Robot animal tracker

First Nations Australians have developed sophisticated tracking skills and animal knowledge for thousands of years, which today are used by Indigenous Rangers to identify animals. In this activity example, students create algorithms to navigate a robot from an animal image to its matching track. In doing so, students learn about how First Nations Australians identify animals and animal tracks.

Required resources

- Robot (e.g. Bee-Bot, Dash and Dot, Sphero)
- Blank Bee-Bot or similar map or masking tape to create a grid on the floor
- A First Nations Australian book about animal tracks such as Bush Tracks by Ros Moriarty, illustrated by Balarinji

Required learning

- Students will have learned what an ‘algorithm’ is.
- Students may have seen a BeeBot before and been shown features and how to navigate it although learning about how the BeeBot works could be incorporated into this lesson.

Suggested steps

Hook

An introduction to this activity could be inviting an Elder and Traditional Custodian of your school's traditional land to come and share local First Nations Australian knowledge about animals and animal tracking. Alternatively, students could listen to a storybook related to animals or animal tracks by a First Nations Australian author and illustrator, such as 'Bush Tracks' by Ros Moriarty, illustrated by Balarinji or a video demonstrating First Nations Australian tracking techniques.

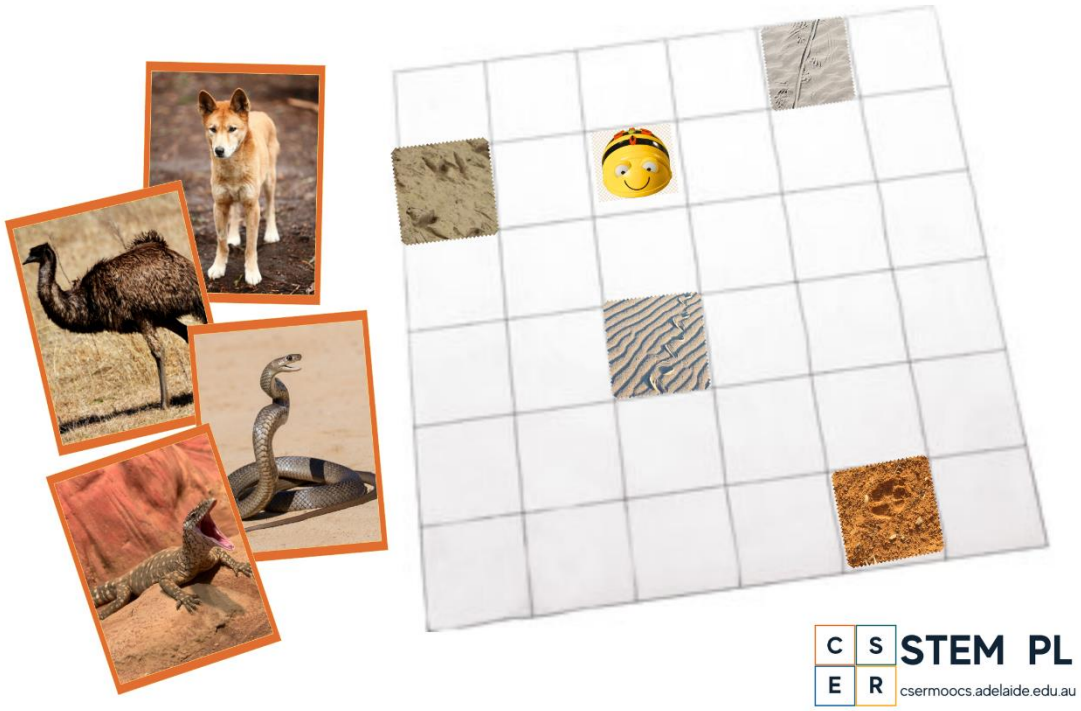
Research

After learning about First Nations Australian animal tracking, students (or the teacher) can research and create matching animal tracking cards - one with the animal and one with the track.

Depending on the year level, the teacher could source photos and/or create drawings or students could create their own representations of the animal and track based on what they have learned from First Nations Australian tracking knowledge.

Programming

Students randomly pick an animal card and navigate the robot to the correct track by programming the robot. Students are expected to navigate the robot to the correct position on the mat. In the example below, we have used a Bee-Bot but you could use other robots you may have available.



Why is this relevant?

Computer scientists are working with conservationists to develop technologies to monitor many of our endangered species. Conservationists would often survey animal populations using manual methods, such as going to an area and counting tracks or sightings. Conservationists survey animal populations to understand population trends, identify threats, protect endangered species, inform policies, and ensure the health of ecosystems, ultimately contributing to effective wildlife conservation and habitat preservation. Increasingly technologies, such as robots and computer vision are being used to help identify animal movements and populations. This activity provides an interesting context for students to explore navigating a robot from one location to another while learning about the rich knowledge Firs Nations Australians provide in understanding animal tracking.

Assessment

Observation can be used to check students' ability to carry out tasks aligned to the Australian Curriculum.

Allow students time to practice with the robot so that they feel comfortable using the functionality and in navigating around a mat. A checklist like the one below can help support observations.

- Teachers observe students using the Bee-Bots, creating their algorithms and debugging.
- Use questioning to elicit student understanding of the functions of the Bee-Bot and their algorithmic thinking.
- The teacher moves around the room and asks students as they are using the Bee-Bot to explain what the Bee-Bot is and how they are using it.

Students	Yes / No / Partial	Comments
Student can explain the steps needed to solve their algorithm (how to get BeeBot from one area to another)		
Student can correctly navigate BeeBot from one area of the mat to another		
Student can explain and justify their algorithm choice		
Student can identify where a 'bug' has occurred		
Student can fix their programming bug (debug)		

For more assessment resources we recommend the Digital Technologies Hub:
https://www.digitaltechnologieshub.edu.au/teach-and-assess/

Australian Curriculum

Years 1 and 2 Digital Technologies

Students learn to:

- follow and describe algorithms involving a sequence of steps, branching (decisions) and iteration (repetition) (AC9TDI2P02)

Cross-curriculum priorities

These content descriptions connect to the following Aboriginal and Torres Strait Islander Histories and Cultures cross-curriculum organising idea:

- Country/Place: First Nations communities of Australia maintain a deep connection to, and responsibility for, Country/Place and have holistic values and belief systems that are connected to the land, sea, sky and waterways. (A_TSICP1)

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)

Teacher professional learning resources

- CSER Digital Technologies + X MOOC Sustainability module
- Making Tracks, Lesson Idea - Years 1-5, AAMT and ATSIMA, NAIDOC Week
- Animal tracking, National Aboriginal and Torres Strait Islander Children's Day, SNAICC.
- Angwenhe Impatye? Whose Footprint? Artwork and story created by young mother attending 'It's Child's Play and Stay Strong Woman's Group at Gap Youth and Community Centre (2013), Northern Territory Library, ICTV Play.
- Teaching Tracking, Central Land Council, Alice Springs, ICTV Play.

For more information

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

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