

## **Notes from Prof Tina Bruce to support and encourage children, families, practitioners and carers to engage with nature and understand the natural world**

These notes cannot possibly describe all the wonders of nature. They are offered as a way of helping practitioners, parents, grandparents and carers to support children in appreciating and understanding how humans and nature are interconnected and interdependent.

### **Respecting and valuing nature and helping it to thrive.**

Take litter home from parks, beaches woodlands etc.

Leave plants and flowers to grow in wild places.

Leave wild places as you find them so that nature is not disturbed.

### **Biodiversity, ecosystems and habitats**

**Biodiversity** - the huge variety of Life on our planet (plants, bacteria, animals Including humans).

**Ecosystems** -the variety of different habitats and creature in one region.

**Habitat**- the natural environment in which an animal or plant usually lives.

Biodiversity, ecosystems and habitats depend on:

Sun, light, warmth/cold, earth, water, rain, clean air -- and weather is part of this.

### **Weather**

Biodiversity, ecosystems and habitats are influenced by the weather. In the UK there are seasons which bring changes in the weather.

**Winter** – colder (maybe snow and ice and frost). Some animals hibernate or find warm, secure places to hide. Trees and plants rest before the spring growth. The shortest day is 21<sup>st</sup> December.

**Spring** – seeds begin to grow (bulbs – snowdrop, crocus, daffodils), buds on trees ready to open as leaves, catkins on some trees.

**Summer** – flowers bloom, leaves on deciduous trees, warmer weather. 21<sup>st</sup> June the longest day.

**Autumn** – fruits (apples, plums) on trees, berries on bushes (blackberries), nuts (hazel), acorns on oaks, and conkers on horse chestnut trees. Some animals gather these to eat during colder winter weather (squirrels).

### **Clouds**

Cumulus clouds are white and fluffy.

Cirrus clouds look like horse tails.

Nimbostratus clouds are dark.

Fish belly sky means rain is nigh!

## Different Habitats

Different plants are needed in different habitats so that different wild creatures (bugs, animals, fish,) can live and this helps the environment in different and important ways.

**Land** - Balconies, gardens, allotments, streets with trees or flowers, parks, woodlands. Forests, moors, heathlands, peatlands, meadows, fields, hedges, trees, hills, mountains, grasslands, deserts, church yards, stately homes gardens, museum gardens.

**Land and water** – wetlands, flood plains, osiers, seashore, tidal rivers, polar regions.

**Water (aquatic)** - puddles, ponds, lakes, streams, rivers, creeks, estuaries sea (salty).

## Earth

Different creatures live in different soils and rocks, e.g.:

Clay, sand, stony, chalky, rocks, peat. The earth has minerals. These are inorganic (not made from dead things). And crystals (quartz, grains of sand, ice, diamonds, gold, salt)

Different plants grow in different soils or on rocks.

**Seeds** need oxygen, warmth, water, light, and gravity:

Radicles grow down into the soil to be roots.

Plumules grow up to be shoots.

**Soil needs mixing** – Earthworms mix minerals in the soil and help plants to grow. They burrow and aerate the soil. Soil needs oxygen.

**Rocks** are a mixture of minerals tight together like jigsaw pieces. They can be hard and brittle (granite) or crumble when rubbed (shale).

**Fossils** are relics of something that lived thousands/millions of years ago and have turned to rock (ammonites) or impressions in rock of footprints.

Stoney and rocky places provide shelter and warmth and nesting places for animals and for insects and other bugs.

**GRASSY AND MEADOW HABITATS** -- if the grass is long enough and not cut too short, this encourages clover, thistles, wildflowers, which attract insects, butterflies (daytime), moths (mostly night ) beetles, bees.

## WATERY HABITATS

Puddles, streams, rivers, ponds and lakes are *freshwater habitats*.

*Sea shore habitats* are salty (creeks and river estuaries can be).

*Wetlands* change with tides or with flooding.

## SEASHORE HABITATS

**Seaweed** arranges itself on a beach (zonation). Seaweeds are non- flowering plants and they are (the biggest) algae.

Near the low water mark – red seaweeds

Further up the shore – brown seaweeds which can last longer in the air without being in the water

Further still up the shore – green seaweeds

Some are long and thin, jagged edges, have bobbles called air bladder

**Animals** on the beach are also in zones.

*Crabs* (crustaceans because they are covered in tough hard skin and have soft leg joints)

*Sandhoppers* near the shore

*Anemones* in rock pools,

*Limpets* cling to rocks

**Shells to find:** whelks, winkles, razor, scallop, mussel, oyster, starfish, sea urchin, cowrie

Other creatures are jelly fish, sponges

**Keeping a balance of plants and life in a habitat** (in a tree, woodland, hedge)

Carnivores (owls, hawks, foxes) are predators who eat meat. They eat herbivores who are plant eaters (rabbits, voles, mice, caterpillars).

Birds, moles and hedgehogs eat insects and perhaps slugs, snails, worms, caterpillars, aphids, ants, spiders.

Insects eat leaves, roots, stems, flower nectar. Bees pollinate as they collect nectar, sucking it up with their proboscis.

Beavers help in rivers that flood by making dams.

Rushes grow in osier areas and are cut to use for baskets etc and to support bird and fish life.

## Plants

Every habitat needs plants to support living creatures.

Plants bring:

Clean air

water management (floods prevented)

stop soil erosion (landslides)

Give life to plant eaters (who give are food for meat eaters (carnivores)).

**Examples of plants:**

### Trees

Trees live longer than any other living part of the planet (some are more than 1000 years old – known as ancient trees. If they are known to be very old as it is known when they were planted, e.g. 700 years, they are known as venerable trees.).

Trees have:

**Tap roots and side roots** in the earth.

**Trunks** made of wood -- inner layer of bark which grows each year and outer layer which splits and cracks as the inner bark grows (one ring each year).

**Branches and twigs** grow on these. Circular scars on twigs show the age. One for each year.

Squirrels, owls, rooks and many birds sleep in trees, look out from trees, build nest in trees.

Rotten wood is vital for bugs (stag beetles, larvae, and small animals to either eat or hide in and keep warm. Woodpeckers chip our hole from rotting wood in tree trunks, and this falls to the ground (haws) where mice, insects and other bugs hide.

**Leaves** – deciduous trees shed leaves in the autumn. Evergreens (conifers) do not.

Different shapes of leaves:

- Tooth-edged – hornbeam, sweet chestnut
- Palmate (like a hand) -horse chestnut
- Heart shaped – linden (or lime)
- Lobed – oak
- Prickly – holly

Leaves attract aphids, larvae, caterpillars, deer and cattle to eat them. Spiders make a web to catch and eat the bugs. When the leaves fall in the autumn they make a carpet (beech mast) under which bugs (millipedes, centipedes, earwigs, woodlouse,) and small animals hide and keep warm as the weather gets colder. Birds (blackbirds) rummage in leaves to find worms.

**Tree flowers** -loose with petals (apple) or tight with catkins (sycamore)  
Flowers attract bees, butterflies, moths.

**Fruits** (containing the seeds for a new tree):

- Apples with pips inside on apple trees
- Conkers in a prickly cover (horse chestnut tree)
- Walnuts, hazel nuts,
- Acorn (oak) sycamore and maple (aeroplane type winged seeds)

### **Furniture, tools, sculptures and decorations**

Different woods are used for different purposes by humans:

- Pine tables, chairs
- Silver birch (lady of the woods) garden brooms
- Willow baskets and lobster pots
- Fir trees for Christmas trees
- Cedar for pencil lead
- Yew trees in churchyards (topiary shapes)

**A tree can be described as a kind of city!**

## **Flowers, hedges, grass, algae, fungus, moss**

### **Flowers in plants (not trees)**

Different plants attract different creatures. They might have **petals** of different colours, scents, shapes to attract different insects and other bugs. (Roses, lilies, daisies)

**Pollen** rubs off on bees' legs when they find nectar juice. This is used to make honey in the beehive. The honeycomb is made of six-sided wax where the honey is stored.

Bumble bees nest in the ground and sleep in winter.

**Seeds** are dispersed in different ways:

- Fluffy dandelion clocks
- Explosions of seeds – gorse bushes fling seed afar

### **Mushrooms and toadstools are fungi.**

There are also algae and lichen and moss. Reindeer moss is used by florists to keep plants damp in baskets. Lichen grows in different colours on rocks and stones.

## Animals

**Rodents** -- rabbits, voles, mice, squirrels, chisel teeth to gnaw bark, nuts and stems.

**Amphibians** -- frogs, toads newts who begin life in the water. Frogs make clumps of frog spawn, then tadpoles, then mainly on land as frogs. Toads make strings of spawn, then tadpoles and then mainly on land. Toads are dry and warty. Frogs are shiny and slippery. They eat insects, slugs and worms.

**Mammals** -- Humans are mammals. Mammals have babies born alive, breast feed (mammary glands), warm-blooded, fur/hair, look after young until mature, teeth according to habitats:

*Herbivores* – sheep, cattle, eat grass. Teeth good for masticating and grinding.

*Carnivores* – foxes have teeth for cutting and chewing (incisors, canine, molars)

**Birds** – beaks, like teeth, have a purpose:

Predators – hooked for pinning down prey, tearing flesh. (owls, kestrels)

Fish eaters – beaks long for spearing fish, herons, seagulls

Beaks open like nets to catch insects as they fly (swifts, martins, swallows)

Beaks short good for eating seeds worms and berries (robins, blackbirds)

Beaks short and strong for cracking snail shells or nuts (thrushes, nuthatches)

**Fish** -- Have scales, fins, tails, skeletons and gills (to breathe in the water). They are cold blooded.

Some (plaice) are flat and can swim on the bottom of the sea.

Some eat plants in the water.

Others, like pike (who live in fresh water in streams and rivers), lurk at the edges and eat other creatures and smaller fish.

Some have mouths like sieves when they open.

Minnows are tiny and like trout live in running water. Carp (goldfish) live in still water ponds and lakes.

## Butterflies and Moths

Suck nectar with their tube -like proboscis from flowers

Flowers which attract butterflies:

Aubretia, buddleia , thistles, lavender, cow parsley, lemon verbena, honeysuckle, ragwort, scabious, valerian, daisies, privet hedges, radishes;

Also hedges, woodlands, waysides, gardens.

Eggs hatch into caterpillars, then become a chrysalis.

Moths come out mostly at night.

## Insects

Often live under stones, in soil among dead leaves, the bark of trees, on grass and plant stems and on leaves of trees.

They have 6 legs, and lay eggs which hatch into larvae which eats and eats, shedding skin until larger. Then when full grown the larva becomes a pupa until adult.

**or**

The eggs hatch into nymphs which look like the parents but have no wings. They moult as they grow.

Insects have a head, thorax and abdomen (ants, grasshoppers, flies).

**Spiders** are not insects. They have 8 legs. They are arachnids.

## **Birds**

Most birds fly (even swans, who need a 'runway' to take off and land).  
Peacocks do not fly.

*Feathers(plumage)* – Wing feathers (used to be used for writing pens) Tail feathers, and body feathers, which keep the bird warm and are usually fluffy and smaller.

*Birds lay eggs* and need places for them to hatch.

- nests in trees, hedges, or in rocky places on cliffs, or on moors and heathlands (larks and curlews)
- in church towers and sides of buildings (kestrels, pigeons)
- House martins need mud mixed with clay and dry grass to fix their nests to the eaves of buildings.

Many birds use trees, hedges, rocks as places to hide, and use as look outposts, or to dry off on a cliff and preen (oil their feathers).

Some birds come to the UK in the summer only and leave when the colder winter comes (cuckoo, swallow, swift).

Some birds gather in flocks (seagulls, rooks, starlings, pigeons, tits). Starlings sometimes fly in beautiful patterns in the sky, like a dance in the sky (called murmurations).

Feeding:

Some birds feed on the ground (robins, blackbirds, thrushes).

Some feed up high (tits, finches, nuthatches).

Some catch insects in the air (martins, swifts) .

Crow family – jackdaw, raven, rook, magpie, jay

Birds of prey – buzzards, kestrels, sparrow hawks, owls

Aquatic birds – ducks, swans, coots, moorhens, Canada geese

## **Mammals**

*Nests for the young* –

Water voles make holes in riverbanks.

Rabbits live in tunnels called warrens and make burrow in the warren for the young.

When they leave to find food they stop up the burrow.

Squirrels make a drey for their young.

Badgers live in a sett, with a mound of earth ear the entrances.

Mice make holes in trees or the ground.

Foxes make an earth. They hunt at night. They might make their nest in an abandoned badger set or rabbit warren. They also live in towns in parks and churchyards. There might be bones outside the entrance and a musty smell.

*Some herbivore mammals*

- Horse, stallion, mare, foal
- Donkey, jackass, ass, foal
- Cattle, bull, cow, calf
- Sheep, ram, ewe, lamb
- Goat, billy, nanny, kid
- Red deer, stag, hind, calf
- Fallow deer, buck, doe, fawn
- Pig, boar, sow, piglet

A horse is 15 hands high or more (hand = 10cm/4inches).  
A pony is less than 15 hands high.

Red squirrels are rare and live in pine woods.

Grey squirrels are everywhere and like to live in oak and chestnut trees.

### ***Different feet for different purposes***

Hoofed animals are ungulates (horned feet).

Cloven (divided into two toe-horns) – cattle, sheep, goats, deer, pigs

One toe-horn – horses. The hoof becomes worn down so they have metal horseshoes fitted by blacksmiths.

Birds have feet suitable for perching, webbed feet for swimming (ducks, swans, geese).

### **Trails**

- Footprints in the mud, or wet sand are left by birds and animals.
- Nibbled pinecones, hazel nuts, beech nuts are left (squirrels, mice, voles).
- Bark is pecked (woodpeckers).
- Piles of feathers (foxes, hawks).
- Owl pellets coughed up by the owl (velvet look of fur and feathers).

*Droppings:*

- different sizes -- deer, rabbits
- cowpats (perhaps with dung beetles)
- bird droppings (often white with seeds in it)

Worms leave earth rings.

Moles leave molehills.

Sheep leave tufts of wool on twigs.

### *Animal pathways*

Some animals have used the same pathway generation after generation – badgers for hundreds of years sometimes.

### ***Animal and bird sounds***

- Dawn chorus as the sun rises – mainly robins, blackbirds and thrushes
- Evening chorus as the sun sets and the birds settle for the night
- Tawny owls hoot and reply to each other as night falls
- Also in the night, dog foxes bark and vixens scream.
- *Alarm sounds:*
  - Water voles jump into the water with a loud splash if they are disturbed on land.
  - Rabbits stamp
  - Blackbirds and robins make a rattling call.

### **Useful links:**

- BBC i Player documentaries – David Attenborough (e.g. Blue Planet)
- Extract from <https://www.doseofnature.org.uk/the-science>
- hello@citizen zoo.org