

The Math-in-CTE Pedagogic Framework:

The Seven Elements of a Math-Enhanced CTE Lesson

The Seven Elements	Teacher Notes
<p>1. Introduce the CTE lesson.</p> <ul style="list-style-type: none"> • Explain the CTE lesson. • Identify, discuss, point out, or pull out the math embedded in the CTE lesson. 	<ul style="list-style-type: none"> • <i>Make the objective of the lesson explicit.</i> • <i>Do not introduce as a “math” lesson.</i> • <i>Discuss/share introductory approaches at your PD sessions.</i>
<p>2. Assess students’ math awareness as it relates to the CTE lesson.</p> <ul style="list-style-type: none"> • As you assess, introduce math vocabulary through the math example embedded in the CTE. • Employ a variety of methods and techniques for assessing awareness of all students, e.g., questioning, worksheets, group learning activities, etc. 	<ul style="list-style-type: none"> • <i>Bridging of CTE content to math vocabulary should begin here.</i> • <i>During the PD sessions, share and/or develop methods for assessing awareness.</i> • <i>Involve all class members in assessment.</i>
<p>3. Work through the math example <i>embedded</i> in the CTE lesson.</p> <ul style="list-style-type: none"> • Work through the steps/processes of the embedded math example. • Bridge the CTE and math language. The transition from CTE to math vocabulary should be gradual throughout the lesson, being sure never to abandon completely either set of vocabulary once it is introduced. 	<ul style="list-style-type: none"> • <i>Use aids that illustrate the concepts and vocabulary. Examples:</i> <ul style="list-style-type: none"> ○ <i>Posters</i> ○ <i>PowerPoint presentations</i> ○ <i>Handouts</i> ○ <i>Resources</i>
<p>4. Work through <i>related, contextual math-in-CTE</i> examples. Using the same math concept <i>embedded</i> in the CTE lesson:</p> <ul style="list-style-type: none"> • Work through similar problems/examples in the same occupational context. • Use examples with varying levels of difficulty; order examples from basic to advanced. • Continue to bridge CTE and math vocabulary. • Check for understanding. 	<ul style="list-style-type: none"> • <i>Develop examples of various levels of difficulty.</i> • <i>Develop separate worksheets for the various levels.</i> • <i>Locate/utilize resources that support bridging of vocabulary.</i>
<p>5. Work through <i>traditional math</i> examples. Using the same math concept as in the <i>embedded and related, contextual examples</i>:</p> <ul style="list-style-type: none"> • Work through traditional math examples as they may appear on tests. • Move from basic to advanced examples. • Continue to bridge CTE and math vocabulary. • Check for understanding. 	<ul style="list-style-type: none"> • <i>Use samples from:</i> <ul style="list-style-type: none"> ○ <i>Standardized tests</i> ○ <i>State tests</i> • <i>Develop worksheets and create learning activities.</i>
<p>6. Students demonstrate their understanding.</p> <ul style="list-style-type: none"> • Provide students opportunities for demonstrating their understanding of the math concepts embedded in the CTE lesson. • Conclude the math examples and tie back to the CTE content; conclude the lesson on the topic of CTE. 	<ul style="list-style-type: none"> • <i>Develop learning activities that allow students to demonstrate their understanding of both the math <u>and</u> the CTE lesson.</i>
<p>7. Formal assessment.</p> <ul style="list-style-type: none"> • Incorporate math questions into formal assessments at the end of the CTE unit/course. 	<ul style="list-style-type: none"> • <i>Include math questions on any regularly-scheduled testing or unit exams.</i> • <i>Include math assessment as a part of major projects.</i>