

MODIFIED UBD LESSON PLAN

COURSE: Middle School

UNIT: Manufacturing Level 2

EXERCISE: Perishable Fruit Container

TIME FRAME: 1-3 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.

Materials:

- Chip Board
- Clear packaging tape

Additional Materials:

- Other materials can be brought in at the teachers discretion
- DUCT TAPE IS NOT ALLOWED



SAFETY: *Summary of safety strategies in the lesson.*

Please use this space to describe safety procedures or highlights for this lesson.

S1 DESIRED RESULTS:**ESTABLISHED GOALS:**

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.

TRANSFER:

Students will be able to independently use their learning to...

- Create a product with top design, efficiency, and fulfills all significant factors of engineering design as possible.

MEANING:**UNDERSTANDINGS**

Students will understand that...

- Practicing engineers do not follow a single uniform approach to engineering design
- Design is a process used by engineers to generate products, processes, and systems based on the recognition of a need

ESSENTIAL QUESTIONS

Students will keep considering...

- What is engineering design a process of?
- How do firms approach engineering design differently?
- What are some significant factors of engineering design?
- Can we ever fulfill all significant factors of a product?

ACQUISITION OF KNOWLEDGE AND SKILL:

Students will know...

- Engineering design process
- Ten-step design process
- Design is to create, fashion, execute, or construct according to plan
- Significant factors of the design process
- Functionality versus quality
- Safety versus ergonomics

Students will be skilled at...

- Defining the term engineering design
- Communicating the engineering design process
- Performing the 10-step design process
- Developing a solution using the engineering design process

S2 EVIDENCE:**EVALUATIVE CRITERIA:**

- Graded rubric

ASSESSMENT EVIDENCE:

Performance Task(s):

Perishable Fruit Container

Fruit and vegetables are shipped in containers every day. These containers may come from across town or from other cities or countries. Your team's objective is to design and construct a container that will hold 25 pieces of fruit. The container is to be shipped flat and assembled on site with the directions included. Once loaded, the container must protect the fruit from normal shipping impacts.

Other Evidence:

- Thoughtful, clear, thorough
- Graded on accuracy, multiple-choice questions
- Completed on time

- Online end-of-unit test
- Design and Modeling Unit 7A Reading Worksheet
- Design and Modeling Unit 7B Reading Worksheet

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S3 LEARNING PLAN: *Summary of Key Learning Events and Instruction*

Pre-Assessment:

Design and Modeling Pre-Test

Learning Experiences:

1. **Introduce unit**
2. **Content knowledge**
 - Design and Modeling Unit 7A presentation, reading, and worksheet.
 - Design and Modeling Unit 7B presentation, reading, and worksheet.

3. **Student activity: Perishable Fruit Container**

Outline

1. **Introduce**
 - a. Hand out copies of the Perishable Fruit Learning Activity
 - b. Have students listen and read along as you go over the case study (the problem) and the RFP (the constraints)
 - c. Have students write down any additional instructions or constraints you wish to add
 - d. Put students into teams of three
2. **Brainstorm**
 - a. Have students discuss possible solutions with their teams and write down their ideas in the space provided
 - b. Once students have determined a solution, they will sketch it in the space provided
3. **Construct**
 - a. Students construct their container and write down notes on how they constructed it. These notes will be used later to help them write their assembly instructions.
4. **Test**
 - a. Students test the temperature change of their containers and do a 4' drop test.
 - b. If modifications are necessary, they should write down and make the modifications.
 - c. Students will brainstorm and write down possible pictograms for assembling their container
 - d. Once students are satisfied with their ideas, they will sketch out their final solution for the assembly instructions in the space provided.
5. **Communicate Results**
 - a. Students will discuss and write down ideas for a brief presentation about their process and solution for a perishable fruit container. Students will share their results by speaking to the rest and presenting their containers and instructions.

4. **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*

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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 Understanding by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe

Integrating Differentiated Instruction and Understanding by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe
ISBN-13: 978-1416602842
ISBN-10: 1416602844

Differentiating Reading Instruction
by Laura Robb.
ISBN13: 9780545022989

A Teacher's Guide to Differentiating Instruction
The Center for Comprehensive School Reform and Improvement



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 definitions
Use resources like dictionary.com to find definitions to your keywords