

**TAP Coaching PLC, 2014-15
LESSON PLAN**

Lesson Title		Program of Study and CIP Code
Checking Labor Costs when Estimating Brick		Masonry (CIP 46.0101)
What unit is this lesson plan part of (if applicable)?		
Estimating Materials and Costs		
Student Level (if applicable)		
12 th Grade		
Lesson Objective or Task		
Students will decide if a given cost for labor is reasonable for a defined job and demonstrate their decision with a mathematical argument.		
Lesson Duration		
45 minutes		
Materials Needed		
Chart paper and markers, calculators, problem examples		
Safety		
NA		
Essential Question(s)		
How do you justify the bid estimate for the labor when working with brick?		
Assessment		
Formative: The opening activity where students create a list of needed information for this type of problem gives the instructor an idea of how much students remember about the process. The final writing helps the instructor decide where to focus any continued practice.		
Summative: Written assessment		
Standards Addressed		
POS Task: <ul style="list-style-type: none">• 1301 Estimate brick masonry work. PA Common Core Standards: <ul style="list-style-type: none">• CC.3.5.11-12.D: Determine the meaning of symbols, key terms, and other domain-specific words and		

phrases as they are used in a specific technical context relevant to grades 11-12 texts and topics.

- CC.3.6.11-12.1: Write routinely over extended time frames and shorter time frames for a range of discipline specific tasks, purposes, and audiences.
- CC.2.1.HS.F.4: Use units as a way to understand problems and to guide the solution of multi-step problems.
- CC.2.1.HS.F.5: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
- SMP #1: Make sense of problems and persevere in solving them.
- SMP #2: Reason abstractly and quantitatively.
- SMP #3: Construct viable arguments and critique the reasoning of others.
- SMP #4: Model with mathematics.

Vocabulary Introduced/Reviewed

Man hours, Rules of Thumb

Accommodations / Adaptations

Assign students to partners with similar math ability so that discussion is not overtaken by stronger math student. When asking students to independently list, check in with students to make sure each one has at least one or two entries to contribute.

Lesson Steps / Description

Activating procedures: Quick write by individual students (Collins Level 2) - List the kinds of information you either need to know or be given in order to estimate the labor cost when laying a brick wall. Make sure you have at least 3 items.

Pair/share- Students compare lists with a partner and add anything that is missing. Whole group share out to create complete reference list. Expected information includes: Size of the wall, rule of thumb for brick is 7 bricks per square foot (6.75 exactly), 2 workers can expect to lay 650 bricks in an 8 hour shift. Group needs to decide on pay rate for the workers – we used \$32 per hour.

Teaching strategies/procedures:

Pairs are presented with information about a bid written for the labor involved in a masonry job. Each pair gets a different example. The group must use the information to determine if the bid is reasonable and must justify their response with a mathematical argument. Here are the problems that we used:

- You have been asked to create a bid for the labor involved in building a standard brick wall that is 65 feet by 8 feet. Is \$2500 a reasonable amount for you and your friend to do this work?
- You have been asked to create a bid for the labor involved in building a standard brick wall that is 40 feet by 10 feet. Is \$2200 a reasonable amount for you and your friend to do this work?
- You have been asked to create a bid for the labor involved in building a standard brick wall that is 25 feet by 6 feet. Is \$1300 a reasonable amount for you and your friend to do this work?

Groups write up their arguments on chart paper and present ideas to the class. Other students ask questions and critique the reasoning behind the justification.

Summarizing strategies/procedures:

Individual students write (Collins level 2) at least 5 lines describing any successes and challenges each had in

completing this problem. You may need to model an example if students have not done something like this in the past. For instance, “I realized that I needed to start with finding square feet of the wall and I had no problem finding the number of bricks. I was confused at first when I only had to look at the labor costs, and I am not comfortable finding the number of hours for the job.”

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