

CARDINAL TECHNOLOGY

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A U. S. News & World Report "Outstanding School"

DESIGN BRIEF MOUSE TRAP CAR:

Start Date: 01/23/2017: Design a Mouse Trap Car to travel the fastest time to a specific distance.

PROJECT OBJECTIVES

- Develop and understanding of simple machines and how they function to complete work.
- Develop an understanding of “manufacturing” challenges.
 - Working to deadlines
 - Networking
- Apply Creative Problem-Solving Methodology to reach a unique solution to given project criteria and parameters.

PROJECT PROCESS/PROCEDURES

1. Students will keep a Design Journal.
2. Students will develop 3 Concept (Brainstorm) sketches, recorded in the journal.
3. Students will present their design solutions to their classmates and teacher.
4. Students will prototype, test, evaluate, and refine/revise their design in order to reach an optimal solution to the state problem. Application of the iterative process of Design and Engineering.

LENGTH OF INSTRUCTION PERIOD

5-Weeks Application of Design Process: Mouse Trap Car

TOOLS/EQUIPMENT/PARTS/MATERIALS

- Design Journal
- Pencils
- Measuring Devices
- Software
- MTC kit

DELIVERABLES AND ASSESSMENTS

- Pretest/Post Test
- Working Mouse Trap Car
- Completed the WBL Curriculum
- Virtual Mouse Trap Car with race results
- Design Journal
 - Title Page
 - Table of Contents
 - Pages numbered, dated and signed

GANTT CHART

| Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|--|--|---|
| Jan. 23 Introduction to MTC Review Rules/Journals/WBL Pretest Learning Target: What are the steps to the Design Process and what are the TSA rules for the Mouse Trap Car competition http://georgianationalfair.com/wp-content/uploads/2011/05/TSA.pdf | 24 www.Whiteboxlearning.com Learning Target: What are 4 things that happened during the Industrial Revolution. | 25 www.Whiteboxlearning.com Learning Target: What is Mechanical Advantage and what are the Simple Machines? | 26 www.Whiteboxlearning.com Learning Target: What are Mechanisms, Powertrains, Linkages, and Structural Components? | 27 www.Whiteboxlearning.com Learning Target: Design Journal Check: Identify the simple machines, linkages, structural components used to build the mousetrap car. |
| 30 www.Whiteboxlearning.com Learning Target: How to Design the Mouse using the TSA rules. Name Each Design As follows: First, Last Name, 101 First, Last Name, 102 | 31 www.Whiteboxlearning.com Learning Target: How to Design the Mouse using the TSA rules. | Feb. 1 www.Whiteboxlearning.com Learning Target: How to Design the Mouse using the TSA rules. | 2 www.Whiteboxlearning.com Learning Target: How to Design the Mouse using the TSA rules. | 3 Posttest Race Day Design Notebook Check |
| 6 Pretest Learning Target: How to Build the Mouse Trap Car Teacher Demonstration of the Process. <ul style="list-style-type: none"> • Students watch and take notes. • General Safety • Drill press Safety | 7 Learning Target: Drilling Holes | 8 Learning Target: Prepping Mouse trap | 9 Learning Target: How to Assemble | 10 Learning Target: Final Assembly www.Whiteboxlearning.com |
| 13 Learning Target: How to test and redesign | 14 Learning Target: How to test and redesign | 15 Learning Target: Testing car designs | 16 Learning Target: Testing car design | 17 Posttest Early Release Day |

GRADING

| | 100pts | -10 points for each infraction | 50pts |
|---|---|---|---|
| Design Journal | Followed specified format Had entries for each day of week Neat and organized | Did not follow specified format Entries Missing Not Neat and/or unorganized | Notebook and no entries |
| <ul style="list-style-type: none"> Daily Journal Entries | Kept meaningful notes as to what they were doing each day. Notes were dated and signed. | Kept some notes. Notes were mostly dated and signed. | Note taking was an afterthought and not meaningful. |
| Quizzes | White Box Learning | | |
| Pretest | Quia | | |
| Posttest | Quia | | |
| Completed Mouse trap Car | Completed working car Neatly built Exhibited good Craftsmanship | Does not work Lots of excess Glue Components not assembled correctly | Incomplete |
| WBL Virtual Car Design | Raced and recorded results | Did not race but had a design Did not record results | Did not do |
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STATE DOE STANDARDS

STEM-FET-5

Explain a whole systems approach to the engineering design process to solve a technical problem.

- 5.1 Describe the role of problem identification and definition, brainstorming, research, specifications, constraints, criteria, alternative solutions, analysis, decision making, communication, evaluation, and modification as activities comprising the engineering design process.
- 5.2 Apply the engineering design process to the solution of a technical problem.
- 5.3 Optimize and justify design solutions based on cost, time, schedule, and performance constraints.
- 5.4 Communicate design solutions to peers and potential consumers using graphical media, oral presentations, and technical writing.
- 5.5 Evaluate the design based on consumer research, peer feedback, financial and safety risk, and cost benefit analysis to optimize the design solution.
- 5.6 Demonstrate an understanding of the continuous improvement process as it applies to new designs and modifications of existing designs for new applications.

STEM-FET-6

Employ critical thinking skills and teamwork skills when working in groups to solve problems, to make decisions, achieve group goals and use team members' talents effectively.

- 6.1 Identify and describe common tasks that require employees to use problem-solving skills.
- 6.2 Analyze elements of a problem to develop creative solutions.
- 6.3 Describe the value of using problem-solving and critical thinking skills to improve a situation or process.
- 6.4 Create ideas, proposals, and solutions to problems.
- 6.5 Work with others to achieve objectives in a timely manner.
- 6.6 Promote the full involvement and use of team members' individual talents and skills.
- 6.7 Demonstrate teamwork processes that provide team building, consensus, continuous improvement, respect for the opinions of others, cooperation, adaptability, and conflict resolution.
- 6.8 Take responsibility for shared group and individual work tasks.
- 6.9 Demonstrate sensitivity to and value for diversity.
- 6.10 Apply peer evaluation techniques to critique group members.
- 6.11 Integrate business principles when working as a team.

Technology *is* our future – Education gets us there!