



Kew Wildlife Zone: Environmental Games

Games are a fun, simple and active way to introduce concepts, or cement ideas learnt 'in theory'. The games described here offer approaches to dealing with scientific concepts that may be difficult to explain in words, for describing ecological processes and encouraging thought about the importance of conserving our environment.

These games are all cheap to run. They only require scrap paper or card and pencils, string and thread or at most a selection of easily available household items.

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Environmental Games

There are many ways to engage children in wildlife and conservation programmes, and one that is sure to appeal is the use of games and role play. Games can help to simplify the messages we want to get across and also offer a sensory and fun experience that is likely to be long remembered.

The following games have been drawn from a large number that have been compiled over time. These have come from many sources, written and verbal, across the UK and the world including such institutes as the International Centre for Conservation Education and publications such as Wildzone, Canada . They have all been tried and tested and have proved to be very successful. Our thanks go to all those whose activity we have used here.

If you have a particular adaptation of these games that works well for you, or another game or role play that you would like to share with our pack readers please let us know via our feedback section.

Have fun!

The Pollination Game

Key themes

- The process of plant pollination – what is needed and how it happens.
- The different parts of a flower and how they are involved.
- The plant's dependency on insect pollinators.
- What pollinating insects get from a plant.

CURRICULUM LINKS:

Science

- Unit 2B Plants and animals in the local environment
Section 4: Flowering plants
- Unit 5B Life cycles
- Unit 6A Interdependence and adaptation

Art and Design

- Unit 2B Mother Nature, designer

Citizenship

- Unit 01 Taking part – developing skills of communication and participation

Equipment/roles needed

Petals	2 sets of 4 shaped and coloured petals made from stiff card (about 50 cm or more in length). Each petal should be tapered at the base, so that a child can hold it up.
Socks	4 pairs (or more) of long socks. These are worn on the hands of the children representing the stamens (one pair of socks per child and at least 2 children per flower)
Ping pong balls	40 or more ping-pong balls with Velcro strips on them (to stick to the socks). These represent the 'pollen grains'. You can use rolled-up sticky tape, but it is not quite so effective.
Woolly 'bobble' hats	2, worn by the two children who represent the stigmas.
Cans or cartons of soft drink	2, one for each flower, to represent the nectar.
'Pollinator' costume	A bee costume could be as simple as some wire for antennae, a stripy sweater and some cardboard wings. You could also make a butterfly costume.
Drinking straws	Each pollinator should have a drinking straw, to represent the insect's mouthparts.

Some of the equipment listed are desirable rather than essential. However, the more visual the game, the more the children become involved and interested. Part of the exercise can be to ask children what parts they think may be necessary for the process and involve the class in designing and making the items needed (perhaps with inspiration from a selection of real flowers).

How to play

Two sets of five children each hold up a petal and each group forms the outermost circle of each flower. Children representing stamens should share out the 'pollen grains' evenly between them, sticking them onto their sock-covered hands. They should then stand inside the petal ring and hold up their hands to present the 'pollen'.

Each 'stigma' child stands in the centre of a flower and holds up his/her bobblehat-covered head to receive pollen.

Drink cartons should be put by the feet of the 'petals' and are where the visiting pollinator might like to come and sip 'nectar'.

The children act out the process of pollination by playing the role of various flower parts, or by being the pollinating insect. One child takes the part of the pollinator and 'flies' between two 'flowers', removing pollen from the stamens of one and placing it on the stigma of the other. The pollinator may then transport pollen of the second plant back to the stigma of the first plant, etc.

Encourage the children to discuss what they have just acted out. The process can be developed further by discussing the stages of fertilisation, seed growth and dispersal.

Modifications

Have boys being stamens and girls being stigmas, to emphasise that some parts of the flower are male and some female.

Some types of plants have male-only and female-only flowers. These could also be represented.

Have more than two flowers, so the pollinator has to choose which to visit, based on how pretty the petals are or how tasty the carton of drink ('nectar') is. Allow the 'petals' to call out encouragement, then discuss how plants attract the attention of pollinators without being able to shout (e.g. bright colours, sweet scents, and flowers that 'dance' in a breeze).

Some flowers are only pollinated by insects with long tongues (e.g. butterflies). In a game with two 'pollinators', a butterfly and a bee, the 'bee' only has a very short drinking straw, while the 'butterfly' has a long one. The juice carton ('nectar') could be hidden at the centre of the flower with the child who is the 'stigma', who only lets 'butterfly' with the long straw reach it (and transfer pollen to her head), and not letting short-tongue bees near.

More information

See *pollinators, bees, butterflies, flower and pollination* in Chapter 3.

Acknowledgements

The game was initially developed by SAPS (Science and Plants for Schools).

Who am I?

Key themes

Based on the game '20 questions', this game encourages use of new names and vocabulary, and increases familiarity with the organisms that have been researched.

Answering 'yes' and 'no' questions is also the basis for dichotomous keys (though this needn't be explained!).

It is also a useful 'quiet' game.

CURRICULUM LINKS:

Science

Unit 2B Plants and animals in the local environment

Unit 4B Habitats

Citizenship

Unit 01 Taking part – developing skills of communication and participation

Equipment needed

None

How to play

Children form small groups, perhaps of 4 or 5, and one child mentally selects a plant or animal from their habitat studies. The other children can then ask 20 questions to see if they can guess the chosen organism. The child being questioned can only answer 'yes' or 'no' (or 'don't know', so those asking the questions must remember to phrase them suitably – for example 'are you an animal?', but not 'are you an animal or a plant?')

Remember: 'Animals' include birds and invertebrates.

If the group has not guessed the organism after 20 questions have been asked, the person can give them the answer. Each person in the group should be allowed a turn at selecting an organism for the others to guess.

If children need guidance, suitable questions could include: 'do you have colourful flowers?', 'are you a tree?', 'do you live in or near ponds/woods/grasslands?', 'do you have long thin leaves?', 'are you a 'creepy crawly'?', 'do you eat other animals?' or 'do you eat plants?', 'can you fly?', 'do you look very different when you are young?' (e.g. frogs/tadpoles, butterflies/caterpillars).

Modifications

This game emphasises the basic dichotomy between plant and animal. Children should pick up fairly quickly that 'are you a plant?' or 'are you an animal?' should be one of their first questions. To make things slightly more complicated (depending on the age and knowledge of the children) you could also include fungi. Bear in mind that fungi, although superficially similar to plants are neither plants nor animals. Fungi are fungi!

More information

See the *Species Cards* in Chapter 3 for more information on the different plants and animals that the children could choose.

The Pollution Game

Key themes

The Pollution Game helps children to understand some of the consequences of polluting our environment. Using this game it is easy to show children how pollution can affect a wide range of living things, some perhaps originating quite far from the original location of the pollution.

It also emphasises food chains and food pyramids.

CURRICULUM LINKS:

Science

- Unit 2B Plants and animals in the local environment
- Unit 4B Habitats
- Unit 6A Interdependence and adaptation

Citizenship

- Unit 01 Taking part – developing skills of communication and participation

Equipment needed

Several containers These can be anything, e.g. carrier bags, paper bags or envelopes. You will need as many containers as there are children in the lowest link of your food chain, i.e. if 20 children are 'plants' you will need '20' containers.

Small squares of paper You will need several hundred, about 75% one colour (e.g. white) and 24% another (e.g. red). You don't have to cut the paper up neatly – rough pieces (about 1 cm square) will do!

Lots of space!

How to play

Divide the children into groups, each representing an element of a food chain. You should have at least three elements: 'plants', 'herbivores', and 'carnivores'. Divide the children to correspond roughly with the pyramid of numbers – lots of plants (e.g. 20), fewer herbivores (e.g. 8), and very few carnivores (e.g. 1 or 2).

The game requires lots of space. It is best played outdoors, but remember to set boundaries beyond which the children cannot run. Call this defined area a 'habitat'.

The 'plants' position themselves somewhere inside the 'habitat'. You can then scatter all the pieces of coloured paper (mixed) into the space. On your signal, the 'plants' each pick up as many pieces of paper as they can get hold of, and put them in their containers. The plants should be given a set amount of time, e.g. 1 minute, depending on how many paper pieces there are. You can either let the children move, or you can make them lie on one spot and stretch out for the food as if their arms were roots and leaves. The paper collected in the containers represents the food the plant has accumulated.

Once the 'plants' have accumulated their food, give a signal to allow the 'herbivores' to 'catch and eat' the plants. It is easier to allow a little licence here as, of course, normally one would not expect plants to run away from herbivores. However, as long as this is explained to the children, it is good to let the 'plants' run around and enjoy the game. Explanations could involve "plants are stuck in the same place, but they often have spines or taste horrible, so herbivores avoid eating them. You don't have spines or a nasty taste, so instead, I am going to let you run".

Every time a herbivore 'eats' a plant, the plant has to give its food store (container full of paper) to the herbivore. This should mean that most 'herbivores' will end up with two or more containers, representing the 'food' they have eaten. Eaten 'plants' have to leave the space. A set time, perhaps 3 or 4 minutes, until most of the plants have been eaten should be allowed. Uneaten 'plants' can sit on the ground.

On your next signal, the 'carnivore(s)' are let loose to catch the 'herbivores'. Every herbivore caught must hand over its food-store to the carnivore and leave the playing area. After a set time, perhaps 3 or 4 minutes, when the carnivores have 'eaten' several herbivores and accumulated their food, call a halt. The 'carnivore(s)' should have several containers and lots of coloured paper. The children gather round to

look at what the carnivore has eaten. Explain that the 75% of paper that is white is normal 'healthy' food, and the 25% of paper that is red (or other chosen colour) represents polluted 'food', that is, harmful chemicals in the soil that have been accumulated in the plants and therefore are also taken in by the rest of the animals in the food chain.

Modifications

For very young children, you can run the game without the 'pollution' context, and merely use it to explain food chains and pyramids of numbers.

Name the 'plants', 'herbivores' and 'carnivores' according to food chains you have studied. For example, the plants could be Hazel bushes, turning their food into Hazelnuts. The 'herbivores' could then be Wood Mice, and the 'carnivores' Owls or Foxes.

Depending on the abilities of the children, the food chain can be made more complex and could incorporate several carnivore levels, the 'young' of the top carnivore (e.g. eggs of a kestrel) or perhaps, decomposers.

If many different types of creatures are included, make cardboard labels with their names on, so that children can hang these round their necks. You could then suggest that 'carnivores' can only catch 'herbivores' that they would normally eat in the wild. For example 'Grass Snakes' are allowed to eat 'Frogs', but not 'Blue tits'. Making an appropriate selection of name labels will take some thought. Use the species cards in Chapter 3 for guidance.

Instead of mixing the two colours of paper, scatter the 'clean food' (white) first all around the area, then scatter the 'polluted food' in just one area. You could cover a roughly circular patch and describe it as a polluted pond or chemical dump, or make a line through the area and call it a polluted stream. Ensure that your polluted area is within reach of at least a few of your herbivores, ideally around a quarter. After the 'herbivores' have collected their food, it would be good to ask how many have red pieces in their containers. You could explain at this stage that the red zone was polluted, and their red pieces represent that they have been contaminated, but not badly enough to kill them. Then, at the end of the game, the carnivore(s) should have collected at least some red pieces. Use this to explain how pollution can affect a wide range of living things, even if they weren't near the original site of the pollution.

Avoid litter! Encourage the children to clear every last scrap of paper at the end of the game (they could be 'decomposers', recycling the food so that it is available for the next group of plants that need it). Using rice paper will mean that any missed scraps will dissolve after rain. Avoid playing this game outdoors on a windy day – the paper pieces will go everywhere!

More information

See *plants*, *herbivores*, *carnivores*, in Chapter 3 for descriptions of their roles, and details of animals and plants that you can use as examples in your food chain.

Habitat Damage Musical Chairs

Key themes

The game clearly demonstrates that the problems of damaging habitats can be much more far-reaching than just the proportion of the area damaged.

It encourages children to think about interdependency between creatures and the amount of space needed to support them.

It encourages children to think about human impacts on the environment.

CURRICULUM LINKS:

Science

Unit 2B Plants and animals in the local environment

Unit 4B Habitats

Citizenship

Unit 01 Taking part – developing skills of communication and participation

Unit 03 Animals and us

Equipment needed

Source of music	e.g. CD or cassette player.
Several chairs/mats/ cardboard pieces	You will need one per child.
Stickers or labels	Each should have the name (or a symbol) for an animal, invertebrate or plant. You will need 'breeding pairs' of animals, e.g. male wood mouse and female wood mouse, male butterfly, female butterfly etc. Include some pollinating insects, e.g. bees, butterflies, and some foodplants, e.g. grasses for Meadow Brown butterfly. All your living things should be from the same habitat, e.g. woodland or grassland. See Chapter 3 for species lists.

How to play

Give each child a label. Put the chairs (or mats or large pieces of card, if you prefer to use them) in a long line with alternate chairs facing in the opposite direction from one another (the normal arrangement for the game 'Musical Chairs'). Each child sits on the chair.

Explain to the children that the chairs represent your chosen habitat and that they are some of the creatures and plants living there.

When you start the music, children circle around the line of chairs. While they are circling, remove about three or four chairs from the middle of the line. This represents a road that has been built through the habitat, dividing it into two islands.

When you turn off the music, each child quickly finds the nearest chair and sits on it. Of course, there are now more children than chairs – those that have not been able to find a chair represent animals or plants that are now no longer in that habitat. Read out the labels of each plant or animal that is 'lost', asking the children each time whether one 'sex' of a species is now living on its own in the habitat. Point out that if the female badger has gone, for example, the male badger will have no partner so won't be able to breed, so effectively, both badgers are 'lost'. You therefore call out the 'other partners' from their seats. Similarly, if a female of a species is on an 'island' on one side of the road and the male on the other side, it is probably impossible for them to breed. Both are taken away and represent 'lost' species. If pollinator has been 'lost', tell the children that it pollinated a particular plant, e.g. bumble bee pollinating white dead nettle. Without its pollinator, this plant cannot reproduce and must be 'lost' too. Some of the larger predators, e.g. fox and badger, need lots of space to find enough food. If they are on an island with, say, less than 5 chairs, then there won't be enough food for them and they must be 'lost' too.

This is a good moment to ask the children to review how many species have really been lost from the habitat. Although the 'road' only cut through a small proportion of the 'habitat' and there still appears to be a good deal of the 'habitat' left, in reality there has been a much greater loss of biodiversity than they might have thought possible.

The game can be continued by taking away chairs from either side of the 'road' to represent erosion of the remaining 'island' habitats, through pollution, new construction (e.g. a motorway service station), etc. Again, the high level of biodiversity loss can be discussed after each 'time-out'.

Modifications

Encourage children to make the noise of the animal or plant (grasses swishing?) as they move.

More information

See Chapter 3 for ideas on which animals and plant to include.

Acknowledgements

This game was developed by Adam Adamou formerly of the International Centre for Conservation Education.

Oh Deer!

Key themes

Reinforces the basic principle that there are four main components in making up a habitat: Food, Water, Space and Shelter.

Animals can only survive if all their needs are met.

The ideas of competition and recycling can also be introduced.

CURRICULUM LINKS:

Science

Unit 4B Habitats

Unit 6A Interdependence and adaptation

Citizenship

Unit 01 Taking part – developing skills of communication and participation

Equipment needed

A large open space

How to play

The group must align themselves along one end of a roughly square playing area representing the habitat. From this group, select two volunteers to represent the beginnings of a deer population. Those two children come out into the middle of the field. The rest of the children represent the four components of a habitat: food, water, shelter and space. Choose appropriate actions/symbols for each. Those being 'shelter', for example, could use their arms to form a triangle over their head. Remember that deer eat grass, shrubs and other small plants, so encourage children to develop appropriate symbols.

When all the symbols are agreed on, the habitat line children and the two deer turn their backs on each other. The leader then asks all the children to choose one of the symbols. Each child is free to choose what they want to be each time, in the manner of the game 'rock, paper, scissors'. The 'habitat' children make the symbol of what they want to be, while the 'deer' make symbols about what they need, e.g. the 'water' symbol means they are thirsty. On the count of three, the 'deer' and the habitat' children turn to face each other, making their symbols.

The two deer must then run to the habitat line and extract a child who has made the same symbol as themselves and bring them into the middle area. This means the deer's need has been met, e.g. if it was 'thirsty' it has found 'water', and it has been able to reproduce.

You then repeat the process and watch the deer population grow. However, strange things will start to happen. For example, the deer might demand more shelter than there are 'shelter' children in the habitat line. Competition (in the ecological sense) then comes into play, and those deer that fail to meet their needs 'die' (as dramatically as the children like!) and lie on the ground. 'Dead deer' have to miss two rounds, to represent the idea of decay and recycling, before they can become 'habitat' again.

You may need to prompt during the game to check that all four habitat components are being included. For example, the deer might want more space as things get crowded in their field.

Repeating rounds will emphasise that populations can only grow while the habitat is large and varied enough to meet their needs.

Wildlife Theatre

Using role play can be a great way to summarise a day working in a 'wildlife zone', such as that at Kew. Once children have explored their local biodiversity, and discussed relevant issues such as a code of behaviour in the wild (Chapter 6) or threats to local wildlife, these can be enacted in a brief play.

Children should discuss and choose a relevant topic. It might be something like: pollution in our local river; accidental fires in our heathland; alien plants invading a natural area etc. Small groups of children (perhaps eight or nine) need to each develop a storyline, with a script, and decide on the characters needed for their play. Each 'story' should take no more than 5-10 minutes to tell.

A storyline such as 'Pollution in the river' might include characters such as; the polluter, young children observing the effects of the pollution, minibeasts and fish in the river, plants along the water's edge etc. The children can either play the characters themselves, or use vegetables (e.g. potatoes, carrots, peppers suitably adorned with paper cut-outs, cotton wool, felt, glitter etc) to represent their chosen 'character' – be it a person, plant or animal. They should make sure that they use the 'characteristics' of each plant or animal as far as is possible. The groups then take it in turn to each act out their play, with its 'environmental message' for the other children.

This is a hugely enjoyable and engrossing activity for children and teachers alike – and can be done with very few or even no resources! Perhaps the children can present their 'plays' at assembly for the rest of the school, to show what they have learnt.