

Microwave Oven Demonstration

Summary

This lesson is a teacher demonstration on how to use a microwave oven.

Main Core Tie

Food And Nutrition

[Strand 2 Standard 1](#)

Time Frame

1 class periods of 45 minutes each

Materials

Have 1-3 microwave ovens set up for use; Have the bran muffin recipe made up and ready to use; Have the Chinese hors d'oeuvres made up except for about 4; Liquid measuring cups, A thermometer, A conventional muffin pan, Food-release spray, A microwave oven pan, Microwave-safe paper towels and plates; A microwave grill (optional), A bread basket for serving, A plate for serving hors d'oeuvres, and Examples of microwave cookware.

Intended Learning Outcomes

Students will understand how to use the microwave ovens in the school foods lab.

Instructional Procedures

Ask the students the following questions: How many have microwave ovens at home? Where have they used them? What foods have students cooked in them? What are advantages and disadvantages of using microwave ovens?(savings in time, energy, and nutrients)

Using a premixed bran muffin mixture, prepare six muffins and put them in a conventional oven to be baked.

Show a microwave oven from the kitchen lab and talk about its components; the magnetron converts the electrical energy to microwaves; the stirrer blade sends microwaves throughout the oven so foods cook more evenly; the metal walls reflect the microwaves back into the food; and the turntable helps foods to cook more evenly.

Talk about how microwave ovens vary in the amount of microwaves they produce at each setting due to different power ratings. Electrical power is measured in units called watts. The higher the oven wattage, the more microwaves are produced. You can generally find the oven wattage on the back of the oven along with the serial and model numbers. If you want to check the wattage, you can do this simple experiment.

1. Fill a 4-cup glass measure with tap water. Take the water's temperature and record it.
2. Heat the water for two minutes in the microwave oven. Take the water's temperature and record it.
3. Subtract the first temperature from the second.
4. Multiply that result by 18.5 and record it.
5. This figure is the actual wattage output. Compare this with the wattage quoted by the manufacturer. (The Magic of Microwave, University of Washington State Cooperative Extension; 1983).

Do the experiment and determine the wattage of the microwave oven you are using. Talk about power settings and the fact that the magnetron switches on and off for a certain percentage of time according to the percentage of power desired. It is this on-again/off-again action that makes it possible to defrost foods without cooking them.

Microwave ovens cook by making food molecules vibrate. The microwaves generally penetrate to a depth of 1 1/2 inches. If the food is thicker, the rest of it is cooked by agitation of the molecules

moving deeper into the food until it is completely heated. Have students rub their hands together to feel the warmth that is created by friction.

Some foods cook better in microwave ovens than others. Generally, foods with water, fat, or sugar are heated more quickly in the microwave. Foods high in water such as vegetables will cook faster than foods low in water like meats. Foods like pasta and rice need time to absorb water when they cook so there is no real time savings over conventional cooking techniques.

Sugar and fat attract microwaves and can create hot spots in food where they are concentrated (for example, a jelly doughnut). Salt also attracts microwaves. The food under salt will cook faster than food that has not been salted.

While preparing the Chinese hors d'oeuvres, talk about the other factors that influence microwave cooking. 1. Food Density: Food that is heavier or more dense takes longer to cook than food that is lighter. 2. Size and Shape of Food: Food needs to be in uniform pieces and placed in a circle for more even cooking with smaller parts to the inside. 3. Starting Temperature: Cold or frozen foods take longer to cook than foods that are warmer. 4. Amount of Food. The more foods you cook the longer it will take because you always have the same amount of microwaves.

Start cooking the hors d'oeuvres 12 at a time for about 3-5 minutes as you talk about the type of cookware you need to use in the microwave oven. If you don't have a microwave grill, cook the hors d'oeuvres on a paper plate lined with microwave-safe paper towels.

Talk about the fact that some paper products may have metal fragments from recycling; so towels you use need to be labeled microwave safe. Glass, glass-ceramic, stoneware, China, and pottery with no metal trim or metallic glazes, Plastic, and paper are all items that can be used in the microwave oven. Have examples of each product to show.

The shape of the container is also important. Pans should be shallow with straight sides. Ring-shaped and round pans allow for even cooking; square and rectangular pans should have rounded corners. Point out special techniques that need to be used for microwave cooking: 1. Food needs to be placed in a ring shape with the smallest parts to the center where it cooks more slowly. 2. Cover foods with plastic wrap, waxed paper, or paper towels to avoid spattering and to keep some moisture in. Paper towels allow more moisture to escape than waxed paper; plastic wrap is the best for retaining moisture if you don't have a glass lid. 3. Stirring, rotating, and turning all promote even cooking.

If you want to see if your microwave oven has hot spots, place marshmallows in the bottom or sprinkle grated cheese on bread and see where the cheese melts or the marshmallow puffs first. 4. Determine cooking time. Microwave cooking has two parts: cooking time and standing time. Foods should be checked for their doneness after the standing time, but not before or they may be overcooked.

Put six muffins in the microwave oven to cook for one minute and 45 seconds. Remove and allow to stand while removing the muffins from the conventional oven. Place the muffins in a basket, slice them into pieces so everyone gets at least 1/4-1/2 of each. Show the differences between the conventional baking and microwave baking's color and texture.

Mention microwave oven safety rules 1. Never run the oven without food in it. 2. Follow the manufacturer's directions for commercially-frozen foods. 3. Loosen tight fitting lids and caps to avoid explosion from steam build up. 4. Never attach kitchen magnets to the microwave oven. 5. Have the microwave tested by authorized repair persons if you suspect leakage.

Make sure your microwave oven is always clean as any additional spills in it will increase cooking time. Wash the inside with hot, soapy water and dry thoroughly. If something is stuck inside, put a cup of water in the microwave oven and bring it to a boil to loosen. Never use abrasive cleaners.

Serve the hors d'oeuvres and muffins to the class and, if you required them to do the worksheets, have the students hand them in.

Extensions

If you have a longer class period have the students make something in the microwave. I have then make apple crisp the next day

Authors

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