

Essential Energy – Stage 3

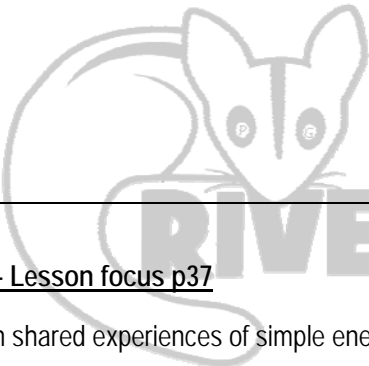
Physical World Strand

Term	1	2	3	4	Weeks	1	2	3	4	5	6	7	8	9	10	11
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Outcome	Lesson Sequence – Overview	Resources	Word Wall
<p>ST3-8PW-ST explains how energy is transformed from one form to another</p> <ul style="list-style-type: none"> discuss different sources of energy and how the types of energy could be transformed or transferred contribute to discussions about electricity, how it is used and how it is generated <p>ST3-1WS-S plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions</p> <ul style="list-style-type: none"> identify the purpose and features of a science journal, word wall and chat-board work in teams to sort and classify ideas pose questions for investigation in response to a 	<p>Lesson 1 <u>Scientific support – Lesson focus p11</u></p> <ul style="list-style-type: none"> To capture students' interest and find out what they think they know about how energy from a variety of sources can be used to generate electricity. To elicit students' questions about the use and management of electricity. <p><u>Students:</u></p> <ul style="list-style-type: none"> discuss what they think they know about energy and what electrical energy is used for share ideas using a think-box strategy record ideas on the science chat-board. 	<p>For the class</p> <ul style="list-style-type: none"> class science journal 1 enlarged copy of 'Request for scientific support' (Resource sheet 1, see 'Preparation') 5 shoe boxes or similar (see 'Preparation') 6 large sheets of paper or cardboard (see 'Preparation') 6 marking pens team roles chart team skills chart word wall <p>For each team</p> <ul style="list-style-type: none"> role wristbands or badges for Director, Manager and Speaker each team member's science journal adhesive tape marking pens self-adhesive notes 	<p>advantages</p> <p>appliance</p> <p>audit</p> <p>battery</p> <p>biomass</p> <p>chemical</p> <p>circuit</p> <p>coal</p> <p>conductor</p> <p>cooking</p> <p>disadvantages</p> <p>efficiency</p> <p>elastic</p> <p>electrical</p> <p>electricity</p>

request for assistance.			<i>electrons</i> <i>emit</i> <i>energy</i> <i>explain</i>
<p>ST3-8PW-ST explains how energy is transformed from one form to another</p> <ul style="list-style-type: none"> identify different types of energy explore and document electricity use in their home. <p>ST3-1WS-S plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions</p> <ul style="list-style-type: none"> work in collaborative learning teams to observe different types of energy in the school record their observations in a table discuss and compare their observations 	<p>Lesson 2 <u>Susceptible to shortages – Lesson focus p17</u></p> <ul style="list-style-type: none"> To provide hands-on, shared experiences of types of energy and what energy is used for. <p>Session 1 Delicate definitions <u>Students:</u></p> <ul style="list-style-type: none"> <i>explore the different types of energy identified by scientists</i> <i>observe the different types of energy used in their school.</i> <p>Session 2 Marvellous machines <u>Students:</u></p> <ul style="list-style-type: none"> <i>identify how household machines transform one type of energy into another</i> <i>explore electrical energy usage in and around the home.</i> 	<p>Session 1 For the class</p> <ul style="list-style-type: none"> class science journal word wall team skills chart team roles chart 'Types of energy' cards for the science chat-board (see 'Preparation') 1 enlarged copy of 'School energy survey' (Resource sheet 2) 1 or more resource(s) containing a scientific definition of 'energy', (eg, an encyclopaedia) <p>For each team</p> <ul style="list-style-type: none"> role wristbands or badges for Director, Manager and Speaker each team member's science journal 1 copy of 'School energy survey' (Resource sheet 2) 1 pen <i>Optional:</i> 1 clipboard <p>Session 2 For the class</p>	<i>environmental</i> <i>fair test</i> <i>fossil fuel</i> <i>friction</i> <i>gas</i> <i>generator</i> <i>geothermal</i> <i>gravitational</i> <i>heat</i> <i>hydroelectricity</i> <i>insulation</i> <i>investigation</i> <i>journal</i> <i>light</i>

		<ul style="list-style-type: none"> • class science journal • word wall • 1 enlarged copy of 'Auditing appliances' (Resource sheet 4) <p>For each team</p> <ul style="list-style-type: none"> • each team member's science journal • 1 'Auditing appliances' folder (eg, a manila folder) • 1 copy of 'Information note for families' (Resource sheet 3) • 1 copy of 'Auditing appliances' (Resource sheet 4) • 1 copy of 'Energy usage guide' (see 'Preparation') 	<p><i>machines</i></p> <p><i>microwaves</i></p> <p><i>movement</i></p> <p><i>non-renewable</i></p> <p><i>nuclear</i></p> <p><i>observation</i></p> <p><i>oil</i></p> <p><i>power station</i></p> <p><i>prediction</i></p>
<p>ST3-8PW-ST explains how energy is transformed from one form to another</p> <ul style="list-style-type: none"> • identify that heat from the Sun can be transferred to heat water <p>ST3-1WS-S plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions</p> <ul style="list-style-type: none"> • use a Predict, Reason, Observe and Explain (PROE) strategy to plan a simple investigation 	<p>Lesson 3</p> <p><u>Here comes the sun – Lesson focus p30</u></p> <ul style="list-style-type: none"> • To provide hands-on, shared experiences of simple energy transfers. <p>Students:</p> <ul style="list-style-type: none"> • <i>work in collaborative learning teams to investigate how energy from the Sun can be used to heat water</i> • <i>modify a soft drink can to investigate how to heat the water faster.</i> 	<p>For the class</p> <ul style="list-style-type: none"> • class science journal • word wall • team skills chart • team roles chart • 1 enlarged copy of 'PROE' (Resource sheet 5) • bucket of water • measuring cup <p>For each team</p> <ul style="list-style-type: none"> • role wristbands or badges for Director, Manager and Speaker • each team member's science journal • 1 copy of 'PROE' (Resource sheet 5) • 2 empty soft drink cans • 1 thermometer 	<p><i>radiation</i></p> <p><i>reason</i></p> <p><i>record</i></p> <p><i>renewable</i></p> <p><i>science</i></p> <p><i>solar</i></p> <p><i>sound</i></p> <p><i>substation</i></p> <p><i>survey</i></p>

<ul style="list-style-type: none"> work in teams to safely investigate methods of improving the heating of water in a can record observations in a table compare their results with their predictions, and present to the class evaluate their investigation discuss the advantages and disadvantages of different methods of heating water. 		<ul style="list-style-type: none"> equipment for modifying cans (see 'Preparation') 	<p><i>sustainable</i> <i>tidal</i> <i>transfer</i> <i>transform</i> <i>transmission lines</i> <i>turbine</i> <i>wind</i> <i>usage</i> <i>variables</i></p>
<p>ST3-8PW-ST explains how energy is transformed from one form to another</p> <ul style="list-style-type: none"> identify how waterwheels transfer and transform energy and have been used by different cultures for centuries discuss the management challenges and environmental impacts of harnessing energy from streams and rivers. <p>ST3-1WS-S plans and conducts scientific investigations to answer testable</p>	<p>Lesson 4 <u>Mobilising movement – Lesson focus p37</u></p> <ul style="list-style-type: none"> To provide hands-on shared experiences of simple energy transformations. <p>Session 1 Whirling water <u>Students:</u></p> <ul style="list-style-type: none"> <i>work in collaborative learning teams to create a waterwheel</i> <i>identify one variable to change on their waterwheel.</i> <p>Session 2 Winning waterwheels <u>Students:</u></p> <ul style="list-style-type: none"> <i>work in collaborative learning teams to test their changed waterwheel</i> <i>discuss and compare their results.</i> 	<p>Session 1 For the class</p> <ul style="list-style-type: none"> class science journal word wall team skills chart team roles chart enlarged copy of 'Waterwheel procedure' (Resource sheet 6) enlarged copy of 'Waterwheel investigation planner' (Resource sheet 7) 1 ice-cream or large yoghurt container sand or marbles to fill the container scissors or Stanley knife 1 bucket 1 timing device (eg, a stopwatch or a watch with a second hand) 	<p><i>voltage</i> <i>voltmeter</i> <i>watt</i> <i>waterwheel</i></p>

questions, and collects and summarises data to communicate conclusions

- write a question for investigation and predict what will happen when the variable that they chose changes
- work in collaborative learning teams to plan and safely conduct an investigation about variables that affect the efficiency of a waterwheel
- record results of multiple trials in a table and calculate averages
- make evidence-based claims about their results and compare their results with their predictions and with other teams' results
- evaluate their investigation



- water

For each team

- role wristbands or badges for Director, Manager and Speaker
- each team member's science journal
- 1 copy of 'Waterwheel procedure' (Resource sheet 6)
- 1 copy of 'Waterwheel investigation planner' (Resource sheet 7)
- 8 wooden skewers
- adhesive tape
- 2 pieces of adhesive tac
- 2 x 30cm pieces of string
- materials to make waterwheel blades (see 'Preparation')
- small weight (eg, an eraser)

Session 2


For the class


- class science journal
- word wall
- team skills chart
- team roles chart
- enlarged copy of 'Waterwheel investigation planner' (Resource sheet 7) from Session 1


For each team

- role wristbands or badges for Director, Manager and Speaker
- each team member's science journal

		<ul style="list-style-type: none"> • copy of 'Waterwheel investigation planner' (Resource sheet 7) from Session 1 • waterwheels from Session 1 	
<p>ST3-8PW-ST explains how energy is transformed from one form to another</p> <ul style="list-style-type: none"> • contribute to discussions about how electricity is generated. <p>ST3-1WS-S plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions</p> <ul style="list-style-type: none"> • draw flow charts representing energy transfer and transformation • make claims about where energy might have come from • read and interpret factual texts 	<h2>Lesson 5</h2> <p><u>Domestic help – Lesson focus p50</u></p> <ul style="list-style-type: none"> • To support students to represent and explain their understanding of how energy can be transferred or transformed, and to introduce current scientific views about how electricity is generated. <p>Students:</p> <ul style="list-style-type: none"> • <i>create flow charts to show energy transformations and transfers</i> • <i>read and discuss factual texts about how to generate electricity</i> • <i>compare the benefits of different energy sources.</i> 	<p>For the class</p> <ul style="list-style-type: none"> • class science journal • class science chat-board • team roles chart • team skills chart • 1 enlarged copy of 'Where does electrical energy come from?' (Resource sheet 8) • 'Request for scientific support' (Resource sheet 1) from Lesson 1 • collection of multimedia resources (see 'Preparation') <p>For each team</p> <ul style="list-style-type: none"> • role wristbands or badges for Director, Manager and Speaker • each team member's science journal • 1 copy of 'Where does electrical energy come from?' (Resource sheet 8) 	
<p>ST3-8PW-ST explains how energy is transformed from one form to another</p> <ul style="list-style-type: none"> • identify how electricity is used in the home 	<h2>Lesson 6</h2> <p><u>Necessary energy – Lesson focus p59</u></p> <ul style="list-style-type: none"> • To support students to represent their understanding of how and why electrical energy is used in the home and to introduce current scientific views about sustainable energy sources. 	<p>For the class</p> <ul style="list-style-type: none"> • class science journal • class science chat-board • team roles chart • team skills chart 	

<p>ST3-1WS-S plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions</p> <ul style="list-style-type: none"> contribute to discussions about how often different appliances are used and whether they are necessary participate in creating a factual letter including evidence-based claims 	<p>Students:</p> <ul style="list-style-type: none"> present the results of their investigations about the use of appliances identify what electricity is used for in households and how it is used. 	<ul style="list-style-type: none"> 1 enlarged copy of 'Measuring mayhem' (Resource sheet 9) 'Request for scientific support' (Resource sheet 1) from Lesson 1 materials to write letter to STIVS (see 'Preparation') <p>For each team</p> <ul style="list-style-type: none"> role wristbands or badges for Director, Manager and Speaker each team member's science journal each team member's completed 'Auditing appliances' (Resource sheet 4, see Lesson 2, Session 2) 1 copy of 'Measuring mayhem' (Resource sheet 9) per team member 	
<p>ST3-8PW-ST explains how energy is transformed from one form to another</p> <p>ST3-1WS-S plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate</p> <ul style="list-style-type: none"> write a question for investigation and predict what will 	<p>Lesson 7</p> <p>Full of potential – Lesson focus p63</p> <ul style="list-style-type: none"> To support students to plan and conduct an investigation of how to generate electricity using simple household items. <p>Students:</p> <ul style="list-style-type: none"> <i>make a simple battery following a procedural text</i> <i>work in collaborative learning teams to plan and conduct an investigation to determine the effect of a chosen variable on the functioning of their battery</i> <i>observe, record and share the results of their investigation.</i> 	<p>For the class</p> <ul style="list-style-type: none"> class science journal word wall team skills chart team roles chart two AA batteries two pieces of insulated wire with alligator clips or strip 2 cm of insulation off ends of wire 1 small light globe that can be connected to an AA battery, eg, a torch light globe 	

<p>happen when a variable is changed</p> <ul style="list-style-type: none"> • work in collaborative learning teams to plan and safely conduct an investigation about variables that affect a simple battery • record their results in a table • make evidence-based claims about their results • compare their results with their predictions and with other teams' results • evaluate their investigation • discuss and compare this method of electricity production with other methods. 		<ul style="list-style-type: none"> • enlarged copy of 'Generating electricity' (Resource sheet 10) • enlarged copy of 'Battery procedure' (Resource sheet 11) • enlarged copy of 'Battery investigation planner' (Resource sheet 12) <p>For each team</p> <ul style="list-style-type: none"> • role wristbands or badges for Director, Manager and Speaker • each team member's science journal • 1 copy of 'Battery procedure' (Resource sheet 11) • 1 copy of 'Battery investigation planner' (Resource sheet 12) • 2 pieces of copper (see 'Preparation') • 2 galvanised nails (see 'Preparation') • 2 lemons or potatoes • 3 pieces of insulated wire with alligator clips or strip 2 cm of insulation off ends of wire • 1 voltmeter or small LED light globe with two wires • materials to make modifications to their battery (see 'Preparation') 	
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<p>ST3-8PW-ST explains how energy is transformed from one form to another</p> <p>ST3-1WS-S plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate</p> <ul style="list-style-type: none"> • discuss a propaganda text and assess its scientific claims • identify that science and culture interact to influence personal and community choices • create multimedia texts and/or presentations to communicate what they have learnt during the unit, supporting claims with evidence • contribute to discussions and express their opinions about their learning journey. 	<h2>Lesson 8</h2> <p>Community choices – Lesson focus p73</p> <ul style="list-style-type: none"> • To provide opportunities for students to represent what they know about how energy from a variety of sources can be used to generate electricity, and to reflect on their learning during the unit. <p>Students:</p> <ul style="list-style-type: none"> • <i>review and reflect on their learning during the unit</i> • <i>read and discuss a propaganda text</i> • <i>discuss the role of scientists and scientific information in society</i> • <i>create texts to communicate what they have learned.</i> 	<p>For the class</p> <ul style="list-style-type: none"> • class science journal • class science chat-board • 1 enlarged copy of 'Successful conclusion' (Resource sheet 13) • 1 enlarged copy of 'Certificate of Appreciation' (Resource sheet 14) • 1 enlarged copy of 'Propaganda for Short Circuit' (Resource sheet 15) <p>For each team</p> <ul style="list-style-type: none"> • each team member's science journal • 1 copy of 'Propaganda for Short Circuit' (Resource sheet 15) 	
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