How To Use a Microwave Oven

The microwave oven is now an essential part of most kitchens. During the summer or other hot times of the year, it's an excellent appliance to use because it won't heat up your kitchen the way an oven will. Unfortunately, most people still use the microwave to heat coffee, melt butter or make popcorn. That's just fine - but the appliance can do so much more!

How the Oven Works

The microwave works when the high voltage is converted to waves of electromagnetic energy, which is a combination of electrical and magnetic energy. This energy is in the frequency band of radio waves, not x-rays. A wave guide and stirrer blade work together to make sure the energy reaches all areas of the oven interior. When the door is opened or the timer reaches zero, the energy automatically stops, so no microwave radiation leaves the oven. All ovens also have two independent systems that ensure the electrical activity stops as soon as the door is opened.

The microwaves make the water molecules contained in food vibrate and 'wiggle', which produces heat. This is what cooks the food, and also why the oven itself doesn't heat up. That's why foods that have a lot of water, like fruits and vegetables, cook more quickly. Foods high in fat and sugar also cook more quickly. Metal reflects the microwaves, and the energy passes through glass, plastic and paper. As soon as the microwave energy is absorbed by the food, it is converted to heat - so the microwave energy can't 'contaminate' the food.

Although heat is produced directly in the food, microwave energy doesn't cook food from the inside out. More dense foods like meat are cooked primarily by conduction of heat from the outer layers, which are heated by microwaves.

In combination microwave/convention ovens, you'll notice that the interior is metal. A convection oven's special feature is a fan that constantly circulates hot air around the food, so it cooks more quickly and browns very evenly. Follow the cooking instructions to the letter if you have one of these appliances.

Never try to repair your own microwave. It is a complex appliance that includes a magnetron, high voltage transformer, thermal protectors, and complicated circuits.

A few words about microwave safety:

- The foods will be very hot when removed from the oven, so use oven pads and be careful.
- If the food is covered during cooking, make sure to leave a small portion vented, or uncovered, so steam doesn't build up and burn you when the covering is removed.

- The foods should sit as directed in the recipe after being removed from the oven so the heat can continue to spread and dissipate. This is called 'standing time', but it is actually more cooking time.
- Most ovens have hot spots, and if you eat the food directly from the oven, a few areas could be superheated and will burn.
- On the flip side, there can also be cold spots where the food doesn't get hot enough to kill bacteria. Follow stirring and rotating instructions carefully.
- Don't use metal containers unless the recipe specifically directs you to: as stated above, microwaves bounce off metal, which can cause arcing and a fire inside the oven. Some recipes may call for shielding parts of the food, especially meats, with small amounts of foil. This is perfect acceptable as long as the directions are carefully followed.
- Make sure any glass, plastic containers, and plastic wrap you use are labeled 'microwave safe'. You can also test containers, as directed on the next page.
- Don't heat water or other liquids beyond the time recommended by the manufacturer or any recipe. Superheating can occur when plain water is heated in a clean cup for an excessive amount of time. The water will look innocuous, but when moved it can literally erupt out of the cup. Don't heat the water twice - that adds to the superheating risk. Adding sugar or coffee granules to the water will reduce the risk of superheating.
- Never operate a microwave if the door is damaged or doesn't close securely.
- Don't operate the oven while it is empty. This can also cause arcing and start a fire.
- It's also a good idea to stand 3-4 feet away from the microwave when it is operating - just to be on the safe side!