**Grade: 5**

**EIE KIT: An Alarming Idea**

**NGSS Standards:**

* **3-5-ETS1-1.** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
* **3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
* **3-5-ETS1-3.** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

 **Revisit/Reteach 4th Grade Standards**

* **4-PS3-2.** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
* **4-PS3-4**. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.\*

**ELA Standards:**

 **Informational Text**

* [CCSS.ELA-Literacy.RI.5.2](http://www.corestandards.org/ELA-Literacy/RI/5/2/)
Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
* [CCSS.ELA-Literacy.RI.5.4](http://www.corestandards.org/ELA-Literacy/RI/5/4/)
Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*.
* [CCSS.ELA-Literacy.RI.5.5](http://www.corestandards.org/ELA-Literacy/RI/5/5/)
Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.
* [CCSS.ELA-Literacy.RI.5.7](http://www.corestandards.org/ELA-Literacy/RI/5/7/)
Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
* [CCSS.ELA-Literacy.RI.5.9](http://www.corestandards.org/ELA-Literacy/RI/5/9/)
Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

 **Writing**

* [CCSS.ELA-Literacy.W.5.7](http://www.corestandards.org/ELA-Literacy/W/5/7/)
Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
* [CCSS.ELA-Literacy.W.5.8](http://www.corestandards.org/ELA-Literacy/W/5/8/)
Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
* [CCSS.ELA-Literacy.W.5.9](http://www.corestandards.org/ELA-Literacy/W/5/9/)
Draw evidence from literary or informational texts to support analysis, reflection, and research.

**Speaking and Listening**

* [CCSS.ELA-Literacy.SL.5.1.d](http://www.corestandards.org/ELA-Literacy/SL/5/1/d/)
Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
* [CCSS.ELA-Literacy.SL.5.2](http://www.corestandards.org/ELA-Literacy/SL/5/2/)
Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
* [CCSS.ELA-Literacy.SL.5.3](http://www.corestandards.org/ELA-Literacy/SL/5/3/)
Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.
* Presentation of Knowledge and Ideas:
* [CCSS.ELA-Literacy.SL.5.4](http://www.corestandards.org/ELA-Literacy/SL/5/4/)
Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

 **Math Standards:**

**Content and Language Objectives:**

* *I can explain the job of an electrical engineer and give examples of how they design and improve technology with electricity using appropriate vocabulary.*
* *I can discuss how the events in the story relate to the engineering design process.*
* *I can explain the problem and solution in the story.*
* *I can write or sketch a short description of each step in the Engineering Design Process.*
* *I can gather and summarize information about a topic and make connections across multiple texts and media.*
* *I can describe the circuit I built using appropriate vocabulary.*

**Scope and Sequence**

**Prep Lesson – SEE “Technology in a Bag” Template**

**Lesson 1 – Building Background**

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| **DE/Techbook:** **\*\*\*To use DE Hyperlinks, you must first log into BPS DE or right click to copy the url\*\*\***[**DE - What is Electricity? Role of Electrons (hyperlink)**](https://app.discoveryeducation.com/learn/techbook/units/f607d71a-e05f-42da-9ab4-a49546785df9/concepts/44bb21fc-b5cf-4b66-b808-fa82f0fabc6f/tabs/759da9a7-2edf-4cde-9515-7081ca990764/pages/815eb731-2ccf-4be6-bb67-fbaaa4bb7d34)[**Materials that Conduct and Insulate Board (hyperlink)**](https://app.discoveryeducation.com/builders/boards?assetGuid=82AF816C-D242-D007-76D9-0DBA013F7890&includeHeader=true&layout=default) | **ELA Resources:****EiE Text: An Alarming Idea****Reach: Unit 2 Leveled Readers**  **Understanding Electricity** | **Additional Resources:**[**Interactive Map With Flag, Facts, Video of Australia (hyperlink)**](http://mapmaker.nationalgeographic.org/)[Electrical Engineers in Real Life Science Buddies - jobs, education, salary, etc.(hyperlink)](http://www.sciencebuddies.org/science-engineering-careers/engineering/electrical-electronics-engineer#whatdotheydo) **Energy Stick:** Form a path for electrons to flow by have students form a circle. Explain that electrons can move to/from atoms. They will choose the easiest path. Materials that allow electrons to flow easily are CONDUCTORS, materials that do not allow electrons to flow easily are called INSULATORS. Demonstrate an opened and closed circuit. Place various materials between 2 students to test conductors and insulators (students may put fingers in a bucket of water to show that electrons flow through the water) |

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| Unit 1 Tiered Vocabulary |
| **T1 Common** | Electricity, battery |
| **T2 General Academic** | circuit, conductor, engineer, generator, kilometer, technology |
| **T3 Domain Specific** | Electrical engineer, engineer design process, schematic diagram |
| **Multicultural** | By jingoes, clapped out, biscuit, jillaroo, onya, station |

**Lesson 2 – CORE –** *What is electrical energy? What are other forms of energy and how do they relate to one another?*

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| **DE/Techbook:**[**Interactive - Types of Energy, Transfer, Not Created Nor Destroyed (hyperlink)**](https://app.discoveryeducation.com/player/view/assetguid/46b47adb-e1db-409f-b781-8e605feb780b) | **ELA Resources:****Reach: Unit 2 Leveled Readers**  **Electricity at Home (lex 660)** **Electricity at School (lex 790)** | **Additional Resources:** |

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| Unit 2 Tiered Vocabulary |
| **T1 Common** | Electricity, energy |
| **T2 General Academic** | Energy, technology, transform |
| **T3 Domain Specific** | mechanical |

**Lesson 3 – CORE –** *How can schematic diagrams be used to represent and build circuits? (series and parallel)*

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| **DE/Techbook:****Components of a circuit:**[**Naming Basic Parts of a Circuit (hyperink)**](http://app.discoveryeducation.com/player/view/assetGuid/cff75203-9752-4176-8380-0ee5b7511cdf)[**Parts of a Simple Circuit and Conductors vs Insulators (hyperlink)**](http://app.discoveryeducation.com/player/view/assetGuid/82bfc470-9b30-4ca3-b645-e6b8972444a8)[**Virtual Lab: Problem Solving Simple Circuit \*\*you may have student sketch schematic diagram with this\*\* (hyperlink)**](https://app.discoveryeducation.com/player/view/assetGuid/ec445e38-61fc-46a4-9b80-8222af192007)[**Quick Intro Series vs Parallel Circuits (hyperlink)**](http://app.discoveryeducation.com/player/view/assetGuid/82bfc470-9b30-4ca3-b645-e6b8972444a8)**Series Circuits vs Parallel Circuits:**[**Interactive Comparison of Series vs Parallel Circuits (hyperlink)**](https://app.discoveryeducation.com/player/view/assetGuid/7aa0d0cb-b4f9-4332-b189-2c193bd7b266)[**Video Series vs Parallel Circuits (hyperlink)**](https://app.discoveryeducation.com/learn/videos/eb4a0a12-fa1f-4eac-9bb2-3a16cf05f790)**Putting it Together:**[**Review of Parts, Series/Parallel, Vocab 10-15 mins (hyperlink)**](https://app.discoveryeducation.com/player/view/assetGuid/d1507f6e-09c3-4e7b-b1e9-16708e402009) | **ELA Resources:****Readworks Passage: Electricity & Energy Circuits** [**S Drive Location (hyperlink)**](file:///S%3A%5C2016-2017%5CSTEM%20GRANT%202016-2017%5CGrade%205%5CGrade%205%20Alarming%20Idea%20Planning%20Template%20and%20Resources) | **Additional Resources:**[**Interactive Circuit Building (hyperlink)**](https://www.explorelearning.com/index.cfm?method=cResource.dspView&ResourceID=398)[**Site With a Variety of Links to Other Sites Related to Circuits and Elec - INTERACTIVE (hyperlink)**](http://sqworl.com/nd51wf)**Extensions (requires more materials):****Lemon circuits****Squishy circuits** |

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| Unit 3 Tiered Vocabulary |
| **T1 Common** | Represent, symbol |
| **T2 General Academic** | Circuit, current, switch |
| **T3 Domain Specific** | Schematic diagram |

**Lesson 4 – ENRICH / DESIGN** - *How can I use my knowledge of conductors, series and parallel circuits, schematic diagrams, and the Engineering Design Process to design an alarm circuit that uses light and sound and that someone else can build?*

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| **DE/Techbook:**[**Multiple Choice Assessment on Circuits (hyperlink)**](https://app.discoveryeducation.com/player/view/assetGuid/3d10a309-c9f4-4b17-9dee-ea7e0ea8a551) | **ELA Resources:** | **Additional Resources:** |

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| Unit 4 Tiered Vocabulary |
| **T1 Common** | Design (redesign), goal, material, problem, solution, teamwork, test |
| **T2 General Academic** | Circuit, conductor, insulator, switch |
| **T3 Domain Specific** | Contractor, engineering design process, trough |

**Culminating Writing Assignment**

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| [**4 Part DE Constructed Response Hyperlink - Expository Writing**](https://docreader.readspeaker.com/docreader/index.php?jsmode=1&cid=brqmy&bp=sptol=0.3&autotag=1&url=https%3A%2F%2Fgtm-media.discoveryeducation.com%2Fvideos%2FTechbookPDFs%2FDE_NGSS_G4_BCR_SG_ElectricCircuits_WN_FINAL.pdf) | [**Teacher Scoring Rubric and Response (hyperlink)**](https://docreader.readspeaker.com/docreader/index.php?jsmode=1&cid=brqmy&bp=sptol=0.3&autotag=1&url=https%3A%2F%2Fgtm-media.discoveryeducation.com%2Fvideos%2FTechbookPDFs%2FDE_NGSS_G4_BCR_TG_ElectricCircuits_WN_FINAL.pdf) |

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| **LESSON OVERVIEW AND SIMPLIFICATION** |
| **LESSON 1** | **Students will be able to:*** **Locate Australia on a map**
* **Use vocabulary in sentence frames and collaborative discussions**
* **Identify the steps in the Engineering Design Process**
 | **Prep Tips:*** **Use interactive map link, rather than copies**
* **Skip activity 1-2**
* **Choose your own way to record or post vocab, rather than copy 1-3**
* **Copy 1-4 with vocab sentence frames or put on overhead and students write sentences in notebooks**
* **Use the overhead for 1-5 and/or 1-6, do as whole class or partner or think, pair, share**
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| **Lesson 2** |  |  |

**To Do:**

**Lesson 4 – do we need anything else?**

**Simplify Kit Lessons**

**Focus Wall Words**

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| **Tier 1** |
| electricity |
| battery |
| represent |
| symbol |
| design/redesign |
| goal |
| material |
| problem |
| solution |
| teamwork |
| test |
|  |
| **Tier 2** |
| circuit |
| energy |
| current |
| conductor |
| engineer |
| kilometer |
| technology |
| generator |
| transform |
| switch |
| insulator |
|  |
| **Tier 3** |
| electrical engineer |
| mechanical |
| schematic diagram |
| contractor |
| trough |

**Australian Words and Phrases**

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| by jingoes |
| station |
| onya |
| clapped out |
| biscuit |
| jillaroo |

***Essential Question***

*How can schematic diagrams be used to represent and build circuits?*

***Essential Question***

*How are series and parallel circuits different? How might one be more useful than the other?*

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