparative Morphology, eg The bone structure of the limbs of vertebrates is very similar, usually having 5 digits. Vertebrates have 7 bones in the neck.
4. Embryology. The embryos of vertebrates pass through similar developmental stages, having throat gill slits at some stage in the development.
5. Rocks and organic materials such as coal have different amounts of radioactive elements present in them.

Interpretations:

In terms of Evolution

1. There was a gradual changing of organisms from simple one celled organisms, through simple plant and animal forms to the complex present day forms.

Difficulties: a. One form changes abruptly into the next form without any intermediate forms. Some intermediate forms are quoted, archaopteryx being the most well-known one - transition from between reptile and bird. To overcome this many and varied theories are being developed. (eg **Explosive evolution** - major kinds of animals developed quickly and maintained their morphological integrity from the Cambrian to the present time; **Punctuated equilibria** - evolutionary changes occur quickly until stability is reached. The organism then continues for long periods of time with no or little evolution)

b. The existence of "fossil" organisms in our present day, eg Coelacanth fish, some forms and species of Foraminifera (one-celled sea organisms), tadpole shrimp *Triops*. There is a gap between when these animals are found in the fossil records and the present day.

2. If an organism can change by natural selection within its kind, eg all the types of domestic dogs, cats, cattle, budgies, then natural selection should bring about changes of organisms from one form to another. (eg fish into amphibians)

Difficulty: No living transition forms have been found.

3. Similar body structure is evidence of development from a common ancestor.

Difficulties: Examples such as 7 bones in the neck of vertebrates are widely cited while examples that do not fit -eg, the number of bones in the tail of vertebrates - are ignored.

4. If embryos go through the same stages as they develop, this indicates a common ancestry.

Difficulties: Ernest Haeckel who provided the evidence for this was found to have stylised both his descriptions and diagrams to fit this theory. It is rejected by evolutionists but persists in high school textbooks.

5. From a radioisotope-calibrated time scale the age of the Earth is of the order of 4 billion years, possibly sufficient time for biological evolution to occur.

Assumptions: In developing the radioisotope-calibrated time scale only data fitting long geological time periods is used. Radioactive 'clocks' are set to zero when rock is formed, some containing fossils.

Difficulties: Are the assumptions valid? Two radioisotopes used are Uranium 235 and Potassium 40. Uranium 235 atoms decay through a series of steps to Lead 205. Potassium 40 atoms decay to argon 40. The rate at which this happens can be estimated assuming no outside interference. Exposure to water or high temperature will change this rate as will the difference in solubility, volatility and diffusability of intermediate elements. The assumptions are probably engineered to produce the desired outcomes.

In Terms of Creation

1. A wide scaled flood could produce the sequence of fossils. As the flood waters rose, the least mobile creatures would be buried first and the most mobile last. Preliminary experiments by Coffin showed that the floating dead bodies of plants and animals sink in the order shown by the fossil records.
2. We can accept that organisms can change to form different species by natural selection. This is called microevolution. An all wise God would have given creatures a diversity of genetic characteristics so they can survive in this world with its changing environment. In the beginning God told everything to be fruitful and multiply and fill the Earth, everything after its kind. That is why there is no intermediate species.
3. & 4. God has chosen a similar design for limbs or organs that have a similar function in different creatures.
5. God may have made rocks with an apparently ancient age. However, the criteria chosen to set up radioisotopic-calibrated time scales may be wrong and the Earth really may be relatively young - 6 to 10 thousands years old.

THE BOTTOM LINE.

1. The source of life of *LIFE* is something evolutionists cannot explain. Amino acids can spontaneously be produced in discharge tubes and some randomly combine to produce simple proteins. However, they do not have any life and cannot replicate themselves.
2. Evolution theory seeks to destroy the foundation of Christianity. It is a master plan of the devil himself. It is designed to leave God out of our lives.

If life by chance spontaneously appeared on Earth, we don't need an all powerful God to create anything.

If humans evolved from lower forms of life then there is no sin. According to the law of the survival of the fittest, if I wanted something of yours and have to kill you to get it because I am stronger, quicker or smarter than you, that is ok.

If there is no sin, there is no need for the plan of salvation. Jesus' death on the cross is pointless! (The book *The Lie: Evolution* by Ken Ham explains this point very well. Recommended reading.)

Activity 11

Participate in an expedition into a wilderness area and keep a log, to study the flora and fauna with respect to the terrain. After the expedition and when the log books are completed, participate in a discussion with the group on your observations.

Outline

This activity is to be completed on camp out.

Resource Material

Keeping a Log

There seems to be no set format for keeping a log. A log can be any of the following:

- *series of photographs recording events of a field trip.
- *a diary

The diary may just record events occurring on the field trip or include description of preparations for the trip - what equipment to take, necessary food and water, the course to be followed, and at the end of the trip, how they would do it differently another time.

There is one important principle to keeping a log - 'RECORD IT NOW!' while it is fresh in the mind. 'Now' can mean straight after the event, at a rest break along the way or at the end of the day. It does not mean a week later. Studies have shown that after 1 week 80% of what has been learned is forgotten.

Flora and Fauna Exploration

When planning the explorations, seasonal conditions need to be considered. ie A study of the flora and fauna on Hawkesbury sandstone around Sydney reveals few flowering plants, many invertebrates (beetles, grasshoppers and spiders) and active reptiles in the hot conditions of February/March while there are lots of wildflowers, few invertebrates and reptiles in the cold conditions of July/August.

Expedition

To compare flora and fauna with respect to terrain, select an area with clear contrasts. For example, in Australia the Warrumbungles are an outcrop of ridges on an otherwise flat plane. Its vegetation and fauna are quite different to that of the surrounding planes.

Other terrains with contrasts include: gullies and ridge tops, alpine regions above and below the snow line, river banks and tidal estuaries.

To Perform the Flora and Fauna Study

1. Pace out a square 10 paces X 10 paces.
2. Record the different types of plants present.
3. Identify the most abundant type of plant present.
4. Record any rare or endangered species present.
5. Record the heights of obvious levels within the vegetation.(canopy, understoreys)
6. Record what animals are present. Look for signs - burrows, footprints, droppings, digging, claw marks on trees, nests etc.
(In Australia - 'Mammal Tracks and Signs' Barbara Triggs, Oxford Press)
7. Sort through the litter, sweep a net through the grass or leaves on shrubs/trees, look under bark and record the many invertebrates found there. Names like ant, beetle, caterpillar, leaf hopper, moth, spider are sufficient.

