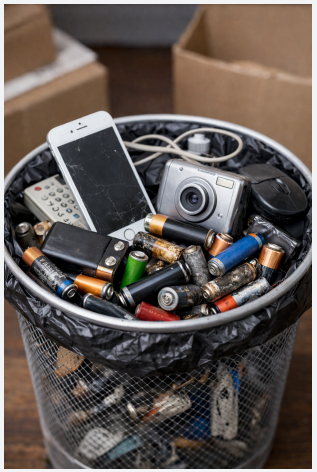
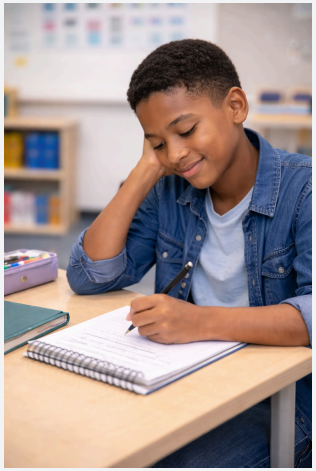
The Life (and Afterlife) of Batteries

The Life (and Afterlife) of Batteries is a two-week learning experience for middle school students that connects everyday technology use to real safety and environmental issues. Using Xplorlabs resources, students will explore how batteries work, what can go wrong when they are thrown away improperly, and why electronic waste is a growing problem. Students participate in hands-on investigations, examine real e-waste data, and use math skills such as percent change, data comparison, and graphing to make sense of what they observe. The experience concludes with students creating an e-waste awareness or proper-disposal project aimed at helping families and the school community make safer, more responsible choices.

Instructional Phases	Engage	Explore	Explain	Elaborate	Evaluate
Visual Storyline					
Standards	Students will be able to… (1) activate prior knowledge related to everyday technology use and disposal; (2) identify real-world safety and environmental problems connected to electronic disposal; and (3) ask questions and make predictions about what happens to electronics after use.	Students will be able to… (1) observe and record evidence from battery investigations; (2) compare risks associated with different battery types; (3) identify patterns related to injury, fire, and environmental risk; and (4) organize observations into tables or charts for later analysis.	Students will be able to… (1) explain why button batteries and lithium-ion batteries are dangerous under certain conditions; (2) use evidence from investigations to support explanations while analyzing and interpreting data; and (3) connect observed patterns to safety and environmental risks.	Students will be able to… (1) apply understandings of battery risks to real-world disposal decisions; (2) use data and evidence to evaluate safer battery disposal practices; (3) analyze how individual and community choices impact safety and the environment; and (4) design an evidence-based solution for their community.	Students will be able to… (1) communicate understandings of battery risks using evidence; (2) use data and observations to support conclusions; (3) evaluate solutions for safer battery disposal; and (4) reflect on how learning connects to real-world safety and environmental issues.

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Timing	1 Day	3 - 5 Days	1 Day	2 - 3 Days	1 Day
Overview	Through discussion and visual prompts, students reflect on their own experiences with batteries and electronic devices, considering how often they are used, replaced, and thrown away in daily life. The teacher introduces real-world statistics of electronics-related hazards, such as fires, chemical burns, and environmental contamination, without yet explaining the science behind them. This phase is designed to surface student assumptions, build curiosity, and frame the essential question: *How do we dispose of electronic devices to prevent fires, injuries, and environmental harm?*	Students investigate battery-related risks through hands-on, evidence-based activities: On Day 1, students conduct the Bologna Test to safely observe how button batteries can cause chemical harm if swallowed. They will refer back to the experiment over three days. On Day 2, students examine lithium-ion battery risks using Xplorlabs resources, such as images, simulations, and guiding prompts. On Day 3, students do a gallery walk of research and compare risks across battery types, sorting evidence into injury, fire, and environmental categories. They will organize their observations in personal journals. Throughout this phase, students focus on careful observation, data collection, and pattern recognition (without yet explaining the underlying science).	Students use evidence collected during the Explore phase to make sense of their observations: The teacher introduces clear, age-appropriate explanations of how button batteries cause chemical burns and how lithium-ion batteries can overheat and lead to fires through thermal runaway. Students revisit their observation charts and comparison tables to identify patterns related to injury, fire, and environmental risks. Math instruction is integrated as students analyze data, interpret percentages related to e-waste disposal, and explain trends using graphs and/or tables. This phase focuses on moving students from what they observed to why it matters, using precise language and evidence.	Students apply what they have learned about button battery and lithium-ion battery risks to real-world disposal scenarios: Students investigate proper battery disposal methods, including local recycling options and community guidelines, and evaluate how improper disposal can lead to injury, fires, and environmental harm. Using evidence and analyzing data from their investigations, students work collaboratively to design an e-waste awareness or proper disposal project. This phase emphasizes transferring scientific and mathematical understanding to authentic situations and preparing students to communicate safety recommendations beyond the classroom.	Students complete and share their battery safety and e-waste project, demonstrating their understanding of risks associated with button and lithium-ion batteries. Students use evidence from experiments, data analysis, and research to support recommendations for safer disposal practices. Projects are assessed using a rubric that measures understanding, use of evidence, clarity of communication, and application to real-world contexts. Students also reflect on their experiences and do final discussions about e-waste and thermal runaway. Students plan on how they will “leave their legacy”. This phase provides an opportunity for students to reflect on how their learning connects to safety, sustainability, and responsible decision-making.

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Supporting Documents	Lesson Slides with Notes	Day One: Bologna Test Day Two: Nearpod Day Three: Research		Project Ideas	Evaluation and Reflection