

## TAKING COMMON FOODS APART

### Performance Standards 12C/11A.H

Students will apply the process of scientific inquiry to examine the chemical and physical characteristics of matter in a variety of foods accordingly:

- *Knowledge*: understand the criteria for classifying homogeneous and heterogeneous combinations of mixtures.
- *Application*: apply the appropriate critical distinctions in common combinations in foods.
- *Communication*: compare and contrast simple combinations of homogeneous and heterogeneous mixtures in common food examples.

### Procedures

1. ***In order to know and apply concepts that describe properties of matter and energy and the interactions between them (12C) and the concepts, principles and processes of scientific inquiry (11A)***, students should experience sufficient learning opportunities to develop the following:
  - Differentiate qualitative and quantitative applications that distinguish the kinds of mixtures that are commonly found in foods.
  - Use conceptual or physical models to distinguish kinds of mixtures.
  - Design a format for comparisons of homogeneous and heterogeneous food combinations of mixtures, solutions, emulsions, etc.
  - Collect, record and analyze comparison data correctly.
  - Present findings of comparisons.
  - Propose additional examples of foods that could be categorized as mixtures or reliant on the characteristics of such combinations.

Note to teacher: Family and Consumer Sciences (FCS) students will enhance their knowledge of the structure of matter by identifying its relationship to food production. This assessment applies to the National FCS Standard #9.0 (Food Science, Dietetics and Nutrition/Integrate knowledge, skills and practices required for careers in food science, dietetics and nutrition). This assessment will evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans (9.3). This could be used as an application or assessment through the following Family, Career and Community Leaders of America (FCCLA) STAR Events: Illustrated Talk and Student Body (nutrition-related education project).

2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Provide each student with ingredients and recipes to prepare (or analyze) the following food products:
  - Group A – Variety of fruits to prepare fruit salad
  - Group B – Ingredients to make party mix
  - Group C – A variety of drink mixes to prepare beverages
  - Group D – Ingredients to bake brownies
  - Group E – Ingredients to make a fruit smoothie
  - Group F – Ingredients to make mayonnaise
  - Group G – Ingredients to make an egg white meringue
  - Group H – Ingredients to make sweetened condensed milk
  - Group I – Ingredients to make rock candy
4. Begin the classroom activity with contextual definitions about the kinds and components of chemical mixtures such as emulsions, aerosols and solutions. Compare each food product or its ingredients to the relationship in the classification of mixtures. The students will classify their ingredients and justify their reasons for classifying. Students will create conceptual or physical models of food mixtures that explain the physical and chemical characteristics in the context of foods. This assessment is adapted from Lesson Plan #AELP-PHY0046 “Structure of Matter,” an AskERIC Lesson Plan by Linda Smith, Yukon, OK.

5. Evaluate each student's work using the Science Rubric as follows, and add the scores to determine the performance level:
- *Knowledge*: The factors that determine the structure of matter such as solvent, solute, solutions and heterogeneous or homogeneous mixtures.
  - *Application*: Apply the appropriate scientific habits of mind when investigating food preparation techniques related to the structure of matter.
  - *Communication*: The explanations of the scientific qualities of structure of matter and the peer review to explain why each ingredient was placed into the various groups was well organized and well detailed.

#### **Examples of Student Work**

- [Meets](#)
- [Exceeds](#)

#### **Time Requirements**

- One half class period to plan lab
- One half class period to discuss structures of matter
- One period to prepare food ingredients and to categorize food products
- One half to one class period to summarize results and discuss the relationship of food to science

#### **Resources**

- Copies of ingredient list
- Copies of recipes
- Copies of Taking Food Apart and Putting It Together Again
- Food needed to prepare labs
- Science Rubric

## TAKING FOOD APART AND PUTTING IT TOGETHER AGAIN

Using the class definitions for mixtures and their components (including emulsions, solutions, aerosols, solvent, solute, etc.), categorize the following combinations of foods. You will need to create your own chart. On a separate sheet of paper, create diagrams that explain the different kinds of mixtures. Label your diagrams, using proper terms and the specific food ingredients in the mixtures.

Group A - Variety of fruits to prepare fruit salad

Group B - Ingredients to make party mix

Group C - A variety of drink mixes to prepare beverages

Group D - Ingredients to bake brownies

Group E - Ingredients to make a fruit smoothie

Group F - Ingredients to make mayonnaise

Group G - Ingredients to make an egg white meringue

Group H - Ingredients to make sweetened condensed milk

Group I - Ingredients to make rock candy

## SCIENCE RUBRIC

Exceeds - must receive no more than one 3 and the rest 4s in the other areas of the rubric.

Meets - may receive no more than one 2 and a combination of 3s and 4s in the other areas of the rubric.

Approaches - may receive no more than one 1 and a combination of 2s, 3s or 4s, in the other areas of the rubric.

Begins - must receive at least a 1 in all 3 areas of the rubric.

	<b>KNOWLEDGE</b>	<b>APPLICATION</b>	<b>COMMUNICATION</b>
	Knows and understands scientific terms, facts, concepts, principles, theories and methods.	Applies scientific knowledge, skills and methods to manipulate, analyze, synthesize, create and evaluate.	Communicates scientific knowledge and applications through writing, speech and visual displays.
<b>4</b>	<ul style="list-style-type: none"> <li>• Descriptions of scientific terms, facts, concepts, principles, theories and methods are complete and correct.</li> </ul>	<ul style="list-style-type: none"> <li>• Applications are thorough, appropriate and accurate.</li> </ul>	<ul style="list-style-type: none"> <li>• Written, oral and/or visual communication is well organized and effective.</li> </ul>
<b>3</b>	<ul style="list-style-type: none"> <li>• Descriptions of scientific terms, facts, concepts, principles, theories and methods are mostly complete and correct.</li> </ul>	<ul style="list-style-type: none"> <li>• Applications are mostly thorough, appropriate and accurate.</li> </ul>	<ul style="list-style-type: none"> <li>• Most of the written, oral and/or visual communication is well organized and effective.</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>• Descriptions of scientific terms, facts, concepts, principles, theories and methods are somewhat complete and correct.</li> </ul>	<ul style="list-style-type: none"> <li>• Applications are somewhat appropriate and accurate.</li> </ul>	<ul style="list-style-type: none"> <li>• Some of the written, oral and/or visual communication is organized and effective.</li> </ul>
<b>1</b>	<ul style="list-style-type: none"> <li>• Descriptions of scientific terms, facts, concepts, principles, theories and methods are minimally present or correct.</li> </ul>	<ul style="list-style-type: none"> <li>• Applications are minimally appropriate and accurate.</li> </ul>	<ul style="list-style-type: none"> <li>• Little of the written, oral and/or visual communication is organized and effective.</li> </ul>
<b>0</b>	<ul style="list-style-type: none"> <li>• All descriptions of scientific terms, facts, concepts, principles, theories and methods are missing and/or incorrect.</li> </ul>	<ul style="list-style-type: none"> <li>• All applications are missing and/or incorrect.</li> </ul>	<ul style="list-style-type: none"> <li>• All of the written, oral or visual communication is missing and/or lacks organization.</li> </ul>
<b>Score</b>			