Use Technology to Survey the Local Area

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Apps/programs that can be used in the course:

- Browser for general internet searches (available on all phones)
- Voice Recorder (Dictaphone available on most phones)
- Arboreal
- BirdNET/Merlin Bird ID
- iNaturalist
- Picture This
- Skoletube (Danish)

Target audience: 11-16 years old.

Time use: 4 lessons outside and 4 lessons indoors.

About this activity

This activity is part of a series of activities developed by the Danish research project called *Natural Technology*. The purpose of the project is to investigate technology in combination with nature, such as the potential of smartphones in children and teenagers' experiences in nature. You can read more about the project here: **https://naturligteknik.dk/en/**

Natural Technology is affiliated with the interdisciplinary organization Center for Children and Nature and is supported by Nordea-fonden.

Natural Technology is anchored in the research program 'Future Technology, Culture and Learning', located at the Danish School of Education at Aarhus University.

Preparation

The students must investigate a local area in all directions. The course starts in the immediate area or nearest green area, e.g. a green area in the schoolyard, a green wedge, a park or the like. There should ideally be some soil, bushes and trees. It probably makes sense for the teacher to divide into groups and delimit an approximate area for each group, which will be their field area. The area must have a certain size, but that depends on what can currently be found on it. In principle, any area, large or small, can be used. Chromebooks, iPads or the students' own smartphones (hereafter referred to as telephones) can be used as technological tools.

Goal

In groups, the students must carry out various investigations (steps) that will help them get an overview of the nearby area. Based on the steps (the parameters that they investigate), they will have to sketch out the area so they can share it with their peers who have done similar investigations in their area. The sharing happens by using multimodal technologies to rebuild the area that they have identified and 'simulating' it. The sharing of knowledge means that they on the one hand prepare a presentation, which is the emphasis, and on the other hand, that they receive explanations of nearby areas through the others' presentations and gain insight into what characterizes those areas.

TEACHING ACTIVITIES - DIVIDED INTO STEPS

Teacher	**Students (in groups)**
Create a journal – which the students will use to establish and outline the area. The journal is shared digitally with the students of the class or with assigned groups. **Journal** The journal is used especially in field work to record and collect observations from the investigations.	1. Record the date and time and the members of the group in the journal. (The journal must be used for all observations in the individual steps.) 1.1. Use a phone to find the temperature on the spot – find it both via DMI's website and possibly through a temperature gauge on the phone. Also find information about the wind conditions on the day and determine the cardinal directions in relation to the area. 1.2. Find information about when the sun rises and sets and how much precipitation and how many hours of sunshine normally apply to the area. 1.3. Get a feel for the perimeter of the spot and its approximate area and by measuring its length and width with the phone's pedometer (alternatively GPS and a virtual map). 1.4. Make a sketch of the area, either by hand or on screen. Remember that you will use it to keep track of and plot your observations.
Investigate possible locations that can be studied. Help students download and use the suggested apps. Pay attention to the platform used (Chrome OS, iOS or Android).	2. Find the spots in the area where you think it is 1) easiest and 2) most difficult to encounter birds. Discuss why. 2.1. List all of your arguments and rank them in order by discussing them. 2.2. Record a small sound clip that captures the sound experience in the two spots. 2.3. Document with photos any buildings in your area. Note what they are used for and if necessary, look up additional information online. Measure their height with Arboreal and plot onto the map. Record any sound experiences in the respective locations.

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Be ready to suggest birds that are commonly found in the local area. Continue to help students download and use the suggested apps.	3. Photograph five birds in bushes, trees, on buildings or on the ground in your area. Mark their approximate location on the map. 3.1. Take a few minutes to sit completely still and wait. There need not be five different species of birds to observe at once. It can be advantageous to find one bird at a time. Spend at least 3 minutes observing the bird unless it flies in. 3.2. Observe and note the time when it arrives and what happened immediately before. That is, observe and write some field notes about the location and what the bird does, as well as when it flies away again. 3.3. Use a bird app to determine the species and find its birdsong. 3.4. Read up on what each found bird (the specific species) feeds on and what kinds of environments it prefers (depending on the season). Feel free to use several internet sources (app sources) and note where you got the information from. Discuss which sources you feel most comfortable sharing information from and why. 3.5. Examine and photograph the area for I) food items and 2) the location of the bird.
(Consideration: This it could also be expanded with small invertebrates like insects for e.g., lower grade levels). Continued focus on students downloading and using the suggested apps.	4. Photo-document and identify 5-7 bushes or trees and 5 small plants at different distances from the trees or buildings with iNaturalist (or Picture This), including those the birds have perched in. 4.1. Measure the height of your bird trees with Arboreal. If the birds have been perched elsewhere, just choose some trees in the area. 4.2. Measure the distance from the plants to the tree trunks or buildings with a GPS or pedometer.

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If necessary, help the students understand cultural landscapes.	5. Find the place in the area where you would most like to have a picnic and discuss and list the arguments for it. 5.1. Find the plant, tree or bird that you think is most important for your friends to hear about from your area and explain. 5.2. Find the spot in the area where you least want to stay and discuss and list the arguments for your preference. 5.3. Come up with 4 things that you think would make the spot in 5.2. attractive for having a picnic. Explain how your changes do something positive for the area.
Feel free to inspire the students to use other virtual formats, e.g. Prezi, Visme, etc.	6. Create a virtual model of your area, e.g. on Skoletube, based on your observations, so that your friends have access to as much of the information you have collected and your thoughts as possible. You should aim to get them to feel as if they have been there themselves. 6.1. Check whether your assumptions about where you would find birds proved true. Discuss and explain why you were right or wrong.
Teacher Set up a traditional framework for the presentation or think in terms of fair stands or visits from other classes and grade levels.	**Evaluation – Shared by the whole class** 7. Each group presents/shares their area with the others in the class in virtual 'simulations'. 7.1. Give the plant or bird that you prefer to share special attention. 7.2. Offer opinions about what surprised you most about your area and what you would do differently if you were to conduct this type of study again. 7.3. When all groups have presented, the whole class completes the fifth step for all the areas together. This means that the areas are discussed based on parameters such as: where would you rather have a picnic; where would you rather not have a picnic. In the end the students vote. 7.4. The spot that receives the most votes for being unsuitable for a picnic will be discussed in class. Consider how to modify the spot. And who will do it.

Learning objectives

This course unit uses technology to develop the students' insight into the scientific method, to increase connection to nature through the use of the local environment and to give insight into the types of plants and animals that inhabit the local environment, as well as how the questions under investigation are connected. The implicit goal is to build the students' 1) relationship with their immediate natural environment, 2) insight into common species of birds, tree species and plants, and 3) insight into how biological groups (biotic factors) relate to abiotic ones, 4) thereby building greater attachment to the location.