Schools Tree Day – Year 7 & 8 – Biodiversity challenge

Teacher preparation

Overarching learning goals: Students understand how to design an investigation to find out how species diversity is affected by habitats around the school and identify different habitats around the school and link these with different types of ecosystems. Students collect data about the school species diversity in different habitats and organise all the data collected by all the students to analyse and draw conclusions.

Teacher content information: School grounds are divided up into different functions. As a result, areas are planted in different ways. The issue with urbanised areas is that most of the species planted originate from other continents, meaning they are non-indigenous. Even when native plants are used they may not be indigenous to the area.

There can be a large number of habitats in the school grounds. The true definition of a habitat is a place where something lives. Different habitats in the school grounds can mimic some ecosystems:

- Garden beds mimic cultivated areas, heathland or grassland depending what is planted there.
- Playing fields mimic grazing land.
- Treed area with native trees mimic woodland.
- Thickly planted areas with native plants mimic forests.

Before you begin the activity review what your students know about ecosystems. An ecosystem includes all of the living components plus any physical components. Physical components include the slope, gullies where it is damp, rocks, rotting logs and soil. Most school habitats can be described by their vegetation. Review how we might

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separate native and introduced trees, shrubs, grasses and small plants. Also explain that indigenous species are ones that have evolved in that particular ecosystem.

You should also discuss with your students the differences between species diversity and ecosystem diversity. Species diversity refers to the number of different species in an ecosystem (species abundance is the number of individuals). Ecosystem diversity refers to a variety of different ecosystems in the one area. It is important to have highly diverse ecosystems and species so that they are less vulnerable to change.

Student and classroom organisation

Step 1: Nature Walk and identification of the school's habitats.

Take students out into the school grounds on a nature walk and provide them with a map of the school grounds. On their walk students will need to:

1. Identify what kind of habitats are in the school ground.
2. Formulate a description of the habitats.
3. Map the habitats.

Divide up the school ground habitats so that each group has a designated area. Ensure each habitat has an appropriate name that describes the habitat and distinguishes it from all the others. Work out how the class can be best organised to collect the habitat data without doubling up too much.

Step 2: Collecting data on species diversity for each habitat

Each group will collect data on their designated habitat and fill it in on the Student Worksheet. Before they do this, they will need to decide on the following variables:

1. Decide how the data will be collected.

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2. Design ways to collect the data.
3. Decide on what data is important to collect.

Students are not experts in identifying organisms so they will need to try to reduce the error in their data collection by deciding on the rules beforehand. Because the students are working in groups it is important for them to think about their method to avoid double-ups and errors. Before collecting the data, confirm that each group will be using a similar timing for gathering data.

Data sets that can be recorded may include:

- **Soil creatures** – total number of different species. If your school has a Berlese funnel you could extract animals using it. You could find out what a Berlese funnel looks like and make your own using a two litre drink bottle as a funnel and a desk light.
- **Birds** – you could find out the total number of species and the main behaviours of birds as they use each habitat. You may not see some birds, but you will hear them and may distinguish their call. Unless you know your bird species do not worry about separating the native birds from the introduced species.
- **Leaf creatures** – look over the leaves and stems for the total number of species of leaf and branch species. Peek under the loose bark, but don't pull it off. Different kinds of spider webs count as different species as well.
- **Small flying creatures** – each group of insect flies in a different way. Look at each of the habitats for an equal amount of time and count the number of insects that fly. Towards the end, shake some grasses or leaves and see what flies off.
- **Fungi and molds** – fungi and molds are most commonly found in damp areas among leaf litter and on fallen fruit below fruit trees. If the weather has been hot and dry it may not be possible find evidence of them at all. Students might consider doing some sterile agar plates. They will need to obtain the plates, find out how to inoculate them and then dispose of them according to the State's regulations.

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- **Grasses and small plants** – in school grounds these plants can usually be categorised as planted indigenous grasses and small plants, planted native grasses and small plants, planted introduced grasses and small plants, and weeds that are usually non-native plants. Map out similar areas in the different habitats and count the number of species for each category. You may need help in separating out the plants from different categories.
- **Trees** – besides counting the number of tree species in each area, describe how each species affects the area – shade, leaf litter, effect on the soil and plants underneath it. Try to distinguish between indigenous, native and introduced trees.
- **Shrubs** – besides counting the number of shrub species in each area describe how each species affects the area – shade, leaf litter, effect on the soil and plants underneath it. Try to distinguish between indigenous, native and introduced shrubs.
- **Plant diseases** – in each location look at the plants and see if they have strange lumps and bumps, spots on the leaves or anything else to indicate it has a disease. If there are fleshy lumps called galls, break a few open and see if you can find any grubs inside.

Step 3: Pool data on a spreadsheet

Once all the data is collected, it can be pooled onto a single spreadsheet. You can then analyse the data so that species diversity and ecosystem diversity can be compared. Students can investigate if there are relationships between species diversity (the number of different species) and the number of different habitats (mini ecosystems). Students can graph their individual data or the pooled data. For example, one axis can have the habitats and the other axis can be the number of species. Alternatively, graph the number of indigenous, native and introduced species.

Step 4: Create a report

Using the data students should produce a short report. They should use their chosen graph or graphs to show differences between the

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habitats. Students can provide their views on the biodiversity in their school. They should also suggest how their data collection could be improved if they were to do it a second time.

Students can then use their presentations to make a case for building new habitats by participating in Planet Ark's Schools Tree Day: treeday.planetark.org.

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