UNIT PLAN

Unit Title "Feeling Hot, Hot, Hot"	**Stage** Stage 2 (Year 3)
Term 3	**Strand** Physical World
Duration 10 weeks (90 minutes per lesson)	**Concept** 'How heat is produced and transferred'

RATIONALE

Rationale

The unit "Feeling, Hot, Hot, Hot" focuses on the Physical World content strand and has been produced in accordance with the K-10 New South Wales Science Syllabus. Teachers will adopt a constructivist approach to teaching in order to allow students to become highly involved in their learning through participating in engaging, hands on and inquiry based activities (Skamp, 2011). Students will work in supportive, dynamic and social environments where they will actively build on their pre conceptions to develop scientifically aligned understandings of how heat is produced and transferred (K-10 NSW Science Syllabus). A constructivist approach to science education in the primary classroom is a more effective pedagogical approach (Skamp, K & Peers, S. 2012).

Throughout this unit of work students will develop an in-depth understanding of heat sources, how heat sources produce heat and how heat is transferred. This will involve the introduction and exploration of the following scientific terms and concepts: primary heat source, secondary heat source, electrical energy, chemical energy, movement energy, conduction, convection, conductors and insulators. Within this unit of work students will be required to work scientifically (follow instructions, pose questions for investigation, predict outcomes and collect, record and analyse data) and technologically (define the design task, establish design criteria, consider constraints when planning) in order to optimize their learning and explore their sense of wonder and inquisitiveness about the world around them (K-10 NSW Science Syllabus).

The unit of work follows the 5E instructional model to assist teachers scaffold the learning of science and integrate other Key Learning Areas in appropriate and engaging ways. The 5E Model allows students to actively explore and construct the scientific concept under the guidance of the teacher, in order to make sense of experiences and develop conceptual understanding. The 5E model also allows for students to express their learning through language and literacy products (Primary CONNECTIONS REFERNCE).

"Feeling, Hot, Hot, Hot" integrates English, Mathematics and Information and Communication Technology throughout the unit in order to assist

students in connecting the concept of heat to real life experiences. Similarly the unit of work makes an inter curricular link between the Physical World and Products content strands of the NSW Science Syllabus. The unit of work is designed to cater for different learning needs such as special needs learners, gifted and talented learners and Indigenous learners through the use of visual, auditory and kinesthetic learning activities as well as the incorporation of the Aboriginal 8-ways Learning Framework.

APPLICATION OF LITERATURE IN SCIENCE

Children's Books: Linking Literacy and Science Learning

Books:

Temperature: Heating Up and Cooling Down

Stille, D. R., & Boyd, S. (2004). *Temperature: heating up and cooling down*. Minneapolis: Picture Window Books.

Energy: Heat, Light, and Fuel

Stille, D. R., & Boyd, S. (2004). *Energy: heat, light, and fuel*. Minneapolis: Picture Window Books.

Texts to read in English lessons as a link to science:

Sunshine on my shoulders

Canyon, C., & Denver, J. (2003). *John Denver's Sunshine on my shoulders*. Nevada City, Calif.: Dawn Publications.

Sizzle! A book about heat waves

Thomas, R., & Shea, D. (2005). *Sizzle!: a book about heat waves*. Minneapolis, Minn.: Picture Window Books.

Heat

Walker, S. M., & King, A. (2006). *Heat*. Minneapolis: Lerner Publications.

Text Types:

Letters from Mario

Emails from Mario

Persuasive texts to Luigi

KEY LEARNING AREAS

KLA Science and Technology
Outcomes and Performance Indicators
Physical World

- ST2-6PW – Identifies ways heat is produced and that heat moves from one object to another
  - Identify objects that are sources of heat.
  - Classify heat sources as Primary Sources or Secondary Sources.
  - Identify different ways heat can be produced e.g. electrical energy, chemical energy, movement energy
  - Identify how heat can be transferred e.g. conduction and convection
  - Identify objects that influence heat transfer e.g. conductors and insulators

Products (Inter curricular link)

- ST2-16P – Describes how products are designed and produced, and they way people use them
  - Identify the component parts of a product and explain how the parts are designed to work together.

Working Scientifically

- ST2-4WS – Investigates their questions and predictions by analysing collected data, suggesting explanations for their findings, and communicating and reflecting on the processes undertaken
  - Using curiosity, prior knowledge, experiences and scientific information with guidance identifying questions in familiar contexts that can be investigated scientifically
  - Predicting what might happen based on prior knowledge in an investigation
  - Working collaboratively and individually, to suggest ways to plan and conduct investigations to find answers to questions
  - Safely using appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate
  - Using a range of methods including tables and simple column graphs to represent data to identify patterns and trends, using digital technologies as appropriate
  - Comparing results with predictions, suggesting possible reasons for findings

Working Technologically

- ST2-5WT – Applies a design process and uses a range of tools, equipment, materials and techniques to produce solutions that address specific design criteria
  - Using creative thinking techniques, including brainstorming, mind-mapping, sketching and modelling
  - Using digital technologies and multimedia for communicating design ideas
  - Exploring a range of materials appropriate for the task
  - Safely and correctly using a range of tools and equipment, materials and techniques
  - Observe the effects of heat moving from one object to another, e.g. the feeling when hands are placed in warm or cold water

KLA English

Outcomes and Performance Indicators

Speaking and Listening

- EN2-1A – Communicates in a range of informal and formal contexts by adopting a range of roles in group, classroom, school and community contexts
  - Understand the ways in which spoken language differs from written language when adopting a range of roles

Writing and Representing

- EN2-2A – Plans, composes and reviews a range of texts that are more demanding in terms of topic, audience and language
  - Plan, draft and publish imaginative, informative and persuasive texts containing key information and supporting details for a widening range of audiences, demonstrating increasing control over text structures and language features (ACELY1682, ACELY1694)

Thinking Imaginatively, Creatively and Interpretively

- EN2-10C – Thinks imaginatively, creatively and interpretively about information, ideas and texts when responding to and composing texts

KLA Mathematics

Outcomes and Performance Indicators

Working Mathematically

Problem Solving

- MA2-2WM – Selects and uses appropriate mental or written strategies, or terminology to solve problems

Measurement and Geometry

Position

- MA2-17MG – Uses simple maps and grids to represent position and follow routes including using compass directions

Statistics and Probability

Data

- MA2-18SP – Selects appropriate methods to collect data, and constructs, compares, interprets and evaluates data displays, including tables, picture graphs and column graphs.

○ Respond to a range of texts e.g. through role play **Expressing Themselves** • EN2-11D – Responds to and compose a range of texts that express viewpoints of the world similar to and different from their own • Experiment with visual, multimodal and digital technologies to represent aspects of experience and relationships	

ASSESSMENT

Assessment – Formative (during learning engagement) Formative assessment (assessment as learning) occurs during the learning process and allows the teacher to monitor progress, ask questions and provide informal feedback. Formative assessment will occur throughout the entire unit through: • Observation • Discussion • Questioning • Student justifications • Anecdotal notes • Demonstrations • Blog submissions (Science Journal) • Flow chart	**Assessment – Summative (at the end)** Summative assessment (assessment of learning) occurs at the end of the learning process and allows the teacher to assess the student's achievement against the learning goals and standards. This assessment will outline the progression the student has made from the initial diagnostic assessment. Summative assessment will occur during the 10th lesson through: • Persuasive text to Luigi • Blog submissions (Science Journal)
Work Samples – to show understanding and achievement of outcomes • Blog submissions (Science Journal) • Flow chart • Persuasive text to Luigi	

STUDENT DYNAMIC

<table>
<tr><td colspan="2">Number
There are 24 students in this Year Three class</td></tr>
<tr><td>Differentiation Needs
Differentiated lessons provide educational opportunities for all students in the class. By catering for the different learning needs and styles throughout our unit of work “Feeling, Hot, Hot, Hot” we have endeavored to provide support for all children in their learning. Within this class use the “Feeling Hot Hot Hot” to allow students to move around and dance to the music, releasing energy in a positive way. This song helps a child with ADHD release energy without being singled out.
Examples of differentiation include:
• Lesson 1 – Students with higher abilities are encouraged to use scientific terms and give extensive reasoning to their classifications of ‘what is heat’ during the initial questioning time. Students working towards and at stage level will be able to express what they know through articulating their thoughts in the later in the lesson.
• Lesson 4 – This lesson is hands on and students are working collaboratively in mixed ability groups. This will allow students to learn together, and work with students that can assist with highlighting what is happening, which also gives the higher achieving students an opportunity to communicate what they know and learnt.</td><td>Skills, interests and prior knowledge
Prior to this unit student’s knowledge of ‘how heat is produced and transferred’ will be limited, as they have not had any prior units in Early Stage 1 or Stage 1 that deals with this topic. Student’s knowledge will come from their prior experiences about heat. Teachers will need to build upon their prior knowledge and experiences and use this to shape their unit.
- Students work collaboratively
- Hands on activities
- Inquiry based lessons
• ST1-5WT - Uses a structured design process, everyday tools, materials, equipment and techniques to produce solutions that respond to identified needs and wants.</td></tr>
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LEARNING MATTER

Essential Understandings Students will learn about: • Heat • Sources of heat (primary and secondary) • Heat production (electrical energy, chemical energy, movement energy) • Heat transfer (conduction, convection, conductors and insulators)	**Essential Skills** Students will learn to: Investigate, predict, observe, classify, explore, discover, experiment, document, plan, design and record findings, in relation to heat. Examples include: • Classify different sources of heat • Sources of energy • Conduct investigations into heat • Predict, observe and record their results from the experiments

Related Text Types

In the unit, 'Feeling Hot, Hot, Hot' different text types can be used when integrating content with the Key Learning Area of English:

- Story sharing – students share stories which are related
- Persuasive texts
- Science journal blog – Students will record in their groups in their science journals their predictions for each experiments, what they observed during each other the experiments and their final results from the experiment

Lesson Evaluation

- Was the unit 'Feeling hot, hot, hot' successful?
- Were the outcomes and indicators achieved in each lesson?
- Were the activities undertaken in each lesson successful
- Were all students challenged/not challenged? (worked to their ability)
- Were the resources used in the lessons appropriate, sufficient and able to assist the children in achieving the outcomes?
- Were the students using scientific language and terminology throughout the unit?
- Were students misconceptions revealed and addressed?
- Did the unit follow a co-operative learning, and learning through social interaction efficiently?
- Did the unit cater for different learning styles? (Differentiation)
- Did each lesson flow on from each previous lesson?
- Was literacy and numeracy aspects embedded into the unit?
- Did the unit have aspects of the 8 ways of learning (indigenous)
- Were students engaged and involved in each lesson?
- Was assessment and students learning goals met?
- Was teacher and student communication effective?
- Did the unit of work follow the 5E model?
- Was my assumption of student prior knowledge correct?
- Did the unit adapt a constructivist approach to teaching?

Resources :

Candle	Thermometers	Resource Box	Scarf
Water bottle	Tin can	Hot water bottle	Mittens
Blog Page	Science World Wall	Mario Mail	Resource Box
Science Word Wall	Ice	Blog Page	Mario Mail
IPads	Resources Box	Resource Pack	Magazines
Images of Electrical, Chemical and Movement		Newspapers	Grid Game
Tape	Dice	Picture cards	'Aurasma' App on IPad.
IWB Video	Hot Water	Cold Water	2 Glasses per group
Red and blue food dye	Mario Mail	'Poll everywhere' App on Ipad	Myrtle Tea
English books	12 x primary heat sources (e.g. candle)	12 x secondary heat sources (e.g. hot water bottle)	

EXPERIMENTS

Lesson 3: Steps

1. Collect resource box and iPad.
2. Students examine and discuss the four objects inside the box.
3. Students complete table on blog.

Resources

- 6 x resource box
- 12 x primary heat sources (e.g. candle)
- 12 x secondary heat sources (e.g. hot water bottle)
- iPad

Lesson 4: Steps

1. Collect resource box.
2. Students cut out and categorise pictures from resource sheet on butcher's paper.
3. Students explore magazine and newspapers for more pictures to categorise under each heading.

Resources

- 6 x resource box
- 6 x 'Energies that produce heat' resource sheet
- 6 x butchers paper
- Magazines
- Newspapers

Lesson 5: Steps

Conduction

1. Place ice cubes on four different materials (foam, wood, plastic, metal)
2. Record observations and take photographs to submit to the class blog.

Convection

1. Pour room temperature water into one cup and hot water into the other cup.
2. Add blue dye to the room temperature cup and red dye to the hot water cup.
3. Record observations and take photographs to submit to the class blog.

Resources

Conduction	Convection
• 6 x foam block	12 x clear glass cup
• 6 x wood block	room temperature
• 6 x plastic block	water

		• 6 x metal block hot water • 24 x ice cube blue food dye • iPad red food dye
Lesson 7: Steps 1. Collect resource box and iPad. 2. Students choose four different spoons or materials they would like to test to see if they conduct heat. 3. Students create their own open investigation to test this e.g. fill four cups with hot water and leave each spoon/material in the water for 1 minute then order spoon/material from hottest to coldest. 4. Students record results and observations and submit photographs to the class blog. **Resources** • 6 x resource box • Various cups (same size for each resource box) • Various spoons (made of different materials) • Various other materials (to make own spoon e.g. aluminum foil) • Hot water • Stop watch • iPad	**Lesson 8: Steps** 1. Collect resource box and iPad. 2. Students choose four different spoons or materials they would like to test to see if they insulate heat. 3. Students create their own open investigation to test this e.g. wrap four ice cubes in materials of own choosing, time for one minute and then order the ice cubes from most melted to least melted (least = best insulator) 4. Students record results and observations and submit photographs to the class blog. **Resources** • 6 x resource box • Various different materials e.g. paper bag, aluminum foil • Ice cubes • Stop watch • iPad	**Lesson 9: Steps** 1. Collect resource box and iPad 2. Students select materials to create their own mug. 3. Pour Myrtle tea into each group's mug. 4. Order from warmest (conductor) to coolest (insulator) **Resources** • 6 x resource box • Various materials e.g. glue, tape, aluminum foil

RISK ASSESSMENT

RISK	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Lesson 9	Lesson 10
Burns from Candles										
Tripping over items										
Burns from boiled water										
Slipping on water or melted Ice on floor										
Allergic Reactions										
Broken Glass										
Matches / Lighter										
Drinking Hot Water										
Rubber Bands – used inappropriately										

KEY

Low	When there is little chance of the incident or injury
Medium	When there is some chance of the incident or injury requiring first aid
High	When there is a likely chance of a serious incident or injury requiring medical treatment
Extreme	When there is a high chance of a serious incident resulting in a highly debilitating injury

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RISK	DESCRIPTION	Elimination / Control Measures	Who	When
Burn from hot candle	Holding the candle or melted wax (when candle is lit)	Only teacher holds candle when candle is lit	Teacher	During experiments
Tripping over items	Students trip over items left on the floor	Ask students to not leave items on the floor as they should all be on the table	Students	During experiments
Burns from boiled water	Students spill boiled water on themselves or another students	All materials containing boiled water are out of students reach or held only by the teacher. Students inform teacher who follows appropriate protocols.	Staff and students	During experiments
Slipping on water or melted Ice on floor	Water or melted ice spilled onto the floor	If students or staff see any spilt water on floor to clean it up straight away	Students and staff	During experiments
Allergic reactions		Staff aware of students allergies	Staff	Anytime possible time
Broken glass	Student drop glass item on floor	Students stay away from area and inform staff immediately and staff clean up immediately	Staff and Students	During Experiments
Matches/lighter	Students burn themselves from feeling heat from lighter/matches	Only the teacher holds the lighter/matchers	Staff	At all times
Drinking hot water	Students drink boiled water	Ask students not to drink the hot water and have all the boiled water on one table and closely monitor	Student and staff	During experiments
Rubber Bands	Students flicking rubber bands in classroom	Students instructed to use all materials appropriately	Student and staff	During experiments

ABORIGINAL 8 WAYS FRAMEWORK PEDAGOGY

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Lesson 9	Lesson 10
Story Sharing	✓	✓					✓		✓	✓
Learning Maps			✓						✓	✓
Non Verbal	✓	✓	✓	✓		✓	✓	✓	✓	✓
Non Linear			✓				✓	✓		✓
Symbols and Images				✓		✓				
Land Links					✓				✓	
Deconstruct Reconstruct					✓		✓	✓	✓	
Community Links									✓	✓

LESSON SEQUENCE

5E Model	Learning engagements	Outcomes	Aboriginal 8-Ways Link	Resources
	<u>Lesson 1: Who's Feeling Hot?</u> • Show students a candle and ask them to share their ideas and feelings through Think, Pair, and Share. • Students spread out around the room, teacher lights candle and	ST2-6PW ST2-5WT EN2-1A MA2-9MG	Story Sharing	• Candle • Thermometers • Resource Box -Scarf

Engage	asks students to close their eyes and think about how they feel; encourage students to think about what they would like to share with the class. • Students demonstrate how they feel by standing along the temperature continuum – in a line from cold to hot; discuss with students why they chose to position themselves where they did. • Discuss the question: o "Why did people in our class feel different?" • Students measure different areas of the classroom using thermometers to see if there were temperature differences; students discuss why these differences may have occurred. • Form into 'Science Groups' and collect their resource box from the 'Materials Table.' • 'Science Groups' collaboratively examine each object and determine if it is hot or cold; 'Science Groups' submit there answers to the "Who's Feeling Hot?" blog page; followed by a whole class discussion of the submissions. • Read Temperature: Heating up and cooling down • Students begin adding to a science 'Word Wall.' Diagnostic Assessment Focus: • What is hot and what is cold? **<u>Lesson 2: How do things get hot?</u>** • Student reads aloud new 'Mario Mail' from the IWB; followed by a class discussion of the letter. • Students form into 'Science Groups' and collect one resource box from the 'Materials Table.' • 'Science Groups' brainstorm and create a mind map of their	MA2-2WM ST2-6PW ST2-5WT ST2-4WS EN2-1A EN2-2A EN2-11D	Non-Verbal	-Water bottle -Tin can -Hot water bottle -Mittens • Blog Page (link to go here) • Science World Wall • Heating up and cooling down book • Mario Mail • Resource Box • Science Word Wall • Ice • Blog Page

Engage Explore	current understanding of heat; display on science wall. • Physical exploration of how heat is produced: o Students pretend to be molecules; students stand close together; students begin wiggling and walking around; students move faster and start jumping; stop students and let them notice where they are and how they are feeling. • Class sits in a circle and discusses what the students think occurred; add to the science 'Word Wall.' • Reform into 'Science Groups' and conduct heat 'Heat Transfer Experiment'; class discussion as to why the ice melted and why their hands changed temperature. • 'Science Groups' post there understanding of what occurred during the experiment on the "How do things get hot?" blog page. • Add to science 'Word Wall.' • Students use the blog posts and science 'Word Wall' to respond to 'Mario Mail.' Diagnostic Assessment Focus: • How can heat be produced and move from one object to another? **<u>Lesson 3:</u> Is It Me Or Is It Getting Hot In Here?** • Refer to the student's pre conceptions of heat, how heat is produced and how heat is transferred, from previous lesson's blog submissions. • Student reads aloud the new 'Mario Mail' from the IWB; followed by a class discussion of the letter. • Form into 'Science Groups' and explore the ' Is It Me Or Is It Getting Hot In Here?' blog page on iPads. • 'Science Groups' submit thoughts and ideas to the *Poll*	ST2-6PW ST2-5WT ST2-4WS EN2-1A MA2-18SP	Non-Verbal Story Sharing Non-Linear Learning Maps Non-Verbal	• Mario Mail • IPads • Resources Box

Explore	*Everywhere* question: o "What is a heat source? Can you give an example?" • Students discuss and justify the submissions as a whole class; introduce the scientific terms 'Primary Source' and 'Secondary Source.' • 'Science Groups' collect one resource box from the 'Materials Table' and actively explore and discuss each item as a group; record observations on the "LESSON NAME" blog page; 'Science Groups' rotate to explore each resource box. • Class discussion and justification of each group's observations; create a 'T Chart' to display on the science wall. • Add to science 'Word Wall.' Formative Assessment Focus: • How can heat be produced in many ways? **<u>Lesson 4:</u> Where does the heat come from?** • Refer to the student's pre conceptions of heat sources and how Primary Sources produce their own heat; refer to the 'T Chart' created last lesson. • Form into 'Science Groups' and collect one resource pack from the 'Materials Table.' • 'Science Groups' examine, discuss and categories each image in a chart under the following headings 'Electrical', 'Chemical' and 'Movement.' • Students explore magazines, newspapers and the classroom to find and classify other objects in their world under these headings. • Students post a picture of their chart on the " Where does the heat come from?" blog and collaboratively create a definition for each	ST2-6PW ST2-5WT ST2-4WS EN2-1A MA2-17MG MA2-18SP	Symbols and Images Non-Verbal	• Resource Pack -Images of *Electrical, Chemical and Movement* • Magazines • Newspapers • Objects around the classroom • Grid Game

Explore	heading. • Class discussion and justification of each groups classifications and definitions. • Whole class participate in the "Energies that produce heat" grid game; students use the *"AURASMA"* application to check their classification in an interactive way. • Add to science 'Word Wall.' Formative Assessment Focus: • How can heat be produced in many ways? **<u>Lesson 5: Why was that laptop hot?</u>** • Refer to the student's pre conceptions of how heat can transfer from one object to another; refer to students initial brainstorm ("How do things get hot? Blog Page"). • Explore how heat can be transferred on the IWB video: <u>http://studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/heat.htm</u> • Think, Pair, Share: "Why was the laptop hot?" • Add words to science 'Word Wall.' • Form into 'Science Groups' and collect one resource box from the 'Materials Table.' • Students collaboratively make predictions within their 'Science Groups' and submit to the "Why was that laptop hot?" blog page. • Students conduct the 'Conduction and Convection Experiment' with teacher guidance in order to discover for themselves two ways heat can be transferred. • 'Science Groups' take photographs of the experiment on iPads and upload their photographs and observations to the "LESSON	ST2-6PW ST2-5WT ST2-4WS EN2-1A EN2-2A EN2-11D	Deconstruct / Reconstruct Land Links	(tape, dice, picture cards) • 'Aurasma' App on IPad. • Science Word Wall • IWB Video • Word Wall • Resource Box • Pre Coloured Ice • Hot Water • Cold Water • 2 Glasses per group • Red food dye • Large Tub • Smaller container

Explain	NAME" blog.
	• Add to science 'Word Wall.'
	• Class collaboratively create a response to 'Mario Mail.'
	
	Extension activity:
	• Physical exploration of molecules during conduction and convection.
	  o Conduction – tennis ball is passed along the line to each person (molecule).
	  o Convection – tennis ball moves from the first person to the last persons (molecules).
	• Encourage students to read - Energy: Heat, Light, and Fuel.
	Formative Assessment Focus:
	• How can heat move from one object to another?
	
	<u>Lesson 6: How does heat travel?</u>
	• Student reads aloud the new 'Mario Mail' on the IWB; followed by a class discussion of the letter.
	• Form into 'Science Groups' and use the iPads to explore and refresh the content covered in previous explore lessons.
	• Students individually choose how they would like to represent heat travelling through conduction and convection; students may use a flow chart, labelled diagram or ICT.
	• Willing students present their representation to the class and justify and explain their representation; teacher takes photographs of representations for students digital portfolios; display representations on the science wall.
	• Students submit a digital copy of their representation to the teacher to forward onto Mario.
		ST2-6PW
		ST2-5WT
		ST2-4WS
		EN2-1A
		EN2-2A
		EN2-11D
			Deconstruct / Reconstruct
			
			Non-Verbal Symbols and Images
				• Mario Mail
				• IPad's
				• Science Journals
				• Camera

Elaborate	Extension activity: • Challenge students working at and working above stage level to represent conduction and convection at a molecular level. Formative Assessment Focus: • How can heat move from one object to another? **<u>Lesson 7: Why was it hot?</u>** • Refer to the student's developing conceptions of heat transfer; refer to the science wall. • Student reads aloud the new 'Mario Mail' on the IWB; followed by a class discussion of the letter. • Students sitting on the floor in a circle; teacher proposes the following scenario for a group discussion: o *"Have you ever touched something that you thought was going to be cold, but it was actually hot? What was it and why do you think it was hot?"* • Form into 'Science Groups' and collect resource box from the 'Materials Table.' • Students refer to the "Why was it hot?" blog page to ensure they are conducting a fair investigation. • 'Science Groups' record and submit their predictions and experiment steps to the blog. • Students conduct the 'Conductor Experiment' using their own investigation process in order to explore which material is the best conductors of heat. • Students tabulate and submit their results and photographs to the class blog; teacher initiates class discussion and justification of	ST2-6PW ST2-5WT ST2-4WS EN2-1A MA2-18SP	Story Sharing Non-Linear Deconstruct / Reconstruct Non-Verbal	• Mario Mail • Resource Box • Word Wall

Elaborate	their findings. • Add to science 'Word Wall.' Formative Assessment Focus: • Assessment of science inquiry skills: questioning and predicting and planning and conducting. **<u>Lesson 8:Why is it not hot?</u>** • Refer to the student's developing conceptions of heat transfer; refer to the science wall. • Form into 'Science Groups' and collect resource box from the 'Materials Table'; discuss and collaboratively answer the *Poll Everywhere* question: o "What is an insulator" • Students refer to the "Why is it not hot?" blog page to ensure they are conducting a fair investigation. • 'Science Groups' record and submit their predictions and experiment steps to the blog. • Students conduct the 'Insulator Experiment' using their own investigation process in order to explore which material is the best insulator of heat. • Students tabulate and submit their results and photographs to the class blog; teacher initiates class discussion and justification of their findings. • Add to science 'Word Wall.' • Inform students to search around their house for materials they can bring in next lesson for a conductor and insulator experiment. Formative Assessment Focus:	ST2-6PW ST2-5WT ST2-4WS EN2-1A MA2-18SP	Non-Linear Deconstruct / Reconstruct Non-Verbal	• Resource Box • IPads – poll everywhere

Elaborate	• Assessment of science inquiry skills: questioning and predicting and planning and conducting. **<u>Lesson 9: Lets get creative!</u>** • Refer to the student's developing conceptions of heat transfer; refer to the science wall. • Students sitting on the floor in a circle; teacher proposes the following scenario for a group discussion: o *"Close your eyes and imagine you are holding a cup of Myrtle tea. Is the cup hot or is it cold? What about when you drink the tea, is the tea hot or is it cold?"* • Form into 'Science Groups' and collect the resource box from the 'Materials Table'; students combine materials from home within their 'Science Group.' • Students refer to the "Lets get creative!" blog page to ensure they are conducting a fair investigation. • 'Science Groups' record and submit their predictions and experiment steps to the blog. • Students conduct the 'Insulator Creator Experiment' using their own investigation process in order to create a mug out of their materials from home or the resource box that will hold their Myrtle tea (Inter Curriculum Link – Products) • Students form a large circle on the floor and each group's mug is passed around the circle. • Students reform 'Science Groups' and collaboratively submit answers to the following *Poll Everywhere* questions: o "Which mug was the hottest and therefore the best conductor?" o Which mug was the coolest and therefore the best	ST2-6PW ST2-5WT ST2-4WS EN2-1A EN2-2A EN2-11D MA2-18SP MA2-9MG	Story Sharing Learning Maps Land Links Community Links Deconstruct / Reconstruct Non-Verbal	• Resource Box • Materials from home • Myrtle Tea

Evaluate	insulator?" • Add to the science 'Word Wall.' • Students create and send a response to 'Mario Mail.' Formative Assessment Focus: • Assessment of science inquiry skills: questioning and predicting, planning and conducting, communicating and evaluating. **<u>Lesson 10: Lets get Mario a job!</u>** • Refer back to the student's pre conceptions of heat, how heat is produced and how it is transferred; compare this against their current understanding and make real world connections to highlight its relevance. • Students will be creating a persuasive text of their own choosing to send to Luigi; they will endeavour to persuade him to give Mario a fulltime job; they will explain everything they have taught Mario about heat, how it is produced and transferred. • Encourage students to refer to the science wall and "Feeling Hot, Hot, Hot!" blog for scientific terminology and concepts they have learnt throughout the unit. • Students will begin drafting this persuasive text; they will be given a rubric to follow. Summative Assessment Focus: • How can heat be produced in many ways and move from one object to another?	ST2-6PW ST2-4WS EN2-1A EN2-2A EN2-10C EN2-11D ST2-16P	Community Links Non-Linear Learning Maps Story Sharing Non-Verbal	• English book • Science wall

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Rubrics

Lesson 6 Rubric: Formative Assessment	4	3	2	1
Title	Title is informative, centered and larger than other text	Title is informative and larger than other text	Title is informative and centered	The title is incomplete and does not clearly identify the topic
Labels	Every item is identifies with a label that is clear and correct	Almost every item is labeled. It is clear which item goes with what label	Most items have been labeled. It is clear which item goes with what label	Limited number of items have been labeled or identifies OR it is not clear what label goes with what object
Concepts	All assigned concepts have been addressed and are clear to identify	Most assigned concepts have been addressed and are clear to identify	Some assigned concepts have been addressed and are clear to identify	Limited number of assigned concepts have been addressed and are clear to identify
Accuracy	All of the assigned concepts are accurate and recognisable	Most of the assigned concepts are accurate and recognisable	Some of the assigned concepts are accurate and recognisable	Limited number of the assigned concepts are accurate and recognizable
Spelling	All words are spelled correctly in the title, labels and descriptions	All common words are spelled correctly in the title, labels and descriptions. 1-2 scientific words are spelled incorrect	Most words are spelled correctly in the title, labels and descriptions	Limited number words are spelled correctly in the title, labels and descriptions

alie Harris 20111629

Lesson 10 Rubric: Summative Assessment	4	3	2	1
Attention Grabber	The introduction has a strong hook and is appropriate for the audience	The introduction has a hook but is inappropriate for the audience	The student has an interesting introduction but the connection to topic is not clear	The introduction is not interesting or relevant to the topic
Support position	Student has included 3 or more pieces of evidence to support their statement from their discoveries throughout the unit	Student has included 3 pieces of evidence to support their statement from their discoveries throughout the unit	Student has included 2 pieces of evidence to support their statement from their discoveries throughout the unit	Student has included 1 or fewer pieces of evidence to support their statement from their discoveries throughout the unit
Accuracy	All supportive facts are accurate	Almost all supportive facts are accurate	Most supportive facts are accurate	Most supportive facts are inaccurate
Sentence structure	All sentences are well constructed with varied structure	Most sentences are well constructed with varied structure	Most sentences are well constructed with no varied structure	Most sentences are not well constructed with varied structure
Grammar and Spelling	Students makes no errors in grammar or spelling that distract the reader from the content	Students 1-2 makes errors in grammar or spelling that distract the reader from the content	Students makes 3-4 errors in grammar or spelling that distract the reader from the content	Students makes errors in grammar or spelling that distract the reader from the content

Letters from Mario:

From: Mario Gioppi
To: year3science@cronullapublic.com

Subject: Help Wanted!!
Thursday 15th July 2.00pm

Apprentice Chef Mario
Famous Italian
Restaurant,
Sydney, Australia

Luigi's Kitchen

Dear Students,

My name is Mario and I am an apprentice chef at one of the best Italian restaurants in Australia. I am a student just like you – but I am learning how to be a great chef like my boss, Chef Luigi.

Chef Luigi has left me in charge of the kitchen while he is out. I need to start preparing the ingredients for tonight. He has told me I will be needing to cook using conduction and convection methods and would of learnt this in my earlier training.

I know schools teach about heat in their science lessons, so I thought you might be able to write to me and tell me what you have learnt about heat.

Luigi will be back in a few hours, so please send me an email/letter back asap so I can have the food prepared and impress Luigi with my knowledge of heat and the kitchen (with help from you ofcoarse).

Sincerely,
Apprentice Chef Mario

mario.gioppi@luigiskitchen.com.au

From: Mario Gioppi
To: year3science@cronullapublic.com

Subject: Help Wanted!!
Thursday 15th July 2.00pm

Apprentice Chef Mario
Famous Italian
Restaurant,
Sydney, Australia

Luigi's Kitchen

Dear Students,

Thank you for your quick reply – knowing that heat is a transfer of energy has been very helpful.

Chef Luigi is out serving the customers and the electricity isn't working.

Do you happen to know much about heat sources? Not "Luigi's Secret Bolognese" sauce that's a different type of sauce but I might be able to let you in on the top-secret ingredient if you can help me out again.

Does 'Electrical, Chemical or Movement' mean anything to you?

Shh! Don't let Luigi find out about our emails. I really want to keep this job.

I look forward to hearing about what you know about primary and secondary heat sources.

Sincerely,
Apprentice Chef Mario

talie Ha

From: Mario Gioppi
To: year3science@cronullapublic.com

Subject: Help Wanted!!
Thursday 2nd July 2.00pm

Apprentice Chef Mario
Famous Italian
Restaurant,
Sydney, Australia

Luigi's Kitchen

Dear Students,

You all are so clever, one day you could all be chefs. I was able to heat the Bolognese sauce to perfection with your responses on primary and secondary sources and now know many others way I could heat it.

Thank You for your response, as I told you in my first letter, Chef Luigi, tells me that I should know about types of heat transfer... but I confess that I cannot remember them.

Would you please remind me what is meant by conduction and convection? I know I have a convection oven, but I am not really sure what that means in relation to how things are cooked.

Think I'll tell my apprentice friends about your class. Will any of your other science topics help with my cooking?

Yours Truly,
Mario Gioppi

mario.gioppi@luigiskitchen.com.au

From: Mario Gioppi
To: year3science@cronullapublic.com

Subject: Help Wanted!!
Thursday 15th July 2.00pm

Apprentice Chef Mario
Famous Italian
Restaurant,
Sydney, Australia

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Sincerely,
Apprentice Chef Mario

mario.gioppi@luigiskitchen.com.au

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