

## Packaging Lesson Plan

1. **Course Title:** Technology Education in Grades K-12
2. **Teacher:** Cary Dunn, Jr.
3. **Grade Level:** 6-8
4. **Lesson Title:** Paper Packaging Design
5. **Lesson Length:** 20 minutes
6. **State Standards of Learning (SOL):**
  - a. Math (Virginia SOL's)
    - 6.7: The student will use estimation strategies to solve multistep practical problems involving whole numbers, decimals, and fractions (rational numbers).
    - 6.10: The student will estimate and then determine length, weight/mass, area, and liquid volume/capacity, using standard and nonstandard units of measure.
    - 6.13(a): The student will estimate angle measures, using  $45^\circ$ ,  $90^\circ$ , and  $180^\circ$  as referents, and use the appropriate tools to measure the given angles.
    - 8.9: The student will construct a three-dimensional model, given the top, side, and/or bottom views.
  - b. Science (Virginia SOL's)
    - PS.10: The student will investigate and understand scientific principles and technological applications of work, force, and motion.
7. **Standards for Technological Literacy (SfTL):**
  - a. *SfTL 3 R* – Requirements are the parameters placed on the development of a product or system.
  - b. *SfTL 8 E* – Design is a creative planning process that leads to useful products and systems.
  - c. *SfTL 8 F* – There is no perfect design.
  - d. *SfTL 8 G* – Requirements for a design are made up of criteria and constraints.
  - e. *SfTL 9 F* – Design involves a set of steps, which can be performed in different sequences and repeated as needed.
  - f. *SfTL 9 H* – Modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions.
  - g. *SfTL 9 I* – Established design principles are used to evaluate existing designs, to collect data, and to guide the design process.
  - h. *SfTL 9 K* – A prototype is a working model used to test a design concept by making actual observations and necessary adjustments.

- i. *SfTL* 10 F – Troubleshooting is a problem-solving method used to identify the cause of a malfunction in a technological system.
- j. *SfTL* 11 J – Make 2D and 3D representations of the designed solution.

## 8. Behavioral Objectives:

At the conclusion of the design module, the students will be able to:

- a. Understand the various ways paper board is cut and folded into a carton package.
- b. Develop a dimensioned fabrication drawing that also lists the fabrication process.
- c. Construct the package in accordance with the directions indicated on their own drawing.
- d. Demonstrate an understanding of the fundamental principles of package manufacturing.
- e. Effectively document the processes and outcomes in their Web Portfolio of their work on this Design Brief.

## 9. Content Outline:

- a. Background
  - Paper sacks/bags;
  - Corrugated paper board;
  - Cardboard package manufacturing;
- b. Technological processes
  - Assessment (research);
  - Development (design);
  - Production / Construct (manufacturing);
  - Testing and Modification;
  - Final Production;
  - Final testing (successful end product);
- c. Parameters of Design Brief
  - Develop the most efficient package possible that contains and successfully holds an 8” length of 2x4 pine during testing.
  - Students will conduct the testing by standing 10 feet apart and tossing the package to each other at least twice.
  - Design and construction will follow the “Design Criteria/Constraints” section of the Design Brief.
  - Prepare three different design sketches and assemble models of these for experimentation and testing. Prepare one sketch of the final design prior to constructing the final model.

## d. Design steps

- Identify the problem (assess, research);
- Generate ideas through research and brainstorming (development);
- Explore possible solutions (design);
- Construct prototype models for experimentation and testing (manufacture);
- Develop a package that successfully holds its contents.

10. **Procedures:**

<b>Time</b>	<b>Procedure</b>
5 min.	<b>Set-Induction</b>
	<ol style="list-style-type: none"> <li>1. Briefly explain the relationship of technology and manufacturing.</li> <li>2. Explain the lesson objectives and the use of ideas therein to construct a model of a paper board carton package.</li> </ol>
15 min.	<b>Body of the lesson</b>
	<p>Using PowerPoint, give a lesson covering package history, variety of packaging, and package manufacturing.</p> <ol style="list-style-type: none"> <li>1. Package history.</li> <li>2. Package uses.</li> <li>3. Technology processes used.</li> <li>4. Package production/manufacturing.</li> <li>5. Concepts of “self-locking” package construction.</li> </ol>
5 min.	<b>Design Brief</b>
	<ol style="list-style-type: none"> <li>1. Pass out the Design Brief.</li> <li>2. Discuss the Design Brief with the class.</li> <li>3. Ask if there are any questions before continuing.</li> </ol>
	<b>Conclusion (For this EDCI lesson assignment)</b>
	<ol style="list-style-type: none"> <li>1. Have students begin Design Brief in the production lab.</li> <li>2. Identify points of failure. Discuss possible solutions.</li> </ol>

**11. Evaluation:**

1. Cardboard uses the following design concept for added strength:
  - a. Tempering
  - b. Glued paper particle boards
  - c. Corrugated paper board

Answer: c

2. Name the device around which paper board is wrapped during assembly

Answer: A blank

3. List two advantages of using paper as a package material:

Possible answers: 1) Ease of recycling, 2) Economic, 3) Weight [low], 4) Can be folded and “self-locked”

**12. Instructional Aids or Resources:**

- a. PowerPoint presentation;
- b. Handouts;
- c. Poster board;
- d. Shipping paper.

**13. Safety Guidelines: List any safety issues that you need to address to safely prepare them for the lab work that accompanies this lesson.**

- a. Keep long hair, loose clothing, jewelry, and dangling objects away from the tools.
- b. Follow project guidelines.
- c. Do not overcrowd the work area.
- d. Use tools and equipment safely in the construction of the prototype.
- e. Give an overview of the proper use of Buster (tester).
- f. Buster must be operated in the presence of the instructor.

**14. Interdisciplinary Connections:**

- a. Math: Measurement, angle geometry;
- b. Science/Physics: load, impact;
- c. Social Studies: Societal impacts of paper packaging.
- d. Language Arts: Students will write about their “reflections” and “findings” from the Design Brief activity in their portfolios.

**15. Technology and Culture:**

- a. Students will brainstorm the societal impacts of the use of paper for packaging.
- b. Students will brainstorm examples of products that are “over-packaged”.

**16. Diversity:**

- a. Special needs students will receive individual assistance as required, preferably during the model building phase.

**17. Reflection:**

- a. Students will reflect upon the technological principles that encompass the paper packaging manufacturing process.
- b. Students will record their reflections in writing in their portfolio.

**18. References:**

- a. Howard, M. (2003). Vocational Information Center. *Career Activities and Vocational Lesson Plans*. Retrieved 8/2/2004. <http://www.khake.com>
- b. Weyerhaeuser Corporation (2001). *Pulp, Paper, and Packaging Board*. Retrieved 8/7/2004. <http://www.weyerhaeuser.com/ourbusinesses/pulppaperpckging/containerboard/default.asp>
- c. Econocorp, Inc. *Econoseal Product Line*. Retrieved 8/7/2004 <http://www.econocorp.com/products.html>