NATURAL HISTORY MUSEUM

Urban tree survey: lesson plan

Activities	Resources
Part one – What trees do we know? **Discussion:** (10 mins) Students are asked to brainstorm all the tree names they can think of as a group. Pictures can be used to prompt students. • What tree names can you think of? • What do these trees look like? • What do their leaves look like? • Do you have trees in your gardens or local parks? What are they? **Activity: Classifying leaves** (25 mins) Students are divided into groups of 3-5 and each group is given a selection of leaves. Students look at and discuss the different features of the leaves and are asked to group (classify) them in as many different ways as possible, recording the different ways of grouping as they go. For example: Leaf shape, leaf edge, leaf surface, leaf colour. • Do you recognise any of the leaves? • What are the differences and similarities between the different leaves? • How could you group the leaves? (What features can you use?) • What features can't you use? (highlight features common to all the leaves they have in class such as a stem, veins). **Extension opportunity** – Introduce students to the term 'lobe' as a classifying feature. On the leaf chart examples such as field maple, hawthorn, oak and sycamore leaves have clear examples of lobes. Another classifying feature on trees like ash, elder, horse chestnut, and rowan are 'leaflets', pairs of smaller leaves either side of a central leaf stalk. **Discussion:** (10 mins) Groups share the ways they grouped (classified) their leaves and what they found. What features did they find useful to classify leaves and what were not (as all their leaves have them). **Curriculum links:** (National Curriculum 1999) Key Stage 2 Science **Sc2 4b** Pupils should be taught how locally occurring animals and plants can be identified and assigned to groups. (National Curriculum 2010) Scientific and technological understanding **M11** Children should be taught to identify, group and select materials using properties and behaviours that can be tested, and identify and group living things using observable features and other characteristics.	Resource 1 - • Downloadable leaf chart showing common tree species found in the UK. • An assortment of 10-12 different leaves collected from the school grounds or local area for each group. • Paper, pencils, pens and coloured pencils. Key vocabulary: Stalk, edge, smooth, saw-edged, wavy, spiny, surface, hairy, smooth, prickly, shape, long, narrow, oval, pointed, round, heart-shaped, lobed, lobes, leaflets.








Activities	Resources
Part two – The Natural History Museum Urban Tree Project **Activity: Introduction to the project** (15 mins) Students are seated and told of an exciting new project, the 'Urban Tree Project', at the Natural History Museum that they can be a part of. A letter that Bob has personally written to students involved in the project is read and specifically outlines how the information (data) they collect will be used and why it is so important they take part – they will be helping scientists to understand the biodiversity of UK tree species. Students are introduced to the leaf chart they will be using in this lesson and also out in the field. It is important to highlight that the features Museum scientists use to identify the leaves are the same as those the students themselves decided to use to group the leaves in the last lesson – they are doing what real scientists do! • Why is it important to be able to identify leaves (and therefore trees)? • What words/features have the scientists used in the leaf chart to help identify the leaves? • How can the information (data) we collect help this project? The species name can be explained to students again using the analogy from Bob Press's letter which uses their own names as an example. Scientists give living things a scientific name comprised of a genus (group) name which is like their surname, and also a species name which is like their first name. Scientists name in this way to prevent the confusion of the many common names a species can be given. For example, 'daddy longlegs' is used as a common name for three different kinds of animal – a crane fly, a spider and another kind of arachnid (eight-legged arthropod). A scientific name for a species is the same no matter where you are in the world. Latin names are also useful because if you know that two species are in the same genus you know that they will share some characteristics e.g. leaf shape. This is like human names, which reflect family relationships. Two family members who share a surname will often look alike. **Note about genus/species names on the leaf chart** For most of the leaves on the leaf chart we have only given the genus name in latin, not the latin species name (which has two parts). This is because it can be difficult to tell the difference between species within these genera just by looking at their leaves. If you identify a tree as belonging to one of these genera (e.g. oak - latin genus name: Quercus) that is still useful for the survey and you can still upload the result to the website.	• Interactive Whiteboard (IWB) loaded with: 1. Letter from Bob Press to students outlining why he needs their help. 2. Leaf chart. Resource 2 – • Letter from Bob Press to students. Resource 1 – • Copies of the downloadable leaf chart.
Optional literacy activity: The letter can be used in a guided or independent reading activity with the comprehension questions provided in resource bank 6 (Literacy ELL 4). Teachers may also opt to ask students to write a letter to reply to Bob Press (Literacy ELL 3).	**Optional literacy activity:** The letter from Bob Press includes a list of sample questions that can be used in a reading comprehension activity.
Activity: Identification of leaves (15 mins) Students are divided into groups of 3-5 and each group is given the same selection of leaves as the previous lesson. Each group then consults their copy of the downloaded leaf chart and discusses each leaf's features, then identifying the tree the leaf comes from. Students record their identification of each leaf in a format of their/the teacher's choice. Once the groups have finished identification of all leaves, then the whole class shares their answers and discusses any misidentifications and how this could have happened.	Resource 1– • Copies of the downloadable leaf chart. • The assortment of 10-12 different leaves collected from the school grounds or local area for each group. • Paper, pencils and pens.

Activities	Resources
Part two – The Natural History Museum Urban Tree Project **Curriculum links:** (National Curriculum 1999) Key Stage 2 Science **Sc1 4b** Pupils should be taught how locally occurring animals and plants can be identified and assigned to groups. **Sc1 4c** Pupils should be taught that the variety of plants and animals makes it important to identify them and assign them to groups. **Optional literacy activity** – Key Stage 2 English **En2 2b** Pupils should be taught to look for meaning beyond the literal. **En2 3a** Pupils should be taught to obtain specific information through detailed reading. **En2 9a** The range should include diaries, autobiographies, biographies, letters. **En3 1e** Pupils should be taught to use features of layout, presentation and organisation effectively. **En3 11** The range of readers for writing should include teachers, the class, other children, adults, the wider community and imagined readers. (National Curriculum 2010) Scientific and technological understanding **M11** Children should be taught to identify, group and select materials using properties and behaviours that can be tested, and identify and group living things using observable features and other characteristics. **L16.** Children should be taught to explore and explain practical ways in which science can contribute to a more sustainable future. **Optional literacy activity** – Essentials for learning and life: Literacy **3** Children learn how to write, present and broadcast a range of ideas, in a wide variety of forms and with awareness of different audiences and purposes; communicate these ideas with accuracy on paper, on screen and through multimodal texts. **4** Children learn how to analyse, evaluate and criticise a range of uses of language in order to draw out meaning, purpose and effect.	








Activities	Resources
Part two – The Natural History Museum Urban Tree Project **Field survey preparation** (10–15 mins) The next lesson's activities are explained to the students so they are prepared for the field survey. Explain that they will be working in teams of three and each have a role to fulfil (badges can be used if desired). Roles and role badges are a great way to give each student certain responsibilities to ensure the task is completed with minimal complaint. These roles can be explained as: Recorder – responsible for recording all information on the recording sheet such as sketching the map, sketching the leaves, marking down the features of each leaf and making notes like wildlife seen near each tree. Identifier – responsible for holding the leaf chart and reading out the descriptions to their group so they can identify the leaf correctly. Manager – responsible for overseeing the team, holding the plastic bag of leaves, discussing things with team members and offering assistance when needed. The recording sheet is shown and discussed with the students so they are clear with what they are to do. The map is very important so they can identify the same features and trees on Google maps later. Sketching each leaf on the sheet is important so that when they return to class later they know which leaf out of their plastic bag belongs to which tree.	• IWB loaded with recording sheet. • Paper, pencils, rulers and pens.
Optional activity: To prepare the students for the mapping part of the activity, teachers may opt to ask students to map their classroom or another familiar environment, labelling prominent features.	
Curriculum links: (National Curriculum 1999) Key Stage 2 Geography **2e** In developing geographical skills, pupils should be taught to draw plans and maps at a range of scales. (National Curriculum 2010) Mathematical understanding **L21.** Children should be taught to use and make maps, scale models and diagrams for a purpose.	








Activities	Resources

Part three – Field survey for the project

Activity – Surveying local area and identify trees (40-50 mins)

Before leaving the classroom, an initial discussion will confirm that each student knows their role within their team, and that they are to map, identify and collect leaves from trees in the surveyed area and behave responsibly. Students can be instructed that any unknown leaves collected can be identified later online or using books back in the classroom.

Students are taken out onto school grounds or a local park to collect leaves, recording information and identifying them with their recording sheets and leaf charts as they go. Digital photos of the trees will also be needed. (Students may also be instructed to take notes and comments on any wildlife seen on or around the trees if any extension activities involving food chains/webs or biodiversity are planned for later stages).

One student (the recorder) will need to make a sketch birds-eye-view of a map of the area and make notes about where the trees were positioned (the other two students helping by giving them information). The recorder will also need to make notes about any wildlife they see around the trees and mark on the map also.

Note: If a digital camera per group is not possible then the teacher can take responsibility for taking photographs of each tree identified by the class in the surveyed area.

Note: In many cases students will find leaves that are not on the leaf chart. In this case the teacher may choose to help the student identify the leaf using books or websites (including the interactive tree key on the Urban Trees Project web pages).

In some cases students will find a specimen that is on the chart but have difficulty deciding which species/group from the chart it is. Some leaves are superficially similar.

In both of the above situations, the teacher can choose to focus the student on finding alternative specimens that they can identify. The unknown specimen can be kept for further research or simply as something to note when presenting results.

Curriculum links:

(National Curriculum 1999)

Key Stage 2 Science

Sc1 2e Pupils should be taught to use simple equipment and materials appropriately and take action to control risks.

Sc2 5b Pupils should be taught about the different plants and animals found in different habitats.

(National Curriculum 2010)

Scientific and technological understanding

M1 Children should be taught to explore and investigate in order to collect data, analyse it and identify patterns.

L2 Children should be taught to make and record accurate measurements and detailed observations, presenting them appropriately, and analyse, interpret and apply them.

Resource 1 –

- Copies of the downloadable leaf chart.

Resource 3 –

- Printable recording sheet for field survey.

For each team:

- 1 recording sheet.
- 1 clipboard.
- 1 copy of leaf chart.
- Pencils and erasers.
- Named plastic zip lock bag for leaves.
- Role badges (optional).
- Digital camera (optional).

Resources for identification of species:

1 Try the interactive tree key at www.nhm.ac.uk/trees.

2 Look in a tree guide book. E.g. Trees of Britain and Europe by Bob Press.

3 Upload photos of your specimen and ask nature enthusiasts for help on the Museum's online tree forum. Go to www.nhm.ac.uk/trees and follow the link.








Activities	Resources
Part four – Mapping the surveyed area **Information and Communications Technology (ICT) Activity: Mapping and locating identified trees** (50 mins) Students sit at a computer in their surveying teams and search for the surveyed area using Google maps. Once they have located the area correctly and 'zoomed in' enough to clearly show the trees in there survey area, students are encouraged to discuss together what they identified each tree as and familiarise themselves with the other features they can see. • What information can you enter to search for the area we surveyed? • Have you magnified (zoomed in) the area enough? • Can you see the trees you identified on the Google map? Each team needs to print off a copy of the satellite map of the surveyed area that fits onto a printed A4 page. **Note:** Students will need to be briefed that they will have to look at the 'satellite' picture of the area and not the 'maps' picture on Google maps as this will show a satellite photo of the area and clearly show features such as trees and buildings. If printing the map is too time-consuming or difficult for the students, they can find the satellite map of the area on the computers, but the teacher can have a printed copy ready to give them. **Optional -** Students may want to print off photos of the identified trees to include in the poster activity or the teacher may have these ready for them.	• Computers. • Printer facilities (black and white or colour) • A4 printer paper. • Each team needs their recording sheet completed in the field survey.
Activity – Poster of surveyed area and identified trees Students make a poster in their teams of the surveyed area and trees they identified. The printed Google map can be placed on the poster with the collected leaves, digital photos of trees and their identification notes and labels (in a format they wish to present it).	Poster materials for each team: • 1 x A2 sized sheet of card. • Scissors and glue. • Printed Google map of area. • Collected leaves from survey. • Printed photos of each identified tree. • Rulers, Pencils, pens and coloured pens.
Curriculum links: (National Curriculum 1999) Key Stage 2 Science **Sc1 2h** Pupils should be taught to use a wide range of methods, including diagrams, drawings, tables, bar charts, line graphs and ICT, to communicate data in an appropriate and systematic manner. (National Curriculum 2010) Essentials for learning and life: ICT Capability **1** Children should learn to find and select information from digital and online sources, making judgements about accuracy and reliability. Mathematical understanding **L21** Children should be taught to use and make maps, scale models and diagrams for a purpose.	

Activities	Resources
Part five – Uploading the information **Activity – Upload information onto Natural History Museum website** **Option A** (20 mins) – If uploading the data onto the website is too difficult for your students to do individually, you may choose to upload the data as a class. The website can be loaded onto the IWB and the information uploaded by the teacher or a student volunteer. **Option B** (50 mins) – If students are able to upload data themselves, the teacher may opt to model one example of uploading data on the IWB to the class group, and then each group can input information themselves. Each team could input all the information they collected, or perhaps be delegated one type of tree to input for the whole class. **Note:** Multiple data sources can be entered for a site on the website, so more able students can upload all their collected data.	• IWB loaded with the uploading data page of website. Optional – • Computers
Curriculum links: (National Curriculum 1999) Key Stage 2 - Information and communication technology **3a** Pupils should be taught how to share and exchange information in a variety of forms including email **5b** Pupils should be taught the knowledge, skills and understanding through working with others to explore a variety of information sources and ICT tools. (National Curriculum 2010) Essentials for learning and life: ICT Capability **3** Children should learn how to collaborate, communicate and share information using connectivity to work with and present to people and audiences within and beyond the school.	








Activities	Resources
Part six – Surveying at home **Activity – Surveying another local area** Teachers may opt to encourage students to go and survey other areas using the same procedure with their family or friends. Teachers can send the resource bank 9 letter home to parents explaining the Urban Tree Project and how to participate. Note: Multiple surveys of the same area are accommodated on the website for the project. If more than one student surveyed a local area, such as a park, the website will allow them all to upload their information for that site.	• IWB loaded with the uploading data page of website. Optional – • Computers
Curriculum links: (National Curriculum 1999) Key Stage 2 Science **Sc1 2e** Pupils should be taught to use simple equipment and materials appropriately and take action to control risks. **Sc2 5b** Pupils should be taught about the different plants and animals found in different habitats. Key Stage 2 - Information and communication technology **3a** Pupils should be taught how to share and exchange information in a variety of forms including email. **5b** Pupils should be taught the knowledge, skills and understanding through working with others to explore a variety of information sources and ICT tools. (National Curriculum 2010) Essentials for learning and life: ICT Capability **3** Children should learn how to collaborate, communicate and share information using connectivity to work with and present to people and audiences within and beyond the school. Scientific and technological understanding **M1** Children should be taught to explore and investigate in order to collect data, analyse it and identify patterns. **L2** Children should be taught to make and record accurate measurements and detailed observations, presenting them appropriately, and analyse, interpret and apply them.	

Downloadable resources

Resource 1

Copies of the downloadable leaf chart for each group of students.

Resource 2

Letter from Bob Press to students explaining the project and survey.

Resource 3

Printable recording sheet for field survey.

Resource 4

Letter to parents explaining the Urban Tree Project and how to participate.

Extend your study further:

Interdependence and biodiversity activities

- Discuss about the importance of trees in the greater environment – How do humans use trees?
- Brainstorm human uses for trees and move onto how animals use them. What observations of other wildlife did students make during the field survey?
- Food chains and webs – use any observations made in the field survey to build food chains or food webs centred on a particular tree (highlights the importance of trees to other organisms).

Curriculum links:

(National Curriculum 1999)

Key Stage 2 Science

Sc2 5b Pupils should be taught about the different plants and animals found in different habitats.

Sc2 5d Pupils should be taught to use food chains to show feeding relationships in a habitat.

Sc2 5e Pupils should be taught about how nearly all food chains start with a green plant.

(National Curriculum 2010)

Scientific and technological understanding

L16 Children should be taught to investigate and explain how plants and animals are interdependent and are diverse and adapted to their environment as a result of evolution.