Integrated Project-based Learning: Combining PTE Standards and Academic Standards

Use this template for planning and sharing ideas for projects. This template is based on the 6 A’s:

Authenticity\* Academic Rigor\* Applied Learning\* Active Exploration\* Adult Connections\* Assessment

| **Project** | |
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| **Title of Project** | **Simple Batteries** |
| **Project Developed by** | Randy Daniel, Art Silva and Daniel Brown |
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| **Pathway / Small Learning Community/Academy** | **Cassia Regional Technical Center**  **Burley High School** |
| **Course Title(s)** | **Building a simple battery** |
|  | **Two class periods** |

| **Authenticity** | |
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| *Briefly describe your project. Include the key question and provide an overview of what students do and learn. Tell why the question is meaningful to the students and where one might see a similar question tackled by an adult in the workplace.* | |
| **Key Question** | **What can be used to build a simple battery?** |
| **Overview** | **The students will construct a simple battery using vinegar, metal wiring and a small light bulb. The purpose is to teach the students through the process of experimentation how to successfully light up the bulb. This incorporates what the electronic and auto mechanics courses are teaching as well as what will be taught in the US History course when they get to the progressive era. (The wizard of Menlo park; Thomas Edison)** |

| **Vocabulary/Key Terms** | | |
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| ***List vocabulary words and key terms essential to student understanding.*** | | |
|  | **Menlo park, Thomas Edison, filament, incandescent light bulb, LED, parallel circuit, series, circuit, positive, negative, electrochemical, schematic.** | |
| | **Active Exploration \* Applied Learning \* Adult Connections** | | | | --- | --- | --- | | *What classroom-based, community-based, and career-based activities does the project involve? Include a description of the active exploration, applied learning, and adult connections in the project (as needed).* | | | | ***Active Exploration*** *How does the project engage students in real investigations using a variety of methods, media and sources? What field-based work will students perform? How does student learning and service support active career exploration?* Students will examine real models of homes. Math will expain scaled units in architecture. They will have lessons on home construction and the building codes for bids. How knowledge is used in industry? **Applied Learning** How do students apply what they have learned and researched to a complex problem  (e.g. designing a product, improving a system, creating an exhibit, organizing an event)? Lecture on industry usage of this concept i.e. model designs. Application with their own proportions also will be explored along with industry standards. ***Adult Connections*** *Who from the community, workplace, postsecondary and/or industry partnership works with students on the project?* Lecture from local industry and community in home design. | | | | **Classroom Activities** | **Community** **Activities** | **Career** **Activities** | | **Historical background research**  **Lab experiment- record data**  **Interpret schematic**  **teamwork** |  | **Communicate on the job**  **Adapt to challenge**  **Work as a team**  **Writing and reading skills** | | |

| **Academic/PTE Rigor** |
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| **Standards** *Use the space below to list the state content standards and PTE industry standards addressed by the project. (A list of the content standards is available at* [*http://www.sde.idaho.gov/ContentStandards/default.asp*](http://www.sde.idaho.gov/ContentStandards/default.asp)*. This page, which includes selected high school level standards, is designed to let you easily create a list of standards you are addressing. You may then copy and paste the list into this template.)* |
| Reading Standards for Literacy in History/Social Studies 6–12  1. Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.  4. Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social studies.  7. Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.  Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12  4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.  5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.  6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.  Secondary Electronics Technology  01.02 Interpersonal Relationships.  01.03 Team Work.  03.01 Interpret written, graphic and/or oral instruction.  03.02 Develop pertinent written, graphic, and/or oral instruction/information.  03.03 Interpret electronic schematics and/or mechanical drawings.  03.04 Prepare electronic schematics and drawings.  03.05 Record data and prepare curves and graphs.  03.08 Maintain written documentation as appropriate to the industry.  03.09 Write formal reports of laboratory experiences. 04.01 Practice proper safety techniques.  04.02 Solve mathematical problems relating to DC circuits.  04.03 Relate the phenomenon of electricity to the nature of matter.  04.04 Describe the operation of electrochemical sources.  04.05 Describe electrical quantities and units.  Automotive Standards  Electrical/Electronics  1.Use wiring diagrams, diagnosis of electrical circuit problems.  5.Check electrical circuits using jumper wires, determine needed repairs. |
| **School to Career Competencies** *Please check (x) the competencies addressed by the project* |
| [ x] Communicate and understand ideas and information  [ x] Collect, analyze and organize information [x ] Identify and solve problems [ x] Use technology [x] Initiate and complete entire activities [ x] Act professionally [ x] Interact with others [ x ] Understand all aspects of an industry [ x ] Take responsibility for career and life choices |
| **Student Goal(s) Once the project begins, ask students to generate one or two personal goals.** |
|  |
| **Assessment** |
| *How do you and the students know the project is a success? What are your criteria for measuring students' achievement of the disciplinary knowledge and applied learning goals of the project? What evidence do they use to demonstrate their progress? What deliverables do they need to complete prior to the final exhibition? How will students self-assess?* |
| They make the circuit work-the bulb lights up!  Through the process of experimentation, using more acid and different thicknesses of the metals the light bulb should grow brighter. |

| **Recommended Resources / Sample Products** | |
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| **Software or Materials Needed** *(Examples*) | **Small containers, vinegar, galvanized nails, copper wiring, LED (light emitting diode) alligator clips, access to the internet, printer** |
| **Teacher-Developed Materials** *(Examples of materials that can be shared with other classes. Please attach samples.)* |  |
| **Student-Developed Materials** *(Examples of products that can be shared with other classes. Please attach samples.)* |  |
| **Websites Used** *(Examples*) | hilaroad.com/camp/projects/lemon/vinegar\_**battery**.html |
| **Final Words** (In a sentence or two, highlight your project’s overall value.) | **The integration of three different disciplines incorporating what we all would have probably studied anyways.** |
| **Teacher Tips/Extensions** (Use the first person to share a useful idea that helps with implementation and ensures success. Make it chatty, informal.) | **Past experiment has been done using fruit ie lemons, grapefruit. Too expensive and messy.**  **Vinegar can be reused.** |
| **Extensions** *(List any ideas for students who may want to go deeper into the learning standards.)* |  |

| **Timeline** |
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| ***What sequence of teaching and learning experiences will equip students to develop and demonstrate the PTE standards and the Academic standards?*** |
| * 2 Day Lesson. |