Seek – Plant and Animal Identification

Correct plant and animal identification is vital for conservation efforts. In this activity, students will conduct a survey of plants in their local area and develop methods to classify their findings. They will then use the Seek app to capture data using the camera tool within the app to identify, explore and learn about those same plants.

Drawing from millions of wildlife observations on iNaturalist, the app provides tailored lists of species in your area. Citizen science projects that involve data collection and reporting can assist the students in seeing the connections and interdependence between all life forms (Sustainability Cross-curriculum priority: Systems SS1). Students will then compare the app's structures and performance to their own methods.

Required resources

- iPad with the Seek by iNaturalist App (installed)
- Notebook and pencil for recording observations
- A story book such as Aussie Native Plants A-Z by Joey Farrell, illustrated by Jocelyn Gibson

Optional reading/viewing

Landcare Australia (2023), *Understanding weeds: Life cycle*, https://juniorlandcare.org.au/learning_activity/understanding-weeds-life-cycle/

Flora Connections (n.d), *How to collect Flora Connections data: A step by step guide,* https://floraconnections.com/guide

Required learning

Students can represent data as pictures, symbols, numbers and words.

Students can follow and describe algorithms involving a sequence of steps, branching (decisions) and iteration (repetition).

Suggested steps

Teacher Notes:

- This activity will be easier to conduct when plants are flowering in your local area.
- Depending on location, it may be difficult to find and identify native plants. Students could complete a similar activity based on identifying weeds in a local area.

1. The teacher looks at information from their local government or conservation groups about the native plants that are present in their region and selects between two and five different types (e.g. eucalyptus/gum, acacia/wattle, tea tree, banksia and bottlebrush).

2. As an introduction, use a native guide or story book as a stimulus. Students discuss how they will be able to identify the different types of native plants in their local area, considering the height of plant, size, shape and colour of leaves, and visible flowers, seeds or fruit. Collaboratively create a checklist or algorithm for defining the different types of plants.

3. With these criteria in mind, the class can use the iPad camera to photograph plants found in a local space. Ideally this would be a natural or managed environment. Students may collect fallen leaves and flowers from the ground as part of their observations.

4. Students share, compare, and sort their data (images and samples) into the groups of plants that they believe are the same. Students discuss the ways that they grouped the images and refine the criteria that could be used to make this task easier.

5. Introduce Google's Quick, Draw - an online AI experiment that challenges users to draw common objects within a 20-second time limit while an artificial intelligence system tries to guess what they are drawing in real-time. This game demonstrates the capabilities of machine learning and image recognition. It uses a neural network to predict drawings with remarkable accuracy, showcasing the potential of AI in understanding and interpreting human-generated visual data.

6. Discuss how Artificial Intelligence (AI) can be trained to identify plants and animals, and how citizen scientists add to data sets and corroborate findings. AI identifies items by shape using computer vision and machine learning techniques. AI algorithms can be used to extract relevant features including contours and geometric properties from plant images to train AI models.

7. Students then use the Seek app to conduct the same survey. Students compare the efficiency of each method. Students may discuss how observations in different seasons may impact their classifications.

Why is this relevant?

Computer scientists are working with conservationists to develop technologies to monitor many of our endangered species. Conservationists survey plant populations to understand land use trends, identify threats, protect endangered species, inform policies, and ensure the health of ecosystems, ultimately contributing to effective wildlife conservation and habitat preservation. Artificial Intelligence (AI) combined with citizen science is increasingly being used to help monitor environments.

Assessment

In a poster, students present their checklist or algorithm and use it to classify one of their observed plants. Using images, collected samples and written observations, they justify their classification. Students could offer feedback on checklists and algorithms created by their peers, identifying strengths and suggesting improvements for their own work. Students compare the results using their checklist/algorithm with Seek and discuss the similarities and differences of each system.

Questions to reflect on

- Were students able to select useful criteria for their checklist/algorithm?
- Did students use all available data from the plants to help with identification (leaves, height, flowers, etc)?

- How did students make connections between the images they collected and their checklist/algorithm?
- Were students able to identify strengths and improvements in their checklist/algorithm?

Australian Curriculum

Years 3 and 4 Digital Technologies

Students learn to:

- recognise different types of data and explore how the same data can be represented differently depending on the purpose (AC9TDI4K03)
- generate, communicate and compare designs (AC9TDI4P03)
- discuss how existing and student solutions satisfy the design criteria and user stories (AC9TDI4P05)

Years 3 and 4 Science

- compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals (AC9S3U01)

Cross-curriculum priorities

These content descriptions connect to the following Sustainability cross-curriculum organising idea:

- Systems: All life forms, including human life, are connected through Earth's systems (geosphere, biosphere, hydrosphere and atmosphere) on which they depend for their wellbeing and survival. (SS1)
- Futures: Sustainable futures require individuals to seek information, identify solutions, reflect on and evaluate past actions, and collaborate with and influence others as they work towards a desired change. (SF2)

Teacher professional learning resources

- CSER Digital Technologies + X MOOC Sustainability module at csermoocs.adelaide.edu.au

For more information

Please visit our webpage https://csermoocs.adelaide.edu.au/lending-library
Email cser@adelaide.edu.au

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