High School

TROPICANA

Container Design, Ship, and Distribute Challenge Lesson Plan

Created by the FLATE Center for Manufacturing Education, Hillsborough Community College
10414 E Columbus Dr., Tampa, FL 33619 • (813) 259-6577 • www.fl-ate.org

NATURE OF CHALLENGE:	GRADE LEVELS
Students are challenged to design a new shipping case for a new juice container.	9-12
TARGETED SUBJECT AREA/S	**MANUFACTURING LEVEL**
Computer technology, Math, Science, and Career and Technical Education	Distribute/Design
LEARNING OBJECTIVES	**TIME FRAME**
1. Students will design a new juice case (shipping box) for a new juice container. 2. Students will integrate science, math, and technology.	One week +

MATERIALS

Journal, sketching pad, graph paper, ruler, CAD drawing program and paint computer programs

DESCRIPTION OF ACTIVITY

In this activity the students have 1- 3 Challenges.
#1 – Container Challenge - Design a new juice container.
#2 - Shipping Challenge - students will design a shipping case.
#3 – Distributions Challenge – students will calculate how many shipping cases, pallets and railcars will be required to distribute 250,000 gallons of juice to consumers.

1. Show the PowerPoint presentation – this gives students an overview of Tropicana and also sets up the Challenge.
2. Divide the class into teams (if you are doing this as an individual challenge, skip this step).
3. Handout the #1 - Shipping Challenge Instructions to each team/student.
4. Go over the instructions with the class, ensuring they are aware of the Challenge objective and design constraints.
5. Use the #1 - Shipping Challenge handout to guide you through the Challenge.
6. Have students begin the Challenge – following the Tasks list and design constraints.
7. Once students have completed the Shipping Challenge, give them the #2 - Distribution Challenge Instructions handout.
8. Go over the instructions with the class, just as you did with the Shipping Challenge.
9. Have students begin the Challenge – following the Task list and design constraints.

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EVALUATION AND DISCUSSION:

Students will be evaluated per the assessment items listed on the instructions handout. Follow-up the activity with a discussion about the design process, the role of science, math and technology in industry and /or career opportunities in manufacturing.

EXTENSIONS & ADDITIONAL RESOURCES

Use these websites to explore the juice packaging industry before, during or after this exercise.

www.tropicana.com www.grahampackaging.com www.madeinflorida.org

Confident about the value of your student's proposed solutions? Share them with our FLATE staff and receive a recognition for your efforts and, quite possibly, even from the manufacturers themselves. Email your students' final reports to curriculum@fl-ate.org.

SUNSHINE STATE STANDARD ALIGNMENT: Grades 9-12

MATHEMATICS:

Number Sense, Concepts, and Operations

1. Standard 2 - The student understands number systems.
2. Standard 3 - The student understands the effect of operations on numbers and the relationship among these operations, selects appropriate operations, and computes for problem solving.
3. Standard 4 – The student uses estimation in problem solving and computation.

Measurement

1. Standard 1 – The student measures quantities in the real world and uses the measures to solve problems.
2. Standard 2 - The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary).
3. Standard 3 - The student estimates measurements in real world problem situations.
4. Standard 4 - The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real world situations.

Geometry and Spatial Sense

1. Standard 1 – The student describes, draws, identifies, and analyzes two and three dimensional shapes.
2. Standard 2 – The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.
3. Standard 3 – The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically.

SCIENCE:

The Nature of Matter

1. Standard 1 – The student understand that all matter has observable, measurable properties.

The Nature of Science

1. Standard 1 – The student uses the scientific processes and habits of mind to solve problems
2. Standard 3 – The student understands that science, technology, and society are interwoven and interdependent.

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TECHNOLOGY EDUCATION CAREER EDUCATION CURRICULUM FRAMEWORKS

Technological Literacy Standards

- 08.0 Demonstrate an understanding of the attributes of design.
- 09.0 Demonstrate an understanding of engineering design.
- 11.0 Demonstrate the abilities to apply the design process.
- 19.0 Demonstrate an understanding of and be able to select and use manufacturing technologies.

Technical Content Standards

- 22.0 Exhibit positive human relations and leadership skills.
- 23.0 Discuss individual interests, aptitudes, and opportunities as they relate to a career.
- 29.0 Perform special skills unique to Manufacturing Technology.
- 30.0 Express knowledge of factors that impact Manufacturing Technologies and practices.

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