Xplorlabs Learning Experience: Solutions for Cell Phone Safety

Students will explore the risks of cell phone overheating, especially during overnight charging, and use the Engineering Design Process to develop a safety solution. They will choose one of five design challenges to create a prototype that addresses phone-related thermal safety.

Instructional phases	Engage: (1) Watch a short video or news clip on thermal runaway and phone fires. (2) Discuss student phone habits (e.g., charging phones under pillows).	Explore: (1) Introduce the five design challenge options. (2) Research causes and effects of overheating and brainstorm design ideas.	Explain: (1) Introduce the Engineering Design Process. (2) Discuss concepts of heat transfer, insulation, and material properties.	Elaborate: (1) Create design sketches and gather materials. (2) Begin building prototypes and/or digital games/simulations. (3) Conduct basic testing (e.g., does it insulate? does it circulate air?).	Evaluate: (1) Present projects to the class. (2) Class discussion on what worked, what didn't, and real-life applications.
Visual storyline	BERHLY BERKEY	P P P	Heat Transfer & Thermal Insulation	Prototype Model	Use Newsey and The service of the
Arizona State Science Standards	<u>6.P1U1.1</u> : Develop and use models to explain the interaction of magnetic forces.	<u>6.P4U2.2</u> : Develop and use models to demonstrate the transfer of energy through conduction, convection, and radiation.	<u>7.P2U1.3</u> : Construct and analyze graphs, charts, and data sets of the transfer of thermal energy.	7.P2U2.5: Design and construct a device that controls or uses energy transfer to perform a function.	<u>8.P4U3.4</u> : Communicate how advancements in technology have changed how humans influence the transfer and transformation of energy.
Timing	Introduction & Research 15 min video + discussion 30 min exploration of design options and forming teams	Planning & Sketching 15 min engineering design process review 30 min team sketches, material list	Build & Test Full class: construct and begin simple testing	Improve & Finalize 15 min reflection and redesign 30 min continue building	Present & Reflect 30 min presentations 15 min class reflection and discussion
Supporting Documents	Design journal templates Lesson Slideshow (<u>link</u>)	Design journal templates	Engineering Design Process poster/handout	Rubric for prototype evaluation	Research articles on thermal runaway and lithium-ion batteries