

# MODIFIED UBD LESSON PLAN

**COURSE:** Middle School

**UNIT:** Transportation Technologies

**EXERCISE:** Balsa Glider

**TIME FRAME:** 1 Hour



**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:

- Balsa wood glider kits
- Sandpaper
- Glue
- Tape

## Tools:

- Scissors
- Stopwatch
- Measuring tape



**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...*

- Understand and utilize the engineering design process

### MEANING:

#### UNDERSTANDINGS

*Students will understand that...*

- As more is learned about various sciences and technologies improve, so do products and services
- Many ways of organizing collected data exist and the best one for the application changes with the given situation and application

#### ESSENTIAL QUESTIONS

*Students will keep considering...*

- How their design could be altered to better accomplish the design constraints and conditions
- How this process could be applied to various other products and services to greatly improve them

### ACQUISITION OF KNOWLEDGE AND SKILL:

*Students will know...*

- The engineering and reengineering processes and how they are performed and applied
- Why companies continuously reengineer their products

*Students will be skilled at...*

- Using variables to design and organize collected data
- Using models to study properties of aerodynamics
- Constructing and conducting an experiment

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<b>S2 EVIDENCE:</b>	
<b>EVALUATIVE CRITERIA:</b>	<b>ASSESSMENT EVIDENCE:</b>
<ul style="list-style-type: none"> <li>Graded rubric</li> </ul>	<p><i>Performance Task(s):</i></p> <p><b>Balsa Glider</b> In this activity, you will change the design of a balsa wood glider to fly a longer distance or to stay in the air for a longer amount of time.</p>
<ul style="list-style-type: none"> <li>Thoughtful, clear, thorough</li> <li>Graded on accuracy, multiple choice questions</li> <li>Completed on time</li> </ul>	<p><i>Other Evidence:</i></p> <ul style="list-style-type: none"> <li>Online end of unit test</li> </ul>

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

**Pre-Assessment:**

Transportation Technologies Pre Test

**Outline:**

**1. Introduce**

- Introduce background information. Review independent and dependent variables.
- Have students read the problem
- Have students listen as you review the constraints and write down any additional constraints or special instructions
- Perform a control test in front of class as a demonstration of how their own trials should be done.
- Put students in groups of 3-4
- Students will perform three control tests on an unmodified glider to get base data. They will write down the distance and hang time for each trial and calculate the average distance and hang time in the space provided.

**2. Brainstorm**

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

**3. Construct**

- Have students construct and modify their gliders

**4. Test**

- Students will test each glider three times.
- Students will write down the distance and hang time for each trial next to the sketch of the design. They will calculate and write down the average distance and hang time for each glider.

**5. Communicate Results**

- Students will present their designs to the class. They will talk about the modifications they made and why they made them. They will listen to other groups present their designs. If time permits, have groups demonstrate their best designs.
- Students will read the reflection questions and write their answers in complete sentences

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### Learning Experiences:

1. When the students perform this activity, they will be forced to think critically about the tradeoffs involved in airplanes, and it will give them a better understanding of the way physical forces act on aircraft.
2. Discussing the potential benefits of modifications and developing plans is also an essential exercise. Be sure to encourage analytical discussion and prevent one person from dominating the conversation.
3. The reflection questions and discussing the results of their trials are also an important exercise. Make sure all the questions are answered in good faith, and that the discussion post-testing is focused and stimulating.

### 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*

Please use this space to insert keywords and their definitions  
Use resources like [dictionary.com](http://dictionary.com) to find definitions to your keywords