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| 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 |
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| PLANNING | |
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| 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 |

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| <p>NYS Standards</p> | <p>New York State Career Development and Occupational Studies (CDOS) Standards Intermediate Level http://www.p12.nysed.gov/cte/ Standard 1: Career Development Students will be knowledgeable about the world of work, explore career options, and relate personal skills, aptitudes, and abilities to future career decisions. Standard 2: Integrated Learning Students will demonstrate how academic knowledge and skills are applied in the workplace and other settings. Standard 3a: Universal Foundation Skills Students will demonstrate mastery of the foundation skills and competencies essential for success in the workplace.</p> | |
| <p>Learning Objectives</p> | <p>Financial and Consumer Literacy 4. Buying Goods and Services Students will b) Distinguish between needs, wants, values, and goals and tell how each impacts spending and savings decisions e) Explain the influence of peers, advertising, technology, and the economy on consumer decisions f) Apply a decision-making model to maximize consumer satisfaction when purchasing goods and services i) Demonstrate personal development of consumer skills through practice of these skills in a variety of classroom applications</p> <p>Measurement in Trade and Technical Fields 1. Measuring Physical Shapes Students will a) Describe the relationship between 3-dimensional shapes and 2-dimensional shapes b) Identify measurements that apply to 3-dimensional shapes c) Apply knowledge of the relationship between 3-dimensional and 2-dimensional shapes and measurement skills to construction of physical shape</p> <p>2. Measurement in Trade and Technical Career Pathways Students will a) Explain the roles, functions, and importance of measuring skills to successful work in trade career areas b) Assess personal skills for performing measuring tasks required for success in specific trade areas c) Evaluate personal suitability for work in specific trade careers</p> | |
| <p>Vocabulary</p> | <p>Academic: Radius, Diameter, Length, Width, Height Fractions</p> | <p>Content: Estimate, Waste, Loss, Inside measurements, Outside measurements, Kerf, Cutting tools</p> |
| <p>Materials and Resources</p> | <p>Computer, carpentry shop, materials and tools to build projects Measuring with a ruler worksheet: https://www.dadsworksheets.com/worksheets/inches-measurement/show-point-on-inch-ruler-quarters-eighths-1-v1.html</p> | |

| | <p>Cost to buy Cornhole Boards: https://www.cornhole.com/standard-cornhole-boards.php</p> <p>Measure Twice, Cut Once: https://www.youtube.com/watch?v=gYCjh3cKteM</p> <p>Cornhole set plans: https://www.diynetwork.com/how-to/outdoors/structures/how-to-build-a-regulation-cornhole-set</p> | | |
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| INSTRUCTION | What will the teacher do? | What will the students do? | How much time for each activity? |
| Pre-assessment | <p>Provide a paper/pencil homework worksheet for the night before this learning experience begins: Measure 4 diagrams of boards to the nearest 1/8th inch.</p> <p>Measuring with a ruler worksheet: https://www.dadsworksheets.com/worksheets/inches-measurement/show-point-on-inch-ruler-quarters-eighths-1-v1.html</p> | <p>Students complete homework worksheet: Measure 4 diagrams of boards to the nearest 1/8th inch. Bring assignment to class</p> | 15 min |
| Do-now/Hook | <p>Day 1- Teacher sets up cornhole games Arrange students in pairs as cornhole teams Play!!! https://www.youtube.com/watch?v=X4jD8k5aTGI</p> | <p>Day 1- Students play corn hole</p> | 40 min |
| Procedure for Instruction/ Learning Activities | <p>Day 2- Arrange students in pairs</p> | <p>Day 2- Students select a trade area, such as: construction (carpentry); transportation; manufacturing; visual arts and communication; human and public services; and, information technology Pairs conduct computer research to develop a list of the most common measurement tasks for that trade area</p> | <p>40 min total 5 min 35 min</p> |

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| | <p>Day 3- Teacher develops a graphic, based on pair lists, showing similarities and differences among measurement tasks for the trade areas</p> <p>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)</p> <p>Teacher supplies student pairs with job tasks for their specific trade (ex. Carpentry; cornhole board)</p> <p>Cost to buy Cornhole Boards: https://www.cornhole.com/standard-cornhole-boards.php</p> <p>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)</p> <p>Teacher provides pairs with</p> | <p>Day 3- Student pairs share their measurement lists with the rest of the class</p> <p>Student pairs choose one distinct measuring task for their trade area (ex. Carpentry; cutting a 2"x4")</p> <p>Students determine average cost of a material (ex. cost of a 2"x4" board)</p> <p>Day4- Students take notes on teacher lesson Students determine the price they would charge a customer for completing the job task</p> <p>Students determine the total cost of the material (ex. 2"x4" board)needed for the specific job task</p> <p>Day 5- Watch video</p> | <p>40 min total 10 min</p> <p>10 min</p> <p>20 min</p> <p>40 min total 30 min</p> <p>10 min</p> <p>40min total 8min</p> |
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| | <p>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?</p> <p>Following the video, teacher leads a class discussion based on the pairs' questions</p> <p>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 graphic organizer for student note-taking</p> <p>Day 7-10 Teacher supplies plans from American Cornhole Association. Cornhole set plans: https://www.diynetwork.com/how-to/outdoors/structures/how-to-build-a-regulation-cornhole-set</p> <p>Student groups build Cornhole boards. Teacher reinforces the importance</p> | <p>Student pairs are given one video discussion question: 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?</p> <p>Pairs share their answers with the class during a teacher-led class discussion.</p> <p>Day 6- Students complete the guided note-taking using the graphic organizer and information provided by the teacher</p> <p>Day 7-10 Students work in groups to build Cornhole boards.</p> <p>Student groups keep records of any waste due to measuring mistakes.</p> | <p>32 min</p> <p>40 min</p> <p>40 minx 3 days</p> |
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| | <p>of measuring accurately</p> <p>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)</p> <p>Day12- Teacher asks for volunteers to share their RAFT assignments</p> <p>Day 13- Teacher arranges teams for cornhole played on the boards students</p> | <p>Day 11- Students produce RAFT reflection letters</p> <p>Day 12- Students role play based on shared RAFT assignments</p> <p>Students complete exit ticket assessment</p> <p>Day 13- Play cornhole on the boards they made!</p> | <p>40 min</p> <p>40min 35 min</p> <p>5min</p> <p>40min</p> |
| <p>Differentiation</p> | <p>Students will be grouped by their abilities and interests. Teacher will provide scaffolded support where needed. Students who have physical disabilities will be accommodated for. Students who are meeting all of the expectations will be challenged to go above and beyond.</p> | | |
| <p>Closure</p> | <p>Play corn hole on the boards they made!</p> <p>Exit ticket Assessment: Why is it important for trade professionals to control waste through accurate measuring?</p> | | |
| <p>ASSESSMENT</p> | | | |
| <p>College, Career, and Life Readiness Skills</p> | <p>See below Based on Middle-level Life/Career Rubrics available at https://nyctecenter.org/middle-level-life-career-rubric-database/rubrics</p> | | |

| Performance Measure | Exemplary | Proficient | Developing | Beginning |
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| 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 way. |
| Reads and Interprets Workplace Documents | Reads, interprets, and applies workplace documents correctly and with ease (e.g., instructional manuals, work orders, invoices, memorandums). | Reads, interprets, and applies workplace documents (e.g., instructional manuals, work orders, invoices, memorandums). | Reads but misinterprets and misapplies workplace documents (e.g., instructional manuals, work orders, invoices, memorandums). | Incorrectly reads, interprets, and applies workplace documents (e.g., instructional manuals, work orders, invoices, memorandums). |
| Shares Responsibility | Motivates members to share contributions equally by valuing all members' ideas and contributions. | Participates in and contributes to group's work. Values all members' ideas and contributions. | Attempts to share responsibility of work, but ends up completing little of the work by disregarding the input of others. | Does very little of the group's work; does not share ideas or respect others ideas. |
| Works Effectively with Diverse Teams | Always listens to, shares with, and supports the efforts of others. Uses respectful and appropriate statements, responses, and body language. | Listens to, shares with, and supports others. Statements and responses are respectful, and appropriate body language is exhibited. | Most statements, responses, and body language are respectful, with only an occasional negative tone. Does not always listen to, share with, or support the efforts of others. | Statements, responses, and/or body language are not respectful. Rarely listens to, shares with, and supports the efforts of others. |
| Writes Clearly | Consistently writes clearly, uses correct grammar, and understands the intended audience of documents | Writes clearly, generally using correct grammar, and understands the intended audience of the | Produces a document that is mostly well written but, sometimes uses incorrect grammar; shows general | Produces a document that is unclear, uses incorrect grammar, and shows a misunderstanding of the intended audience. |

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| | that are produced. | document produced. | understanding of the intended audience. | |
| Balances Short- and Long-term Goals | Consistently balances short-term and long-term goals | Balances short-term and long-term goals. | Succeeds sometimes in balancing short-term and long-term goals. | Attempts to balance short-term or long-term goals, but without much success. |
| Interprets Information and Draws Conclusions | Is able to look at complex information and successfully draw conclusions and apply them to consumer situations. | Is able to look at information and successfully draw conclusions in consumer situations. | Looks at information and sometimes draws conclusions in consumer situations. | Looks at information but rarely draws a conclusion in consumer situations. |
| Manages Personal Finances | Consistently manages budgeting habits within resources, uses personal financial tools and services effectively. | Manages budgeting habits within resources, uses personal financial tools and services effectively. | Is conscious of personal budgeting but occasionally exceeds resources. | Spends personal resources carelessly. |