

MODIFIED UBD LESSON PLAN

COURSE: Middle School

UNIT: Transportation Technologies

EXERCISE: Hovercraft Racers

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:

- Balloons
- Hot glue gun

Tools:

- Coping saw
- Craft knife

Resources:

- CD (not provided)
- Soda bottle (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...

- Understand and utilize characteristics and rules of friction

MEANING:

UNDERSTANDINGS

Students will understand that...

- The forces of friction and gravity can be utilized in design
- Hovercrafts are multi terrain vehicles that can travel on water and land
- Hovercrafts utilize the properties of friction to do this

ESSENTIAL QUESTIONS

Students will keep considering...

- How their hover craft design could be changed to improve the lift and decrease the friction
- How their design could be improved for better coherence to the listed constraints and criteria

ACQUISITION OF KNOWLEDGE AND SKILL:

Students will know...

- How and why a hovercraft floats on a pillow of air

Students will be skilled at...

- Predicting the tendency of a surface to have high or low friction

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|--|---|
| <ul style="list-style-type: none"> • How friction can be controlled to help an object be controlled • The properties and operations of hovercrafts | <ul style="list-style-type: none"> • Developing and constructing special tasked systems • Designing systems that are not common or well known |
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S2 EVIDENCE:

EVALUATIVE CRITERIA:

- Graded rubric

ASSESSMENT EVIDENCE:

Performance Task(s):

Hovercraft Racers

In this exercise, you and one other student will build a hovercraft racer out of a balloon, CD, and a bottle cap.

Other Evidence:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Thoughtful, clear, thorough • Graded on accuracy, multiple choice questions • Completed on time | <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

- Prepare bottle caps and tops by cutting off the top with the coping saw or use pop top lids to avoid having to cut the bottles.
- Have students read the learning activity
- Have students listen as you review friction and forces
- Have students write in the forces acting on the car in the drawing. Discuss the correct answers with the class.
- Have students listen as you review the activity and hot glue gun safety and have them write down any additional instructions
- Put students in groups of 2

2. Construct

- Have students build their hovercraft

3. Test

- Students will test their hovercraft

4. Communicate Results

- Students will read the reflection questions and write their answers in complete sentences

Learning Experiences:

- Reading the background information will be highly informative. Make sure they understand it by going over the exploration section as a class and going over why each force is categorized as it is.
- Playing with the hovercraft racers and visualizing the concepts of friction will cement the knowledge provided in the background segment, as well as inspiring the consideration of other implications friction has.

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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 to find definitions to your keywords