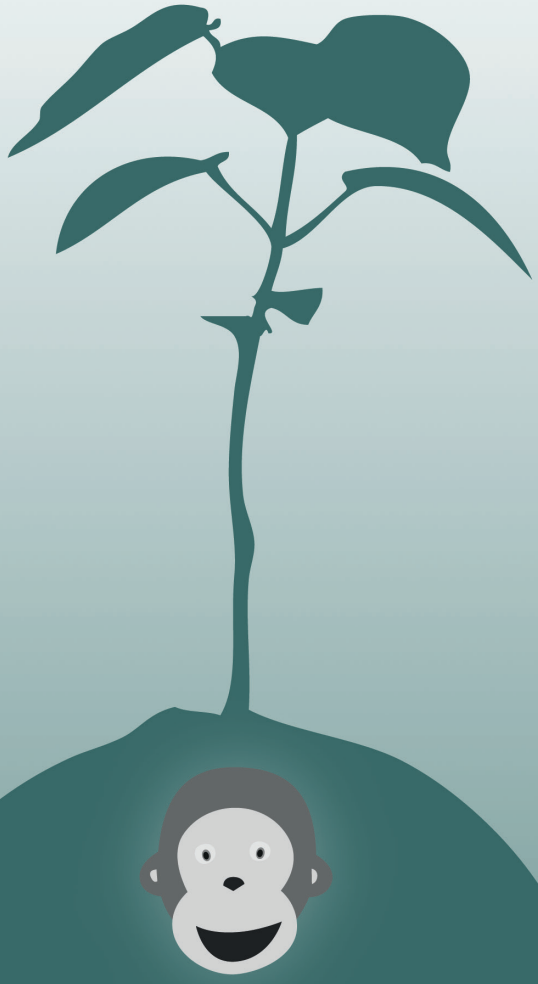


URBAN WORLD ACTIVITY

URBAN SAFARI

Jane Goodall's roots&shoots

URBAN SAFARI

This activity will help students understand some of the obvious and lesser-known creatures which live around their environment, and gain insight as to how these animals provide food for each other.

IN THIS ACTIVITY YOU AND YOUR STUDENTS WILL:

- Learn about the fauna of your local area, and how the ecosystem fits together
- Understand what food chains and food webs are, and the different members of each
- Create a model representing some of the relationships in your local ecosystem
- *Optional:* explore other aspects of the ecosystem, including pyramids of biomass

OBJECTIVES

- Explore your local area, documenting the animals you find along the way. This activity could encompass a simple forage around the immediate environs of your school, or could be expanded to a half-day visit to the beach, wadi or park. Don't be put off if you're city-based – you'll find just as much biodiversity, often more, if you look hard enough!
- Students will gain an appreciation of what's already under their noses but which they may not have noticed. A lot of fauna hides in plain sight, but is only noticeable if you take time to look for it.
- Build a food web or food chain representing some of the animals living in your local area, showing how each depends on the others. This should foster an understanding of the importance of all animals in an ecosystem.

WHAT DO I NEED TO MAKE IT WORK?

- Model-making equipment: cardboard, paper, tubes, pipe cleaners, tissue, string, tape, glue, paints…
- *Optional:* you could provide fruit and vegetables, and toothpicks & accessories, and students could make their models out of fruit & veg.

WHAT THINGS WILL MY STUDENTS CREATE?

- A written record of the animals they've found on their urban safari, including how these animals can be classified.
- A physical model of a food chain or food web, including some or all of these animals.

URBAN SAFARI PREPARATION

Lots of native wild animals can be found across the UAE, but different species will be found in different environments.

You'll focus on your own environment, which may be urban, suburban, coastal, mountainous, city, high-rise or something else. Different environments may favour insects and other arthropods, or reptiles, or mammals; for example, you're unlikely to directly observe large wild mammals downtown, but you'll find plenty of arthropods, as well as scavengers and well-hidden reptiles.

The scope of your safari will depend on your situation, but you can carry this activity out even in a small urban environment or a city: you'll still find plenty of insects (flies, butterflies, bees, dragonflies), arachnids (spiders, scorpions) and lizards. You could visit the school garden, a local park, or the beach.

PLAN YOUR RESEARCH AREA

If you are city-based, your route could end at a local park, but students can still carry out their research on the way to the park. They may even find that there is more diversity of small animals living in the city streets than at the park itself. You'll probably want to work at ground level though, as you'll find a more diverse range of animals.

You may want to involve the students with the planning, and elicit their ideas on where they may find a greater range of biodiversity, based on their previous experiences and knowledge of their locality.

SUGGESTED LOCATIONS

Found a great location? Add it to the online activity! Details are at the end of this activity.

Umm Al Emarat Park Corniche area Al Wathba Wetland Reserve Eastern Mangrove Lagoon Saadiyat beach Khalifa Park Delma Park Lulu Island - unique feral cat colony makes for an unusual food web	Abu Dhabi
Al Zorah mangrove area	Ajman
Zabeel Park Dubai Miracle gardens Beaches	Dubai
Wadi Wurayah	Fujairah
Khatt Springs Hajjar mountains	Ras al-Khaimah
Beaches Corniche area Sharjah parks Sharjah Wildlife centre Sharjah Natural Park Al Meleiha area Elfaya protected area	Sharjah
Umm Al Quwain Mangroves Wadi Al Batha	Umm al-Quwain

DISCUSS HOW TO FIND THE ANIMALS IN THE CHOSEN LOCATION

Students will need to understand that they'll need to look carefully and thoroughly. There is likely to be a wealth of invertebrate life present in soils and around plants that won't be obvious unless they search carefully for it.

Show your group photos of the type of animal they may expect to find locally. Discuss any safety issues which may arise from poisonous or venomous species. It's likely that you will want to avoid handling any animals directly.

Red palm weevil. Marco Petrotta (Wikipedia). License: Creative Commons Attribution 2.0.

Leaf-toed gecko. Thomas Brown (Wikipedia). License: Creative Commons Attribution 2.0.

Some common animals of the UAE can be found here: goo.gl/Pn648B – see links on page specific to deserts, coastal areas, wadis etc.

The UAE Birding website has a great collection of beautiful photographs covering a wide range of animals, broken down by classification (see below): goo.gl/A9gh9R

Some animals may not be observed directly; for example, Arabian Red Foxes, which may be present in your part of the UAE even if you're in a large city, are unlikely to be observed directly, but you may find evidence of them such as faeces, or signs of their activity, such as damaged refuse sacks.

Crimson-speckled footman. Bernard Dupont (Wikipedia). License: Creative Commons Attribution 2.0.

CLASSIFICATIONS

For each animal picture you show, ask them to think about what type of animal it is. Details can be tailored to the age and ability of the group.

If you print some of the UAE Birding pictures (see link above), students could be given free rein to group the pictures into whatever categories they think are appropriate. They may choose colour, or number of legs, or habitat; you can lead them towards thinking of the Linnaean classification of organisms.

For example, younger children may want to group animals into these categories:

- **Arthropods** – small animals with a hard exoskeleton and jointed bodies, including insects and spiders.
- **Reptiles** – cold-blooded animals with scaly skin and no hair.
- **Mammals** – warm-blooded animals which normally have fur.
- **Fish** – marine animals that can live completely underwater.
- **Birds** – feathered animals with wings instead of forelegs.

For older or more advanced groups, categories may be broken down further, for example:

- **Insects** – arthropods with six legs.
- **Arachnids** – arthropods with 8 legs (including scorpions and spiders.)
- **Crustaceans** – almost exclusively marine arthropods including crabs and lobsters. (Woodlice are a non-marine crustacean.)

KidZone Science has an online resource which explains the characteristics of the main animal classes: goo.gl/7DjDPT

As a reminder, you may want to issue this information sheet: goo.gl/AWjrIr

URBAN SAFARI EXPEDITION

Decide in advance on a suitable safari area, which, depending on the nature of the group and the type of surroundings may be limited to the school property, or may encompass your block or neighbourhood. Give groups a time limit (30 minutes to 2 hours) to explore their area, capture data and report back.

Students should aim to find as many species as they can, and record:

- What animal they think it is (if known)
- Classification of animal (see above)
- Number of each animal observed
- Appearance of animal (by drawing, digital photos or camera phones)
- A note of the environment the animal is living in

A template for recording results can be found here: goo.gl/1xPYJ9 or students can make their own.

URBAN SAFARI COMPETITION (OPTIONAL)

You may choose to award small prizes for the individuals or groups that find the largest animal, the smallest animal, the most abundant animal and the weirdest animal.

Food Chains

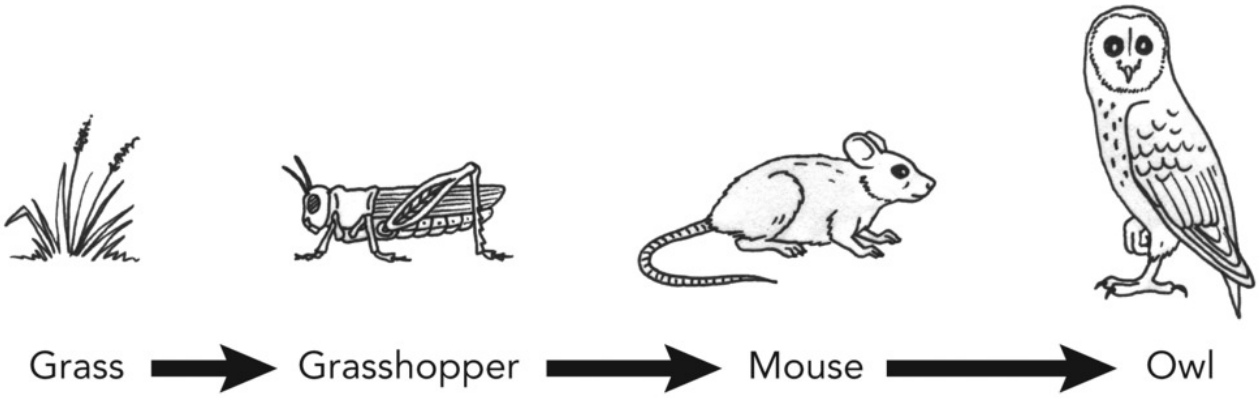
Ask one of the group what they last had to eat. Write their name at the top of a whiteboard, and the item of food below them. Draw an arrow from the food to the name.

Explain that the arrow represents the flow of energy; they got some of their energy from the food.

But where did the food get its energy? The answer of course depends on the food. If it was a cheese sandwich, then you could pursue the idea that the cheese came from cow's milk, and the cow got its energy from grass, and the grass got its energy from the sun. Add these onto the whiteboard, with arrows representing the energy flow.

(At this stage you don't need to worry about sticking to animals or plants from the UAE; the chances are that any food chain involving humans will draw from outside your local region.)

Explain that this is a **food chain**. It shows how energy moves around an ecosystem, and gives us ideas about how changes in an ecosystem can have an effect on other elements. Here's a simple example:



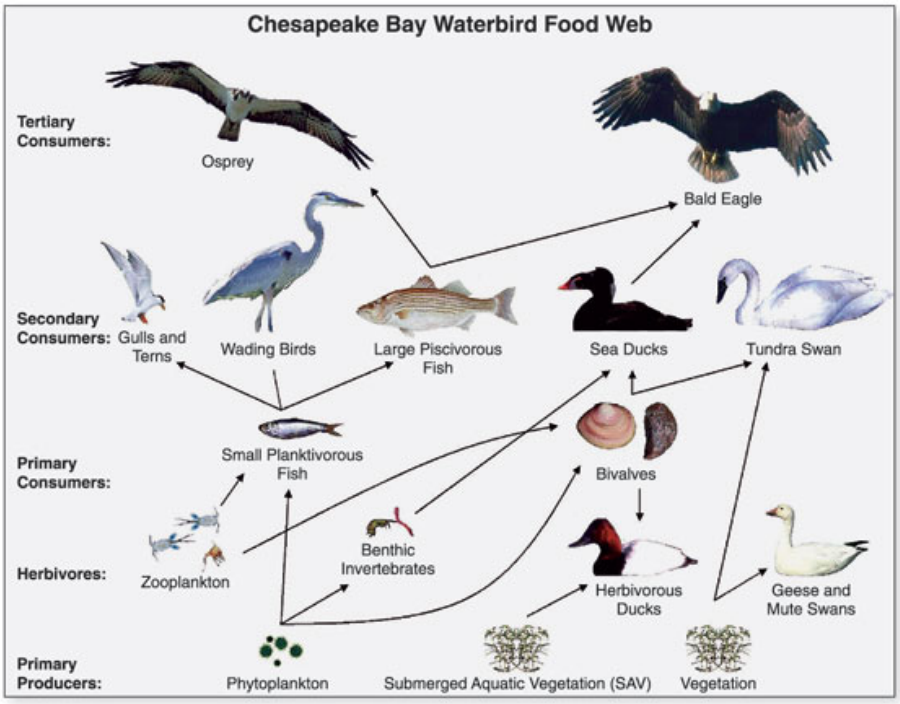
You can find a short but clear online explanation of food chains here: goo.gl/IKtTBV There is also a Food Chain Game linked from that page, which will test students' understanding.

Food Webs (Optional)

Once students are happy with the concept of a food chain, introduce the idea of a ***food web***. In the example involving the cow above, you could prompt them to think about what else eats cows. Wolves perhaps! Then add a wolf to the board, with an arrow from the cow. What else eats grass? Sheep, goats, horses… But wolves also eat sheep, so there will be an arrow from the grass to the sheep, and the sheep to the wolf.

Pretty soon it will be apparent that everything in the ecosystem can be connected to everything else in a food web.

Here's a more complex example, which also shows that food webs are very specific to certain environments, because of the specific ecosystems:



A page explaining food webs, with several easy-to-understand examples, can be found here: goo.gl/eoI10w

FEATURES OF FOOD CHAINS & FOOD WEBS

Give the students the following terms and ask them to research definitions, from a library or the Internet. They will need these later.

- Predator
- Prey
- Consumer
- Producer
- Top Predator
- Decomposer
- Herbivore
- Carnivore
- Omnivore

If you'd rather point them in the right direction, this page will be useful: goo.gl/tVjBiS

UNUSUAL FOOD WEBS (OPTIONAL)

Ask students where the energy in any food web ultimately comes from. They'll work out that it's nearly always the sun. However, some students may be able to think of a very small number of ecosystems where the sun isn't the source of energy. They could research mid-ocean ridge ecosystems and report back to the rest of the class. There are other exotic ecosystems (for example, bacteria living in basalt deep beneath the continental USA), but these ecosystems are far more limited in scope; mid-ocean ridge ecosystems will yield a much more comprehensive food web.

MODEL FOOD CHAIN OR WEB

Prepare the group to create a physical model representing the animals they have found in your locality, in the form of a food chain or food web.

It's likely that they may want to include other animals which they did not observe. They may have ideas of what these animals may be, based on their own experience, or on further research.

Each animal should be modelled, although they could use the photographs they captured earlier if this is not practical. Due to the nature of the task, it's likely that they will need to work in groups.

Traditional modelling materials can be used: cardboard, paper, tissue, tubes, string, glue, wool etc. Making animals out of vegetables (see pictures, right) can be fun and unleash a lot of creativity. Of course, the models may not last quite so long!

The relationships between the animals in the food web/chain should be shown using arrows. For each animal they should annotate where they found the animal, what type of animal it is (see classifications above), the role it performs in the food web (see Features, above) and any other information they think is relevant.

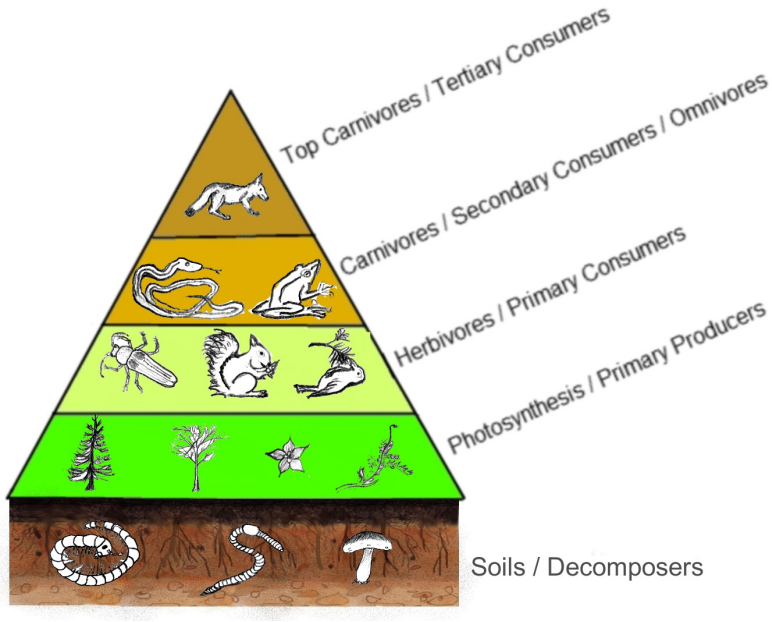
PRESENTATION

If you have several groups and several models, then:

- If the models are similar, ask the groups to compare models and see if they agree with each other's findings – for example, did they classify the animals in a similar way, and did anybody find predator-prey relationships that may not have been quite so obvious?
- If the models are different, then each group can present the main features of their model to the other groups

LEARN MORE

This activity can be extended by looking at **pyramids of biomass**. By picking an animal towards the top of the food chain or web they created, students can consider how many of the animals below it would need to survive for its lifetime, or a year.



By estimating the mass of each animal, they can then build a spreadsheet for each member of the food web / chain showing the biomass required at each level, and the number of animals this equates to.

This may reveal some hidden secrets about different levels of the pyramid. Within your environment you may conclude that, in order to support the visible predator population, there must be more producers than you've observed – maybe there are sources of energy within the food chain which aren't obvious. For example, Arabian Red Foxes may be getting a lot of their energy from city waste such as discarded food. Where does that fit into a food web?

They could even calculate the efficiency of each stage of the process: mass of predator divided by total mass of prey, x 100%. This may vary a lot with different predator/prey relationships. Can they see a pattern for different types of animal, for example mammals vs reptiles?

For this task it may be best to stick to a single food chain rather than a more complex web.

LEARN EVEN MORE

All elements of a food web affect all other elements. For example, when predators die off through sickness, prey animals can thrive, but then producers further down the web may suffer from overgrazing.

The simulation linked from this page allows students to explore what happens to populations in different parts of a food web when the dynamics change: goo.gl/m1bH1W

Particularly relevant at present is the impact of **human interference** on food webs. BBC Bitesize has a good summary here: goo.gl/5ZRUzU

In the UAE, the Red Palm Weevil (picture previously shown) is a significant pest, which can damage palm trees to the point at which they are destroyed, or must be uprooted and burned. There are a number of

ways that the pest can be dealt with, including using harsh pesticides. However, these pesticides may then kill species which would have acted as food for animals further up the food chain, including in watercourses where they may end up as agricultural run-off, and in animals such as birds which eat fruit from the palms where the pesticide may be concentrated.

Students could consider the particular effects of Red Palm Weevil control on the food web they have modelled, using the simulation (above) as an introduction to the concepts they will need. Methods of Red Palm Weevil control used in nearby Saudia Arabia can be found here: goo.gl/TrzoQN

Problems can also be caused by build-up of pesticides and other harmful chemicals in living animals, which accumulate towards the top of the food chain (toxic metals in large predatory fish being another example of this).

Non-pesticidal control methods, such as pheromone traps, can avoid many of the problems associated with pesticide use.

There is a smartphone game which allows further exploration of the red weevil problem: goo.gl/eQr4QD

TELL US HOW YOU GOT ON

When your models are finished, we'd love to see photos of them and hear how your safari went! If you already have an account you can upload a story with images to Roots & Shoots UAE (www.rootsnshoots.ae) and create a story with an online gallery on the website. If you don't already have an account then just send us an email to MrH@rootsnshoots.ae and we can set you up.

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