TUNNELWORKS
KS2 SCIENCE LESSON 2 (ESSENTIALS)
TEACHERS' NOTES

About this lesson

In this lesson pupils explore habitats along the River Thames. They identify how a habitat supports the species it contains, classify a range of river animals and then identify how some animals form a food chain. Pupils consider the impacts human activity can have on a river environment and identify some benefits from the Thames Tideway Tunnel, before considering how they can play their own part in preserving habitats along the River Thames.

Learning outcomes

Students can:

- Classify river animals into invertebrates and vertebrates (fish, amphibians, birds, mammals, reptiles)
- Sort animals into a food chain including producer, consumer, secondary consumer and predator
- Identify how humans may alter natural habitats, with positive and negative consequences
- List some positive impacts the Thames Tideway Tunnel is predicted to have on habitats

Curriculum links

KS2 Science

- Year 4 — Living things – classification, changes to environments
  Animals – food chains
- Year 6 — Living things – classification and characteristics

What you will need

- KS2 environmental science lesson presentation
- KS2 worksheet
- You will need class ICT access if you would like pupils work in pairs or small groups to complete the two drag and drop activities.

Preparation

Review the lesson plan below and the KS2 environmental science lesson presentation. Adapt the content to suit your pupils' ability. It's helpful if pupils have already been introduced to classification and food chains.

Time (60mins)	Teaching activity	Learning activity	Assessment for learning
5 mins	**Starter:** Ask pupils to form pairs or small groups and brainstorm a list of any plants and animals they think or know live in the River Thames. Share ideas.	Pupils generate and share ideas for wildlife that lives in the Thames.	Suggestions, questioning.
5 mins	**Whole-class:** Ask pupils to describe what the habitat might be like at three locations along the River Thames: upstream near the source, in the City, and downstream near the sea. What kind of natural environment might pupils expect to see? Show slide 1a to 1c and review the three habitats. Explain that one helpful way of understanding how habitats and species change along the river is to classify them. Invite pupils to explain what classification means and to suggest some groups into which animals might be classified.	Pupils imagine a habitat along the River Thames and describe some of its characteristics. Pupils can identify differences between upstream, in the City and downstream near the sea.	Verbal descriptions, questioning. Verbal descriptions, questioning.
10 mins	**Whole class or small groups:** Show pupils the classifications and range of animals on slide 2. Show slide 3 Ask pupils to classify some or all of the animals. Share ideas. (NB there are no reptiles in the list.)	Pupils explain the meaning of classification. Pupils drag and drop each animal into its correct classification.	Verbal answers. On-screen work, questioning, discussion.
10 mins	**Small groups:** Ask pupils to identify what living things require and how they might get these from their habitats (shelter, food etc.), recording their ideas on the worksheet. Share ideas and help pupils identify that for some of the species shown, their food sources are also present (e.g. herons eat fish). But for some (like snails or worms) their food sources are missing from the slide.	Pupils discuss, write and share ideas for what living things require (e.g. food, shelter, water, the right temperature etc.) Pupils identify that primary consumers need producers – plants.	Written work, discussion, questioning. Verbal answers.

	Show slide 4 and ask pupils to spot the three additional species; plants.	Pupils identify water mint, plant micro-organisms, and reeds.	Verbal answers.
10 mins	**Whole class or small groups:** Ask pupils to work in their groups to create one or more food chains using the species on slide 4, recording their ideas. Share examples. **Whole class:** Invite pupils to suggest, using examples, whether human activity along the River Thames might have negative (unhelpful) impacts on habitats and species, positive (helpful) impacts, or a mixture. Ask pupils to write down their ideas on the worksheet. Show examples on slide 5. (You may wish to also point out that squeezing the river into a smaller space by building along the banks and into the river makes the habitats and species in it more vulnerable to change. (e.g. the Strand is named as such because it used to be the strandline of the river).	Pupils drag and drop species to form a food chain and copy their idea onto their worksheet. Pupils identify negative and positive impacts and write these on their worksheet.	On-screen and written work. Written work, discussion, questioning.
10 mins	**Small groups:** Ask pupils to briefly discuss how these impacts might change habitats so they can't provide life's essentials so well, and then to share ideas with another group.	Pupils share ideas on how human activity might change a habitat (e.g. loss of shelter, loss of producer plants, lack of oxygen in the water, rubbish that harms animals etc.)	Verbal answers, discussion, questioning.
10 mins	**Plenary:** Show the video on slide 6. Identify as a class how the Thames Tideway Tunnel will help improve habitats downriver in the tidal Thames. Show slide 7. Ask pupils to suggest what they can do personally to make sure they don't have a negative (unhelpful) impact on habitats along the River Thames.	Pupils identify examples of how the Thames Tideway Tunnel will help the tidal Thames by controlling pollution. Pupils can share ideas for actions to prevent pollution or habitat damage.	Verbal answers, discussion, questioning. Verbal answers, discussion, questioning.

Differentiation

Easier	Harder
Select species to classify or to drag into a single food chain (e.g. reeds, tentacled lagoon worm, mullet, harbour porpoise). Pupils can omit secondary consumers from their food chain.	Starter: pupils can think of any differences in the species they might find upstream near the source, or downstream near the sea. Pupils classify all animals and create multiple food chains.

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KS2 SCIENCE
DIG DEEPER

Soil and bird survey

Pupils can complete a simple soil and bird survey in your school grounds to identify the animals present and consider local food chains for wildlife.

Soil

Pupils can search for: worms, slugs, snails, woodlice, centipedes and millipedes, spiders, beetles, ants, earwigs, maggots and grubs (invertebrate larvae) and caterpillars.

Pupils will need a ruler, string, pencils, spade, small trowel (or metal cutlery is fine – sterilise after use) plastic tubs and a plastic tray, magnifying glasses and a guide to soil invertebrates. Working in groups, pupils should:

- Measure a 50cm x 50cm square and mark using pencils and string.
- Dig out the top 5cm and turf, and lay to one side.
- Use their unaided eyes and the magnifying glasses to find any invertebrates in the turf and top layer. Pupils can put soil in the plastic tray to help break it up and see what they find.
- Sort any finds into plastic tubs.
- Repeat for the 5cm layer of soil revealed, using the trowel or cutlery to gently explore the soil and place in the tray, remove invertebrates and sort into plastic tubs.
- Count the numbers of each type of invertebrate they find.

Birds

Pupils can spot pigeons, blackbirds, crows and other corvids, robins, blue tits and other tit family members, finches, sparrows, starlings, magpies, gulls and other birds.

Pupils will need binoculars and a guide to birds. Working in groups, pupils should:

- Set a time to monitor birds on your school fields or another location with grass, trees and shrubs.
- Using their unaided eyes and the binoculars, spot how many of each bird they can see in 15 or 30 minutes, making sure not to double-count birds that move around.

Data

Pupils can present their data as tally charts and bar charts. They can repeat their survey at other times of year to see how species vary across the seasons. Pupils can think of other visitors to their school grounds, such as small mammals like mice, squirrels, foxes and badgers, and starting with the plants in your grounds, think of the food chains that might exist.

Creative writing

Pupils can complete a creative writing activity to describe river habitat or habitat in your school grounds. They could write from the point of view of a visiting human or an animal that lives in that habitat. Pupils can write about the importance of protecting habitats that are havens for wildlife, keeping them safe, clean and unpolluted, (including those on land and along the River Thames).

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KS2 SCIENCE
CREST SUPERSTAR ACTIVITIES

Create a model river habitat - pupils

Rivers are amazing places! They are home to lots of different plants, insects and other invertebrates like snails and worms, fish, amphibians, birds and mammals.

Each one of these needs a place to live – its habitat. Every habitat is home to lots of species. A river can include many different habitats. These change as the river grows during its journey from source to sea.

It would be great to be able to visit a river habitat and find out what lives there. But this isn't always easy!

Your challenge

Build a model river habitat using scrap materials. Create the river bed or bank then add plants and animals to bring your habitat to life! Label your model to show which species your habitat contains.

Ideas to get you started

- Where along the river will your habitat be? Near the source? In the City? Downstream near the sea?
- Will you model the river bank or riverbed?
- What will it be like? Muddy? Sandy? Gravelly? A mixture?
- How can you find out about this habitat?
- What plants and animals will live there?
- What materials and colours will you use?

Sharing your ideas

Show your habitat to the rest of your class and tell them about it. Explain what it's like there and the plants and animals you might find. You could even share some ideas about the food chains that might exist in your habitat.

Create a model river habitat – organisers

What do I do?

1. Help each pupil choose a habitat. There are three examples on slide 2 in the environmental science lesson.
2. Pupils should imagine or research what this habitat looks like and first create the riverbed or river bank.
3. Help pupils identify some species to put in their model. Pupils may be able to recall some ideas from memory or may wish to research some online. Here are some example species from the KS2 environmental science lesson to get you started:

Upstream near the source:	In the City:	Downstream towards the sea:
Water mint Freshwater snail Dace Kingfisher Water vole Lamprey Bat Heron	Micro-organisms Tubificid worm Dunlin Black-tailed Godwit Wigeon Atlantic salmon European eel	Reeds Tentacled lagoon worm Mullet Harbour porpoise Dover sole Shellfish European otter Seal

   Pupils can search for each of these species online to find images that will help them make their models.
4. Remind pupils to label each species to help people understand their model.
5. Some pupils may also want to talk about a food chain in their model habitat.

Resources

This is a flexible activity and can use whatever materials you have to hand or which pupils can bring to school. These could include new or scrap:

- Coloured card and paper
- Textured or reflective card
- Coloured transparent sheet
- Tissue paper
- Fabric remnants
- Pipe cleaners
- Wool
- Coloured pens, pencils and paints
- Glue, tape and scissors

Pupils could make their habitats on flat sheets or for a 3D effect, in a cardboard box.