Electronics

Name of Project: Electronics - Live Quiz and Research/Presentation		Duration: Expands 1-5 class periods
Grade Level(s): 7th	Teacher:	Subject/Course/Unit: Electricity
Big Idea:	Demonstrating/Sharing Understanding Electricity & Circuits - follow up	
Authentic Purpose: (Why does this matter to your students?)	We live in a world where global reliance on electricity continues to grow, along with a multitude of major issues around how we produce, consume, distribute, and store electricity. We all need to understand the basics, as well as educate ourselves on accompanying challenges and opportunities.	
Future-Ready Competencies: ____Collaboration ____Communication ____Critical thinking/Problem Solving ____Creativity & Innovation ____Other:	Objectives: Students work together, share and apply knowledge to create working models of a variety of electrical circuits. Based on experience with “Snap Circuits'' students should be able to predict the observable outcomes of light bulbs and motors when they are attached in different configurations within a variety of circuits. Ex: Lights turning on or off, or becoming brighter or dimmer, or a motor spinning faster or slower...etc. Understanding electricity is one key to thriving in a highly complex world.	
Project Statement: (Include: issue, problem or challenge; student role, purpose, beneficiary, and desired outcomes)	Based on observable data, students should be able to offer explanations about how voltage levels and current flowing in different parts of a circuit relates to the arrangements of loads, conductors, and controlling devices. Fundamental understanding is foundational for deeper problem solving.	
Empathy Anchor: (How will students develop empathy and care about this problem)	Empathy is a long-term goal, born out of multiple experiences along with exposure to factual information, that when combined with a student's growing awareness of their place in the community, helps them to understand their importance in solving problems that affect us all.	
Public Audience & Reveal: (Experts, audiences, or product users students will engage with during and at the end of project)	Students may be invited to share with a middle school in Kenton County, Kentucky. Their “sister school”, Turkey Foot Middle School, is way ahead of us with regards to their energy usage and carbon footprint. For a very brief overview, visit: Turkey Foot Middle School or Is This School the Greenest Building in Kentucky? - RPM Midwest	
Knowledge Construction: (How are students going to construct content knowledge and practice it) Students will build upon concepts and expand upon conversations sparked by this project. For instance, students can be asked to explain how our buildings are wired, whether the circuits are in series or parallel, or contain a combination of both types of circuits.		Student Assessment: Live assessment. Students will make and test working circuits, and describe how the circuits work. These skills transfer to increasingly more difficult challenges.

<table>
<tr><td>Design Process:
1. Discover
2. Research & Empathize
3. Brainstorm
4. Choose
5. Build
6. Test
7. Communicate
8. Redesign</td><td colspan="2">Discovery based learning activities with open ended layers of solutions. Connects with research and real life challenges.
Students share ideas and discuss solutions then test for accuracy of predictions.
Students choose variables to test for. Combining research and experimentation
Students build circuits with a variety of circuit types.
Students test circuits to demonstrate concrete results in place of theories.
Students communicate findings through ongoing conversations, and through written explanations and/or by way of accompanying powerpoint presentations.
Students revisit models as needed to demonstrate understanding and connections.</td></tr>
<tr><td>Resources needed:
(On-site people, facilities, tools, technology, materials, community connections)
Snap Circuits, multimeters, Word, Docs, or presentation software.</td><td>Standards

NYS 7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.

NYS 7-8.DL.3 Compare types of search tools, choose a search tool for effectiveness and efficiency, and evaluate the quality of search tools based on returned results.

NYS 7-8.DL.4 Select and use digital tools to create, revise, and publish digital artifacts.</td><td>Student Reflection:

Students should be able to conduct research to then describe and predict the behaviors of larger scale circuits, based on research findings and from extrapolations after testing with small scale circuits.
Students will be able to report their findings and share with others.</td></tr>
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