Middle-level CTE Learning Experience Title: Costs of Measuring Mistakes Educator: Phillip Helmer, M-O BOCES Length of Lesson: 12 day (40 minute periods) Grade Level: 5-8	CTE Area: Trade and Technical Education CTE Theme: Financial and Consumer Literacy CTE Content: Measurement in Trade and Technical Fields Date Created: March 28, 2019

PLANNING	
Curriculum Goal(s)	Students work in pairs to identify the most common measurement tasks required in a specific trade area; pairs share their lists. Students research the financial costs of wasted time and materials when inaccurate measurements are made in completing the tasks on their lists. Students write a reflection on how consumers are impacted when inaccurate measurements result in wasted resources.
Essential Question	What knowledge and skills are necessary to demonstrate an introductory understanding of how money can be managed and how individuals can create and achieve financial goals while managing financial challenges? What knowledge and skills are necessary to demonstrate introductory understanding of systems of measurement and the ways accurate measurements assist trade and technical workers in the successful completion of their work?
National Standards	Common Career Technical Core Standards https://www.careertech.org/career-ready-practices Career Ready Practices 1. Act as a responsible and contributing citizen and employee 3. Attend to personal health and financial well-being 4. Communicate clearly and effectively and with reason 5. Consider environmental, social, and economic impacts of decisions 8. Utilize critical thinking to make sense of problems and persevere in solving them 11. Use technology to enhance productivity USDOE Employability Skills http://cte.ed.gov/employabilityskills Applied Knowledge: Applied Academic Skills, Critical Thinking Skills The thoughtful integration of academic knowledge and technical skills put to practical use Effective Relationships: Interpersonal Skills, Personal Qualities The skills that enable individuals to interact effectively with clients, coworkers, and supervisors Workplace Skills: Resource Management, Information Use, Communication Skills Systems Thinking, Technology Use The skills employees need to successfully perform work tasks

NYS Standards

	Cost to buy Cornhole Boards: https://www.cornhole.com/standard-cornhole-boards.php Measure Twice, Cut Once: https://www.youtube.com/watch?v=gYCjh3cKteM Cornhole set plans: https://www.diynetwork.com/how-to/outdoors/structures/how-to-build-a-regulation-cornhole-set		
INSTRUCTION	What will the teacher do?	What will the students do?	How much time for each activity?
Pre-assessment	Provide a paper/pencil homework		

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	Day 3- Teacher develops a graphic, based on pair lists, showing similarities and differences among measurement tasks for the trade areas	Day 3- Student pairs share their measurement lists with the rest of the class Student pairs choose one distinct measuring task for their trade area (ex. Carpentry; cutting a 2"x4") Students determine average cost of a material (ex. cost of a 2"x4" board)	40 min total 10 min 10 min 20 min
	Day 4- Teacher delivers direct instruction on how prices for job tasks are set in the trades (ex. Carpentry; time and materials vs. square feet for the job) Teacher supplies student pairs with job tasks for their specific trade (ex. Carpentry; cornhole board) Cost to buy Cornhole Boards: https://www.cornhole.com/standard-cornhole-boards.php	Day4- Students take notes on teacher lesson Students determine the price they would charge a customer for completing the job task Students determine the total cost of the material (ex. 2"x4" board)needed for the specific job task	40 min total 30 min 10 min
	Day 5- Teacher shows Measure Twice, Cut Once: https://www.youtube.com/watch?v=gYCjh3cKteM To illustrate the concept of "measure twice and cut once"(exaggerated example) Teacher provides pairs with	Day 5- Watch video	40min total 8min

discussion questions, such as:
How much waste was there?
How much does this cost for materials?
How would this impact the price charged for the service?
How could this waste be used for another project?
What could have been done to prevent the waste?

Following the video, teacher leads a class discussion based on the pairs' questions

Day 6-
Teacher delivers direct instruction on types of specific measurements typically needed and where mistakes can create material costs(ex. Carpentry; inside vs. outside measurement , kerf)
Teacher provides a graphvs.

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	of measuring accurately		
	Day 11- Teacher assigns a reflection essay: RAFT R= role; Contractor (Carpentry; cornhole board custom woodcrafter) A= audience; Customer (disappointed by over budget due to material waste) F=form; (Business letter) T=topic; (Explain mistake, suggest solutions including asking for additional funds)	Day 11- Students produce RAFT reflection letters	40 min
	Day12- Teacher asks for volunteers to share their RAFT assignments	Day 12- Students role play based on shared RAFT assignments Students complete exit ticket assessment	40min 35 min 5min
	Day 13- Teacher arranges teams for cornhole played on the boards students	Day 13- Play cornhole on the boards they made!	40min

Differentiation

Performance Measure	Exemplary	Proficient	Developing	Beginning
Listens and Cooperates With Team Members	Consistently listens to others and their ideas; helps the team reach its full potential.	Listens to others points of view and makes a definite effort to understand their ideas.	Sometimes listens to others, but often assumes others ideas will not work. Tries to work well with the team.	Does not listen to group's opinions and ideas; wants things done own w 32 (o)2 (wn w)-5 (32 (o)2 (wr do