

Summary	Duration
<p>This excursion addresses outcomes from the NSW Science, Mathematics and English K-6 Syllabuses.</p> <p><i>Focus</i> - Science</p> <p><i>Knowledge and Understanding</i> - Natural Environment</p> <p><i>Substrand</i> - Living World</p> <p>A nationally recognised program where students investigate a local aquatic ecosystem to measure both physical and biological indicators of water quality. Wetland plants and animals are studied, along with the effects of human activities. Web-based program “Macrobiotica” provides extensive material to support this program. For more information, please visit: http://lrr.cli.det.nsw.edu.au/web/macrobiotica_v2/</p>	<p>4 hour on-site excursion to Penrith Lakes Environmental Education Centre.</p> <p><i>Arrival time</i> - 10:00am</p> <p><i>Departure time</i> - 2:00pm</p> <p>Arrival and departure times are guides only. Distance and bus schedules may require modifications to the timetable.</p>

About Penrith Lakes Environmental Education Centre	Learning across the curriculum
<p>Penrith Lakes Environmental Education Centre is located on Old Castlereagh road near Sydney International Regatta Centre. This great location allows us to provide studies of land and water management at Penrith Lakes along with local heritage sites and the environmental issues associated with the Nepean River and Blue Mountains.</p>	<p><i>Cross-curriculum priorities enable students to develop understanding about and address the contemporary issues they face.</i></p> <p>Sustainability is concerned with the ongoing capacity of the Earth to maintain all life. It provides authentic contexts for exploring, investigating and understanding systems in the natural and made environments. Relationships, cycles and cause and effect are explored, and students develop observation and analytical skills to examine these relationships in the world around them to design solutions to identified sustainability problems.</p>

Outcomes	Key concepts
<p>English K-10</p> <ul style="list-style-type: none"> › EN3-3A uses an integrated range of skills, strategies and knowledge to read, view and comprehend a wide range of texts in different media and technologies › ENe-1A communicates with peers and known adults in informal and guided activities demonstrating emerging skills of group interaction <p>Mathematics K-10</p> <ul style="list-style-type: none"> › MA3-2WM selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations › MA3-5NA selects and applies appropriate strategies for addition and subtraction with counting numbers of any size › MA3-18SP uses appropriate methods to collect data and constructs, interprets and evaluates data displays, including dot plots, line graphs and two-way tables <p>Science K-10</p> <ul style="list-style-type: none"> › ST3-1VA shows interest in and enthusiasm for science and technology, responding to their curiosity, questions and perceived needs, wants and opportunities › ST3-2VA demonstrates a willingness to engage responsibly with local, national and global issues relevant to their lives, and to shaping sustainable futures › ST3-4WS investigates by posing questions, including testable questions, making predictions and gathering data to draw evidence-based conclusions and develop explanations › ST3-10LW describes how structural features and other adaptations of living things help them to survive in their environment › ST3-11LW describes some physical conditions of the environment and how these affect the growth and survival of living things 	<ul style="list-style-type: none"> ▪ Living things have structural features and adaptations that help them survive in their environment. ▪ The growth and survival of living things are affected by the physical conditions of their environment.

Content	Teaching and learning activities	Resources
<p>Stage 3 - Reading and viewing</p> <p>Students:</p> <p>Understand and apply knowledge of language forms and features</p> <ul style="list-style-type: none"> ▪ identify and explain how analytical images like figures, tables, diagrams, maps and graphs contribute to our understanding of verbal information in factual and persuasive texts (ACELA1524)  <p>Early Stage 1 - Speaking and listening 1</p>	<p>Activity 1 - Introduction to Penrith Lakes and the local freshwater ecosystem</p> <p>Students are welcomed to the Centre and introduced to Penrith Lakes and the local freshwater ecosystem. The following questions are answered:</p> <ul style="list-style-type: none"> ▪ Where is Penrith Lakes located? ▪ How long has Penrith Lakes been a part of the Penrith Community? ▪ What activities are occurring at Penrith Lakes? 	<p>Provided by PLEEC:</p> <ul style="list-style-type: none"> ▪ Interactive whiteboard ▪ Interactive PowerPoint presentation ▪ Abiotic data collection equipment

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<p>Students:</p> <p>Respond to and compose texts</p> <ul style="list-style-type: none"> ▪ listen to and respond orally to texts and to the communication of others in informal and structured classroom situations (ACELY1646)  <p>Stage 3 - Working Scientifically</p> <p>Students question and predict by:</p> <ul style="list-style-type: none"> ▪ with guidance, posing questions to clarify practical problems or inform a scientific investigation (ACSYS231, ACSYS232) ▪ predicting what the findings of an investigation might be (ACSYS231, ACSYS232) 	<ul style="list-style-type: none"> ▪ Why is Penrith Lakes being established? ▪ How is Penrith Lakes being established? ▪ What products are being created as Penrith Lakes is being established? ▪ What is the purpose of our visit today? ▪ Where is our study site? ▪ What fieldwork will we be completing and data will we be collecting? <p>Students are shown how to use the abiotic data collection equipment to measure the following factors when out in the field:</p> <ul style="list-style-type: none"> ▪ Temperature ▪ pH ▪ Turbidity ▪ Dissolved oxygen ▪ Phosphate ▪ Salinity 	
<p>Early Stage 1 - Speaking and listening 1</p> <p>Students:</p> <p>Develop and apply contextual knowledge</p> <ul style="list-style-type: none"> ▪ understand how to communicate effectively in pairs and groups using agreed interpersonal conventions, active listening, appropriate language and taking turns  <p>Respond to and compose texts</p> <ul style="list-style-type: none"> ▪ use interaction skills including listening while others speak, using appropriate voice levels, articulation and body language, gestures and eye contact (ACELY1784)   <p>Stage 3 - Working Scientifically</p> <p>Students conduct investigations by:</p> <ul style="list-style-type: none"> ▪ using suitable equipment and materials, checking observations and measurements by repeating them where appropriate <p>Stage 3 - Living World</p> <p>Living things have structural features and adaptations that help them to survive in their environment. (ACSSU043)</p>	<p>Activity 2 - What's on the menu?</p> <ul style="list-style-type: none"> ▪ Students will walk to the local freshwater ecosystem where they will be instructed to make observations of the living organisms. ▪ With guidance from PLEEC staff, students must try and figure out who is eating whom in the local freshwater ecosystem. To do this they will need to identify as many living things as they can, discover their feeding habits and relate them in food chains. ▪ Students will be using binoculars and microscopes to identify and classify the living things. 	<p>Provided by PLEEC:</p> <ul style="list-style-type: none"> ▪ Student worksheets (soft copy) ▪ Clipboards ▪ Freshwater ecosystem with producers and consumers ▪ Binoculars ▪ Microscopes <p>Provided by visiting school:</p> <ul style="list-style-type: none"> ▪ Student worksheets (hard copy) ▪ Lead pencils ▪ Student hats ▪ Sunscreen ▪ First aid kit and student medications

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<p>Students:</p> <ul style="list-style-type: none"> observe and describe the structural features of some native Australian animals and plants  present ideas and explanations about how the structural features and behaviour of some plants and animals help them to survive in their environment, e.g. shiny surfaces of leaves on sand dune plants and nocturnal behaviour in some animals  		
<p>Stage 3 - Reading and viewing</p> <p>Students:</p> <p>Understand and apply knowledge of language forms and features</p> <ul style="list-style-type: none"> identify and explain how analytical images like figures, tables, diagrams, maps and graphs contribute to our understanding of verbal information in factual and persuasive texts (ACELA1524)  <p>Early Stage 1 - Speaking and listening 1</p> <p>Students:</p> <p>Develop and apply contextual knowledge</p> <ul style="list-style-type: none"> understand how to communicate effectively in pairs and groups using agreed interpersonal conventions, active listening, appropriate language and taking turns  <p>Respond to and compose texts</p> <ul style="list-style-type: none"> use interaction skills including listening while others speak, using appropriate voice levels, articulation and body language, gestures and eye contact (ACELY1784)  <p>Stage 3 - Whole Numbers 1</p> <p>Students:</p> <p>Identify and describe factors and multiples of whole numbers and use them to solve problems (ACMNA098)</p> <ul style="list-style-type: none"> solve problems using knowledge of factors and multiples, e.g. 'There are 48 people at a party. In how many ways can you set up the tables and chairs, so that each table seats the same number of people and there are no empty chairs?'  <p>Stage 3 - Data 1</p> <p>Students:</p>	<p>Activity 3 - Can I swim here?</p> <ul style="list-style-type: none"> Students will test the water in the local freshwater ecosystem to determine whether it is safe to swim in. With guidance from PLEEC staff, students will measure the following abiotic factors: temperature, pH, turbidity, dissolved oxygen, phosphate and salinity. Each of these tests will give students information about water quality. At the conclusion of their water testing, students will judge the health of the local freshwater ecosystem. 	<p>Provided by PLEEC:</p> <ul style="list-style-type: none"> Student worksheets (soft copy) Clipboards Freshwater ecosystem Abiotic data collection equipment <p>Provided by visiting school:</p> <ul style="list-style-type: none"> Student worksheets (hard copy) Lead pencils Student hats Sunscreen First aid kit and student medications

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<p>Pose questions and collect categorical or numerical data by observation or survey (ACMSP118)</p> <ul style="list-style-type: none"> collect categorical and numerical data through observation or by conducting surveys, e.g. observe the number of a particular type of insect in one square metre of the playground over time  <p>Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119)</p> <ul style="list-style-type: none"> tabulate collected data, including numerical data, with and without the use of digital technologies such as spreadsheets  <p>Describe and interpret different data sets in context (ACMSP120)</p> <ul style="list-style-type: none"> describe and interpret data presented in tables, dot plots, column graphs and line graphs, e.g. 'The graph shows that the heights of all children in the class are between 125 cm and 154 cm'  <p>Stage 3 - Working Scientifically</p> <p>Students conduct investigations by:</p> <ul style="list-style-type: none"> using suitable equipment and materials, checking observations and measurements by repeating them where appropriate <p>Stage 3 - Living World</p> <p>The growth and survival of living things are affected by the physical conditions of their environment. (ACSSU094)</p> <p>Students:</p> <ul style="list-style-type: none"> identify some physical conditions of a local environment, e.g. temperature, slope, wind speed, amount of light and water make predictions about how changing the physical conditions of the environment impacts on the growth and survival of living things, e.g. different amounts of light or water on plant growth or the effect of different temperatures on the growth of yeast or bread mould    		
<p>Early Stage 1 - Speaking and listening 1</p> <p>Students:</p> <p>Develop and apply contextual knowledge</p> <ul style="list-style-type: none"> understand how to communicate effectively in pairs and groups using agreed interpersonal conventions, active listening, appropriate language and taking turns 	<p>Activity 4 - Collecting macroinvertebrates</p> <ul style="list-style-type: none"> Students use dip nets to catch macroinvertebrates in the local freshwater ecosystem. As students collect freshwater insects, PLEEC staff will collect one of each of the species caught and put them in a specimen jar. 	<p>Provided by PLEEC:</p> <ul style="list-style-type: none"> Freshwater ecosystem with macroinvertebrates Dip nets Macroinvertebrate key

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<p> Respond to and compose texts</p> <ul style="list-style-type: none"> ▪ use interaction skills including listening while others speak, using appropriate voice levels, articulation and body language, gestures and eye contact (ACELY1784)  <p> Stage 3 - Working Scientifically</p> <p>Students conduct investigations by:</p> <ul style="list-style-type: none"> ▪ using suitable equipment and materials, checking observations and measurements by repeating them where appropriate <p>Stage 3 - Living World</p> <p>Living things have structural features and adaptations that help them to survive in their environment. (ACSSU043)</p> <p>Students:</p> <ul style="list-style-type: none"> ▪ observe and describe the structural features of some native Australian animals and plants  		<ul style="list-style-type: none"> ▪ Microscopes <p>Provided by visiting school:</p> <ul style="list-style-type: none"> ▪ Student hats ▪ Sunscreen ▪ First aid kit and student medications
<p>Stage 3 - Reading and viewing</p> <p>Students:</p> <p>Understand and apply knowledge of language forms and features</p> <ul style="list-style-type: none"> ▪ identify and explain how analytical images like figures, tables, diagrams, maps and graphs contribute to our understanding of verbal information in factual and persuasive texts (ACELA1524)  <p>Early Stage 1 - Speaking and listening 1</p> <p>Students:</p> <p>Respond to and compose texts</p> <ul style="list-style-type: none"> ▪ listen to and respond orally to texts and to the communication of others in informal and structured classroom situations (ACELY1646)  <p>Stage 3 - Addition and Subtraction 2</p> <p>Students:</p> <ul style="list-style-type: none"> ▶ select and apply appropriate mental and written strategies, with and without the use of digital technologies, to solve unfamiliar problems (Problem Solving)  <p></p>	<p>Activity 5 - Identifying macroinvertebrates</p> <p>Back at the Environmental Education Centre, PLEEC staff help students to understand the data they collected in the field.</p> <ul style="list-style-type: none"> ▪ The macroinvertebrates collected from the local freshwater ecosystem are put under a video microscope and identified. ▪ Each freshwater insect has a predetermined score. This score has been allocated according to their sensitivity to pollution. Students record these scores as different species are identified. ▪ Once all freshwater insects have been identified, students add up their total score to work out the health of the local freshwater ecosystem they have been studying. ▪ As students identify certain freshwater insects, PLEEC staff will describe the stage of their lifecycle. Students are also given the opportunity to sequence the life cycle stages of certain species. 	<p>Provided by PLEEC:</p> <ul style="list-style-type: none"> ▪ Interactive whiteboard ▪ Interactive PowerPoint presentation ▪ Video microscope ▪ Student worksheet (soft copy) ▪ Clipboards <p>Provided by visiting school:</p> <ul style="list-style-type: none"> ▪ Student worksheet (hard copy) ▪ Lead pencils

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<p>Stage 3 - Working Scientifically</p> <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> ▪ drawing conclusions and providing explanations based on data and information gathered first-hand or from secondary sources ✨ ▪ comparing gathered data with predictions, and using as evidence in developing explanations of events and phenomena (AC SIS218, AC SIS221, AC SHE081, AC SHE098) ✨ <p>Stage 3 - Living World</p> <p>The growth and survival of living things are affected by the physical conditions of their environment. (AC SSU094)</p> <p>Students:</p> <ul style="list-style-type: none"> ▪ use gathered data to develop explanations about how changing the physical conditions of the environment affects the growth and survival of living things 🎓📊 <p>🌱</p>		