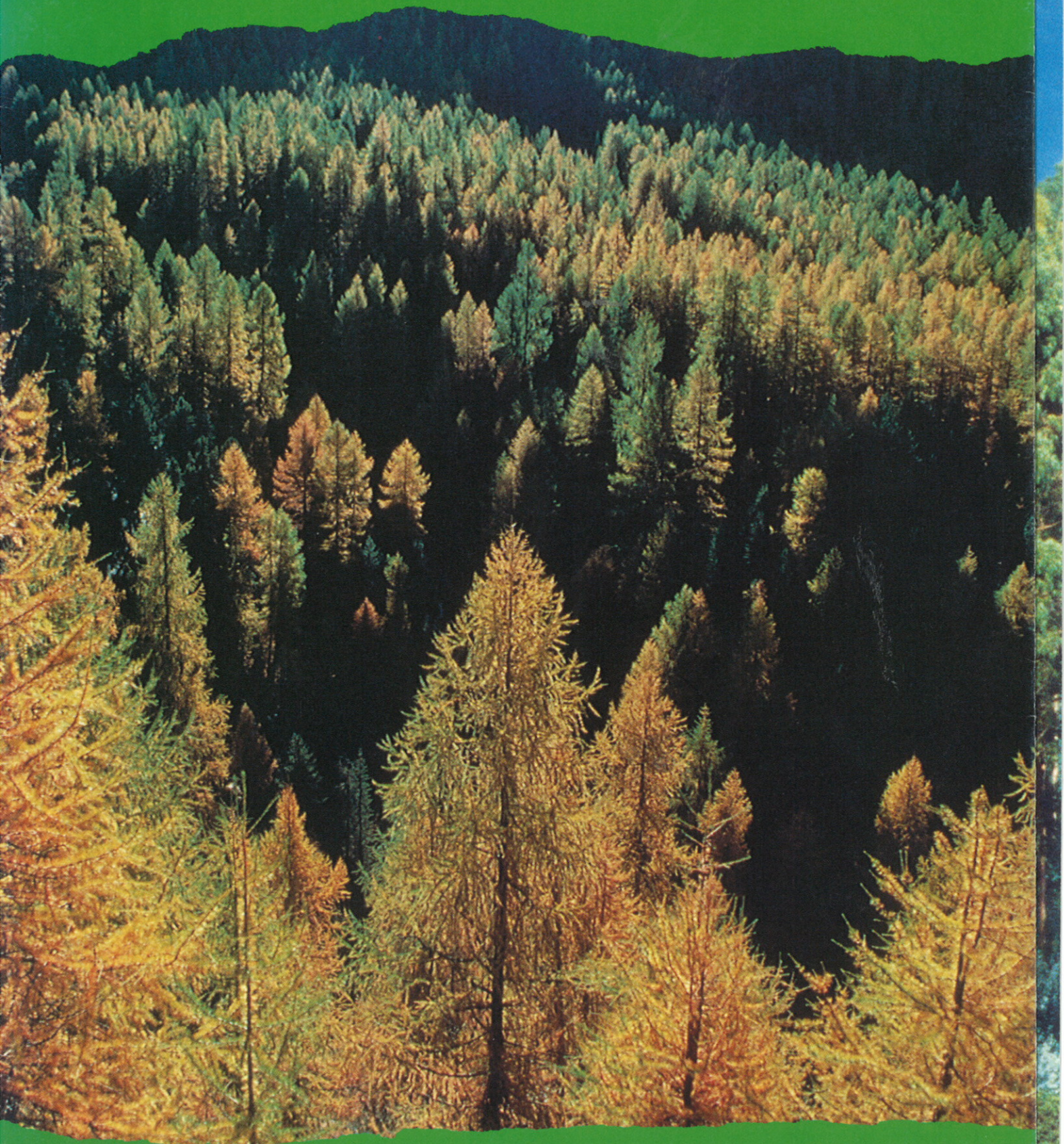


FORESTS

SENIOR TOPICS



ASHTON

 SCHOLASTIC

Registered by Australia Post. Publication No NBP 7940
May be opened for postal inspection—March 1992

AIMS

For students to:

- ✿ appreciate the uses and value of forests
- ✿ understand the delicate nature of the forest environment
- ✿ recognise and understand the impact of humans on forests
- ✿ recognise that forests are essential to life on Earth.

OBJECTIVES

Students will:

- ✿ investigate different types of forest, their structures and life forms
- ✿ investigate the practical, creative and recreational uses of forests and forest products, both in the past and present
- ✿ experience and appreciate the beauty of forests
- ✿ record their findings, attitudes and feelings in a variety of ways.

SKILLS DEVELOPMENT

- ✿ Observation.
- ✿ Information management.
- ✿ Oral and written language.
- ✿ Decision making and problem solving.
- ✿ Estimating, measuring, calculating, graphing.

GENERAL PREPARATION

Obtain:

- ✿ library resources—books, magazines, pictures, kits, atlases, literature, encyclopaedias, newspapers, videos
- ✿ pertinent contacts
- ✿ writing and art and craft materials
- ✿ large sheets of paper for word banks and murals.
- ✿ notebook and specimen collecting materials
- ✿ gardening tools.

EXCURSION PREPARATION

Prepare for the excursion by:

- ✿ organising place, date, transport, permission note and worksheets
- ✿ directing students to wear loose comfortable clothing, sturdy shoes, hat and insect repellent
- ✿ discussing and setting guidelines and rules for the protection of forest life. Only walk and work beside marked trails and note any signs or restrictions.



- ✿ deciding when worksheets and data or specimen gathering sheets are due
- ✿ deciding upon and gathering equipment to be taken. A kit for each student might include: notebook, clipboard and paper, pencils, crayons, tape measure and paintbrush for picking up tiny animals (Other useful items are: specimen collecting materials such as clip-lock plastic bags in various sizes, plastic containers with lids, self-adhesive labels, nets, scoops, sieves, funnels, tweezers, cottonwool, tissues, protective gloves and large sheets of paper.)
- ✿ collecting recording equipment such as a camera, light meter, video camera, tape-recorder, spare batteries and thermometers
- ✿ collecting observation materials such as a torch, magnifying glasses, binoculars and sighting devices
- ✿ acquiring a first aid kit which includes salt for removing leeches if the class is visiting a rainforest.

BACKGROUND

How is a forest structured?

A forest may be divided horizontally into layers or strata, each supporting varying animal and plant forms. The three major strata are:

- ✿ the canopy
- ✿ the shrub layer
- ✿ the forest floor.

How do forests differ?

Forests may be classified in the following ways:

- ✿ by the characteristics of their leaves, eg needleleafed or broadleafed forests
- ✿ by their timber, eg hardwood or softwood forests
- ✿ by the prevailing climatic and soil conditions, eg tropical rainforests, tropical seasonal forests, temperate deciduous forests, temperate evergreen forests, arboreal forests, savannas.

How important are forests?

Forests are very important to life on Earth. Over the centuries they have provided food, shelter and a wide variety of products to people all over the world. Forests have value:

- ✿ for the survival of indigenous peoples, eg Amazonian Indians, Dyaks
- ✿ economically, eg food, timber, paper, drugs, rubber, oils, gums, resins, chemicals
- ✿ environmentally, eg effect on oxygen supply, ozone layer, climate, rainfall; greenhouse effect
- ✿ recreationally, eg picnic and camping grounds, for bushwalking, birdwatching
- ✿ as part of the beauty of nature.

Are some forests more at risk than others?

It is now recognised that not all forests are renewable. Some forests, such as pine, may be replanted, but rainforests cannot. The plant life which takes over the cleared areas is of a different type altogether.

Rainforests:

- ✿ have evolved over thousands of years
- ✿ support living things that have adapted to, and can only live in, that particular environment.

The destruction of rainforests may:

- ✿ disrupt the ecological balance in an area
- ✿ lead to extinction of flora and fauna.

What endangers forests?

Forests have been under threat for at least 10 000 years, ever since humans began clearing them for cultivation and settlement. In recent decades we

have become aware of other factors which also endanger forest ecosystems. These include:

- ✿ logging
- ✿ feral and introduced animals
- ✿ pests and disease
- ✿ uncontrolled burning
- ✿ industrial pollution
- ✿ mining
- ✿ building of dams and power stations.

How are forests managed?

In recent years people have become increasingly aware of the need to manage forest resources for the benefit of the Earth.

Management of forests is called forestry, and it is concerned with:

- ✿ maintenance of timber supply
- ✿ protection and management of forest fauna and flora
- ✿ watershed management
- ✿ provision of recreational areas.

What can we do to ensure the survival of forests?

As forests belong to all people, we can all play a part in ensuring their survival. We can:

- ✿ raise our own awareness, and that of others
- ✿ become educated, and educate others, by looking at all aspects of conservation
- ✿ shop selectively, conserve, recycle
- ✿ plant and care for trees
- ✿ express concern in positive ways, eg letters, posters.

Tree facts

- ✿ The oldest living tree, a bristlecone pine in the White Mountains of California, is thought to be over 4600 years of age.
- ✿ The tallest tree is a Californian redwood, at 112 m, the height of a 37-storey building.
- ✿ The widest tree is a bald cypress in Mexico, which is over 39 m wide.
- ✿ The tallest eucalypt is a mountain ash in Tasmania, which stands almost 100 m tall.
- ✿ A Huon pine in Tasmania is estimated to be 3800 years old.
- ✿ Eucalypts are the fastest-growing trees in the world, reaching 37.5 m in 25 years.
- ✿ A fully grown tree may use up to 100 L of water a day.
- ✿ The largest branched tree is found in India. A 550-year-old banyan, it has a circumference of approximately 300 m. Its canopy covers 13 ha, the size of six football fields.

AN INTRODUCTION TO FORESTS

- ✿ Share Jeannie Baker's *Where the forest meets the sea* or *Window. Where the forest meets the sea* is also available on video. Contrast the book and the film.
- ✿ Discuss:
 - the human, economic and ecological aspects of change to a particular area over a period of time.
 - conservation of natural resources versus the needs and wants of society. Are all developments appropriate?
 - ownership and responsibility for management. Who owns the natural environment? Who should decide its future, and in what way? Should individuals be involved in issues if they do not live in the immediate area? Why?
 - changes in individual, community and government attitudes. What affects attitudes and effects change? ☉ ♣

Record the responses for future reference.

Follow this by brainstorming students' existing knowledge on forests. On a large sheet of paper or by use of an overhead projector, note all ideas that students have, whether pertinent or not. Cluster like ideas together and categorise these under subject headings, eg fauna, flora, structure, forest management, value, use, dangers.

Compile word banks and display for easy reference and encourage students to add to the list during the unit to expand their knowledge of the subject.

A forest walk

If at all possible, plan a walk with the class through a forest. If this is impractical, adapt the following activities for the school playground or a local park. ☉

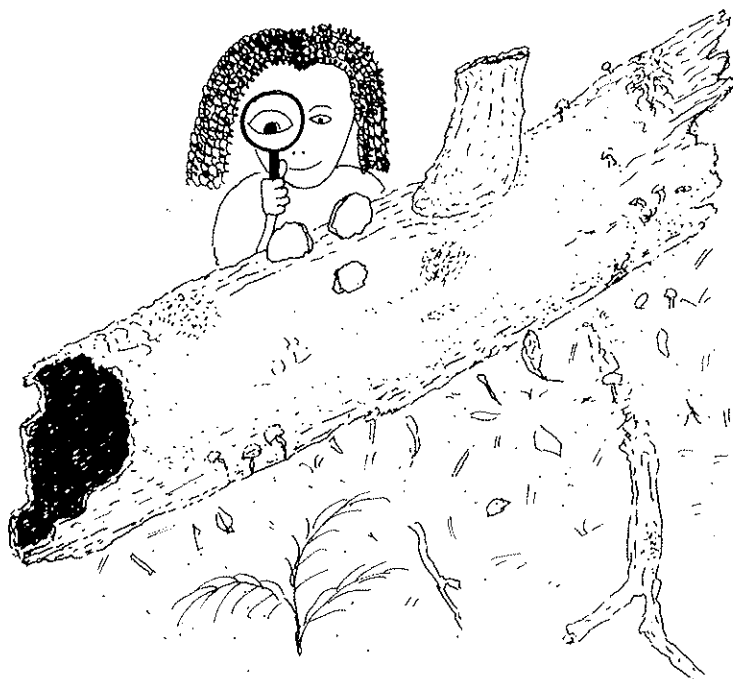
- ✿ Observe :
 - the height, spread, shade, span, girth, shape, trunk, arrangement and direction of branches
 - the size and arrangement, colour, appearance, texture and direction of leaves
 - the colour, texture and thickness of the bark
 - different types of tree and the variety within same genus, family or species
 - adaptation features, eg buttress roots,

spindly trunks, sweeping branches ☉ ♣
—and identify the forest strata
—note and record animal and plant species in each strata (see photocopiable pages i and ii). ♣

- ✿ Note forest sounds, smells, textures, shadow play.
- ✿ Conduct a leaf litter study:
 - scoop approximately one square metre of litter from the forest floor
 - sieve to separate the litter or, alternatively, spread it out over a large sheet of paper or plastic
 - distinguish between living and non-living things
 - study, identify and group creatures found
 - record by photographing, drawing or taking notes
 - return litter to original position
 - repeat the procedure in a different area and compare findings.

Account for differences, considering depth of litter, composition of litter, moisture content, temperature and light. ♣

- ✿ Make a study of a rotting log:
 - note any plant life or growth on the log, eg fungi, moss, lichen
 - observe, discuss and note findings.



- ✿ Examine human, animal and climatic impact: note broken or trodden twigs, branches and undergrowth, cut timber, cleared areas, fences, barbecue areas, bridges, kiosks, tracks (animal and human), nests, mounds, burrows, effects of fire, wind and water.
- ✿ Note any uses being made of the forest.
- ✿ Collect samples of flora which has fallen to the forest floor (provided this is not prohibited), to take back to school.
- ✿ Where is the coolest spot in the forest? Measure temperatures in various locations: under the tree canopy; close to the tree trunk and away from the trunk; in direct sunlight; in leaf litter; on a log and in a log; in a still-water pool and in a running stream; in dry sand or soil and in damp sand or soil; among ferns or ground level plants; on rocks in shade and light. Account for the differences. 🖐

Back at school

- ✿ Discuss the excursion.
- ✿ Share sightings, findings, specimens, thoughts and feelings. List as word banks and display. Encourage curiosity and questioning.
- ✿ Study specimens collected, using the naked eye, magnifying glasses or microscopes.
- ✿ Specimens could be labelled and displayed around the room, on nature tables and reference charts.
- ✿ Compare notes and make generalisations.
- ✿ Add new knowledge to word banks.
- ✿ Decide upon areas for further investigation. ☉ 🖐

Further investigation

- ✿ Map world distribution of forests. 🗺
- ✿ In groups, select a specific forest type and investigate structure and strata, species of fauna that inhabit the forest and the ways in which each is suited to its particular environment. Consider different species of flora and non-native species and their effects on the forest. Discuss the value and uses of the forest to humans both past and present. What uses do forest animals make of wood and wood products? What uses do humans make of wood and wood products? Discuss modern threats to forests. 🗺

- ✿ Compare and contrast indigenous peoples such as Aborigines, Dyaks, Amazonian Indians, and the ways in which they utilise forests, whether as nomadic hunters or as shifting cultivators. Study lifestyle, social structure, food and drink, clothing, shelter, tools, utensils and weapons. ☉ 🖐

MAKE A FOREST DISPLAY

Students could record and present findings of their investigations, using a variety of forms and methods. Discourage the use of photocopies and encourage originality.

Some suggestions: labelled diagrams, tables and graphs, posters, murals (particularly suitable for forest strata), articles for newspapers, magazines, journals, board and card games, quizzes, crosswords and wordfinds. For the technically skilled, computer, audio or video presentations may be appropriate. Encourage them to research and discuss the appropriate register and genre for their displays. ☉ 🖐

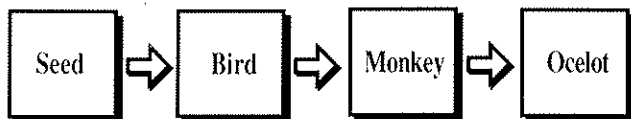
Related activities

- ✿ Encourage reading on and around the topic in a variety of forms and genre. Have students write in different registers for different audiences.
- ✿ Students might discuss, debate, role play or interview specialists regarding controversial issues (for instance, the Forest Industries Association commercials on television—write away for the information and discuss). Many issues will arise during the course of the unit. Assist students to clarify ideas and feelings and develop their own individual attitudes and values. Issues could include: the greenhouse effect, depletion of the ozone layer, advantages and disadvantages of recycling. ☉ 🖐
- ✿ Students might implement a recycling program in the school or perhaps organise a tree planting and beautification scheme. 🖐
- ✿ Involve students in further related scientific studies and experiments. Observe specimens, using magnifying glasses or microscopes; classify leaf specimens; study seeds, nuts and cones; observe and discuss wood; gauge levels of pollution; carry out plant growth experiments; construct food chains; experiment with paper making. 🖐

- ❁ Construct food chains beginning with a plant part. Construct food webs involving a number of life forms. Construct food pyramids. A food chain may be shown as a pyramid with the number of organisms decreasing as you move from the base to the apex. A second pyramid may show the chain following the death of an animal at the apex. 🖐

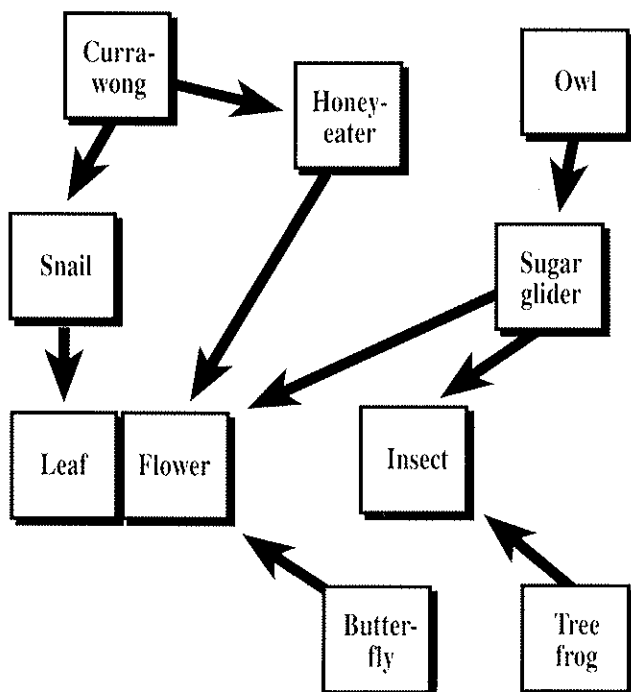
FOOD CHAIN

(South American rainforest)



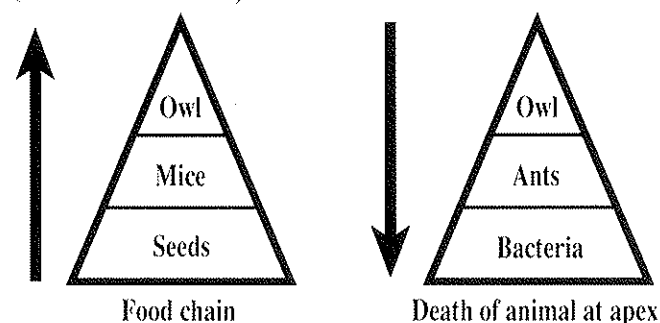
FOOD WEB

(Australian sclerophyll forest)



FOOD PYRAMID

(Arboreal forest)



- ❁ Study energy cycles and recycling within the forest. See photocopyable page iii. ☺ 🖐
- ❁ Many mathematical concepts could be linked to the study of forests, particularly to trees. Involve students in surveying the number and density of trees in a particular area. They might estimate the height of selected trees or measure their circumference. Encourage students to use a variety of graphs to record their findings.

FOREST ART

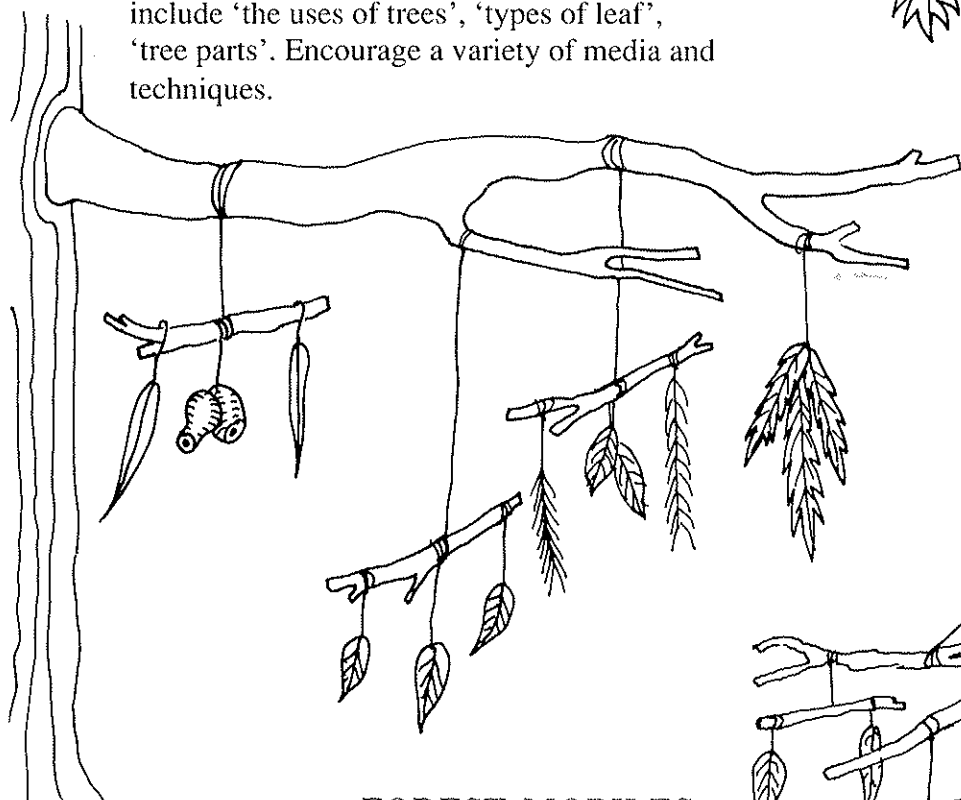
There are many creative and practical arts experiences that flow naturally from forest studies. ☺ 🖐

- ❁ Make prints, rubbings, and spatter shapes, using leaves of different shapes and sizes. For rubbings and prints be sure that students have the underside of the leaf facing the paper so that the veins are distinct. Good prints can be made, using soft crayon or ink. Better results are achieved by using modelling clay and plaster of Paris.
- ❁ Preserve leaves and flowers. Place specimens between sheets of blotting or other absorbent paper. Place these between layers of newspaper, inside magazines or telephone directories. Compress between heavy books. Use a flower press if available. The specimens are best left for several weeks until all moisture has been removed. Pressings can then be attached to card, covered with self-adhesive plastic or laminated for use as decorative bookmarks or greeting cards.
- ❁ Take bark rubbings. Use strong paper and the whole length of a large, dark wax crayon. Students may find it easier to work in pairs, with one partner holding the paper steady. It is also best to start on smooth-barked trees, progressing to rough, heavily textured ones as students master the technique. Compare.
- ❁ Make plaster casts of bark pieces.
- ❁ Create collages, using twigs, leaves, bark, fruits, nuts, cones and other forest litter. Spray finished pictures with a clear lacquer.
- ❁ Draw, from direct observation, trees of varying shapes, a leaf, a branch, a trunk, bark structures and patterns, growth rings, forest inhabitants. Use charcoal or crayons for best results. Colour and texture can be added later if desired.

- ✿ Sculpt trees from paper. Roll paper sheets into cylinders and paste. Cut down (about a third of the length) at intervals around the top, pull individual sheets out and curl, twist and bend to the desired shape.

- ✿ Design posters. Students decide on a topic, such as 'Save our trees', or 'Management means preservation'. Emphasise the need for planning. Striking headlines, bold design and colour, effective use of space, minimal detail will have the most impact.

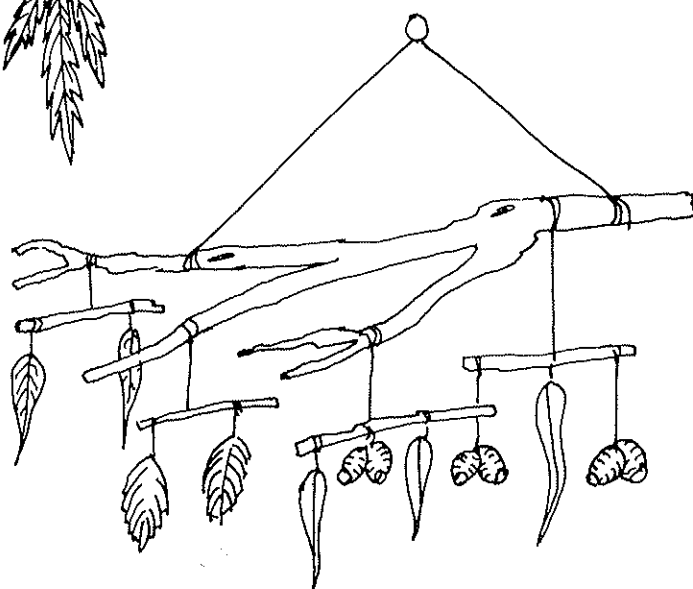
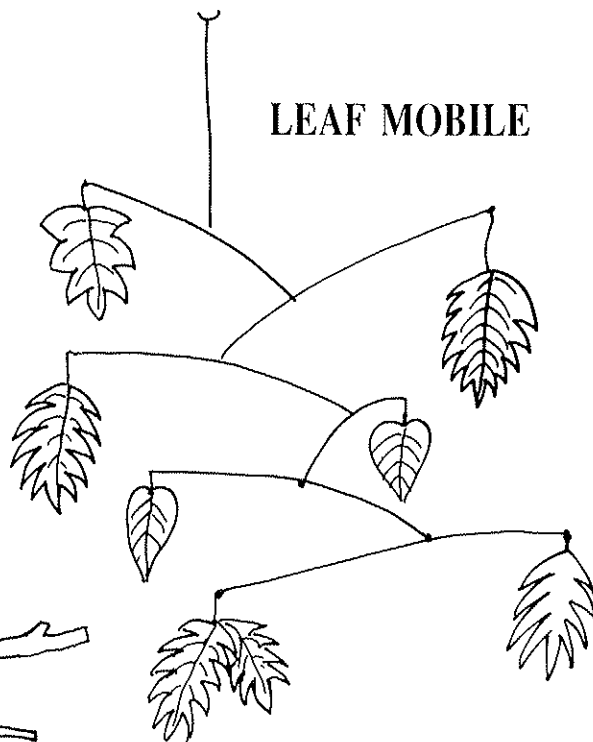
- ✿ Produce displays. Examples of themes might include 'the uses of trees', 'types of leaf', 'tree parts'. Encourage a variety of media and techniques.



FOREST MOBILES

- ✿ Experiment with plant dyes. Leaves, stems, roots, bark, berries, seeds, flowers or lichens might be used separately or combined to produce colour. Dried materials and barks should be soaked for several days before dyeing. Long, slow simmering usually produces richer colours. Colours are paler when plants are collected following periods of rain. Place individual species of plant material in a stocking and boil for twenty minutes. Add material to be dyed and steep, drain and dry. Use the material in other art and craft works.

LEAF MOBILE



- ✿ Print with wood off-cuts.
- ✿ Create jewellery and freestanding figures from seeds, nuts, dried berries, flowers, grasses, vines and twigs.
- ✿ Make simple toys from wood off-cuts.
- ✿ Paint, using twigs and pine needles instead of brushes.
- ✿ Paint on bark. Use examples of Aboriginal bark painting for discussion and inspiration.
- ✿ Create musical instruments, using wood, nuts, fruits and cones.
- ✿ Blow gum leaves. Hold two leaves together, keep lips loose and blow softly on edges for the best results.

FOREST FIND

Explorer's name: _____

Date: _____

SPECIMEN

INSECT

☐

SPIDER

☐

WORM

☐

CRUSTACEAN

☐

FISH

☐

REPTILE

☐

BIRD

☐

MAMMAL

☐

OTHER: _____

LOCATION

CANOPY

☐

MID STOREY

☐

F. FLOOR

☐

LITTER

☐

OTHER _____

DESCRIPTION

Number of body parts: _____

Colour: _____

Number of legs _____

Shape: _____

Wings:

☐ Yes☐ No

Number _____

Size: approx. _____ cm

Tail:

☐ Yes☐ No

Long

Short

_____ 1 cm

PICTURE

COMMENTS

FOREST FIND

Explorer's name: _____

Date: _____

SPECIMEN

BARK	<input type="checkbox"/>	FERN	<input type="checkbox"/>	FLOWER	<input type="checkbox"/>	FUNGUS	<input type="checkbox"/>
GRASS	<input type="checkbox"/>	HERB	<input type="checkbox"/>	LEAF	<input type="checkbox"/>	MOSS	<input type="checkbox"/>
NUT	<input type="checkbox"/>	TWIG	<input type="checkbox"/>	VINE	<input type="checkbox"/>	OTHER:	_____

LOCATION

CANOPY	<input type="checkbox"/>	MID STOREY	<input type="checkbox"/>	F. FLOOR	<input type="checkbox"/>	LITTER	<input type="checkbox"/>
ON LOG	<input type="checkbox"/>	IN LOG	<input type="checkbox"/>	UNDER LOG	<input type="checkbox"/>		
OTHER	_____						


DESCRIPTION

Colour: _____ 1 cm

Shape: _____ Size: approx. _____ cm

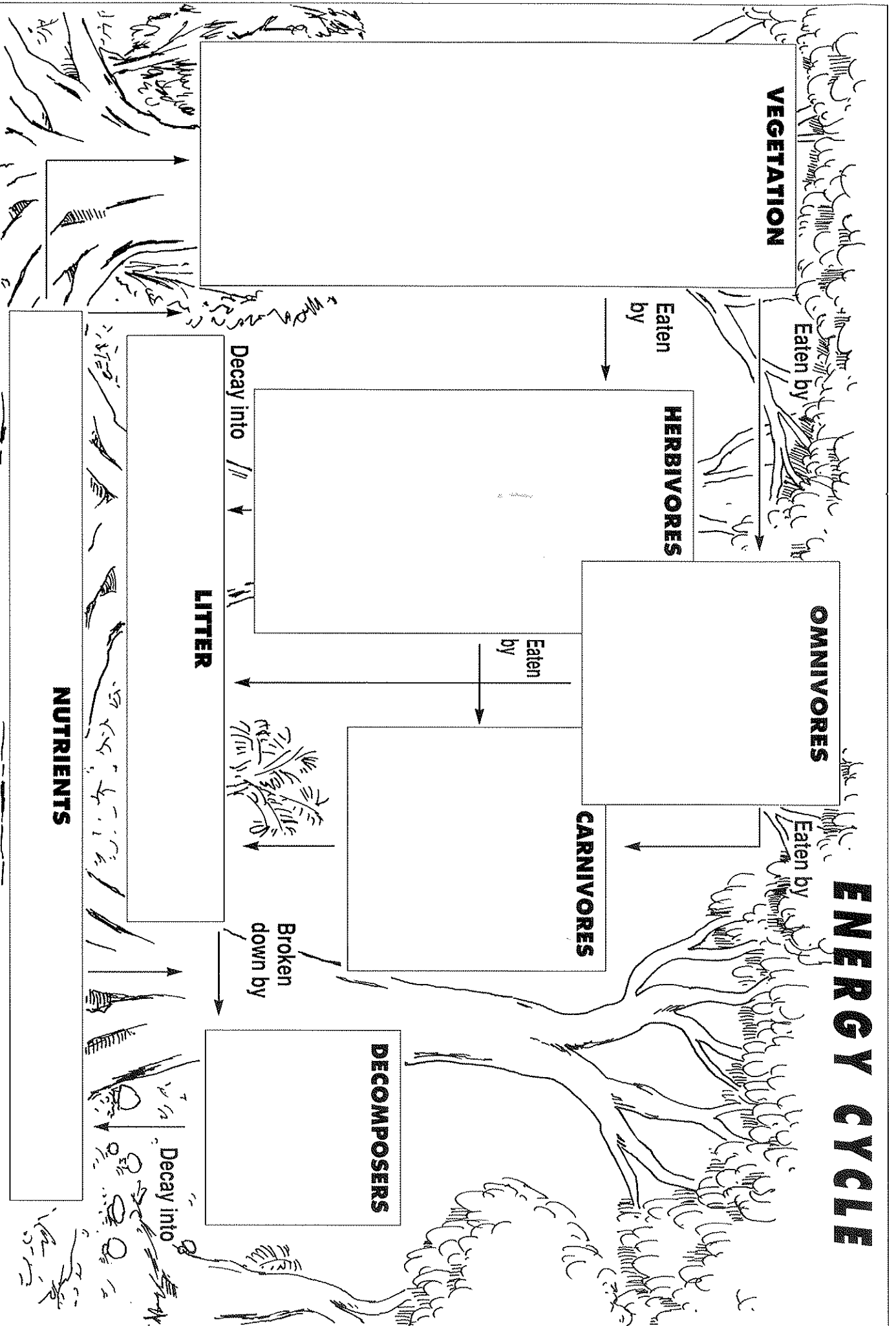
Circle: rough smooth waxy spiny moist dry narrow wide
thick thin flaky solid hollow Other _____
edging: serrated straight Other _____

PICTURE



COMMENTS

ENERGY CYCLE



TREE PRODUCTS

TRUNKS

burning
—charcoal
—fuel
—methylated spirit
—wood tar
pulp
—acetates
—Cellophane
—explosives
—lacquer
—paper, cardboard
—photographic film
—plastics
—Rayon
—triacetate

FRUIT AND BERRIES

alcohol
food
fragrant oils
shells
—containers
—smoking pipes
strychnine
wax

SEEDS

candles
cattle, horse feed
cocoa
coffee
cosmetics
medicines
oils
—soap
—machinery
—margarine
ornaments

BRANCHES

antiseptic
baskets
Celluloid
matches
motion picture film
spice

ROOTS

sarsaparilla

ROOT BARK

medicines
oil to perfume soap
tea

FIBRES

cord
mats

FLOWERS

flavourings
perfumes
spices

SAP

dyes
fuel for vehicles
gum
—candies
—chewing gum
gum arabic
resins
—antiseptic
—balsam
—medicines
—optical instruments
—rosin
—turpentine
—throat lozenges

STEMS

rattan

BARK

adhesives
chewing gum
cork
—ball centres
—corks
—dartboards
—floats for fishing
—gaskets
—linoleum
—noticeboards
—shoe soles
—tiles

dyes
medicines
oil for insect repellent
spices
tannin

NUTS

dyes
food
margarine oils
medicines
soft drink flavourings

