

MODIFIED UBD LESSON PLAN

COURSE: Middle School

UNIT: Transportation Technologies

EXERCISE: Egg-cellent Landing

TIME FRAME: 1 - 2 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:

- Zip-lock sandwich bag
- Styrofoam cups
- Foam sheets
- Balloons
- Tape

Additional Resources:

- Eggs (1 per group) (NOT PROVIDED)



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...

- Identify safety features and understanding how they work

MEANING:

UNDERSTANDINGS

Students will understand that...

- The engineering design process is a universal process that is used to design and develop products from scratch, while the redesigning process is a process that allows products to be improved

ESSENTIAL QUESTIONS

Students will keep considering...

- How the engineering process could be applied to various other situations
- How their product could be improved so the egg could be safer and dropped from a greater height

ACQUISITION OF KNOWLEDGE AND SKILL:

Students will know...

- Characteristics of modern fabrication and the factors that affect the industry
- What terminal velocity is and how it can be calculated
- How different materials absorb and distribute forces

Students will be skilled at...

- Applying the engineering design process
- Designing and developing safety systems
- Performing the modern fabrication process

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S2 EVIDENCE:	
EVALUATIVE CRITERIA:	ASSESSMENT EVIDENCE:
<ul style="list-style-type: none"> Graded rubric 	<p><i>Performance Task(s):</i></p> <p>Egg-cellent Landing In this activity, you will build an egg lander that will carry an egg safely to the ground when dropped on a hard surface.</p>
<ul style="list-style-type: none"> Thoughtful, clear, thorough Graded on accuracy, multiple choice questions Completed on time 	<p><i>Other Evidence:</i></p> <ul style="list-style-type: none"> Online end of unit test

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

Pre-Assessment:

Transportation Technologies Pre Test

Outline:

1. Introduce

- Have students read the problem
- Have students listen as you review the constraints and write down any additional constraints, materials, or special testing instructions
- Put students in groups of 3

2. Brainstorm

- Have students talk to their small group about possible solutions and sketch and write down ideas and materials in the space provided
- After students determine their final solution, have them write down the materials needed and sketch the final solution in the space provided

3. Construct

- Have students build their landers

4. Test

- Give students an egg inside of a closed sandwich bag and direct them to keep it in the bag at all times. This will keep it from becoming a mess if/when it breaks.
- Review testing instructions
- Students will test their landers at various heights

5. Communicate Results

- Students will present their design to the class. They will talk about their design, why they chose it, and their results. They will listen to other groups present their designs.
- Students will read the reflection questions and write their answers in complete sentences

Learning Experiences:

- Through the building of their egg landers, the students will have a chance to link together the romanticized versions of space exploration found in science fiction to the reality of any space mission in a fun way. Understanding the problems faced by space engineers will be an excellent

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opportunity.

2. Keeping a falling egg safe is something students may have not done before. During brainstorming, there will be a lot of ideas floating around, and it will be a great exercise in group communication and teamwork.
3. Make sure the students aren't testing their ideas as they build. This would be a waste of eggs and a waste of time, as the focus of this activity isn't a trial and error method towards success, it's in foreseeing and managing the properties of falling objects.

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 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*

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Please use this space to insert keywords and their definitions
Use resources like dictionary.com to find definitions to your keywords