
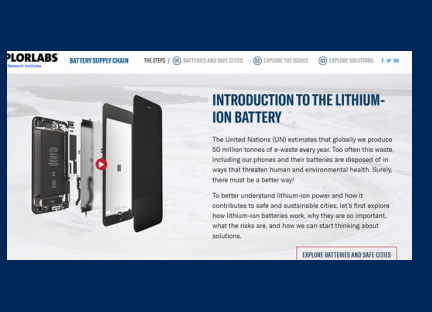
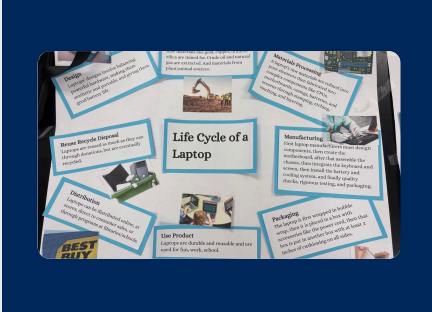



The Human Side of Sustainability: Adding Empathy to the Product Life Cycle.

Students created a product life cycle poster of a product that they used in their daily lives. With the combination of Project Lead the Way Energy and the Environment module and Xplorlabs : The Science of Extraction of E-Waste pathway, we explored the history of lithium-ion batteries, where do the raw materials come from, the human aspect of acquiring those raw materials and how they can affect human's health and their environment. We celebrated with a gallery walk of our posters and learned from each other's experiences.

	Engage	Explore	Explore/Explain	Elaborate
Visual of Experiences				
NGSS	MS-PS1-1 Matter and its Interactions / LS2: Ecosystems: Interactions Energy and Dynamics / MS-ESS3 Earth and Human Activity / MS-ETS1 Engineering Design			
Time	100 minutes - 2 class periods	150 minutes - 3 class periods	200 minutes - 4 class periods	50 minutes
Anticipated Outcomes	<p>Students were engaged in conversations about our mobile phones, asked where did they think materials came from to make our mobile phones.</p> <p>We then created a product life cycle of the mobile phone (using PLTW Activity 3.2 Product Life Cycle) and started to explore the resources at Xplorlabs: The Science of Extraction of E-Waste pathway.</p>	<p>After the 1st day, students began using the student guide and we went through the Xplorlabs; The Science of Extraction of E-Waste pathway to learn about the history of lithium-ion batteries, how do they work, how are materials extracted, manufactured, transported, used by consumers, end of life (disposal) and finally solutions to get products out of the landfills.</p>	<p>Once we finished exploring the Xplorlab: The Science of Extraction of E-Waste pathway, students started to pick a product that they used in their daily lives and began researching its product life cycle. Once students were done with their research, they created their product life cycle poster to include vital information about their product.</p>	<p>Students participated in a gallery walk of their final product life cycle posters. Each class were given questions to respond to as they were looking at each others posters and we ended the class period with reflections on the whole experience, what important lessons did they take away from learning about their chosen product and how they can change their habits/educate their families or school. Posters were hung in the hallways for our school community to enjoy.</p>
Supporting Documents	Xplorlabs: The Science of Extraction of E-Waste	Xplorlabs: The Science of Extraction of E-Waste Student guide	PLTW Activity 3.2 Product Life Cycle — research questions —	