



## **THE PERFECT PACKAGE**

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### **Annotation**

In this assignment, students will act as food packaging engineers as they evaluate an existing food package and propose improvements needed to make it the “perfect” package.

### **Primary Learning Outcomes:**

Students will be able to define the term *package* and explain the basic functions of a food package.

Students will be able to name and describe commonly used packaging materials and package types.

Students will be able to apply physical, chemical, and biological principles to the evaluation of a food package.

Students will be able to communicate effectively scientific information through written means.

Students will be able to explain the importance of food packaging to the food industry.

### **Assessed Georgia Performance Standards:**

SCSh3. Students will identify and investigate problems scientifically.

SCSh6. Students will communicate scientific investigations and information clearly.

### **Duration:**

Preparation: 15 minutes

Introduction: 20 minutes

Student Assignment: Adaptable to class schedule

Conclusion: Adaptable to class schedule

**Total Class Time: Adaptable to class schedule**

### **Materials and Equipment:**

Various food packages provided by students

### **Safety:**

There are no significant safety concerns associated with this activity.

### **Technology Connection:**

Students may use all available information resources (e.g. internet search, library research, online databases, books, and periodicals) to aid them in completing the assignment.

### **Procedures:**

#### Teacher Preparation:

Use the attached template to prepare a copy of *The Perfect Package* student handout for each student.

*Estimated Time:*

15 minutes

### Introduction:

Name any material that you can think of, and it was probably used at some time as a food packaging material. Did you know?

- The earliest food packaging was provided by nature in the form of gourds, shells, leaves, hollowed logs, woven grasses, and animal organs.
- The first commercial cardboard box was produced in England in 1817, more than two hundred years after the Chinese invented cardboard.
- The can opener was invented in 1875.
- The first glass bottle-making machines were invented in the United States in 1882.
- The polyethylene terephthalate (PET) bottle became available in 1977 for use in the beverage industry.

Food packaging is an extremely important area of food science. From the time a food product leaves the factory until it is consumed by the public, it is the package that is primarily responsible for maintaining the integrity of the product. Many definitions are used in the food industry to define the term package. However, the basic definition of a **package** is an enclosure of a food product that serves one or more of the following functions.

- *Containment* – Products must be contained in order to be moved from the factory to the grocery store to the pantry shelf.
- *Protection* – Products must be protected from physical damage (*e.g.* drops or falls), environmental effects (*e.g.* water, light, or oxygen), and contaminants (*e.g.* dust, microorganisms, or chemicals).
- *Communication* – The package must attract consumers for purchase. It also communicates product information such as nutritional content, ingredients, and net weight.
- *Convenience* – The package must conveniently fit into the consumer's lifestyle.

Food packaging dates back to the dawn of human civilization when food was contained in materials such as leaves, cloth, and pottery. Modern food packages consist of materials such as paper, metal, glass, and plastics. Recently, a number of different plastics are becoming increasingly important in new package development. As packaging materials, plastics provide visibility of the product, strength, flexibility, and a barrier to moisture and gases. Plastics are polymers, or long chains of repeating molecules. In addition to carbon, these chains may also contain elements such as oxygen, nitrogen, and sulfur. These additional elements, along with the length and shape of the carbon chains, determine the type of plastic produced. The plastics most commonly used in the packaging industry are polyethylene, polyvinyl chloride (PVC), and polyethylene terephthalate (PET). While there are a variety of packaging materials available, the material selected for a particular food product must be compatible with the product, thus protecting and maintaining product quality.

Explain to students that in this assignment they will evaluate a current product package and determine whether the package is best suited to meet the packaging needs of that product.



*Estimated Time:*

20 minutes

**Student Assignment:**

Students should select and provide a food package and follow the guidelines provided in *The Perfect Package* student handout to complete an evaluation of the product package. Students may work individually or in small groups.

*Estimated Time:*

Adaptable to class schedule

**Conclusion:**

Have students share with the class the findings of their package evaluations.

*Estimated Time:*

Adaptable to class schedule

**Assessment:**

Assessment should be based on *The Perfect Package* Scoring Rubric.

**References:**

- Kadoya, T., ed. 1990. *Food Packaging*. Academic Press, Inc. San Diego, California.
- Robertson, G.L. 1993. *Food Packaging: Principles and Practice*. Marcel Dekker, Inc. New York, New York.

### THE PERFECT PACKAGE *Scoring Rubric*

CRITERIA	10	9-8	7-5	4-0	SCORE
<b>Product Name &amp; Description</b>	Product name and a clear, detailed description of the product are provided.	Product name and a description of the product are provided.	Product name and a superficial or unclear description of the product are provided.	Product name or product description is missing or shows little effort.	_____ Comments:
<b>Package Description</b>	Clear, detailed package description is provided, including package type, materials used, appearance, and size.	Basic package description is provided, including package type, materials used, appearance, and size.	Package description is incomplete or unclear.	Package description is missing or shows little effort.	_____ Comments:
<b>Containment</b>	Clear, detailed explanation of how package achieves containment and why this is important is provided.	Basic explanation of how package achieves containment and why this is important is provided.	Basic explanation of how package achieves containment is provided.	Explanation of how package achieves containment is missing or shows little effort.	_____ Comments:
<b>Protection</b>	Clear, detailed explanation of how package achieves protection and why this is important is provided.	Basic explanation of how package achieves protection and why this is important is provided.	Basic explanation of how package achieves protection is provided.	Explanation of how package achieves protection is missing or shows little effort.	_____ Comments:
<b>Communication</b>	Clear, detailed explanation of how package achieves communication and why this is important is provided.	Basic explanation of how package achieves communication and why this is important is provided.	Basic explanation of how package achieves communication is provided.	Explanation of how package achieves communication is missing or shows little effort.	_____ Comments:
<b>Convenience</b>	Clear, detailed explanation of how package achieves convenience and why this is important is provided.	Basic explanation of how package achieves convenience and why this is important is provided.	Basic explanation of how package achieves convenience is provided.	Explanation of how package achieves convenience is missing or shows little effort.	_____ Comments:

<b>Package Evaluation</b>	Detailed evaluation of the package is clearly based on the discussion of how the package achieves the four basic functions.	Somewhat detailed evaluation of the package is clearly based on the discussion of how the package achieves the four basic functions.	Evaluation of the package is somewhat based on the discussion of how the package achieves the four basic functions.	Package evaluation is missing or shows little effort.	_____ Comments:
<b>Package Improvements</b>	Detailed and thoughtful explanation of two or more package improvements are given. Improvements are based on the four basic functions of a package.	Detailed and thoughtful explanation of one package improvement is given. Improvement is based on the four basic functions of a package.	Superficial explanation of one package improvement is given. Improvement may or may not be based on the four basic functions of a package.	Explanation of package improvements is missing or shows little effort.	_____ Comments:
<b>Written Communication</b>	Written proposal follows assigned outline and is written in paragraph form.	Written proposal follows assigned outline and is written in paragraph form.	Written proposal follows assigned outline and is written in paragraph form.	Written proposal does not follow assigned outline or is not written in paragraph form.	_____ Comments:
<b>Spelling, Punctuation and Grammar</b>	One or fewer errors in spelling, punctuation and grammar in the report.	Two or three errors in spelling, punctuation and grammar in the report.	Four errors in spelling, punctuation and grammar in the report.	More than 4 errors in spelling, punctuation and grammar in the report.	_____ Comments:
<b>Total Score (out of 100):</b>					_____

**Additional Teacher Comments:**



## **THE PERFECT PACKAGE** *Student Handout*

### **Introduction:**

Name any material that you can think of, and it was probably used at some time as a food packaging material. Did you know?

- The earliest food packaging was provided by nature in the form of gourds, shells, leaves, hollowed logs, woven grasses, and animal organs.
- The first commercial cardboard box was produced in England in 1817, more than two hundred years after the Chinese invented cardboard.
- The can opener was invented in 1875.
- The first glass bottle-making machines were invented in the United States in 1882.
- The polyethylene terephthalate (PET) bottle became available in 1977 for use in the beverage industry.

In this assignment, you will select a food product and evaluate its current package. Your task is to determine whether the package is a “perfect” fit for the product.

### **Purpose:**

To evaluate a current product package and to determine whether the package is best suited to meet the packaging needs of that product.

### **Assignment:**

1. Select and provide a food package for evaluation.
2. On separate paper, complete the following *Product Package Evaluation* for the package you have selected.

### ***Product Package Evaluation:***

Evaluate your product package and prepare a written report of your findings. Your report should follow the outline below.

1. Product Name & Description – Provide the name and a brief description of the product you have selected.
2. Package Description – Provide a detailed description of the product package, including package type, materials used, appearance, and size of the package.
3. Package Function
  - a. Containment – Explain how the package achieves containment. Why is this important?
  - b. Protection – Explain how the package achieves protection. Why is this important?
  - c. Communication – Explain how the package achieves communication. Why is this important?
  - d. Convenience – Explain how the package achieves convenience. Why is this important?
4. Package Evaluation – In your opinion, is the existing package the best-suited package for the product? If yes, why? If no, why not?
5. Package Improvements – Describe any improvements that could be made to enhance the function of the product package.