

# Physical and Chemical Changes in Food

## Summary

Study food mixtures and substances in order to identify atoms, molecules, elements, and compounds and recognize physical changes that take place in foods.

## Main Core Tie

Food Science

[Strand 5](#)

## Background for Teachers

FOOD IS MATTER. Matter refers to the substance of which physical objects are composed. All matter is made up of chemical elements.

According to atomic theory, matter is made of very tiny particles called atoms. If the substance has only one kind of atom, the substance is called an element. All elements are made of atoms. There are 88 naturally occurring elements. There are a number of other synthetic or man-made elements. The total number is 109. Of these, 25 are considered to be very important to the food industry and to a study of foods. The elements combine in various ways and amounts to make up the human body and the food that sustains it.

## Intended Learning Outcomes

There are scientific principles involved in the art of preparing and serving food; therefore, in a sense, any place where food is prepared is a laboratory in which science can be studied and learned.

## Instructional Procedures

See attachments below.

The students will participate in a PREASSESSMENT to determine their knowledge of matter by watching a demonstration to illustrate the three phases of matter. Discuss.

The students will participate in experiments allowing observation of matter being changed from gas and liquid to a solid CRYSTALLIZATION state.

Students will observe melting as a change of state by selecting a teaspoon full each of low, medium, and high quality chocolate chips. Each type, respectively, should be placed in the hand of a different student. Students should observe the rate at which each type of chocolate chip melts. They should then refer to the label to hypothesize the reason for the difference in the rate of melting and to justify the best choice for chocolate chip cookies.

The students will experiment with the process of SUBLIMATION. The students will observe a piece of red meat that shows FREEZER BURN as an example of sublimation. They will compare it with a similar piece that shows no freezer burn. They will describe and compare the two and decide if the change in the meat is a physical or a chemical change in the state of matter. Discuss the answers to the questions: what is freezer burn, how can you prevent it, and will it kill you if you eat it?

The teacher will divide a chalk board in three sections and write one of the following phrases in each section: All Natural, Artificial Flavors and Colors, Chemicals. The students will come to the board and write the first thing that comes to their minds as they read each phrase.

The teacher will read each list aloud and explain that no food is free of chemicals and that all foods can be analyzed in terms of their chemical makeup.

The students will practice using the scientific method or research by following the directions for DISCOVERING NUTRIENTS: A ROUND OF FOOD TESTS. Several nutrient tests are provided. The teacher may assign each unit different nutrients to test for and have the class share their results.

The students will practice using the scientific method or research by following the directions on VITAMIN C INDICATOR and complete the accompanying observation sheet.  
The students will participate in a MATTER-SUMMATIVE EVALUATION by performing some experiments with a number of mixtures and identifying the ones that show physical changes.

Authors

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