Part 1: Get the facts on fats

The fats people eat can come from either plants or animals. Fats from plants and animals are similar in some ways but different in others. In the activity below, you can do some simple experiments to learn some fat facts!

Materials:

- Tablespoon of butter
- Tablespoon of vegetable oil
- Brown paper bag
- Wax paper
- Blunt-end scissors
- Water
- Masking tape
- Plastic straw
- 3 zip-closing plastic bags
- 2 clear plastic cups
- Cotton swabs
- Bowl
- Ballpoint pen

Procedures:

1. Cover your work surface with newspaper. Use your masking tape and pen to label three zip-closing plastic bags water, butter, and oil. Ask your adult partner to pour hot tap water into a bowl until it is about 1/2 full. Place about 1 tablespoon of butter, vegetable oil, and water into their labeled bags.

2. Make sure all three bags are sealed. Place the bags in the bowl of hot water and leave them there until the butter becomes liquid.

3. Place a piece of a brown paper bag flat on your work surface. Use your pencil to divide the paper into three sections. Label the sections water, butter, and oil.

4. Dip a separate cotton swab into the liquid in each bag and place the wet end of the swab on its labeled area on the paper. Reseal the bags and put them back into the water. Go on to the next step; we'll come back to these cotton swabs later.

5. Tape a piece of wax paper flat on your newspaper. Use separate straws to place a drop of water, a drop of oil, and a drop of butter on the wax paper. Observe each drop for similarities and differences. Try dragging each drop along the paper with a straw. What do you observe?

6. Again on your wax paper, use a straw to try mixing a few drops of oil with a few drops of water. Try the same thing with butter and water. How well did they mix? Now try mixing some oil and butter. Did they mix any better?

7. Pour cold tap water into a bowl until it is about 1/4filled. Pour about 1/2 the butter and about 1/2 the oil from their bags into separate small plastic cups. Place the cups in the water and hold them there so they do not spill. What do you notice happening to either the butter or the oil?

8. Let's look back at your brown paper bag. Do you see any similarities or differences in the way the liquids look on the brown paper? Do the butter and oil marks look similar, or does either one look like the water?

9. Fill 2 clear plastic cups about 2/3 full of tap water. Pour the rest of the oil into one cup and the rest of the butter into the other cup. What did you observe about each liquid? How are they similar or different?

Think about this ... Corn oil, olive oil, and peanut oil are all fats that come from plants. The fat on a steak or piece of chicken is, of course, animal fat. If you think about these plant and animal fats, what is something similar about them? What is something different?

Now think about the characteristics of three other common substances: cheese, soap, and bees wax. Do you think these are made of some of the same things as the other fats? Why or why not?

Where's the Chemistry?
The butter and oil you compared are both made from fat. The butter is made from cow's milk which makes it animal fat. The oil is made from corn, making it plant fat. Both types of fat are made from almost identical chemicals arranged in very similar ways. These similarities cause them to soak through a brown paper bag, feel greasy, and not dissolve in water. There are also some differences between them. The milk fat has a structure that allows it to be shaken until it becomes solid butter. Butter can be melted and resolidified over and over again. The same thing cannot be done with oil.

Part 2: Starches

Another major nutrient in the food we eat is carbohydrates. One of the most popular carbohydrates throughout the world is starch. Starch is the major ingredient in bread, potatoes, rice, and pasta. In the activity below, you can use a simple test to see if a food contains starch.

Materials:
• Crackers (light-colored)
• Rice
• Spaghetti
• Popsicle stick
• Ballpoint pen
• Sheet of white paper
• 5 paper or plastic cups
• 5 Straws
• Wax paper
• Masking tape
• Tincture of iodine
• Tablespoon
• Eyedropper

Caution! Be sure to read and follow all directions and warnings

on the tincture of iodine label.

• An adult should make an iodine solution by adding 1/8 teaspoon of tincture of iodine to 2 teaspoons of water.
• Be very careful when using tincture of iodine.
• When you have finished the activity, rinse out all cups and the straw and throw them away.

• Throw away all food items and wash your hands.

Procedures:
1. Cover your work surface with newspaper. On your sheet of white paper, label three areas as follows: cracker, rice, and pasta. Place a small amount of each food on its area of the paper.

2. Use an eyedropper to place 1 drop of iodine solution on each type of food. What do you observe? A dark color shows you that the iodine has reacted with starch in the food. Do all these foods seem to contain starch?

*Think about this ...*The iodine test can tell us whether a food contains starch. Let's see whether another kind of iodine test can tell us if one food sample has more or less starch than another.

1. Use your masking tape and pen to label the cups 1, 2, 3, and 4. Use a Popsicle stick to crush a cracker into tiny pieces. Place equal amounts of cracker in each of your four labeled cups. Add 1 tablespoon of water to cup 1, 2 tablespoons of water to cup 2, 3 tablespoons of water to cup 3, and 4 tablespoons of water to cup 4.

2. Use separate straws to stir and mix your crackers with the water in each cup until the cracker has completely fallen apart and is well-mixed with the water.

3. Use a straw to take a few drops from the top of each water/cracker solution. Place 3 drops of each solution on a piece of wax paper as shown.

4. Ask your adult partner to add 1 drop of the iodine solution to the drops of water/cracker solution on the wax paper. Does the color change in any of the solutions? Do all the colors look the same? What explains the difference in color if you saw any?

Where's the Chemistry?
In the first part of the activity, when you placed the iodine solution on the crackers, rice, and spaghetti, the solution should have turned a dark blue color. This change in color is caused by a reaction between the iodine and the starch molecules. This color change tells you that the food you are testing contains starch.

When you tested the four different cracker and water solutions, you should have gotten the most color change in the one with the least water and the least color change in the cup with the most water. Why do you think it works this way?