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** | |
| --- | --- |
| **Title of Project** | **Can you make your mark on heavy metal?** |
| **Project Developed by** | Nathan Hyer and Sam Franklin |
| **E-mail Address** | [hyerna@tfsd.org](mailto:hyerna@tfsd.org), [franklinsa@tfsd.org](mailto:franklinsa@tfsd.org) |
| **School** | **Canyon Ridge High School** |
| **Pathway / Small Learning Community/Academy** | **Automated Manufacturing & Chemistry** |
| **Course Title(s)** | **Precision Machining I, II, and III, Chemistry** |
| **Time Frame** |  |

| **Authenticity** | |
| --- | --- |
| *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 are the considerations and requirements in marking metal?** |
| **Overview** | **Students will learn about the various methods used to etch and plate metal. The etching methods of laser, chemical and electro-chemical along with chemical and electroplating will be explored. In addition to the methods, safety will also be addressed.** |

| **Vocabulary/Key Terms** | | |
| --- | --- | --- |
| ***List vocabulary words and key terms essential to student understanding.*** | | |
|  | **Acid**  **Base**  **Alloys**  **Neutralize**  **Anode**  **Cathode**  **Oxidation**  **Etch**  **Plate**  **Mask**  **Reaction**  **Ion**  **Cat ion**  **Lead**  **Solution**  **Chemical burn**  **Salt** | |
| | **Active Exploration \* Applied Learning \* Adult Connections** | | | | --- | --- | --- | | **Classroom Activities** | **Community** **Activities** | **Career** **Activities** | | **Introduce students to the vocabulary, concepts and tools pertaining to metal etching and plating.**  **Show students** [**CerMark laser marking on metals**](https://www.youtube.com/watch?v=-MaN6Nzfr8Q)**.**  **Other videos (Copper Sulfate – chemical, Salt water – Electro-chemical, Electroplating)**  **Students will etch or plate a custom project.** | **Visit or have a representative from a local manufacturing facility that uses etching or plating discuss the role this serves in manufacturing.** | **Students will read an article about etching or plating and write a short summary of their chosen method. This will include the pros, cons, and the safety concerns of the chosen method.** | | |

| **Academic/PTE Rigor** | |
| --- | --- |
| **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.)* | |
| **PTE Standards**  Comply with safe and efficient work practices  Identify and select proper machine controls  Produce parts to blueprint tolerances  Demonstrate the use of CAD/CAM system for part program development   |  | | --- | |  | | **Academic Standards**  CCSS RST.11-12.1 C Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author make s and to any gaps or inconsistencies in the account.  CCSS RST. 11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words or phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.  CCSS RST 11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats, and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.  CCSS RST. 11-12.9 Synthesize information from a range of sources (e.g. texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.  CCSS WHT. 9-10.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.  CCSS SL. 11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. |
| **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 [ ] Act professionally [ ] Interact with others [ X ] Understand all aspects of an industry [ ] 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?* | |
| Students will be able to present the topic and answer the questions that are asked by fellow classmates and the teacher. Students will need to provide a multimedia presentation to the class (PowerPoint, Prezi, or video) to use as a visual aid. Students will be provided with a rubric to self-assess their own project. | |
|  | |

| **Recommended Resources / Sample Products** | |
| --- | --- |
| **Software or Materials Needed** *(Examples*) | **Computers for every student**  **Internet access**  **Student text book/instructions**  **Research materials** |
| **Teacher-Developed Materials** *(Examples of materials that can be shared with other classes. Please attach samples.)* | **Rubric to assess project**  **Rubric for student self-assessment** |
| **Student-Developed Materials** *(Examples of products that can be shared with other classes. Please attach samples.)* | **Report on their chosen topic** |
| **Websites Used** *(Examples*) | **DIY** |
| **Final Words** (In a sentence or two, highlight your project’s overall value.) | **This project introduces students to real life uses of the tools they use in school and how this pertains to future careers and business practices. This also gives a better understanding of the costs, material and safety concerns dealing with metal processing.** |
| **Teacher Tips/Extensions** (Use the first person to share a useful idea that helps with implementation and ensures success. Make it chatty, informal.) | **Reflection report on guest speaker**  **Run school based business** |
| **Extensions** *(List any ideas for students who may want to go deeper into the learning standards.)* | **Senior Project**  **Job Shadow**  **Etch direction signs for school.** |

| **Timeline** |
| --- |
| ***What sequence of teaching and learning experiences will equip students to develop and demonstrate the PTE standards and the Academic standards?*** |
| * The students will have to learn how to correctly cite sources. Students will also have to stand in front of the class to present the topic that was chosen and to be able to answer questions that may be asked from peers, and the teacher. |

**Project Self-Evaluation**

Student name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Research topic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Describe your project IN DETAIL:
2. What materials did you use?
3. What are three things you learned from working on the project?

a.

b.

c.

1. What are three things you learned from your research paper?

a.

b.

c.

1. How do you feel that your project will compare with others?

1. What problems did you encounter? How did you overcome these problems?
2. Did your project turn out the way you planned? If not, why?
3. What would you do differently if you could start all over (in regards to either the project or the research paper)?
4. What did you learn about yourself?
5. What grade do you think you deserve? Justify this grade in 50 words or more.

My grade: \_\_\_\_\_\_\_\_\_\_\_\_\_

Justification:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Project Self-Evaluation**

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Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Research topic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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My grade: \_\_\_\_\_\_\_\_\_\_\_\_\_

Justification:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_