Citizen Science – School Biodiversity Trail Lesson 2 – Years 7 & 8

Teacher Preparation

Learning intentions:

- Students are able to identify some of the impacts of climate change on local biodiversity.
- Students are able to effectively communicate knowledge of climate change and biodiversity.

Success criteria: Students can…

- … create a trail based on a set of scientific and geographical parameters.
- … use Google Maps to assess geographical features appropriate for a school biodiversity trail.
- … identify local plants and animals using the ClimateWatch app.
- … create an accurate map of their trail.

> TIP: CONSIDER MAKING THE LEARNING INTENTIONS AND SUCCESS CRITERIA VISIBLE TO STUDENTS THROUGHOUT THIS LESSON.

Teacher content information: ClimateWatch is a citizen science initiative developed by Earthwatch that seeks to educate people from across Australia on the issue of climate change and empower them to contribute to solutions. Through its ClimateWatch program, Earthwatch works with educators to help them bring their experiences back to the

classroom to foster new generations of environmental leaders. By incorporating ClimateWatch into curriculum, students and teachers will become more knowledgeable about climate change and its impacts, and inspired to contribute to scientific and environmental efforts in their daily lives or future career path. These actions could range from community efforts to protect biodiversity through to encouraging others to be more involved in such activities. Increasing appreciation for the environment and scientific literacy in communities will empower long-term climate action as well as the development of adaptation and mitigation strategies.

Hot tips:

- This is the third lesson in a unit about creating a creating a school biodiversity trail. The full unit of lessons can be found here: [ClimateWatch: Citizen Science - Geography and Science - Years 7 & 8](#).
- This unit has been designed to be taught in either Geography or Science. To further enhance the learnings from this unit for students, consider teaching this as a cross-curricula unit of work.
- In this unit students create a 'school biodiversity trail' inspired by the [ClimateWatch Trails](#) for use now and in the future. Once the trail is established, future cohorts of students can complete this lesson (Lesson 1) and participate in a biodiversity survey along the trail in a single lesson. If you are interested in furthering this process and establishing an official ClimateWatch Trail, visit the Create a ClimateWatch Trail page. To discuss the use of ClimateWatch Trails data in classrooms, feel free to contact climatewatch@earthwatch.org.au

Teaching Sequence

Lesson 1
 10 minutes – Part A: Activating Prior Knowledge
50 minutes – Part B: Identifying a Site for Your Trail

Lesson 2
60+ minutes – Part C: Creating Your School Trail (you will need to visit the trail site)
15 minutes – Part D: Create a Map
10+ minutes – Reflection

Work through this resource material in the following sequence:

Part A: Activating Prior Knowledge

Step 1. Invite students to share their responses to the following questions drawing on knowledge from [School Biodiversity Trail Lesson 1](#) :

- What is a ClimateWatch Trail?
- Why have ClimateWatch Trails been created? What is the purpose of creating a Trail?
- Who can use a ClimateWatch Trail?
- Where can you find ClimateWatch Trails? Are there any near your school?

Invite a scribe to record student responses on the board.

Through your discussion ensure that students understand that [ClimateWatch Trails](#) are being established around Australia in order to record how climate change might be affecting biodiversity. People walking the trail – citizen scientists – are asked to record features of the biodiversity they observe. They can submit this information to ClimateWatch who assess this data over the long term, identifying what

aspects of biodiversity might be being affected by climate change.

Hot tip: If your class have not completed School Biodiversity Trail Lesson 1, open the [ClimateWatch trails](#) page and work through the above questions as a class.

Step 2. Tell students that they will be identifying potential sites for their own school trail inspired by the ClimateWatch Trails. Throughout the rest of the unit they will undergo the processes for creating their own school biodiversity monitoring trail. This trail is to be designed with the intention that it will be used by students over subsequent years, to help build an understanding the biodiversity around them. Explain to students that this is the type of data is used in scientific research to assesses species observations against climate drivers (e.g. temperature and rainfall) and understand how species are responding to climate change.

NOTE: THERE IS THE POTENTIAL FOR STUDENTS TO CREATE THEIR OWN CLIMATEWATCH TRAIL THAT CAN BE SUBMITTED TO THE CLIMATEWATCH TRAIL WEBSITE. HOWEVER, THIS REQUIRES RESOURCES (SUCH AS FUNDING AND COMMUNITY INVOLVEMENT) BEYOND THE SCOPE OF THIS UNIT. FOR FURTHER INFORMATION ON HOW TO CREATE A CLIMATEWATCH TRAIL CAN BE FOUND AT HTTP://WWW.CLIMATEWATCH.ORG.AU/TRAILS

Finally, explain to students that although this is a class-wide project, each student should take responsibility for collecting evidence and artefacts about the work that they put into the project, including drafts of everything they create as part of the project and records of any opportunities they pursue (either successfully or unsuccessfully). The most important thing for students to remember is that the PROCESS of working through this project is really important – perhaps even more than the final product. Students should aim to demonstrate the growth and learning that they experienced both personally and as a group as a result of facing the challenges inherent in a project of this type. Ensure

each student has access to a workbook throughout this unit to record their contributions and ideas.

Part B: Identifying a Site For Your Trail

Step 1. Explain to students that the first step in creating their school biodiversity trail is identifying potential sites. Before searching for sites students will need to make a class list of parameters to assess a site's appropriateness as a school climate trail. Demonstrate how to set these parameters by writing the following example on your whiteboard:

- Walking distance from school

Then explain that your students that if we are to visit the site on several occasions, it will need to be within walking distance from your school.

Step 2. Now, invite students to turn to the person next to them and discuss the parameters that they need to consider. Draw your class' attention after a few minutes and ask for volunteers to offer their parameters. Let your class to further discuss each other's suggestions, adding them to the whiteboard once when you have reached a general consensus.

Make sure the below parameters are included in list your if your class does not reach them organically:

- Accessibility of site – Is this a public park or private land? Do you think we will be able to get access to this area and who should we ask about accessing this area?
- Features of site – Is the site relatively flat or is it rocky or steep? Will people of all ages and abilities be able to visit the site?
- Danger – Is this site dangerous in any way? If so, are there any ways to mitigate this danger?
- Are there ClimateWatch plant species that could be monitored on a regular basis? Eg. A Jacaranda tree located on school grounds?

NOTE: ALTHOUGH SITES WITH HIGH LEVELS OF BIODIVERSITY — SUCH AS AREAS WITH LOTS OF NATIVE BUSHLAND — WOULD BE IDEAL, ANY SITES WITH SOME NATIVE VEGETATION WOULD BE SUITABLE. THE TIMING OF BLOSSOMING PLANTS, VISITING BIRDS AND INSECTS WILL ALL TELL US ABOUT HOW CLIMATE CHANGE MIGHT BE AFFECTING BIODIVERSITY. IF LEAVING THE SCHOOL GROUNDS TO VISIT A LOCAL PARK ETC. IS NOT POSSIBLE, THEN IDENTIFYING PLANTS AT YOUR SCHOOL AND CREATING A TRAIL AROUND THESE PLANTS WOULD ALSO BE SUITABLE.

Step 3. Break the class into groups of three or four and invite students to turn on their devices. Explain to your class that they will be using Google Maps and the parameters on the board to identify a potential sites for their school biodiversity trail. Groups will then have a maximum of 5 minutes to pitch their chosen site to the whole class. These pitches should focus on 'what makes these areas ideal for our our school climate trail?'.

Clarify with students that, at this stage, they don't need to identify the trail itself, just the site where the trail could be located.

For their chosen site, students should record (information also provided on the Student Worksheet):

- The coordinates, so that they can find the site again (this can be found in the white box that appears once you click on an area in the map) and from where they could we access this site
- Approximate area of the site
- What kinds of habitats they expect to find (switching to satellite mode can help in this step) - if needed, direct students to the following sites on habitat types, Australian Museum habitats
- What kinds of plants and animals they might expect to find here (students can search other sites to find this information such as the Atlas of Living Australia)

Once complete, invite each group to present their sites, explaining why
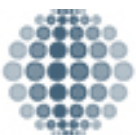
it had been chosen.

Step 4. Based on the parameters set in Part B, Step 2, work with your class to consider each site presented. As a class, choose the site where your trail will be based. The teacher could be in charge of assessing the sites and choosing one for the class to focus on, or students could vote for their favourite site.

Teachers should keep a record of all potential sites. If there are any issues gaining access to your selected site, you will need to choose another option from this list.

Science Extension: Invite students to predict what plants and animals they might expect to see at their trail site. Project or invite students themselves to access the Atlas of Living Australia and navigate to the 'explore your area' feature (https://biocache.ala.org.au/explore/your-area). Move the pin on the map to the location of the your site, and narrow the search radius to an area that includes the trail. Press the 'common name' button in the species list of the Atlas of Living Australia. Then, draw your class' attention to the list of species that have been sighted at your trail site. Make a record of the species you could expect to see along your trail and use this list later to compare your observations with those recorded on the Atlas of Living Australia: What species recorded in the Atlas DIDN'T you find at your site? What species seen at your site DIDN'T you find on the Atlas?

Hot tip: Your local National Parks groups or local council may have en existing species list. If they do, this can be cross-referenced with your students' lists to check for accuracy.

Step 5. Explain to your class when you will be visiting your selected site. Remind students to bring hats, sunscreen and closed toe shoes for this lesson.

Part C: Creating Your School Trail

Prior to this part of the lesson you will be required to scope your selected site. The species that you site during your scoping can be identified using field guides from your school or local library.

Step 1. In the this second lesson, students will be heading outdoors to investigate their chosen site. In preparation for this outdoor element, adapt the safety procedure below for your individual class' needs and review it with your students:

SUGGESTED SAFETY PROCEDURES FOR OUTDOOR LEARNING

* SHOW STUDENTS PICTURES OF POTENTIALLY DANGEROUS ANIMALS AND PLANTS.
* IDENTIFY THE PRESENT SEASON AND WHAT RISKS ARE ASSOCIATED WITH THIS SEASON.
* STAY CLOSE TO THE TEACHER (E.G. WITHIN EYESIGHT).
* WORK IN PAIRS OR SMALL GROUPS.
* STICK TO THE TRACK AND LISTEN TO WARNINGS ABOUT OVERHANGING BRANCHES, SLIPPERY PARTS OF THE TRACK ETC.
* BE CAREFUL WHAT YOU PICK UP AND WHERE YOU PUT YOUR HANDS (I.E. NEVER PUT YOUR HANDS ANYWHERE YOU HAVEN'T CHECKED WITH YOUR EYES).
* WEAR STURDY BOOTS OR SHOES, AND ALWAYS WEAR A HAT AND SUNSCREEN.

Invite students to collect their worksheet and the internet enabled devices, then lead them to the site.

Step 2. When you have reached your site, explain to students that they will begin spending several minutes observing the area using their senses. Invite all students to sit down, ensuring that they are close enough to hear the teacher. Each student should close their eyes and spend one minute listening to the nature around them. After one

minute, invite students to keep their eyes closed and spend one minute feeling the nature around them, including touching the ground around them and feeling the sun or wind on their skin. After one minute, invite students to keep their eyes closed and spend one more minute smelling the nature in the air (they don't have to smell the ground or leaves around them but if they want to they can!). Finally, invite students to open their eyes and spend one minute looking at the nature around them.

Once complete, invite students to share their observations with the class.

TIP: YOU COULD REPEAT THIS ACTIVITY EACH TIME YOU VISIT YOUR SITE, INVITING STUDENTS TO REFLECT ON HOW THEIR OBSERVATIONS AND EXPERIENCES CHANGE OR DIFFER EACH TIME.

Step 3. Now, explain that students need to create their trail. This does not mean cutting a hole through the bush to create a path, rather they should identify features of biodiversity that they think are important and link these together to form a trail that can be followed on a map. Important features could include:

- Large trees
- Open areas with few trees
- Areas of dense vegetation
- Areas where one type of vegetation dominates
- Water courses (rivers, creeks, wetlands, ponds or billabongs)

As you identify important features of biodiversity, invite students to record any plants and animals that they see that can later be included in the field guides that students will create for their trail. If you are unable to identify the plants and animals as you walk around, invite students to either sketch or photograph what you see for identification at a later time.

Note: In the following lesson of this unit, students will focus on identifying plants, animals and habitats along their trail. While plant observations and identification should be possible with just one visit, recording animals will require multiple visits at different times of day. If your area has tall trees you may even wish to arrange a spotlighting excursion for your class.

Step 4. Once you have identified the important features of biodiversity in your site, work together to create a trail linking these features. Invite students to then create a rough map in student's notebook of the trail, showing where the trail could start and finish. This map should include important features of biodiversity.

Instead of using their notebooks, you can invite students to create their map using sticks and an area of bare dirt. This is called a 'mud map'. If any of your students choose to create a mud map be sure to take photos of them before progressing to the next step.

> TIP: IF YOU ARE CREATING YOUR TRAIL IN A BUSH SITE, ENSURE YOU KEEP TO EXISTING PATHS AND TRACKS TO MINIMISE ANY DAMAGE TO LOCAL BIODIVERSITY.

As you create your trail invite students to consider:

- Is this trail suitable to people of all ages and abilities? Does the path require people to climb over logs, up steep slopes or through dense vegetation? How could you minimise these difficulties for all potential trail users?
- Will this trail be suitable for use at different times of the day and year (will it be flooded, dark, subject to tides, etc.)?
- How long would it take to walk this trail? If your trail is too long visitors may lose interest and you will miss out on valuable data, however, if it is too short visitors may not be able to make many observations, and again you may miss out on valuable data.

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Part D: Create a Map

Back in the classroom, students need to convert their sketches or mud map images into a finalised map that can be used by people visiting the trail. The map needs to conform to BOLTSS Map Conventions.

Prior to this lesson, consider the limitations you would like to set on your class for how they create their maps. This could include whether digital maps can be created, websites that you would like your class to use e.g. Google Maps, Scribble Maps, physical resources available to create maps, etc.

Step 1. Explain to your class the limitations that you have set around their map making. If needed, explain the BOLTSS conventions and write these on your whiteboard for reverence. Then, invite students to take 5 minutes to plan their maps.

Step 2. Use the remainder of the class time to create and share your class maps.

Reflection

Step 1. Allow students time to record their contributions and ideas in their workbooks, and time to follow up on any further research required that stemmed from creating their trail (e.g. plant and animal identification, history of the site, tidal information, weather data, etc.).

Step 2. Invite each student to reflect on this lesson by answering the following questions (available in the Student Worksheet):

- Three things I found interesting about our local area:
- Two things about our local area that were new to me:
- One question I now have about what we looked at in this lesson:

Take It Further

Allow your class to use digital technology to display and share their maps. Programs such as [Sketchup](#), [Explain Everything](#) or [Minecraft](#) are great ways to have students model their maps. Additionally, free virtual reality (VR) apps such as [Aurasma](#) and [Metaverse](#) can be used by students to create interactive tours of their sites.

Teacher Reflection

TAKE THIS OPPORTUNITY TO REFLECT ON YOUR OWN TEACHING

* WHAT DID YOU LEARN ABOUT YOUR TEACHING TODAY?
* WHAT WORKED WELL?
* WHAT DIDN'T WORK SO WELL?
* WHAT WOULD YOU SHARE?
* WHERE TO NEXT?
* HOW ARE YOU GOING TO GET THERE?

Note: Cool Australia and Earthwatch have also partnered to create citizen science units of work for [maths](#) and [science](#). To further enhance students' learning, consider teaming up with teachers in these complementary faculties to run a cross-curricular project on phenology and citizen science.