Math-in-CTE Lesson Plan Template

Lesson Title: Rod selection	/ electrode angle	Lesson # M07	
Author(s):	Phone Number(s):	E-mail Address(es):	
Jessie Crosby	974-7815	jcrosby.utc@gmail.com	
Tyson Greifzu	582-3150	turk11235@gmail.com	
Occupational Area: Vocation	onal education (CTE)		
CTE Concept(s): rod selection			
Math Concepts: angles (benchmark and estimation), reading charts/graphs			
Lesson Objective:	After selecting a desired rod, students will learn to read charts for proper amp settings,		
	and use proper electrode angle to deposit weld.		
Supplies Needed:	computer with projector / hand outs: chart 'current (amperage) range table, practice		
	sheet / protractor / included URL's,		

THE "7 ELEMENTS"	TEACHER NOTES (and answer key)		
1. Introduce the CTE lesson.			
"If you recall from last class, there are two main characteristics which will lead you to choosing your rod. What are they? I know your math teacher may use slightly different terms for these measurements, thickness they would call height.	recap from previous lesson ANS : <u>thickness of metal</u> and <u>type of material used</u>		
As you came in you were given a slip of paper. Keep these for later in the lesson. "Once we decide what rod diameter and type we are going to use,	SEE correlation work sheet below		

we'll need to make sure the amperage setting is correct for the rod we've selected. Then we're ready to deposit the weld.	THE REAL LESSON OBJECTIVES		
However the weld needs to be done at a specific angle to insure proper weld deposition.			
Any ideas as to what can happen with improper amperage?			
Any ideas as to what can happen with improper angle?	Brainstorm with them. You write their responses down on the board.		
2. Assess students' math awareness as it relates to the CTE lesson.			
GROUP 1 Take a look at the hand out over last class, there are	This is to recap a previous lesson.		
done. Which rod would vou use for each of the following applications.	ELEMENT 2/1 sheet (below)		
GROUP 2 You will try to determine the amperage setting for a couple of applications given.	Current (amperage) range chart (***hyperlink***) ELEMENT 2/2 sheet (below)		
GROUP 3 Will be at my computer to shoot down some aliens to save the world. I'll be checking your aim.	This is for angle estimation. http://www.xpmath.com/forums/arcade.php?do=play& gameid=75		
Rotate every ten minutes so each group get to each station.	timer <u>http://ticktocktimer.com/ or just keep track of</u> <u>time</u>		

3. Work through the math example <i>embedded</i> in the CTE lesson.	
GRAPHS AND TABLES	
We will use charts often. All of them have two main ideas in them. The math teachers use certain vocab. words for these. Lets make them feel important and learn their words. The information you can control (choose) is the independent variable, this information is usually found in a horizontal layout. Once you make the choice the other information is dependent upon your choice. So they call it the dependent variable and this information is displayed vertically. One depends on the other.	******Current chart link for ELEMENT 2/2 ****** use overhead image of the current (amperage) range table as the teaching model (PAGE 9) <u>http://www.millerwelds.com/pdf/guidelines_smaw.pdf</u>
<u>Golden star moment</u> we have amp setting and rod selection. Which is the dependent variable?	
For our purpose the rod selection is the independent variable and from the chart our amperage is dependent upon which rod we chose.	
This is crucial, improper amperage will not result in a good sound weld.	
When you came in, you were given a word or phrase on a slip of paper. Somebody else in the class has a similar paper. You need to think ' depends on' where the two words work as a couple or relation If these were in a graph of chart which would be displayed borizontally?	Have them wait with partner until matches are found. Have them tell the phrases and tell which is dependent and independent.ANS: see answers to correlation worksheet below
ANGLES	
You have to have a good sense of angle measurements for cutting and welding metals. Cutting metal properly will result in good fitting pieces, and having a proper electrode traveling angle will result in a good sound weld. Since we will be 'doing' this with out <u>measuring</u> your angle, you will just need to mentally visualize it while welding. So lets see what we can come up with. The common angle for welding with the E7018 rod is 10 degrees more, or less, than 90 degrees depending if your pushing or pull the weld.	second angle game with (on/off) protractor. Good visual focus with immediate tool to give accuracy. <u>http://www.crickweb.co.uk/assets/resources/flash.php?</u> <u>&file=angle</u>
This is going to be called an 80 or 100 degree angle in the math class. The angle is usually thought of as the space from the horizontal to the terminal ray.	picture of angle with electrode, show the difference reference angle. (PAGE 13) <u>http://www.millerwelds.com/pdf/guidelines_smaw.pdf</u>

4. Work through related, contextual math-in-CTE examples.			
GRAPH/CHART	showing pictures of each situation. Focus on A,B and C for		
Improper settings for amperage will result in improper weld.	the left SMAW picture		
Too low a setting will result in lack of penetration causing the weld to be weak.	http://content.lincolnelectric.com/pdfs/products/literature/ e/wc478.pdf		
Too high a setting will result in excessive penetration, overheating of the base metal causing excessive distortion possibly ruining your base metal.			
Try to determine the missing information in the chart I'm handing out next.	Worksheet 4/1 below.		
In your math class sometimes a chart is referred to as a matrix. The independent variable information is displayed in a row(horizontal), whereas the dependent variable information is in a column(vertical)	Answers worksheet 4/2		
Now deposit three welds: with too low, too high and correct amperage. About three inches of weld for each scenario. Write about the visual results you notice for each amperage in your flipbooks.			
ANGLES			
While welding there are two 'angles' to be aware of; leading angle and trailing angle.			
If asked to weld two pieces of 3/8 mild steel plate in the flat position	ADVANCED QUESTIONS:		
producing a fillet weld you would want to use about a 10 degrees (towards the direction of travel) trailing travel angle.	Describe the electrode angle for an overhead weld.		
<pre>>>> direction of travel >>> electrode</pre>	If depositing an overhead weld what would the angle be?		
/ metal	Using directions NSEW describe the electrode angle for overhead weld		
Now deposit three welds: a 90, (10) off 90, 45 degree electrode traveling angle to deposit a three inch weld for each angle. Write your observations for each angle in your flipbook.			

5. Work through traditional math examples.	
We are going to go through a few problems involving charts and angles. Lets work through the worksheet for some practice. One side is reading tables and the other side is measuring and	
constructing some angles with a protractor. This will be extremely	Handout for charts 5/1
important when we get to reading and designing blueprints.	Handout for angle 5/2 "WHAT'S MY ANGLE"
6. Students demonstrate their understanding.	
	All pieces will be numbered in pairs 1-20.
Each student will now be given two pieces of scrap metal to weld together using the proper amperage setting and the proper electrode traveling angle. Write your number in your flip book.	
When your finished pass in your product.	
7. Formal assessment.	
Each student will grab a product. Your job now is to analyze another weld to determine the rod used and if the proper amperage and traveling angle were used. Write the product number you have and Write your observations of the weld that lead you to determine whether these were done properly. Make sure to address both amperage and angle in your critique.	

NOTES: You may get more "topics" from the math teacher. As students come in give them the slip of paper. Here are the ones we used

Correlation worksheet

Amount of interest earned	Time money is left (alone) in the bank
Saturation level of the ground	Length of rainstorm
Height off the ground	Number of bounce a ball completes
Total distance traveled	Time driving at constant speed

Answers to correlation worksheet

Amount of interest earned	depends on	Time money is left (alone) in the bank
Saturation level of the ground	depends on	Length of rainstorm
Height off the ground	depends on	Number of bounce a ball completes
Total distance traveled	depends on	Time driving at constant speed

ELEMENT 2/1	1 sheet	ANS	SWERS	
If welding ro	usted truck frame	If welding	rusted	truck frame
Rod used		Rod used	3/32"	6010
If welding 2	2 inch thick mild steel	If welding	2 inch	thick mild steel
Rod used		Rod used	5/32"	7018
If welding a	aluminum boat trailer	If welding	alumi	num boat trailer
Rod used		Rod used	1/8"	4043 tig rod
If welding 1	./8" wall 309L stainless steel pipe	If welding	1/8" w	vall 309L stainless steel pipe
Rod used		Rod used	1/8" 3	09L filler rod

ELEMENT 2/2 sheet Write responses in flipbook

You need to weld 3/8" pad of beads

Rod used?

Amperage setting?

You need to weld 3/8" pad of beads

Rod used? 1/8" 7018

Amperage setting? 80 – 120

You need to weld open root sch. 40 pipe

Rod used? 1/8" 6010 root industry

3/32" 7018 cover standard

Amperage setting? **Amperage setting?** 1/8" 6010 80 – 120 3/32" 7018 60 - 90

ANSWERS

You need to weld open root sch. 40 pipe

Rod used?



	ROD TYPE USED				
	7018	6010	7024	6011	7018
DIAMETER	???????	1/8″	5/32"	??????	3/32″
AMPERAGE	80 – 120	????????	????????	60 – 90	??????

A	NS	W	EF	RS

130-180

3/32"

60-90





Estimate	Estimate
Actual	Actual

ANSWERS to WHATS MY ANGLE due to creating this on the computer I could not measure these with my protractor.

- 1.
- 2.
- 3.
- 4.
- 5.

ANSWERS to 5/1 charts

- 1. 2.5"
- 2. 8 hours
- 3. specifications
- 4. percentage of on-line consumers watching video
- 5. South Korea

Worksheet 5/1 Charts

Thickness

Screen Size

Display Surface

Wi-Fi

Talk Time

Internet Use

Video Playback

Audio Playback

iPhone Competitive Data, June 18, 2007



11.6 mm

3.5 in.

Glass

Yes

8 hours

6 hours

7 hours

24 hours



N95

21 mm

2.6 in.

Plastic

Yes

4 hours

They Don't Say

They Don't Say

They Don't Say

0

Blackjack

11.7 mm

2.2 in.

Plastic

No

5.5 hours

They Don't Say

They Don't Say

They Don't Say



Blackberry

Curve 8300

15.5 mm

2.5 in.

Plastic

No

4 hours

They Don't Say

They Don't Say

They Don't Say

Palm

Treo 750

22 mm

2.5 in.

Plastic

No

4 hours

They Don't Say

They Don't Say

They Don't Say

QUESTIONS

- 1. What is the screen size of the Blackberry?
 - 2. What is the talk time for the iPhone?
 - 3. Which would be the dependent variable?

(phone type or specifications)

Source: Manufacturers' websites

TABLE 2-1

Percentage of online consumers using blogs and user-generated content

	United States	United Kingdom	France	Germany	Japan	South Korea	
Read blogs	25%	10%	21%	10%	52%	31%	describing?
Comment on blogs	14%	4%	10%	4%	20%	21%	
Write a blog	11%	3%	7%	2%	12%	18%	
Watch user- generated video	29%	17%	15%	16%	20%	5%	
Upload user- generated video	8%	4%	2%	2%	3%	4%	percentage)?
Listen to podcasts	11%	7%	6%	7%	4%	0%	
Figures include consume	ars who partici	pate at least mon	thly.				

Source: 2007 Technographics surveys.

From Groundswell: Winning in a World Transformed by Social Technologies

by Charlene Li and Josh Bernoff Copyright 2008 Forrester Research, Inc.

- 4. In the U.K. what is the largest percentage
- 5. What country writes Blogs the most (as a