## Xplorlabs Learning Experience: Understanding & Mitigating the Global Impact of Electronic Waste

Eager Earth Science students will examine the environmental and social impacts of mining for electronic raw materials and the disposal of electronic waste. Through a series of interactive and research-driven activities, students will analyze the global lithium-ion battery supply chain, investigate the conditions of affected countries, and create impactful awareness campaigns targeting specific audiences. This lesson emphasizes constructing evidence-based explanations, designing actionable solutions, and engaging in meaningful dialogue to promote sustainability and safety in their communities.

Instructional phases	Engage	Explore	Explain	Elaborate	Evaluate/Extend
Visual storyline	LITHIUM-ION BATTERIES		Image: Notes     Image: Notes     Image: Notes     Image: Notes     Image: Notes       Image: Notes     Image: Notes     Image: Notes     Image: Notes     Image: Notes       Image: Notes     Image: Notes     Image: Notes     Image: Notes     Image: Notes       Image: Notes     Image: Notes     Image: Notes     Image: Notes     Image: Notes       Image: Notes     Image: Notes     Image: Notes     Image: Notes     Image: Notes       Image: Notes     Image: Notes     Image: Notes     Image: Notes     Image: Notes		NOW Increase 2
Standards	HS-ESS1-2.	HS-ESS1-3.		HS-ESS1-2. HS -ESS1-5.	
Timing	20 minutes	30 minutes	40 minutes	30 minutes	20 minutes
Overview	Video (whole class): Introduction to Extraction to E-waste. Gallery Walk: Teams of five will assess each part of the supply chain as different career professionals [each student in a group will have the same job title]. They will see the intro videos, read the facts, and discuss the content to formulate questions to post on large Post-It paper. Presentation: After each group has seen all steps in the supply chain, they will share what they have learned.	Students will research different countries affected by mining for electronic raw materials and those that are common dumping grounds for electronic waste. Three of the five groups will work on data collection while two groups will work on creating maps for each affected country. (1) Research: Using the mapping features, focus on the environmental and social impacts of mining and e-waste dumping. (2) Data Collection: Each group will select an element to share with the class, collecting data in a slideshow format.	Students will synthesize and share the research findings through a gallery presentation, where each new group will have members of the research and data collection groups. New groups will create an infographic to display at a station. Each group should choose a country and discuss the key elements mined in that country or the environmental and social impacts of electronic waste in that country. Students will to read and take notes on each of the infographics as they rotate around to the posters in 5- minute increments.	Students will apply their knowledge by creating campaigns to raise awareness about electronic waste, targeting different audiences such as peers, community members, community leaders, and local businesses that work in the industry. (1) Campaign Planning: In their own selected, new group, students will brainstorm and create an outline for their campaign (15 mins). (2) Campaign Creation: Students will create a poster, social media post, or digital pamphlet for their cause (15 mins).	Students will present their campaigns in 5 minutes or less and receive feedback from the class. Classmates will provide comments and positive feedback on the campaign approach according to a rubric. Posters and digital content will be shared across all science classes to raise awareness. Passionate students will be provided the opportunity to share their pitch with the audience that was chosen in the Elaborate section (e.g., some students may wish to speak with the mining company that neighbors the school and ask about their sustainable practices).

	Extraction to E-Waste	Extraction to E-Waste	Extraction to E-Waste	Students Organizing for	Arizona Mining Reform
Supporting Documents	<ul> <li>Introduction Video</li> </ul>	Student Document	Student Document	Sustainability International	<u>Coalition</u>
	Supply Chain			(SOS)	
	Pathway	National Geographic			Arizona Mining Association
		<u>Map Maker</u>		Canva	
				Compound Interest	
				Infographics	