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| **Course:** Middle School |
| **Unit:** Manufacturing Level 3 | **exercise:** Unit Overview | **Time Frame:** 18 - 24 Hours |
|  | Preparation: *Summary of “to do’s” that the teacher should understand and prepare before bringing this lesson to the classroom.* |
| Teachers will need to ensure that the proper supplies are available for students to build their solutions. CHOCLATE CASTING**Materials:*** Chocolate melting pot
* Candy molds-truffles
* Candy mold/stars
* Candy molds-mint discs
* Candy melts, red
* Candy melts, dark cocoa
* Candy melt, peanut butter
* Candy melts, light cocoa

**Tools:*** Chocolate melting pot
* Scale classroom compact
* Spoons measuring rbrmd 4p
* Ladle hi temp nylon
* Spatula spoon silicone

WIND POWERED DEVICE**Materials:*** Rubber bands assort 1/4lb
* Straw plastic 10" pk50
* Nylon cord 4oz spool
* Pin straight bx2400
* Marbles 3/4" pk90
* Sticks craft pk1000
* Glue elmers school 4oz
* Marker classic 7708 st8
* Fasteners paper 1/2" bx100
* Crayon prang reg bx/8
* Lid utility pk/125
* Bells jingle silver pk72
* Chalk crayola colored bx12
* Masking sctch highlnd 3/4
* Cup utility 5.5oz pk/250
* Paper const smrtstack 9x12
* Glue stic mini altemp pk50
* Paper copy 8.5x11 wht ream

**Tools:*** Stopwatch-digital
* Ruler flexible 6 clr pk12
* Ruler box-asst transp
* Scissors safety point 7"
* Glue gun high temp

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|  | Safety: *Summary of safety strategies in the lesson.* |
| Please use this space to describe safety procedures or highlights for this lesson.  |
|  | Desired Results:  |
| Established Goals: |  | Transfer: |
| *Problem Solving Techniques and Applications Standards:*Teachers should use the STEM Academy Standards Correlation System available in the STEM Connections area of a unit to extract specific standards and insert these standards here.  | *Students will be able to independently use their learning to…** Better understand what an engineer is and what they do for their job
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| Meaning: |
| Understandings*Students will understand that...** The design process
* What an engineer is
* Engineers improve people’s lives
* Scientists explore and engineers create
* Engineering researchers are interested in the application of a breakthrough
* Scientists are concerned with the knowledge that accompanies a breakthrough
* A successful person will develop the ability to communicate well with others
* Employers look for people who have activities in their lives outside of work
 | Essential Questions*Students will keep considering...** What gap do development engineers create a bridge for?
* What do development engineers do with researchers’ findings?
* What does test engineering involve?
* When do we need a systems engineer?
* Who do construction workers work with?
* Who must operations and maintenance engineers interact with?
* Why do sales engineers need interpersonal skills?
* What are important skills needed to be a well-rounded engineer?
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| Acquisition OF KNOWLEDGE AND SKILL: |
| *Students will know...** The job of an engineer
* The engineer versus the engineering technologist
* The engineer versus the scientist
* Development engineers
* Test engineering
* Design function/design engineer
* Systems engineering
* Manufacturing and construction engineers
* Operations and maintenance engineering
* Technical support engineer
* Sales force engineers
* Consulting
* Management
* Key skills and qualities in an engineer
 | *Students will be skilled at...** Building and testing a wind power device
* Creating a chocolate casting a mold
* Demonstrating the differences between an engineer and a scientist
* Analyzing their energy use
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|  | Evidence:  |
| Evaluative Criteria: |  | Assessment Evidence: |
|  | *Performance Task(s):* There are 3 activities within this unit:1. How Can We Save Water Activity
2. Chocolate Casting Activity
3. Wind Powered Device Activity
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| * Thoughtful, clear, thorough
* Graded on accuracy, multiple-choice questions
* Completed on time
 | *Other Evidence:* * Online end-of-unit test
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|  | Learning Plan: *Summary of Key Learning Events and Instruction* |
| **Pre-Assessment:** Exploring Engineering Pre-Test**Outline:**1. <Set induction> Introduce unit
2. Content knowledge
3. What is Engineering Unit 1A presentation, reading, and worksheet
4. What is Engineering Unit 1B presentation, reading, and worksheet
5. Expectations of an Engineer presentation, reading, and worksheet
6. Student Activities
7. How Can We Save Water?
8. Chocolate Casting
9. Wind Powered Device
10. Post-Test

**Progress Monitoring:**Teacher observes students and provides on-going feedback during the activity. While introducing the unit, the teacher will pause and ask for questions to make sure everyone understands.Students will complete self-assessment and brainstorm how they could improve their skills in the future. At the end of the unit, there will be a quiz to measure their overall understanding. |
|  | Differentiation: *Summary of Key Differentiation Techniques* |
| Please use this space to insert your differentiation techniques. Depending on the needs of students, various techniques might be needed in a classroom, therefore use the information below and experts in the area needed to design your plan for differentiation.The ASCD Study Guide for Integrating Differentiated Instruction and Understating by Design: Connecting Content and Kids.by Carol Ann Tomlinson, Jay McTigheIntegrating Differentiated Instruction and Understating by Design: Connecting Content and Kids.by Carol Ann Tomlinson, Jay McTigheISBN-13: 978-1416602842 ISBN-10: 1416602844Differentiating Reading Instructionby Laura Robb.ISBN13: 9780545022989A Teacher's Guide to Differentiating InstructionThe Center for Comprehensive School Reform and Improvement |

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|  | career Connections: *Summary of Career Opportunities Associated with this Lesson* |
| Please use this space to insert careers that might be connected to this lesson. This section will need continuous updating as new careers and emerging technologies change the opportunities available in the workforce.Good sources for career connections:Occupational Outlook Handbook<http://www.bls.gov/ooh>The National Career Clusters® Framework<http://www.careertech.org/career-clusters> |
|  | Keywords: *Please Insert Keywords from this Lesson with their Definitions* |
| Please use this space to insert keywords and their definitionsUse resources like [dictionary.com](http://dictionary.reference.com/) to find definitions to your keywords |