## Math-in-CTE Lesson Plan Template

Lesson Title: The BIG Inch		Lesson # M12
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Occupational Area: Sheet Metal / Welding		
CTE Concept(s): Reading and using a ruler and working with fractions		
Math Concepts: Ruler Measurement, equivalent, adding and subtracting fractions		
Lesson Objective:	ective: Students will accurately use a ruler and work with fractions	
Supplies Needed: F	upplies Needed: Ruler, marker, pen/pencil, paper, Core Curriculum Contren Learning Series 3 <sup>rd</sup> Edition selected objects to measure.	
THE 117		TEACHER NOTES

THE "7 ELEMENTS"	(and answer key)	
1. Introduce the CTE lesson.		
"Today we are going to review how to read and use a	Note:	
ruler properly."	Many students haven't been formally taught	
"GOOD News! You are only going to have to learn about the first inch." and	how to read or use a ruler since elementary school.	
"Some of you, I realize have struggled along the way with fractions in your math classes once you learn the first inch you'll also have a better understanding of how to add, subtract and identify <u>equivalent</u> fractions."	Be considerate of this, since parts of a ruler (fractions) can be a struggling area for students.	

2. Assess students' math awareness as it relates to the CTE lesson.	You can either ask the students these questions or print out and give to the
1. When were you first taught how to use a ruler?	students as a handout.
2. How frequently have you used a ruler since then?	M12 Rev2 Element 2 Handout.pdf
3. When was the last time you were expected to use this skill in your math class?	Answers for the first three questions may vary depending on students.
<i>4. What do the varying <u>heights</u> of the lines on a ruler represent?</i>	These represent fractions of an inch and they may vary depending on the accuracy of the
"In the shop we may call these tick marks or	ruler, for how many equal parts they have.
indicator marks."	(halfs, fourths, eighths, or sixteenths)
5. Do you know what a fraction is?	
	Equal parts of a whole. (There's no such thing as the bigger half.)
6. Do you know the parts of a fraction? (Top #/Bottom #? Give me the name of these numbers)	Top <i>#</i> is the <u>numerator</u> , bottom <i>#</i> is the <u>denominator.</u> ( <i>No these are not called the over number and under number.</i> )

3. Work through the math example <i>embedded</i> in the CTE lesson.	
Lets learn the BIG Inch!	Give all students an 8 " x 11" sheet of paper
1. Hold your paper length wise	and they will need a writing utensil.
( <u>Horizontal</u> /Landscape)	Tell them they need to repeat what you do,
2. Draw a line as close to the left edge as possible	as you model it for the students.
approximately of the way up the page, and above	
that line mark 0 (zero).	
3. Repeat process on right side, substituting 1" instead of a 0 State: "This is a representation of 1 WHOLE inch."	
4. Take your paper and fold it in half so that the 0 and the 1" line up.	
5. Unfold your paper.	
6. Draw a line along the crease, approximately the	
length of the 0 and 1" line.	
7. Ask the students what does this mark represent.	Students usually say "
8. Mark that line appropriately ".	Note: Require the students to write their fractions with a horizontal (-) line and rather than a slash (/). For example:
	instead of ½

Ask: "Why is this 📴	Students will say, because it is two pieces. Explain that yes, but STRESS that they are two <b>EQUAL</b> parts of a whole.
9. Now mark above the 1" with	Reinforce <b>Numerator</b> and <b>Denominator</b> .
10. Re-Fold the paper in half, then fold it in half again.	
Ask: "What do we have now?" 11. Unfold; Draw lines on two new creases length of the respectively.	(Many students know the common fractions of quarters and fourths. These are referred to as benchmarks in their math class)
Point to the " line and Ask: "What is this measurement?"	Students will say 🔄; Explain to them why it is also 🖙 talking about <u>equivalent fractions</u>
12. Re-Fold the paper and fold it in half again.	and <u>common denominators.</u> Mark appropriately.
13. Unfold; Draw lines on the four new creases, $\frac{1}{2}$ length of the $\frac{1}{4}$ " line and mark them with $\frac{1}{8}$ ", $\frac{3}{8}$ ", $\frac{5}{8}$ " and $\frac{7}{8}$ ".	

Illustrate to students the equivalent fractions for all the other measurements.	Talk to students about how this helps them when adding and subtracting fractions.
Mark them appropriately.	
	NOTE: You may want to follow this process out to the this or 32nds, but folding the
	paper gets tougher and there's less room to write. Another option would also be to include the decimal equivalencies as you go through the parts of an inch.
4. Work through related, contextual math-in-CTE examples.	
Now Lets see how much you understood that process.	For those that do not use the Contren Learning Series Core Curriculum –
Feel free to use the BIG Inch you just created.	Introductory Craft Skills, print the
Please go to Chapter 2 page 16 of the Core Curriculum. Do the review questions Section 3.0.0	M12 Rev2 Bookwork.pdf
	Answers:
And	1. C (1")
	2. A (2 <sup>1</sup> / <sub>2</sub> ")
	3. B (1 <sup>3</sup> / <sub>4</sub> ")
	4. C (¼")
	5. D (1 <sup>5</sup> / <sub>16</sub> ")

Page 17 Section 4.1.1	Answers:
	1. B (4)
	2. C (4)
	3. D (6)
	4. A (48)
Do the best you can this will be part of your class participation grade.	5. C (6)
	Note: If students are still having trouble with their measurements. Print the worksheet for extra practice.
	M12 Rev2 Reading a Ruler Worksheet.pdf
5. Work through <i>traditional math</i> examples.	
Write the following Math Problems on the board Have student's copy down and solve.	Students will complete these problems without the aide of the Big Inch.
	Make sure they show their work. (work with your Math Enhancer to understand all steps)
b. 1 –	a.
c. $1 \frac{1}{4} - \frac{1}{16}$	
d. 🖛 = 💌	
e. 🖛 = 💌	

Do the best you can this will be part of your class participation grade.	
	b.
	c. 🗵
	d. n = 8
	e. n = 16
	Go over problems with students.
6. Students demonstrate their understanding.	
Now, you will have to go into the shop and measure specific objects.	Have objects ready in the shop with clear indications of what and where they need to
You will find these objects numbered 1 - 10 on the	measure.
table	Pre-measure all objects for answer key.
Record the required measurements.	
7. Formal assessment.	Have a one on one discussion with each
Objects from Element 6 will be graded on Accuracy.	student.
	Discusshow they did and work through any mistakes and/or difficulties they may be having.