

MODIFIED UBD LESSON PLAN

COURSE: Introduction to Engineering

UNIT: Materials

EXERCISE: Recycling Display

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:

- Markers
- 24x36 Tag board

Additional Resources:

- Various recyclable materials from home
- Various non-recyclable materials from home

Information:

Before starting this exercise, students should have an understanding of material covered in:

- ✓ Reading: Materials



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

There are no safety strategies for this exercise.

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 display of materials and their recycling identifier.

MEANING:

UNDERSTANDINGS

Students will understand that...

- There are a vast varying degree of materials available for productions of different products.

ESSENTIAL QUESTIONS

Students will keep considering...

- What different types of materials can be used in production;
- If other materials suit the needs of products better than material that is currently being used.

ACQUISITION OF KNOWLEDGE AND SKILL:



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Students will know...

- Different materials that are used to create products;
- How companies utilize different materials for different products.

Students will be skilled at...

- Classifying and describe the characteristics of metals, ceramics, polymers and composites.

S2 EVIDENCE:

EVALUATIVE CRITERIA:

- Constructed well
- Visually pleasing

ASSESSMENT EVIDENCE:

Performance Task(s):

Recycling Display:

Students will create a display of sorted materials using materials that are brought from home and provided by the instructor.

Other Evidence:

- | | |
|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Correct answers • Presented well | <ul style="list-style-type: none"> • Online quiz • Student presentations |
|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|

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

Outline:

1. Set Introduction
Have a discussion with your students about the importance of recycling. There is a wealth of online information that you can share with them on easy ways they can make a difference without heavily altering their day-to-day lives.
2. Read Material
Have your students read the provided document Materials. This document is short and should only take 20-30 minutes of class time. Follow the reading with a brief discussion of the different materials covered in this unit. Encourage your students to take notes while reading to help them study for the online quiz tomorrow.
3. Quiz
After the quiz direct your students to open Material Activity. This activity will teach your students the differences in materials and which ones can be recycled. The night before this activity ask students to bring in various materials from their homes that are both recyclable and non-recyclable. As the instructor bring in a variety of materials as well making sure to have at least one item for each category.
4. Discussion
Prepare focus questions that will engage students in a preliminary discussion of short term and long-term effects of technology on the environment. Provide statistical information concerning landfill usage, how much trash is generated per person, and predicted availability of natural resources. Students may want to incorporate pertinent data in their displays.
5. Presentation

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Encourage students to be creative in their presentation of this information. Consider posting the display in prominent areas around the school and in the community.

Progress Monitoring:

- The instructor will need to monitor the classroom, checking student's work and ensuring students are on task and following directions.
- Ensure students store their projects at the end of class and leave all materials in the room.
- At the end of the activity, post student projects in the room and provide appropriate feedback.

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*

Materials Engineer

Materials engineers develop and create various different materials for various applications.

Construction Worker

Construction workers work with a varying degree of different materials.

Chemist

Chemists utilize many different materials to produce other varying materials.

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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MATERIALS—the matter from which a thing is or can be made.

DEVELOP—grow or cause to grow and become more mature, advanced or elaborate.

CHEMICAL—of or relating to chemistry or the interactions of substances as studied in chemistry.

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