

Year 10 – Citizen Science 70min Lesson 2

Starting our scientific approach

Learning Intentions	Lesson Outcomes
<ul style="list-style-type: none"> Students will learn about insect and plant biodiversity and be introduced to the concept of ecosystem services and the economic values of biodiversity. Students will learn about biodiversity breakdown and formulate their own ideas about the impact of intensive farming. Students will investigate patterns and trends in data to describe their school site and identify habitat zones. Students will formulate questions or hypotheses that can be investigated scientifically 	<ul style="list-style-type: none"> Understand how biodiversity is essential for human survival Understand how human activity largely results in a decrease of biodiversity as we disrupt the circular relationship of our environment Understand and explain significant interconnections between people and the local environments and explain changes that result from these interconnections and their impact Create a hypothesis to the proposed research question “How has human activity impacted biodiversity in our local area?”
Australian Curriculum Content Descriptors	Australian Curriculum General Capabilities
<p>Geography Geographical Knowledge and Understanding</p> <ul style="list-style-type: none"> Human-induced environmental changes that challenge sustainability (ACHGK070) The application of systems thinking to understanding the causes and likely consequences of the environmental change being investigated (ACHGK073) The application of environmental economic and social criteria in evaluating management responses to the change (ACHGK075) <p>Science Science Inquiry Skills</p> <ul style="list-style-type: none"> Formulate questions or hypotheses that can be investigated scientifically (ACSI198) 	<p>Critical and creative thinking</p> <ul style="list-style-type: none"> Inquiring, identifying, exploring and organising information and ideas <p>Critical and creative thinking</p> <ul style="list-style-type: none"> Generating ideas, possibilities and actions <p>ICT Capability</p> <ul style="list-style-type: none"> Investigating with ICT <p>Ethical understanding</p> <ul style="list-style-type: none"> Understanding ethical concepts and issues <p>Ethical understanding</p> <ul style="list-style-type: none"> Reasoning in decision making and actions <p>Sustainability Cross-curriculum priority</p> <ul style="list-style-type: none"> Systems Futures

Assessment

Formative assessment

Students work in groups to characterise their local area and school grounds using geographical knowledge and understanding. From this they will develop 2 hypotheses about the biodiversity in their local area and record these and their observation findings on the data collection sheet.

Phase/Slide	Learning Activity	Resources
Slide 1 - 5	<ul style="list-style-type: none"> • Greetings/introduction • Acknowledgement of Traditional Custodians • Lesson outcomes • Introduction to the citizen science project and the project outcomes 	PowerPoint and video
Slide 6 Engage	<ul style="list-style-type: none"> • Introduction to biodiversity and why it is important • Watch the video which explains biodiversity • Questions: What is biodiversity? And Why is insect and plant biodiversity important? • Answers: 1. Biodiversity is the biological variety and variability of life on Earth. Biodiversity is a measure of variation at the genetic, species, and ecosystem level. Terrestrial biodiversity is usually greater near the equator, which is the result of the warm climate and high primary productivity. 2. Plants and insects create the biological foundation for all terrestrial ecosystems. Plant biodiversity is invaluable because it balances ecosystems, protects watersheds, mitigates erosion, moderates climate, and provides shelter for animals. Insect biodiversity is important because they cycle nutrients, pollinate plants, disperse seeds, maintain soil structure and fertility, control populations of other organisms, and provide a major food source. 	PowerPoint and video https://youtu.be/XTC4qiXd36Q

Phase/Slide	Learning Activity	Resources
Slide 7 -8 Explore Evaluate	<ul style="list-style-type: none"> • Introduction to ecosystem services • Watch the short video that explains how scientists and policy makers are now reframing biodiversity. • Activity 1: healthy biodiversity provides a number of natural services for everyone, in groups students will write down as many ecosystem services (i.e. protection of water sources, soil production etc.), biological services (i.e. Food, medicine etc.) and social benefits (i.e. tourism) that a healthy biodiversity provides and then identify the 3 most important in their opinion and state why. • Some possible answers are given on slide 8 	PowerPoint and video https://youtu.be/YbyxzGbYQBo
Slide 9 -10 Explore Evaluate	<ul style="list-style-type: none"> • Introduce the students to the concept of economic value of biodiversity • Watch the short video which explains the concept • Activity 2: In groups students should now list all the economic benefits of Australia's biodiversity that they can think of and then discuss as a class • Teacher: Guide the students through the activity encourage them to think of industries affected by biodiversity across the whole of Australia. 	PowerPoint and video https://youtu.be/wMIUglBligI
Slide 11-12 Evaluate Reflect Engage	<ul style="list-style-type: none"> • Introduction to the human impact on biodiversity and the cascade of events that can occur due to overuse of a resource • Activity 3: Students are given a well-known example of biodiversity breakdown and are then asked to think about the cyclic relationship between birds, insects and plants. As a class they then need to describe the possible chain of events from harmful farming practices such as monocropping and pesticides. • A possible answer is given on slide 13 	PowerPoint

Phase/Slide	Learning Activity	Resources
Slide 13-14 Evaluate Reflect Problem solve	<ul style="list-style-type: none"> • Introduction to the project and the data collection sheet that they will be working with across this course • Introduction to the research question that they will aim to answer by participating in this citizen science project. 	PowerPoint and data collection sheet
Slide 15 Evaluate Explore Problem solve	<ul style="list-style-type: none"> • Activity 4: Students to work as a class to characterize and describe their local environment, providing enough information for scientists to use the school site in a biodiversity study • Teacher: do not spend too long on this activity. This is just to get the students focused on their local area and environment. Guide them through this activity using the previous videos on slides 6 and 7 as a reference and encourage them to use systems thinking to understanding the causes and likely consequences of the environment and biodiversity being investigated. 	PowerPoint and satellite map of the local area
Slide 16 Evaluate Explore Problem solve	<ul style="list-style-type: none"> • Activity 5: Working in their groups students need to identify the different habitat zones at their school that they could investigate. Then, as a class pick 2 zones that they want to investigate for this project • Teacher: as we are investigating the impact of human activity on biodiversity at the school, ideally one zone should be more natural than the other, for example, shaded area with trees vs intensively mown grass. 	PowerPoint and map of school
Slide 17 -18	<ul style="list-style-type: none"> • Activity 6: As a class the students will pool their ideas together to accurately describe the local area and then fill in the second section of the data collection document, "Observation: Site classification" • Next the students need to develop 2 hypotheses as identified on the data collection sheet • Teacher: These hypotheses are what we will be working to prove/disprove using scientific approach across this course. 	PowerPoint and Data collection sheet
Slide 19 Evaluate reflect	<ul style="list-style-type: none"> • Wrapping up of ideas 	PowerPoint

Slide 20

- Links to videos

PowerPoint