

# Year 10 – Citizen Science 70min Lesson 4

## Data Collection and Analysis

Learning Intentions	Lesson Outcomes
<ul style="list-style-type: none"> <li>Students will use quadrats and hanging traps to sample the insect and plant life at their proposed sample sites</li> <li>Students will collect and record their data following a scientific approach</li> <li>Students will identify the different flora and fauna they have collected and start to systematically compare the 2 sample sites</li> <li>Students will share ideas for digital technologies that can be used for data sampling, collection and analysis</li> </ul>	<ul style="list-style-type: none"> <li>Use quadrats and hanging traps to collect data systematically and accurately</li> <li>Understand how to identify and record plant and insect species data accurately and systematically using a scientific approach</li> <li>Compare data from the two different habitats</li> <li>Analyse patterns and trends in data to describe relationships between variables and identifying inconsistencies</li> <li>Identify strengths and weaknesses of digital technologies used for data sampling, collection and data analysis</li> </ul>
Australian Curriculum Content Descriptors	Australian Curriculum General Capabilities
<p><b>Science</b>  <b>Scientific Inquiry Skills</b></p> <ul style="list-style-type: none"> <li>Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (<a href="#">AC SIS200</a>)</li> <li>Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (<a href="#">AC SIS203</a>)</li> <li>Critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems (<a href="#">AC SIS206</a>)</li> </ul> <p><b>Digital Technologies</b>  <b>Processes and production skills</b></p> <ul style="list-style-type: none"> <li>Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements (<a href="#">ACT DIP036</a>)</li> </ul>	<p><b>Critical and creative thinking</b></p> <ul style="list-style-type: none"> <li>Inquiring, identifying, exploring and organising information and ideas</li> </ul> <p><b>Critical and creative thinking</b></p> <ul style="list-style-type: none"> <li>Generating ideas, possibilities and actions</li> </ul> <p><b>Critical and creative thinking</b></p> <ul style="list-style-type: none"> <li>Analysing, synthesising and evaluating procedures and outcomes</li> </ul> <p><b>ICT Capability</b></p> <ul style="list-style-type: none"> <li>Applying social and ethical protocols and practices when using ICT</li> </ul> <p><b>ICT Capability</b></p> <ul style="list-style-type: none"> <li>Investigating with ICT</li> </ul> <p><b>ICT Capability</b></p> <ul style="list-style-type: none"> <li>Creating with ICT</li> </ul> <p><b>Numeracy</b></p> <ul style="list-style-type: none"> <li>Recognising and using patterns and relationships</li> </ul>

## Assessment

### Formative assessment

Students survey 2 habitats in the school grounds using quadrats and hanging traps, they then collect, record and start to analyse their data in Microsoft Excel to be analysed in this and the subsequent lesson. Students identify strengths and weaknesses of digital technologies used for data sampling, collection and data analysis in class discussion.

Phase/Slide	Learning Activity	Resources
Slide 1 - 4	<ul style="list-style-type: none"> <li>• Greetings/introduction</li> <li>• Acknowledgement of Traditional Custodians</li> <li>• Lesson outcomes</li> </ul>	PowerPoint
Slide 5 - 6 Engage	<ul style="list-style-type: none"> <li>• Introduction to the task: sampling the biodiversity in the two chosen habitats.</li> <li>• Activity 1: Students will use two sampling methods, quadrats and hanging traps, to sample the insect and plant life at their proposed sample sites.</li> </ul>	PowerPoint
Slide 7 - 8 Explore Evaluate	<ul style="list-style-type: none"> <li>• Review how to collect and record data in the data collection sheets provided</li> <li>• In groups go outside with their equipment noted on the slide and collect sample data</li> <li>• Teacher: Guide students through the data collection task</li> </ul>	PowerPoint 3 x copies of data collection sheets per group and pens Quadrats and hanging traps from previous lesson Camera
Slide 9 -11 Evaluate Reflect Problem solve	<ul style="list-style-type: none"> <li>• Activity 2: Record the quadrat sample data. Each group should complete data analysis sheet 1 with all the plant sample data information.</li> <li>• Record the total number of plants within each quadrat in each habitat.</li> <li>• Identify and record a list of all the different types of plants in each habitat.</li> </ul>	PowerPoint and Excel spread sheets: Data analysis sheet 1 Data analysis sheet 2  <a href="https://www.sunshinecoast.qld.gov.au/Environment/Trees-plants-and-gardens/Native-Plants">https://www.sunshinecoast.qld.gov.au/Environment/Trees-plants-and-gardens/Native-Plants</a>
Slide 12 -13 Evaluate	<ul style="list-style-type: none"> <li>• Activity 3: Record the hanging trap sample data. Each group should complete data analysis sheet 1 with all the insect sample data information.</li> <li>• Record the total number of insects within each hanging trap and in each habitat.</li> <li>• Identify and record a list of all the different types of insects in each habitat.</li> </ul>	PowerPoint and Excel spread sheets: Data analysis sheet 1 Data analysis sheet 2  <a href="https://www.qm.qld.gov.au/Explore/Find+out+about/Animals+of+Queensland/Insects/What+insect+is+that/Insect+identifier">https://www.qm.qld.gov.au/Explore/Find+out+about/Animals+of+Queensland/Insects/What+insect+is+that/Insect+identifier</a>

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Slide 14 - 18 Evaluate reflect	<ul style="list-style-type: none"> <li>• Modelling insect populations</li> <li>• Activity 4: Work out the area of each habitat, number of hanging traps and area surveyed by the hanging traps</li> <li>• Now add up the total number of insects surveyed with hanging traps and estimated by hanging traps for both habitats</li> <li>• Activity 5: Interpret population results in a class discussion</li> <li>• If time permits they can do this for the plant data (sheet 2 on Data Analysis sheet 2)</li> </ul>	PowerPoint and Excel spread sheets: Data analysis sheet 2

Phase/Slide	Learning Activity	Resources
Slide 19 -20 Evaluate Reflect Problem solve	<ul style="list-style-type: none"> <li>• Digital Technology discussion</li> <li>• As a whole class ask students to think about ways in which digital technologies could have been used/designed in the data collection method (quadrats and hanging traps) and collation of data</li> <li>• Ask students to share ideas and explain the strengths/weaknesses of the solution compared to the methods we have used thus far in the lessons</li> <li>• Teacher notes: student ideas need to still focus on identifying and recording plant and insect species data accurately and systematically using a scientific approach</li> <li>• Outline how students can use/design digital technologies in their own citizen science projects eg. Apps, thermal cameras, cloud collaboration, GPS tracking, drone mapping, using LiDAR to build wildlife habitat models</li> </ul>	PowerPoint
Slide 21 Evaluate reflect	<ul style="list-style-type: none"> <li>• Wrapping up</li> </ul>	PowerPoint
Slide 22	<ul style="list-style-type: none"> <li>• Possible extension ideas</li> </ul>	PowerPoint
Slide 23	<ul style="list-style-type: none"> <li>• Links to resources</li> </ul>	PowerPoint