



Chapter 8

Fats and Oils

Fat is a nutrient found in foods. Your body uses fat for energy, growth, and nerve and brain functions. Everyone needs some fat in their diet. However, many Americans eat too much fat. Fats are high in calories and the wrong kinds of fat can be unhealthy. For this reason, it is important to learn which fats are healthier and which are less healthy.

Enjoy investigating freaky fats and oils!

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Dress it Up



Did you know some salad dressings are healthier than others?

French, Italian, ranch and honey mustard are all flavors of salad dressing. Salad dressings add flavor to salads, veggies and other foods. Some salad dressings have more “healthy” fats and others have more “unhealthy” fats and more calories.

Healthier fats are unsaturated fats and include **polyunsaturated** and **monounsaturated** fats. Olive oil, canola oil and peanut oil are all good sources of these “healthy” fats. Unsaturated fats are needed for growth, healthy nerves and for brain functions. **Saturated** and **trans fats** are less healthy. Animal fats, vegetable shortening and butter are all high in these unhealthy fats. Some salad dressings have a lot of “unhealthy” fats but others have more “healthy” fats. Reading food labels will help you choose healthier salad dressings.

Even when you eat healthier salad dressings, you can eat too much. Calories add up quickly when you eat fats. One gram of fat (“healthy” or “unhealthy”) has 9 calories. Since there are 5 grams of fat in 1 teaspoon of oil, you get 45 calories from fat in just one teaspoon of oil. Protein and carbohydrates only have 4 calories in one gram. This means fats have over twice as many calories in one gram than protein or carbohydrates. Be sure to look at serving sizes on food labels.

DOODLE BUGS

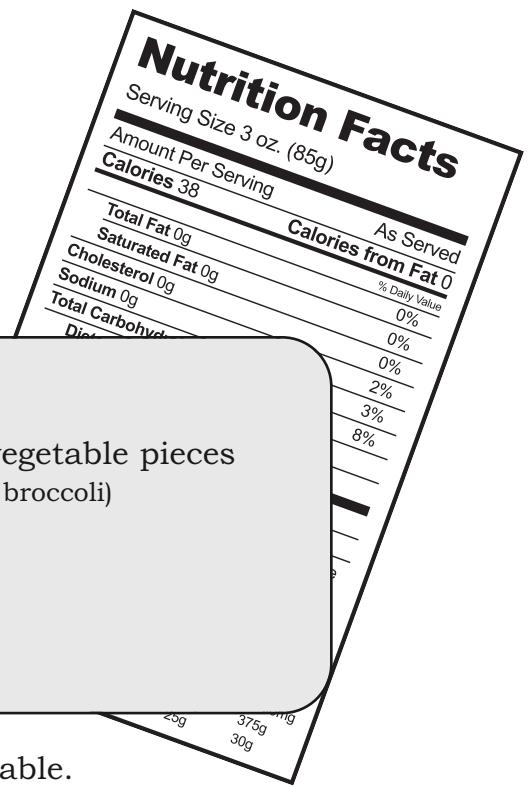
In the reading, circle the unhealthy types of fat.

Draw a box around the number of calories found in one gram of fat.

How many more calories are in one gram of fat than are in one gram of protein?



SCIENTIFIC INQUIRY: Reading Labels



You will need:

- Food labels for the 3 salad dressings
- 1 plate
- 1 tablespoon ranch dressing
- 1 tablespoon light ranch dressing
- 1 tablespoon fat-free ranch dressing
- Several raw vegetable pieces (carrots, celery, broccoli)

Study the salad dressing food labels and fill in the table.

Salad Dressing Nutrition Facts

Dressing	Serving Size (tablespoons)	Calories	Total Fat (grams)	Saturated Fat (grams)	Trans Fat (grams)
Ranch					
Light ranch					
Fat-free ranch					

- Which dressing has the most total fat in one serving?
- Which dressing has the most saturated fat in one serving?
- Fats have 9 calories per gram. How many calories of total fat are in one serving of ranch dressing? (Show your work.)

SCIENTIFIC INQUIRY:

Reading Labels (continued)

- 4. How many calories of fat are in one serving of light ranch dressing?**
(Show your work.)

- 5. How many calories of fat are in one serving of fat-free ranch dressing?**
(Show your work.)

- 6. If you dipped your carrots into one serving of light ranch dressing instead of regular ranch dressing, how many fewer calories would you eat?**

Tasting Time:

Write the names of the three salad dressings around the edge of your plate. Then put a small amount of each dressing next to the matching label. Taste each salad dressing by dipping your vegetables into the dressing and eating. Next, answer the questions below.

- 7. Which ranch dressing did you like best? Why?**

- 8. Which dressing is the healthiest?**

- 9. If a salad dressing is mostly good fats (unsaturated), does it matter how much salad dressing you eat? Why?**

TRY THIS AT HOME:
Garden Vegetable Dressing



You will need:

PREP TIME: 15 minutes

- 1-ounce packet of your favorite ranch dressing/dip mix
- 16-ounce container of low-fat buttermilk
- 1/2 cup of low-fat or fat-free sour cream
- 3/4 cup diced fresh tomatoes or
- 1/4 cup chopped green onions or
- 1/4 cup chopped ripe olives, rinsed and drained or
- 1/4 cup of your favorite vegetable
- Help from an adult

Liven up your dressing when you add your favorite vegetables!

1. Mix all the ingredients together in a medium bowl.
2. Chill in the refrigerator for 1 hour.

SERVING SIZE: 1 ounce

Fun Fact

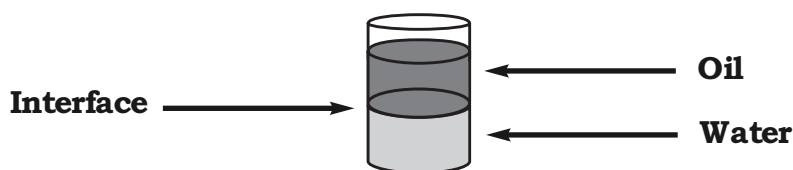
Remember you need 2 1/2 cups of vegetables a day. Eating raw vegetables with low-fat dressing makes a great morning, afternoon or evening snack. Be sure to limit your saturated fat intake by choosing healthier dressings and eating the right size serving of salad dressing. Two tablespoons of your favorite salad dressing will count as one serving (one teaspoon) of oil. The MyPyramid recommendations suggest eating just 4-5 teaspoons of oil a day from nuts, fish and vegetable oils.

Emulsify This



Did you know oil and water do not mix?

Two liquids that will not mix are **immiscible**. Oil and water are two liquids that do not normally mix. If you pour oil and water into a glass, you'll get a layer of oil and a layer of water. Even when you stir them, they'll separate into two layers. Maybe you've seen salad dressings with two layers or peanut butter with oil sitting on top. Did you know salad dressings, mayonnaise and peanut butter are all mixtures of oil and water? How does this happen if oil and water do not normally mix?



To get oil and water to stay mixed, you need an **emulsifier**. Eggs, gelatin, mustard and starch can all be used to emulsify oil and water. The emulsifier plus the two liquids mixed together is called an **emulsion**. Emulsions can be temporary, meaning the oil and water will separate again or permanent, meaning they will never separate.

An example of a temporary emulsion is oil and vinegar dressing. Oil and vinegar are immiscible (normally they don't mix). But if you add mustard and paprika and shake, the oil and vinegar will mix. If you wait, you will see the oil and vinegar separate into two layers again. The line between the two layers is called the interface. An example of a permanent emulsion is mayonnaise. Mayonnaise won't separate because egg yolks are added to the mixture of oil and vinegar. The egg yolk is a permanent emulsifier.

DOODLE BUGS

In the reading, circle the word that describes two liquids that do not normally mix.

Draw a picture below of oil and vinegar dressing before and right after it is shaken.

SCIENTIFIC INQUIRY: **Immiscible**

Your group will need:

1 liquid measuring cup
2 glass jars with lids
1 set measuring spoons
Colored pencils

1/2 cup vinegar
1/2 cup cooking oil
1 teaspoon dry mustard
1 teaspoon paprika

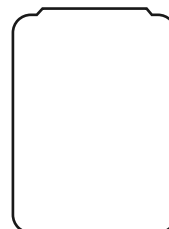


Measure 1/4 cup of vinegar and pour into jar A. Measure 1/4 cup of cooking oil and pour into jar A.

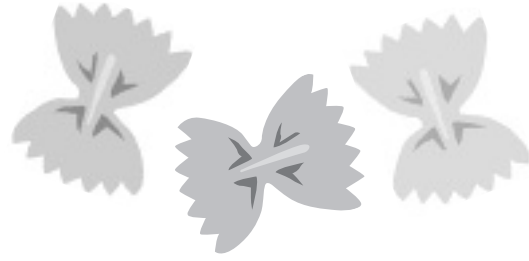
Measure 1/4 cup of vinegar, 1/4 cup of oil, 1 teaspoon of dry mustard and 1 teaspoon of paprika and pour into jar B.

Tightly screw the lids on both jar A and jar B. Rapidly shake both jars. Let every group member have a turn shaking. Place both jars on the table. Watch the jars for a several minutes.

- 1. Which jar's mixture separates the fastest? Why?**
- 2. How did the mustard and paprika change the mixture?**
- 3. Do you have an emulsion in Jar A or in Jar B? What kind of emulsion is it?**
- 4. After you have observed the jars for several minutes, color and label the picture of jar B.**



TRY THIS AT HOME:
Rainbow Pasta Salad



You will need:

PREP TIME: 25 minutes

16 ounces tricolor pasta	1 red pepper, chopped
2/3 cup olive oil	3 cups broccoli, chopped
3 tablespoons apple cider vinegar	1 cup carrots, chopped
2 teaspoon dried basil	1/2 cup ripe olives (rinsed, drained and chopped)
1 teaspoon salt	2 tablespoons parmesan cheese
1/4 teaspoon pepper	Help from an adult
1 green pepper, chopped	

Let's mix vinegar and oil to make a tasty pasta salad!

1. Cook tricolor pasta according to package directions. Drain and rinse with cold water.
2. While pasta is cooking mix the olive oil, vinegar, basil, salt and pepper.
3. In a large bowl, mix the cooked pasta, dressing mixture, peppers, broccoli, carrots and olives.
4. Top with parmesan cheese.
5. Cover and refrigerate until ready to serve.

SERVING SIZE: 3/4 cup

Fun Fact

Vinaigrettes and Italian dressing usually have less unhealthy fats (saturated and trans fats) and more healthy fats (unsaturated fats) than regular creamy dressings. Be sure to read the “Nutrition Facts” on salad dressing food labels to choose dressings with less saturated fats and trans fats. Choosing healthier dressing, eating nuts and fish, and cooking with vegetable oils will give your body the 4-5 teaspoons of oil it needs daily.

Mmmm Creamy



Did you know fat adds flavor to food?

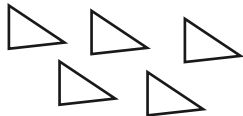
Fat adds flavor to foods like ice cream and has a good mouth feel.

Mouth feel is simply how a food feels in your mouth. Fat feels smooth, creamy and moist in your mouth. Low-fat foods sometimes have a bad mouth feel. They may feel dry or gritty. When people talk about mouth feel, they often mention ice cream.

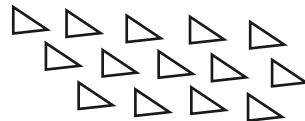
Ice cream is a tasty treat, but it is usually high in fat. The fat separates the ice crystals in ice cream and keeps them from growing bigger. Higher fat ice creams have more fat and have smaller ice crystals. The tiny ice crystals feel smooth and creamy. In general, the more fat in an ice cream, the smoother and fuller it will taste.

Many companies make healthier ice creams with less fat and calories. Unfortunately, using less fat changes the taste and mouth feel of ice cream. Reduced-fat and fat-free ice creams have less fat to separate ice crystals. Therefore, the crystals can grow bigger and make ice cream feel grainy and thin. In today's lesson, you will taste different ice creams to see how different amounts of fat can change the mouth feel.

**Ice crystals in
low-fat ice cream**



**Ice crystals in
higher fat ice cream**



DOODLE BUGS

In the reading, underline the sentence that tells what mouth feel means.

Circle the thing that separates ice crystals and keeps the crystals from growing bigger.

Why would companies want to make an ice cream with less fat than regular ice cream?

SCIENTIFIC INQUIRY: We All Scream for Ice Cream

Your class will need:

72 small cups	1/2 gallon regular ice cream
24 spoons	1/2 gallon reduced-fat ice cream
Food labels for each ice cream	1/2 gallon fat-free ice cream

Use your Nutrition Fact labels to fill in the table below.

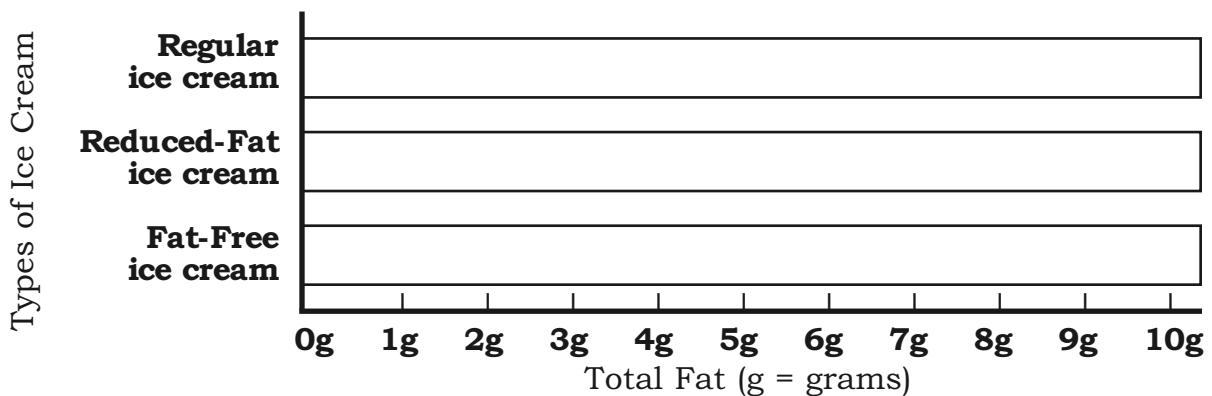
Ice Cream Nutrition Facts

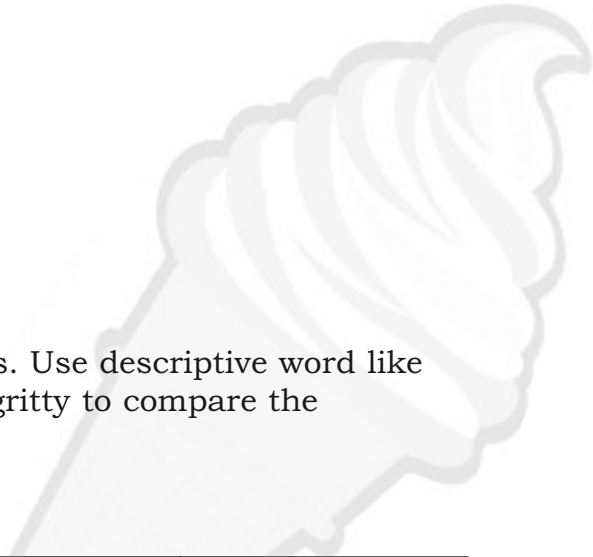
Types of Ice Cream	Serving Size (cups)	Calories	Total Fat (grams)
Regular ice cream			
Reduced-Fat ice cream			
Fat-Free ice cream			

Draw a star beside the ice cream that has the least amount of fat.

Color the bars over to the correct number of grams of total fat in 1 serving of each ice cream.

Total Fat (grams) per Serving of Three Different Types of Ice Creams





Taste Test:

Taste a little of all three kinds of ice creams. Use descriptive word like smooth, sweet, bland, creamy, grainy and gritty to compare the appearance, taste and texture.

Ice Cream Taste Test Facts

Types of Ice Cream	Appearance	Taste	Texture (size of ice crystals)
Regular ice cream			
Reduced-Fat ice cream			
Fat-Free ice cream			

- 1. Which ice cream had the best mouth feel? Why?**

- 2. Which ice cream had the biggest ice crystals? Why does it have bigger ice crystals?**

- 3. Do you think you could eat reduced-fat or fat-free ice cream?**

TRY THIS AT HOME:
Chocolate Coffee Can Ice Cream



You will need:

PREP TIME: 40 minutes

2 clean metal cans, both with lids
(one large can and 1 medium can)

Ice

1/4 cup rock salt

1 cup of cold whole milk

Help from a friend or an adult

1 cup sugar

1 teaspoon vanilla

1 teaspoon chocolate syrup

Kick around your ice cream!

1. Make sure both cans are clean.
2. Place the milk, sugar, vanilla and chocolate syrup in the medium coffee can and tightly seal the lid on the can.
3. Place the medium can into the larger can. Pour ice and salt around the medium can. Make sure the medium can is centered.
4. Seal the larger can with its lid. With a friend roll the can back and forth for about half an hour.
5. Take a peek; if your mixture is creamy you've made ice cream! If it's not keep rolling.
6. Enjoy your own homemade ice cream!

SERVING SIZE: 1/2 cup, serves 3

Fun Fact

Unlike some sweets, ice cream provides your body with calcium. One-half cup of ice cream can count as one-third cup of milk (you need 3 cups of milk a day). Since ice cream is high in fat and sugar, only choose ice cream as a “sometimes” food. When you do choose ice cream, keep your serving size to about a half a cup. Look for low-fat or light ice creams if you like them!

Proficiency Questions

Circle the best answer:

1. How many calories are in one gram of fat?

- a. 4 calories/gram
- b. 7 calories/gram
- c. 9 calories/gram
- d. none of the above

2. Which salad dressing would be a healthier choice?

- a. ranch with 0 grams of saturated fat
- b. ranch with 1 gram of saturated fat
- c. ranch with 2 grams of saturated fat
- d. ranch with 3 grams of saturated fat

3. What does immiscible mean?

- a. mixes easily
- b. explodes when mixed
- c. will not normally mix
- d. none of the above

4. What does an emulsifier do?

- a. helps two liquids mix
- b. stops two liquids from mixing
- c. separates two liquids
- d. all of the above

5. What is mouth feel?

- a. the way food feels in the mouth
- b. the way food tastes
- c. the way food smells
- d. none of the above

6. Why do higher fat ice creams have a good mouth feel?

- a. because they have large ice crystals
- b. because they have small ice crystals
- c. because they feel dry
- d. because they feel bumpy