

Environmental Activities for Schools



Teachers' Toolkit for Iraq

Acknowledgements

All of these activities have been tried and tested in schools in the Peramagroon area. This would not have been possible if it were not for the support and kind permission of the Ministry of Education as well as all of the schools, teachers and students involved.

Darwin Team

This toolkit has been developed as part of a multi faceted UK government funded project aimed at strengthening Iraq's capacity for conserving its biodiversity. Many people from the Darwin Initiative project team have been responsible for developing and testing these activities as well as creating the toolkit.

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Images

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Introduction



Iraq is rich in biodiversity and biological heritage. For its size Iraq has an enormous wealth of landscapes and habitats including everything from snow covered mountains, majestic rivers, arid deserts and plains, montane woodlands and grasslands, luxuriant agricultural regions to the unique marshlands of the south. Iraq also has a rich cultural heritage. The first cities in the world were established in ancient Sumeria in the south of the country. Agriculture was invented over 10,000 years ago in the northern mountains where crops such as barley, wheat, peas and lentils were first grown. This great diversity of habitats together with the impact of man over thousands of years has shaped the present day environment of Iraq and has resulted in the development of a remarkably rich "biodiversity", that is a large number of different types of plants and animals.

Recent work has identified 82 areas of Iraq which are of global significance for conservation. One such site is Peramagroon mountain. This is one of the most important sites in Iraq for breeding birds. It is also home to a large population of the endangered Wild Goat and a number of plant species only found in Iraq.

In common with the rest of the world Iraq faces serious environmental challenges. Years of instability, breakdown in traditional land management and more recently rapid development have had a negative impact on the country's environment.

Young people will have to live with the impact of environmental decisions made now. They are the key to tackling these challenges and protecting this important biological heritage for the future. Environmental education in schools has an important part to play in the promotion of environmental awareness. The need to increase environmental awareness to help promote sustainability of ecosystems in Iraq has been highlighted in both Iraq's National Environmental Strategy and Action Plan (NESAP) and as a national target in line with the framework of the Aichi Biodiversity strategic Goals and Targets in the countries 5th report to the CBD.

Aim of the toolkit

- Provide a set of easy to use games and activities which teachers can use in schools to increase knowledge and understanding of Iraq's biodiversity and environment.
- Provide teachers with background information to help them expand on pupils learning through these activities.

This toolkit was developed as part of an environmental awareness project supported by Nature Iraq and the Darwin Initiative. The team wanted to create Iraq's first country specific environmental education teachers handbook. Many of the activities in this toolkit are based on commonly available and well established activities which are used all over the world. We have adapted these activities for use in Iraq and have tested all of them in schools in the Peramagroon area.

Format

- Each activity has two '**themes**'. A **biodiversity theme** links the activity to Iraq's biodiversity and to increasing understanding of the country's plants and animals. A **environment theme** links the activity to an environmental issue.
- Each activity contains information on the '**materials**' and '**method**' required.
- Gives some suggested '**follow on activities**' to help teachers expand the activities over a longer time scale or in more depth for older children.
- Wherever possible activities include links to **citizen science projects** (see box below) which offer opportunities for children to learn more about the world around them and lead them to a greater awareness of the global environment.
- After each activity there is a set of '**teacher notes**' which provide background information on the biodiversity and environment themes.

The table below shows activities and the biodiversity and environmental themes linked to each activity.

Activity	Biodiversity theme	Environment theme
Bird boxes	Birds and their homes	Habitat loss
Bird feeders	Bird diversity	Waste & Recycling
Balance of nature	Mammal diversity	Protecting endangered animals
Bats & Moths	Bat diversity	Interdependency of species
Butterflies & Dragonflies	Butterfly & dragonfly diversity	Biological indicators
Meet a tree	Iraq's forests	Disappearing Forests
Leaf shapes	Identifying biodiversity	People & Plants

CITIZEN SCIENCE Citizen science is where volunteers work with scientists in real research projects. Usually this is either by collecting and analysing data.

Recently Iraq's first citizen science project was set up to find out more about the country's dragonflies and butterflies. People from across the country sent in images which were identified by experts and have been helping to build a more complete picture of these groups in the country. You can read more about the project online (www.iraqdarwin.org/thebighunt).

There are many other citizen science projects with a global reach. For example, iSpot (www.ispotnature.org./communities/global) is a project to share and identify observations of wildlife all over the world. Zooniverse (www.zooniverse.org) also has citizen science projects which you can take part in online on a wide range of topics.

Birdboxes

Construct simple bird boxes from a single sheet of wood cut into 6 sections.

There are many bird species in Kurdistan. These bird boxes will help attract some into school grounds providing opportunities to learn more about local species and their habitats. The project can also be used to introduce the idea of habitat loss.

THEMES

Biodiversity – Birds and their homes
Environment – Habitat loss

Takes 2 hours

Materials:

Timber (150mm x 1170mm) • Hammer • Nails • Drill / drill bit (size) • Self-tapping screws

Method:

This project uses a single piece of wood, cut into six sections.

Step 1 Cut the timber for the bird box into six sections using the following measurements: back panel 30cm x 15cm; base 12cm x 15cm; front 17.5cm x 15cm; Roof 20cm x 15cm; and two side panels cut for a sloping roof, 20cm high on the back x 17.5cm high at the front.

Step 2 Cut the wood along the pencil lines using a wood saw. Sand down all rough edges to protect the birds.

Step 3 Nail one of the sides to the base of the bird box, then nail them both to the back section. Hammer gently to avoid splitting the wood.

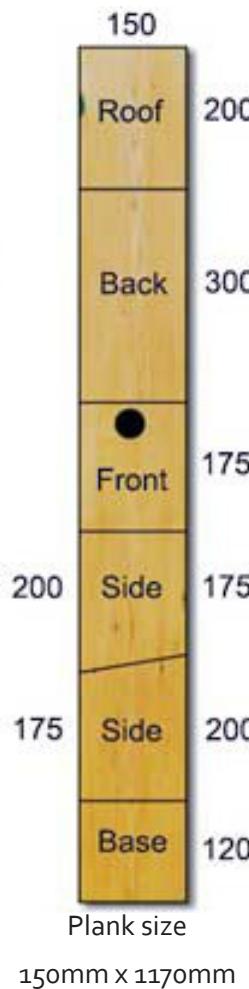


Image: British Trust for Ornithology

Step 4 Turn the nesting box on to the fixed side and nail the other side into position. Three nails for each join should be enough.

Step 5 Before fixing the front panel to the sides makes an entrance hole for the birds using a wide drill bit. Sand the edges smooth. (A 28mm hole attracts Great Tits.)

Step 6 Place the bird box on its back and nail the front to the sides. The pieces should all fit together without gaps.

Step 7 Use the self-tapping screws to fix the top to the sides and the front. This will allow you to remove the top to clean the bird box out.

Step 8 Drill a hole in the top of the bird box and attach it to a tree using a screw. Place at a height of 2 meters or more and in a shady position with the hole facing away from the south so it is not in direct sunlight.

Step 9 Make sure you site your nesting box high up in a tree or building away from predators, strong sunlight and wind. A north-east facing spot is best.

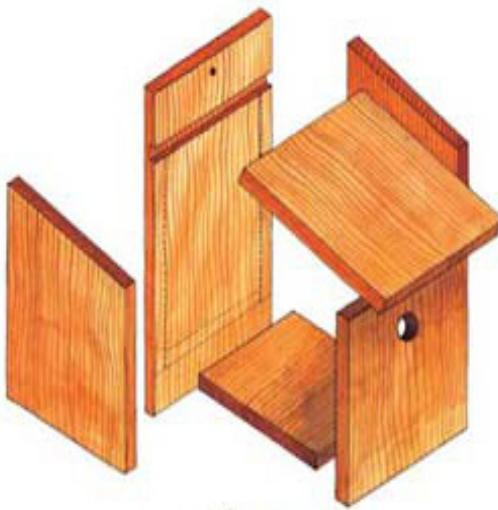


Image: British Trust for Ornithology



Ideas for follow-on activities

Monitoring the boxes

Help the children try to identify the species they see around or nesting in the boxes. It may take a while for birds to find the nests so don't be put off if they are not immediately occupied. Get the children to keep records of their observations. Which species are nesting where? How often do they collect food for the babies - what kind of food? When do the adult start building a nest, when do the young leave?

Maintenance

Clean out the nests after each brood of young leave the nest. This helps ensure that the boxes are clear of dirt and parasites which could be harmful to the next lot of young.

Different habitats

Build several boxes with different size holes and mount them in different areas: for example where there are lots of trees, few trees, no trees (you could put the box on a pole) or on the side of a building. Which species prefer which boxes?

Teacher notes



Great Tit



Sombre Tit



Common
Redstart



Common
Starling



Eurasian
Nuthatch

Biodiversity - Iraq's birds and their homes

A habitat is a bird's home. It includes all a birds necessities for survival – food, water, shelter and nesting areas.

Where do birds nest?

A nest is a structure built to hold eggs and to provide shelter. Different types of birds build different kinds of nests to raise their young. There are many different types, for example:

- Ground nests – some birds lay their eggs straight on the ground or make a shallow depression in the soil or vegetation.
- Burrows – some species build nests inside burrows which can be a good way of protecting young from predators.
- Cavity – similar to burrows, some species build nests inside cavities (holes) in trees.
- Platform – relatively flat nests which can be on the ground or up in trees or buildings.
- Cupped – this is what we usually think of when we think of nests. These look like a bowl or a cup and are built of materials like sticks or feathers. These might be supported in the branches of trees or suspended from them.

What kinds of birds might you find in your nest boxes?

Nest boxes attract birds which would normally nest in woodpecker holes and or cavities. Not birds which nest on the ground or in burrows!

Some of the birds than you are most likely to find in your nest boxes are shown on the left.

Environment – Habitat loss

Habitat loss is probably the greatest threat to the variety of life on the planet today.

The process where natural habitats are damaged or destroyed reducing or removing their ability to support the plants and animals which rely on it for food, breeding or shelter.

Large scale habitat loss is caused by human activity for example clearing land for agriculture, urban development, and mining. Even if a habitat is not completely destroyed it can be fragmented (see box below) and become unable to support the species that it once did.

FRAGMENTING is when habitats are broken up. If areas of forest are cleared, leaving smaller patches with space in between them, then there is not enough room left for species to live and breed, and populations are split up between the “fragments”.



RESOURCES

BIRDS OF PERAMAGROON – a free identification app designed for the birds of Peramagroon but can be used more generally in Kurdistan. This is available from google play or the app store.

BIRDS OF THE MIDDLE EAST EBOOK <http://www.bloomsbury.com/uk/birds-of-the-middle-east-9781408181225/>

Bird feeders

Create bird feeders out of recycled plastic bottles

Help children learn about local bird species by making a simple feeder to encourage them into the school grounds.

THEMES

Biodiversity – Local bird diversity

Environment – Waste & Recycling

Takes 1 hour

Materials:

Plastic bottle • String • Short stick • Bird Seed •

Scissors

Method:

Step 1 Cut a hole in the side of the bottle.

Supervise young children using scissors.

Step 2 Make some small holes in the bottom of the bottle to allow rain water to drain away

Step 3 Make a hole in the lid for a wire or string to go through. Knot the string or wire, and push it through the hole, with enough remaining to tie the feeder into position.

Step 4 Make a smaller hole in the bottle to push the stick through to make a perch for the birds.

Step 5 Tie the feeder so that it hangs from a branch of a tree, somewhere that the children can see it without having to go too close and disturb the birds.



Ideas for follow-on activities

Monitoring the feeders

Ask students to suggest what species of birds will visit the bird feeders, note down their suggestions in a notebook, leaving space for observation notes next to each species.

Help the students to observe the birdlife visiting the feeders, and record when they see a visiting bird. You could keep a count of the number of different bird species and see which are the most common visitors and when the different species come.

Encourage students to identify any unknown birds visiting the feeders (see the resources below for help with identifying bird species).

Maintaining the feeders

Let the students to top up and clean out the feeders if they become empty or mouldy.

The 3 R's

Introduce the idea of waste and recycling by asking the children to guess how long it takes for a plastic bottle to breakdown in the earth.

Discuss why reducing waste is important and get the children to come up with and implement some ideas to reduce, reuse and recycle in school and at home.



Teacher notes



SHORT-TOED
SNAKE EAGLE

Biodiversity - Bird diversity in Iraq

There are about 10,000 bird species in the world.

Most are known from Columbia where there are more than 1800 species. 405 species have been found in Iraq, making it 95th of the list of countries with most bird species. This relatively high number is because of the diversity of habitat types found from mountains, through to woodlands, deserts and vast wetlands.

HABITAT is a place where a living thing exists and where it finds food, shelter and reproduces.

Birds of Kurdistan

Over 260 of Iraq's 405 bird species are known from Kurdistan.

Peremagroon, for example, is famous for the high number of birds of prey that breed, including the Lammergeier that drops bones from a height to crack them open so it can feed on the marrow. The Short-toed Snake Eagle is a master at catching snakes.

RESOURCES

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LAMMERGEIER

Environment – Waste and recycling

In some places people are very environmentally conscious and produce very little waste. In other places this is not managed very well and it creates environmental problems.

DID YOU KNOW that the plastic bottle used in this bird feeder would take 450 years to decompose (break down) in the environment?

What is waste?

Waste is anything that is unwanted or unusable. This could be packaging, manufacturing waste, household waste, waste water and many other things. Nearly everything leaves some waste.

Waste causes environmental and economic problems. For example:

- Waste ending up in water changes the chemical composition of the water. This can be harmful to the wildlife living in and on the water.
- Waste ending up in landfill produce dangerous gases which contribute to global warming.
- Poorly managed waste can attract disease carrying animals such as rats.

Why recycle?

- Recycling is the process of turning waste into new products. It is one of the three R's of waste management – Reduce, reuse and recycle.
- Recycling helps protect the environment - This is because the recyclable waste materials would have been burned or ended up in the landfill. Pollution of the air, land, water and soil is reduced.
- Recycling conserves natural resources - Recycling more waste means that we do not depend too much on raw (natural) resources, which are already massively depleted.
- Recycling saves energy - It takes more energy to produce items with raw materials than from recycling used materials. This means we are more energy efficient and the prices of products can come down.

RECYCLING ALUMINIUM uses only 5% of the energy needed to make new aluminium!

Reduce, reuse and recycle

These are the three R's of waste management. How could you reduce, reuse and recycle in your school?

Balance of nature

Learn about some local wildlife with this energetic game

There are lots of mammal species found in Kurdistan. Some of these are very rare and globally important for conservation. This game is a good way of introducing children to some of these animals.

THEMES

Biodiversity – Local mammal species
Environment – Endangered animals

Takes 10+ minutes

Materials:

Scarves or pieces of cloth • Watch

Method:

Players are divided into 3 roughly even groups:
Persian Leopards, Wild Goats, and leaves.

- The Persian Leopards stand to form a circle.
- The Wild Goats each have a scarf or piece of cloth to tuck in their belt or waistband for their 'tail'. They stand inside the circle.
- The leaves stand outside the circle. They cannot move.

To play:

- The Wild Goat must try to get past the Persian Leopards to 'tag' the leaves. They can catch as many leaves as they are able.
- The Persian Leopards try to catch the Wild Goats by pulling their tails; the Wild Goats are safe when they are in a crouching position, but they cannot move or catch a leaf when they are in a crouching position. The Persian Leopard can only catch one Wild Goat in any round.
- Any Wild Goat caught by the Persian Leopards becomes Persian Leopard as well.

- If the Persian Leopard fails to catch a Wild Goat within any round it 'dies' and becomes a leaf.
- If the Wild Goat fails to get food, it also becomes a leaf.
- When the Wild Goat gets food, the food joins them as a Wild Goat.

Decide in advance on a length of time for each 'round' and how many rounds you will play (perhaps 6 rounds of 2-3 minutes each).

A FOOD CHAIN is the sequence of who eats who in the wild.

Ideas for follow-on activities

Discuss endangered animals

Ask the children if they have ever seen a Persian Leopard or a wild goat. What do they know about these animals? Talk to them about these animals and why they might be endangered using the information in the teachers notes.

What other animals do the children know about which live nearby? Ask them if they can think of another food chain. They could play the game with these different animals.

Citizen Science

There are many different ways of studying which animals are found in a place. One method which has been used very successfully in Iraq is camera traps.

These can be set up and left in an area, they automatically take a picture when something moves nearby.

This project will let you see some real camera trap images and practise your animal identification skills.

Wildcam Gorongosa is a project to track wildlife in Gorongosa National Park in Mozambique. Using trail cameras they have captured thousands of photographs of wild animals in the park, and need volunteers to help identify the species found in the pictures. This isn't always easy! See some real camera trap images and practise your animal identification skills. Find out more at

<http://www.wildcamgorongosa.org/>

Biodiversity - Local mammals

Examples of some local mammals.



Persian Leopard

This leopard is known to exist in the Kurdish mountains but is very rarely seen. Special camera traps (activated by movement) took this picture of one in 2012. The Persian leopard is found globally with nine subspecies. The subspecies living in Kurdistan mountains is believed to be the *Panthera pardus saxicolor* due to its proximity to Iran, the Leopard's stronghold. Beside Iran, the species is also found in Afghanistan, Turkmenistan, Armenia, Azerbaijan, Georgia, Russia North Caucasus, and Turkey.

Living in mountainous habitats, which are naturally patchy and discontinuous, the Persian

Leopard is prone to habitat fragmentation into a patchy network of distant and often too small subpopulations, which make it vulnerable to extinction.



Wild Goat

Capra aegagrus is the wild relative of the domestic goat *Capra hircus*; they are considered as two separate species.

The wild goat ranges discontinuously from Afghanistan and Pakistan, through Iran, Turkmenistan, northern Iraq, Armenia, Azerbaijan, Georgia, and Russia, as far as Turkey. It is extinct in Jordan, Lebanon and Syria. It also occurred in Israel over 10,000 years ago.

The main threats to this species in most of its range are poaching, competition for food with domestic livestock, and disturbance and habitat loss from logging and land clearing.



Red Fox

Vulpes vulpes This has the widest geographic range of all members of the Order Carnivora. The Red Fox is very well adapted to new areas and currently is not under threat.

Teacher notes



Syrian brown bear

Ursus arctos syriacus This is one of the rarest sub-species of Brown Bears, which once ranged throughout the Middle East as far south as the Sinai Peninsula. As the bear was considered a threat to human lives, it was often killed, which in addition to habitat loss through deforestation and desertification has led to a significant decline in its range. Today, the Syrian Bear ranges from Turkey to Iran, including Russia, Georgia, Armenia and Azerbaijan, but is thought to have become extinct in Syria and Lebanon. However, some observations made in 2004 and later in winter 2011 and 2015 indicate otherwise. Habitat degradation, frequent contact with humans and hunting are identified as threats to the Brown Bear and the isolated low numbers of the Syrian bears.



Wild Cat

Felis silvestris These globally widespread wild cats resemble their domestic counterparts in their fur patterns, but are significantly larger. One of the major threats to this species' population is hybridization with domestic cats, which also compete with them for prey and space. Other threats are human-caused mortality, mainly through road kill and habitat loss.



Indian crested porcupine

Hystrix indica This is a wide spread and common species and considered a pest in different parts of its range. No major threats.



Persian Squirrel

Sciurus anomalus Although they remain abundant in some areas of its range, they still are at risk of their population declining due to hunting and trade as well as habitat destruction. In Iraqi Kurdistan where the Persian Squirrel is found, it is hunted and exported to different areas within Iraq and sold as pets.



Wild boar

Sus scrofa Although no population estimate is available for this animal, it is very abundant throughout its range. This includes Iraq, where it is seen as pest for eating crops and causing destruction on farms. The Wild Boar is known to have the widest geographical distribution of all terrestrial mammals.



Golden Jackal

Canis aureus The Golden Jackal is increasing in its world population, due to its tolerance of dry habitat and its omnivorous diet which allows it to live in a wide variety of habitats. However, this animal is still under threat due to habitat loss caused by urbanization, industrialization and agricultural development.

RESOURCES

Mammals of Iraq - A poster showing some of the mammals found in Iraq is included in the Appendix.

Environment – Endangered animals

What is an endangered animal?

An endangered animal is one which is at risk of becoming extinct. An animal or plant is said to be extinct if there are no more of them alive on earth. In some cases an animal might be extinct in the wild but still exist in captivity (e.g. zoos).

20% OF MAMMALS

12.5% OF BIRDS

25% OF AMPHIBIANS

ARE CONSIDERED TO BE IN DANGER

What causes extinctions?

Extinctions can either be natural events for example ice ages have caused huge natural extinctions in the past. Or, they can be caused by humans. The main reason that many plants and animals are threatened today is because of human activities. Some species used to be found in Iraq but are now extinct there. For example, the Asiatic Lion and the Persian Fallow Deer.

What threats are there to wild animals in Iraq?

In Iraq wild animals are threatened by a number of things. Perhaps the most significant of these is rapid development reducing or fragmenting the available habitats. Development of new roads can increase access for hunters, loggers and developers.

FRAGMENTING is when habitats are broken up. If areas of forest are cleared, leaving smaller patches with space in between them, then there is not enough room left for species to live and breed, and populations are split up between the "fragments".

Bats & moths

Learn about the importance of bats in this short energetic game.

Bats are the only flying mammals in the world, and play an important role in their habitats. Learn about how bats navigate in the dark with this short game.

THEMES

Biodiversity – Iraq's Bats

Environment – Interdependency of species

Takes 5+ minutes

Materials:

A blindfold

Method:

Stand the children in a circle.

Ask them what they know about bats. For example:

- What do bats eat?
- When do they go out looking for their food?
- How do they catch their food?

direction of the moth and move towards it.

- Both players move around inside the circle, the bat chasing the moth and the moth trying not to get caught.
- The others in the circle must gently guide the players back into the circle if they hit the edges, and not let them run out.
- You can try playing with more than one moth or more than one bat, or both.

After playing the game get discuss bats and their role in the environment with the students. Ask them why they think bats might be important for humans. Are any other wild animals important? Why are they important?

To play:

- Choose one child to play the bat, and another child to be the moth.
- Blindfold the "bat". The bat and the moth should stand in the middle of the circle.
- The aim of the game is for the bat to "eat" the moth, by touching them, but the only way they can find them is through echolocation...
- As the bat walks around the circle, they shout 'bat!' Whenever they say "bat", the moth must reply, 'moth!' The bat can then guess the



Ideas for follow-on activities

Bat spotting

Children can spend an evening looking for bats where they live. Bats are most easily spotted just after dusk, when you can see them hunting in places which attract flying insects, particularly underneath street lamps or over open water. Remind the children to keep quiet, and not to ever touch or disturb bats. Record what time they spot the bats, and how many bats they saw. Ask them to listen out for their calls as they are hunting – children can hear higher frequencies than adults and so may be able to hear calls that their parents or teachers can't.

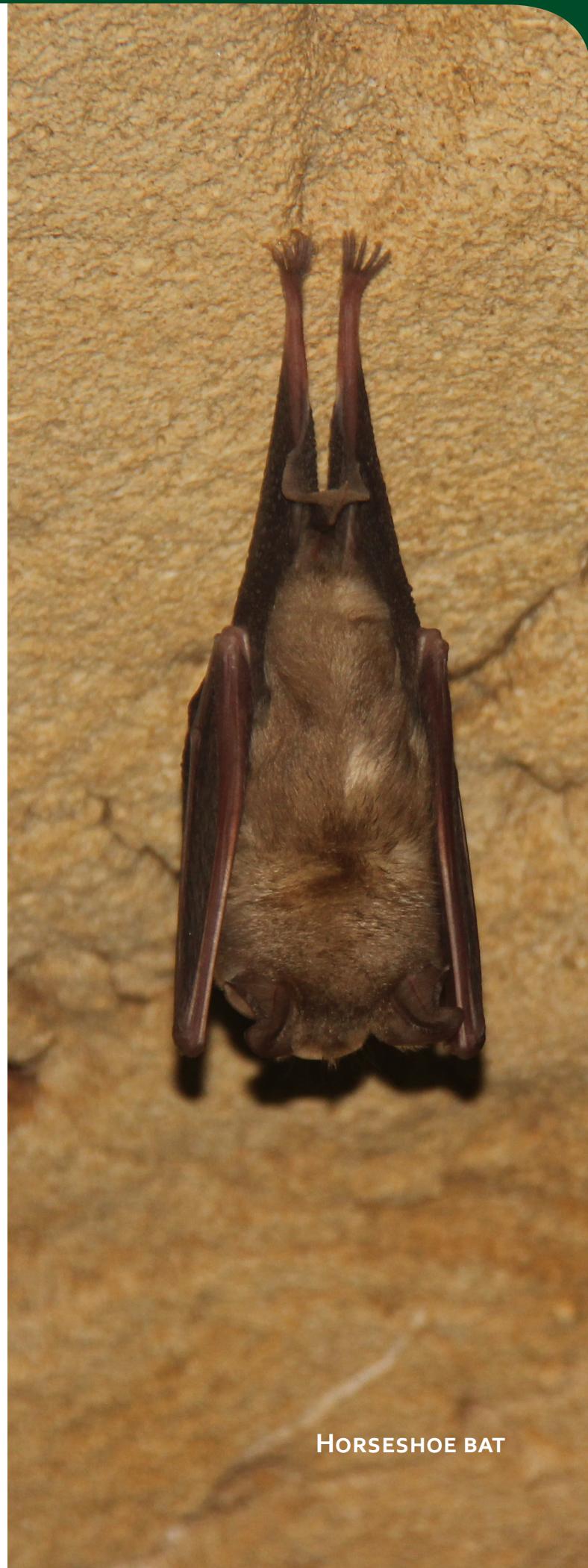
Citizen Science

Bat Detective, a citizen science project, asks volunteers to help identify bat calls.

Since bats are such important species in their habitats (see below), monitoring their populations is very useful. Bats are small and can be difficult to spot in the dark, so one way to identify them is by their calls. Thousands of bat calls have been recorded by volunteers, and scientists need help to identify which sounds in the recordings are bats and which are insects or machines.

On the Bat Detective website you can also listen to recordings of bats, slowed down to a frequency that humans can hear, and notice the differences between the different species. You can also find out about the iBats project – where volunteers record bat sounds for the Bat Detective website – and how to set up a group in your area.

<http://www.batdetective.org/#!/home>



HORSESHOE BAT

Biodiversity - Iraq's bats

There are about 1200 species of bat worldwide.

Basic Bat facts

- They are the only mammal that can truly fly, and account for 20% of all mammal species in the world.
- Bats are found on every continent except Antarctica.
- They are active at night - nocturnal.
- they can vary widely in their hunting and roosting behaviour.

ECHOLOCATION Bats are nocturnal (active at night) and 'see' in the dark using a system called echolocation. As they fly, the bats make high pitched calls. These calls bounce off the bats' surroundings and help them to build up a picture of what's around them. The same system is used by some other animals e.g. dolphins.

- Most feed on insects or fruit, some even eat fish and a few on blood.
- Some of the smallest bats are only 3cm long whilst the largest can have wingspans up to 1.7m wide.

Iraq's bats

Around 14 types of bat are currently known from Iraq. However, not much is known about the native species. New species are still being discovered.

Environment – Interdependency of species

Bats are very important for humans: they benefit us by pollinating plants, dispersing seeds, and feeding on insect pests.

Bats and insects

Bats can eat up to 1,200 mosquitos in an hour, and often their whole body weight in insects in one night. They also eat moths and other insects which can cause damage to crops, and so reduce the need for farmers to use pesticides.

Bats and plants

Worldwide, bats are known to be responsible for pollinating around 500 plant species including many plants that humans use, such as bananas, agave, cloves, carob and peaches. As nectar-feeding bats drink from the flowers of these plants, the pollen gets stuck to their fur, and transported to the other plants that the bats feed on.

Fruit bats also play a vital role in dispersing seeds of the plants that they eat. This is particularly important in rainforests, where deforestation clears vast areas of habitat. Bats cover large distances when they fly at night, and can help to re-populate these areas by dropping seeds.

Because so many plants are dependent on bats for pollination and seed dispersal, they are essential to sustaining rich ecosystems. If bats were to disappear, not only would the plants that they pollinate suffer, but so would all the other species that those plants provide food and shelter for.

Butterflies & dragonflies

Become field scientists and learn about these important insects, in and out of the classroom.



Little is known about Iraq's butterflies and dragonflies. They are however valuable indicators of environmental health. Learn more about local species, and their role in telling us about the environment around us.

THEMES

Biodiversity – butterflies and dragonflies
Environment – Biological indicators

Time varies depending on activity

Materials:

Depends on activity. Pens • Paper • Large jar or container • Digital camera (if available)

Method:

There are a number of simple activities which can highlight the diversity of different species and their lifecycles.

Butterfly life cycle I

Using the Dragonflies and Butterflies in Iraq leaflet, talk about each stage of the lifecycle of a butterfly. Ask the children to draw pictures of what each stage looks like. Use the pictures to make a lifecycle diagram on the classroom wall.

Butterfly life cycle II

Collect eggs or caterpillars and observe the lifecycle in the classroom. Painted Ladies are a good species of butterfly to keep in a classroom.

Caterpillars can be kept a large jar or container, with holes in a lid for ventilation.

Children can collect leaves from the host plant for the caterpillars to feed on – caterpillars only eat specific plants, so it is very important to collect the plant which you found them on.

Once they have grown big enough, the caterpillars need branches to climb onto to pupate.

Within a few weeks, the pupae will hatch into butterflies, which then need to rest on branches as their wings dry out, and when they are ready to fly you should release them back into the wild.

Butterfly & Dragonfly field surveys

Become exploring scientists by carrying out butterfly and dragonfly surveys. This is best done in spring and early summer.

Select a field survey site. This could be a single area or you could go for a short walk e.g. along a river. You will need to be near water if you hope to see dragonflies.

Photograph or draw the species that you see. Keep a count of the number of different species that you see.

If there aren't many insects around, you could also ask the children to record things over the weekend, and bring in their results to compare. Which environments had the most species?

Use the sheet of common species provided to try and identify the species that you've found. What features were important to help identify it?

Ideas for follow-on activities

Extended surveys

Try carrying out surveys in different areas or different times of day and compare the results. Which environments are the best places for butterflies to live? What about dragonflies – do they need the same things that butterflies do? How might this environment change, and how would that affect the species that live there?

A school pond

Create a pond habitat in the school grounds to encourage and support butterflies and dragonflies. There are plenty of resources online with information about how to build a wildlife pond. An important element is that it should not be too deep (a 2m x 2m pool should be no more than 30cm deep at its deepest point) and have plenty of cover.



RESOURCES

DRAGONFLIES AND BUTTERFLIES IN IRAQ leaflet – this can be downloaded from www.iraqdarwin.org/thebighunt or obtained from Nature Iraq.

BUTTERFLY IDENTIFICATION SHEET - see appendix.

Biodiversity - Butterfly and dragonfly diversity



EVAN'S BLUE TAIL



PALE PINCERTAIL

RED-VEINED DARTER



BANDED DEMOISELLE



EASTERN WILLOW SPREADWING



We know of nearly 6000 species of dragonfly and 18,000 – 21,000 species of butterfly worldwide. There are thought to be many more that have not yet been described.

Countries in Central and South America are home to the highest concentrations of butterfly species in the world – about 3,700 species are found in Peru alone. Part of the reason for this is the wide range of environments and climates in these countries which provide lots of different habitats for species to exist in.

Some species of butterfly migrate, travelling thousands of miles over their short lifespans. The Painted Lady, a common butterfly in Iraq, is one of these migratory species and is found all over Asia, Europe, Africa, North America and Australia.

There are many gaps in our knowledge of Iraq's butterfly and dragonfly diversity. There are around 47 species of dragonfly known in Iraq. There are probably more than 200 species of butterfly, but nobody has studied them properly.

The images to the left show some of the common species of dragonfly in Iraq. You can see some of the more common butterfly species in the provided identification sheet (see appendix p X).

Environment – Butterflies and dragonflies as indicator species

Both dragonflies and butterflies can be important environmental indicators.

ENVIRONMENTAL INDICATORS are species which can be used to monitor changes to the environment. Their presence and/or abundance can tell us a lot about the health of the ecosystem they exist in. This can be valuable as an early warning of a problem, or as a way of measuring change without having to study every species in that environment. Environmental indicator species are typically very sensitive to changes in their ecosystems that might be difficult to detect otherwise.

They are good indicators because of two features of their lifecycles:

- Both have relatively short lifecycles, which means that they respond to change quickly – their populations increase and decrease on short time scales, so we can record them year to year and notice changes.
- Both are closely linked to aspects of their environment throughout their lifecycle – butterflies to their host plants, and dragonflies to water – so changes to these environments affect them a lot.

You can find out more on these insects and their lifecycles by looking at the Dragonflies and Butterflies in Iraq leaflet, see resources box page 20 for link.

Dragonflies as indicators of water quality

Dragonflies have aquatic larvae, which generally rely on good water quality. Consequently they can be used to make rapid assessments of water quality and indicate a healthy ecosystem.

Dragonflies are worthy of conservation in their own right, but their requirements for clean water and a mosaic of habitats mean that if dragonflies are conserved so are many other organisms. They can be used as a flagship not only for aquatic habitats but also for the wider insect world.

For older children this could be linked into the surveys described above. Try doing them at two different sites, one which you suspect to be unpolluted and one polluted. Is there any difference?

Water pollution in Iraq

Water can become polluted from a number of sources.

- Pesticides and fertilizers can be carried off fields into rivers by rain and soil erosion.
- Car washing
- sewage and industrial waste disposal.

Butterflies as indicators of environmental change

Butterflies react quickly to changes in their environments due to their short lifecycles. Throughout the stages of the cycle, they depend heavily on specific plant species for food and shelter, and are deeply affected by climate changes and weather patterns. As a result, they act as very useful indicators of changes such as abundance of certain plants and temperature variation.

Meet a tree

Get to know the trees around the school using touch and smell.

Learn more about local tree species and how they are important habitats for a range of other plants and animals.

THEMES

Biodiversity – Iraq's forests

Environment – Deforestation & restoration

Takes 30 minutes - 1 hour

Materials:

Blindfolds

Method:

Carefully select an area with trees in it. Ensure that there are enough, reasonably sized trees fairly well spaced, and that the trunks, or part of them, are fairly accessible.

Ensure there are no obvious hazards for blindfolded children such as water, holes or thorns. If necessary set boundaries, keeping dangerous areas out of bounds.

Divide the children into groups of 2 or 3. If possible, or if the kids are younger, an adult per group is helpful.

One child wears the blindfold, and the other(s) leads them by an indirect route to a tree.

The blindfolded child feels, smells, even tastes the tree until they think they really know it, and all its shapes and features.

They are then led away, the blindfold is removed, and they try to find 'their' tree. Then the next child has a go. Keep swapping and trying different trees. You could try this in different areas with different types of tree and see if it is easier or harder.

This is a good way to talk about different types of trees, how did you know which it was? How many different kinds of tree can you see? What are the differences between trees? Do you know what they are called?

Ideas for follow-on activities

Trees as habitats

Introduce the idea of trees as habitats. Help the children explore their tree and get to know it better. What signs can they see of animals living on or using the tree? Can they see signs of life on any part of the tree? Make a list and try to guess which animals might have left the signs. How is the tree affected by the plants and animals that live on it?

Bark rubbings

Place a piece of paper on the bark of a tree, gently rub with a crayon. Collect rubbings from each child's tree and create a display in the classroom.

Native tree garden

As a longer term project create a native tree garden in the school grounds. Collect seeds of local trees, germinate them and create a native tree garden. Make sure to use seeds that you find close to the school.

Biodiversity - Iraq's forests

Types of forest in Iraq

Most of Iraq's forests are found in the mountains of Kurdistan or along the margins of the major rivers. The most common types of forest are:

- **Oak woodland** found on the mountains and foothills in Oak woodland found on the mountains and foothills in Kurdistan.
- **Riverine forest** found along the fertile, well-watered margins of rivers.
- Introduced forests of non-native trees grown for their wood or to restore vegetation (to protect the soil or to help trap water).

Woodland habitats

Trees are important habitats for many other animals, from their branches to their roots.

Oak trees, for example, can support over 250 different species of insects and 300 species of lichens, which in turn provide food sources for numerous other animals. Buds and flowers in the spring, leaves in the summer and nuts and berries in the autumn and winter are all important food sources for birds, insects, larvae and small mammals. Trees also provide shelter and nesting sites for birds and animals.

Some signs of animals using a tree for food or shelter might include:

- Scratches on the bark
- Animal droppings or hair
- Fallen bark, fruit, twigs
- Nibbled leaves or fruit
- Nests
- Climbing plants growing up the trunk, or plants growing on the trunk (mosses, lichens, fungi)



Environment – Deforestation & restoration

What is deforestation?

Deforestation is the destruction of naturally occurring forests, and is a global problem. Each year around 46-58 thousand square miles of forest are cleared. About half of the world's tropical forest has already disappeared. The main reasons for deforestation are for conversion to farmland, for commercial logging, and for urban development, but it can also happen unintentionally through wildfires and other misuse of land.

Iraq's forests

The forest area of Iraq is around 8250km². This is about 1.8% of the country.

In the past in many places the forest has been cut and has been replaced by forest steppe or steppe.

30% OF EARTH'S SURFACE IS COVERED BY FOREST

70% OF LAND PLANTS AND ANIMALS LIVE IN FORESTS

16,000 SPECIES WORLDWIDE ARE THREATENED

85% OF THOSE ARE DUE TO HABITAT LOSS

Effects of deforestation

Deforestation can lead to decline in biodiversity. Many of the world's plants and animals live in forests, and their destruction can mean extinction for many species. At the current rate, between ten and fifteen thousand species per year could become extinct.

Other dangerous effects of deforestation include climate change, disruptions to the water cycle, and soil erosion.

Reforestation projects

Forests not only play an important role in maintaining biodiversity but also important in many other ways. For instance, forests "trap" rain water by slowing down the rate of run-off following rain. This allows the water to be absorbed into the ground where it can be used both for plant growth and to top up the water table. In areas where the forests have been lost water rapidly runs off steep slopes, often taking soil with it. For this reason new forests are sometimes planted – particularly in areas where there are problems with water run-off and soil loss. These "reforestation" projects can use either native or non-native species – which do you think is best?



Leaf shapes

A number of activities based around the shapes of leaves

Learn more about local tree species and how to identify them from their leaves.

THEMES

Biodiversity – Identifying biodiversity
Environment – People & plants

Time varies depending on activity

Materials:

Tree leaf shape card (in appendix) • Pencils/pens

Method:

A range of different activities can be carried out using the leaf shape card. What works best will depend on the ages of the children, the location and time available. Here are some suggestions:

Activity 1

Send the children on a treasure hunt. How many of the different types of leaves can they find? Can they find any new ones? This could be done as a project over the weekend.

Activity 2

Give a card to a pair of children and ask them to find the tree a particular leaf came from.

Activity 3

Go through the cards with the children, naming the leaves and drawing attention to their different shapes.

- How many different shapes can you find?
- How many different kinds of edges are there?
- Can you draw some of them?
- Are there any that are bigger than your hand?

- Which is the smallest one? Which is the biggest?
- Rub some of them – do any smell nice? Do any smell horrible?

Ideas for follow-on activities

Identifying plants

You can expand this to use the online plant identification guide for Peramagroon to try and identify any leaves from trees you found that weren't on the leaf card. Or other plants which aren't trees.

Try and identify other species around the school? Use the guide and create a list of local species. Students may well be surprised to discovered how many different species they can find. How many plants live in your neighbourhood?

Create a guide to local plants

Create a book or poster of local plant species. Illustrate this with drawings of the plants or by collecting parts of the plants and sticking them into a book with sellotape or glue. Use the website to give a scientific name the different plants. Do you have local names? What are they used for?

Biodiversity - Identifying biodiversity

What is biodiversity?

Biodiversity is the word used to describe the variety of life on Earth. It includes "living things" on every scale: from the tallest trees and the largest animals to tiny organisms (such as bacteria and protozoa) which are so small that they cannot be seen without the aid of a microscope. It is estimated that there are over 8 million different types of species on Earth. This includes over 250,000 species of plant and maybe 7 million species of animal.

Biodiversity can be used to describe diversity at different scales: for instance, it might be used to describe all the species in the world, or in a country, or on a mountain or even in a school!

Biodiversity also describes the diversity of "ecosystems". An ecosystem is a community of organisms which grow together and interact with one another. Ecosystems can also be large – such as forests or oceans or they can be small – such as all the species found on the trunk of a tree.

Because all species are part of ecosystems the best way to conserve biodiversity is to conserve ecosystems rather than single species. For instance, it is best to conserve a forest rather than try to conserve a particular species which grows in that forest.

Identifying biodiversity

In order to better understand and look after biodiversity we need to know what we have. This is why we need to be able to tell different plants and animals apart and give them names. We do this by looking at the similarities and differences between them e.g. colour, size, shape. As you have done with the leaf shapes in this activity.

Environment – People & plants

Plants are important for all aspects of human life. We depend on them for many things.

- Plants provide us with food - in fact everything we eat comes directly or indirectly from plants. For instance, milk comes from cows which feed on grass. Plants provide us with all our energy - this because only plants can convert the light energy from the sun into food through the process of photosynthesis.
- Plants provide us many things we use in everyday life; for instance, timber for building, fuel for heating and cooking, fibres for cloth (for instance cotton) and many of the constituents of cosmetics.
- Petroleum and natural gas were made from plants that lived millions of years ago.
- Plants produce one quarter of all the medicines used on earth. For instance, aspirin comes from the bark of willow trees.
- The roots of plants help hold the soil together. This is particularly important in the arid regions of the world. When the plants are destroyed in deserts (typically because of overgrazing) then the soil is eroded and blows away. This is the main cause of dust storms in Iraq.
- Plants provide the oxygen that we breathe. All of the oxygen on Earth comes from plants as a by-product of photosynthesis.
- Plants help control climate change by storing much of the carbon dioxide produced from the burning of fossil fuels rather than allowing it to be released into the atmosphere. Increased levels of carbon dioxide in the atmosphere are one of the main causes of global warming.

RESOURCES

Plant identification guide <http://iraqdar-win.org/biodiversity/>

Leaf shape card - see appendix

Appendices

The identification sheet shows a selection of some of the more common butterflies found on Peramagroon.

Butterfly identification sheet



DARK CLOUDED YELLOW



MARBLED WHITE



EASTERN KNAPWEED
FRITILLARY



PAINTED LADY



SAADI'S HEATH



LATTICE BROWN



GREAT BANDED GRAYLING



CARDINAL



WAGNER'S STEPPE BROWN



WHITE-BORDERED GRAYLING



GREEN-STRIPED WHITE

Leaf shapes



CRATAEGUS



MORUS



JUGLANS



SALIX



QUERCUS



CELTIS



PALIURUS



POPULUS



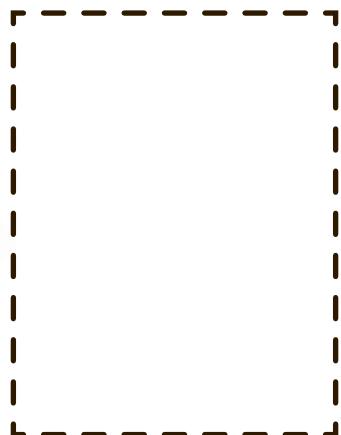
ACER



PISTACIA



FICUS



Did you find any other types of leaf? If so, draw one here.

The poster shows a selection of some of the mammals found in Iraq.

Iraq's mammals



PERSIAN LEOPARD



PERSIAN SQUIRREL



WILD GOAT



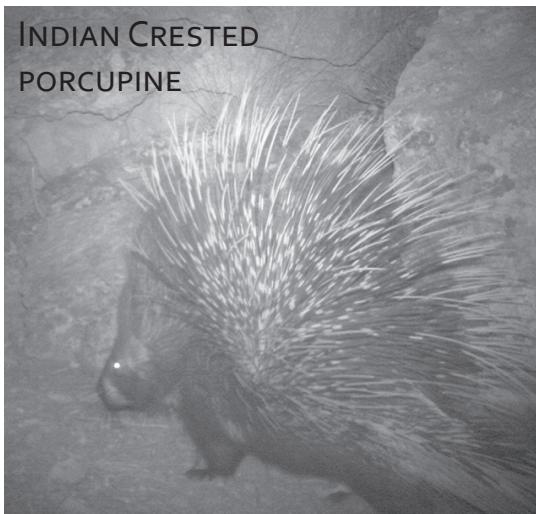
GOLDEN JACKAL



WILD BOAR



WILD CAT



INDIAN CRESTED
PORCUPINE



RED FOX



SYRIAN BROWN BEAR