

# Fatty Acids

## Summary

Connections between chemical structures of fats and oils (lipids) and their use in food science and nutrition.

## Main Core Tie

Food Science

[Strand 7 Standard 3](#)

## Background for Teachers

LIPID - The scientific term used to depict fats and oils. The terms are interchangeable, but fats or oils are more commonly used in everyday language. The three will be, for the most part, the term used in this unit.

Fats need to be included in food supplies because they perform a number of critical functions in the human body. (See FAT IN FOODS in Resources.) Among these are: (1) insulation, (2) the repair of walls of arteries and veins, (3) for energy storage, and (4) as a solvent for vitamins A, D, E, and K. They provide linoleic acids and calories (9 per gram). Fats should not be eaten in excess, and eating them in excess is easy to do in the American culture because they are such an integral part of our everyday food preparation.

Fats in our foods that come from plants are oils; that is, they are liquid at room temperatures. This is true of peanut oil, sunflower oil, vegetable oil, etc. Fats from foods provided by animal sources are generally solid at room temperature. The exception is vegetable shortening s which are chemically modified plant oils that remain solid at room temperature. (See overhead transparency SOME COMMON FATS AND OILS.)

## Intended Learning Outcomes

Fats are the way plants and animals most efficiently store energy, and although there are many different types of fats and oils, there are generally molecular structures and properties that help explain their proper use in food preparation and nutrition.

## Instructional Procedures

See attachments below:

The students will participate in a PREASSESSMENT to sort pictures of foods and pictures of fats and oils into groups or pairs that indicate the best form of fat to use in preparing and/or serving a particular food item.

The students will perform an experiment USING TEMPERATURE TO MEASURE ENERGY to illustrate the concentrated form of energy found in nuts, a fat containing food.

Following a REVIEW OF SCIENTIFIC PRINCIPLES OF LIPIDS, the teacher will have groups of students generate and share lists that illustrate basic kitchen chemistry principles for working with fats and/or oils.

The students will complete an experiment by frying food in different types of oil, complete an observation chart, and keep the record sheet in their science notebook. (See EFFECT OF TYPE OF FAT ON QUALITY OF FRIED POTATOES.)

The teacher will demonstrate a SMOKE POINT OF LIPIDS EXPERIMENT to show how to determine the smoke point of fats. The students will observe and record the information disclosed in the experiment on the worksheet. NOTE: the teacher should do this experiment because of the flammability of fats which could cause a safety hazard. The teacher and the students will perform two

experiments which show some of the PROPERTIES OF LIPIDS and discuss results.

The students will make a temporary emulsion, HONEY MUSTARD SALAD DRESSING, and answer questions on the recipe sheet.

The students will prepare a permanent emulsion. They will prepare OLD-FASHIONED MAYONNAISE and complete questions on the recipe sheet. The students will participate in a SUMMATIVE EVALUATION - HOMEMADE VANILLA ICE CREAM. Given a recipe for ice cream, the students will explain the ingredients and processes. The students will identify the emulsifier and tell what substances it blends. If time permits, the class may make and eat the ice cream.

#### Authors

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