

# 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

<b>Title of Project</b>	<b>Volume and Unit Conversions</b>
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<b>School</b>	Minico High School
<b>Pathway / Small Learning Community/Academy</b>	PTE Diesel Tech & Related Mathematics
<b>Course Title(s)</b>	Applied Math
<b>Time Frame</b>	4 to 5 days

## 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.*

<b>Key Question</b>	<b>How do volume and unit conversions relate to Diesel Technology?</b>
	<b>Unit conversions.</b>
	<b>Formulas.</b>
	<b>Apply to Diesel Technology.</b>

## Vocabulary/Key Terms

*List vocabulary words and key terms essential to student understanding.*

<b>Volume</b>
<b>Formula</b>
<b>Math operations</b>
<b>Cubic inch displacement</b>
<b>Various engine parts</b>

## Vocabulary/Key Terms

Caliper, Micrometer, T gauge.

## 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 explain 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
Unit conversions problems Volume problems Equivalency between units Measuring cubic inch displacement	Skills USA Competition	Shadow or one-on-one interview with:  Diesel Technician  Math Instructor  Rocket Scientist  Parts Personnel

## 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>. 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.)

## Academic/PTE Rigor

Geometry2.1: Understand measurable attributes of objectives and the units, systems, and processes of measurement. Geometry2.2: Apply appropriate techniques, tools, and formulas to determine measurements. Algebra I 1.1: Understand numbers, ways of representing numbers, relationships among numbers, and number system. Algebra I 1.2: Understand meanings of operations and how they relate to one another. Algebra I 1.3: Compute fluently and make reasonable estimates. Algebra I 2.2: Apply appropriate techniques, tools, and formulas to determine measurements. **TM1.1**: Understand and use numbers. **TM1.2**: Understand and perform computations accurately. **TM1.3**: Estimate and judge reasonableness of results. **TM2.1**: Understand and use U.S. customary and metric measurements. **TM2.2**: Apply the concepts of rates, ratios, and proportions. **TM2.4**: Apply appropriate techniques, tools, and formulas to determine measurements. **TM3.6**: Apply functions to a variety of problems.

### School to Career Competencies *Please check (x) the competencies addressed by the project*

- Communicate and understand ideas and information
- Collect, analyze and organize information
- Identify and solve problems
- Use technology
- Initiate and complete entire activities
- Act professionally
- Interact with others
- 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?*

Score 80% or higher on traditional Math Exam. **Benchmark tests to prepare and review.**

Demonstrate proper cubic inch displacement and volume conversions with diesel engines with 100% accuracy.

Self –assess by demonstrating proper knowledge and understanding of concepts.

## Recommended Resources / Sample Products

**Software or Materials Needed**  
(Examples)

**Math book. Work papers.**

**T-gauge, Micrometer, Caliper, Note book.**

## Recommended Resources / Sample Products

### Teacher-Developed Materials

*(Examples of materials that can be shared with other classes. Please attach samples.)*

### Engine Block

### Student-Developed Materials

*(Examples of products that can be shared with other classes. Please attach samples.)*

**Students to develop a “poster talk” illustrating one math problem and its application to the diesel setting.**

### Websites Used

*(Examples)*

**www.ondemand5.com**

### Final Words

*(In a sentence or two, highlight your project’s overall value.)*

**To be competitive in related fields, students must have expanded math skills.**

### Teacher Tips/Extensions

*(Use the first person to share a useful idea that helps with implementation and ensures success. Make it chatty, informal.)*

**Teachers’ presence in each other’s classroom/lab setting is important. The presence directs the discussion r.e. applied academics.**

### Extensions

*(List any ideas for students who may want to go deeper into the learning standards.)*

**Students have an opportunity to extend their learning by preparing a bulletin board display (math problems, photos from Diesel lab/shop) for the school hall. Extra credit will be offered.**

## Timeline

*What sequence of teaching and learning experiences will equip students to develop and demonstrate the PTE standards and the Academic standards?*

- Day 1: Review and discuss what was learned in math class.
- Day 2: Discuss proper use and care of measuring tools and begin learning to use them.
- Day 3: Practice measuring skills on live props and discuss what we learned.
- Day 4: Start final testing using the engine blocks and measuring tools.
- Day 5: Finish up testing and discuss what we learned and what we found to be important to our field.

*(Adapted from the Boston Public Schools Signature Projects.)*

