## Math-in-CTE Lesson Plan Template

Lesson Title: Interpreting Insulation Systems		Lesson # C15		
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Occupational Area: Pre-Engineering				
CTE Concept(s): ROI Payback, Degree Day, Energy Usage, Data Intrepretation				
Math Concepts: Simple Interest Rate, Interpreting Data				
Lesson Objective:	Compare 3 typical insulation systems to determine payback for different systems			
Supplies Needed:	Internet, Computers, Electric Bill, Handouts, and Calculator			

THE "7 ELEMENTS"	TEACHER NOTES (and answer key)
1. Introduce the CTE lesson.	
In Maine most buildings are poorly insulated or insulated with fiberglass. With the new awareness on heating and the cost what insulation system is currently the most cost effective. Show cartoon.	

2. Assess students' math awareness as it relates to the CTE lesson.	
1. Hand out the electric bill and ask them to find the rate in \$/KwH	
2. Ask the students to provide the formula for Degree Day and what it means	
3. Ask the students to do a simple payback and a simple interest calculation	
4. Ask students to interpret graphs and meanings	
3. Work through the math example <i>embedded</i> in the CTE lesson.	
Vocabulary: ROI, Payback, Simple Interest, Rates	
Go over the cost of a typical electric bill and calculation of the overall \$/KwH, how the base rate, fuel charge, and tiers effect the overall rate	
Go over a simple payback example of buying long lasting tires vs cheaper low mileage tires. Apply to other things such as mileage increase with the more expensive tires. Project to other areas in life and insulation	
Calculate Degree Days for a period, explain local Degree Days per year, and significance of the numbers	

4. Work through related, contextual math-in-CTE examples.	
Introduce the data for test buildings, calculate the annual cost for heating the cellulose insulated building knowing the daily DD and KwH projected for annual DD. Introduce the cost for the cellulose insulation system, fiberglass insulation system, and fiberglass with foam insulation system. Mention that I am being nice by also providing them with the annual energy cost for the fiberglass with foam insulated building.	
Come back and demonstrate the Payback of the cellulose insulated building over typical fiberglass insulation.	
5. Work through <i>traditional math</i> examples.	
Simple interest work sheet	

6. Students demonstrate their understanding.	
Students will calculate the annual energy usage costs for the fiberglass insulated building. Knowing the cost for the fiberglass and foam insulated building the students will calculate the Payback for that building	
7. Formal assessment.	
Provide the students with the Degree Days for Juno Alaska, Salt Lake City Utah, and Charlotte South Carolina, the material/labor inflation rates for each location compared with Maine, and the cost for electricity for each location. The students will provide the payback for each insulation system over fiberglass in each location.	

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