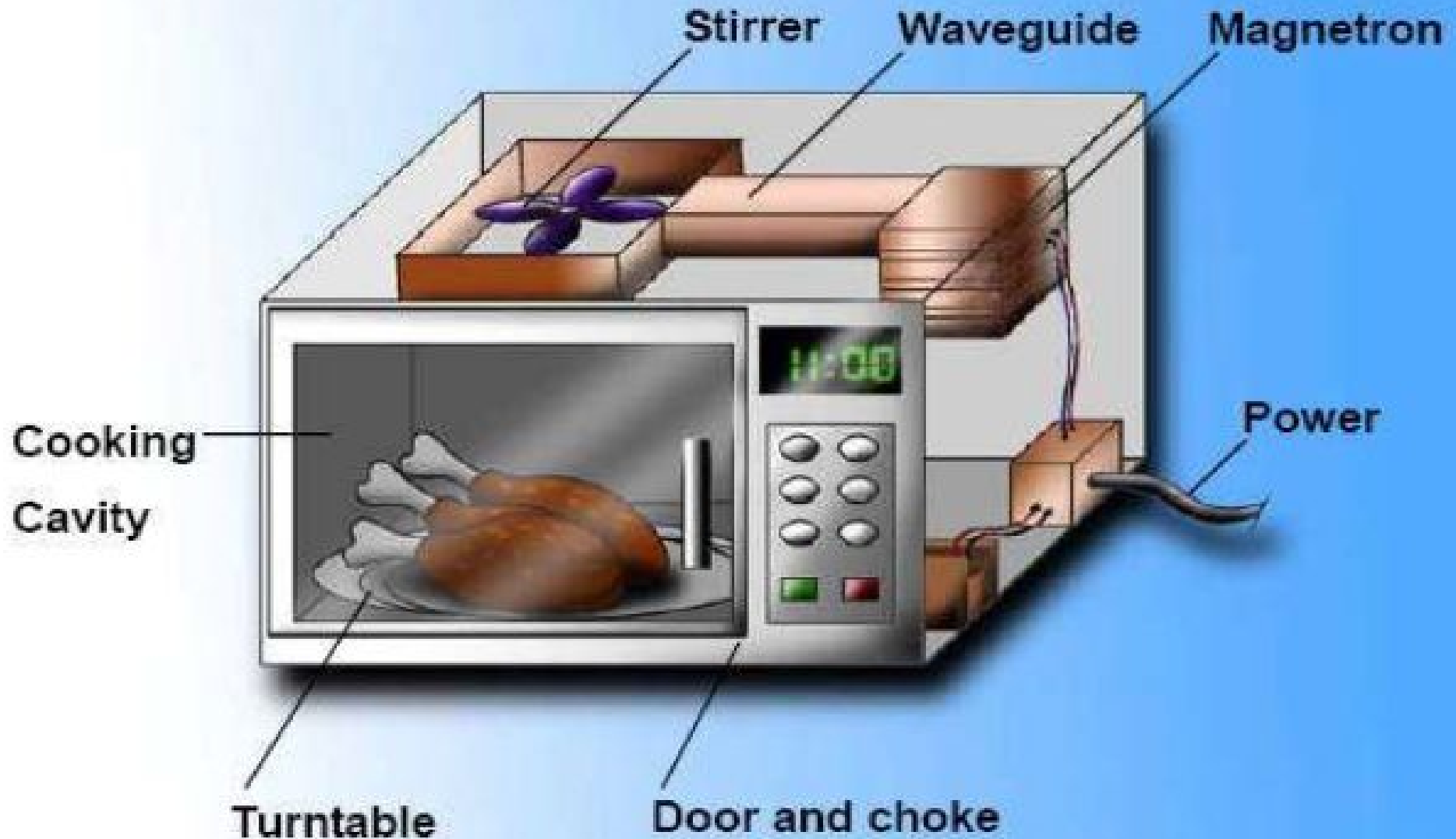


INTRODUCTION

- A **microwave oven**, is a kitchen appliance that can come in many different sizes and styles employing microwave radiation primarily to cook or heat food. This is accomplished by using microwaves, almost always emitted from a magnetron, to excite water (primarily) and other polarized molecules within the food to be heated. This excitation is fairly uniform, leading to food being heated everywhere all at once



Basic structure



History



- Invented accidentally by Dr. Percy LeBaron Spencer
- While testing a magnetron during work, he discovered the candy bar in his pocket melted
- Experimented with other food products (popcorn and eggs), and realized microwaves can cook foods quickly
- At 1947, 1st commercial microwave oven produced (called Radarange)
- Mostly used by restaurants, railroad cars, ocean liners and military
- Improvement and refinements made ~ 1967, 1st domestic microwave oven



What are Microwaves?

- Microwaves are a form of electromagnetic energy, like light waves or radio waves
- Microwaves are used extensively in communications
- such as to relay long-distance telephone signals, television programs and computer information across the earth or to a satellite in space.
- Good for transmitting information because it can penetrate haze, light rain and snow, clouds, and smoke.
- Also used in radars and in detecting speeding cars.
- Microwave has become most familiar as the energy source for cooking food.

PRINCIPLE

■ Microwave oven works by passing non-ionizing microwave radiation, usually at a frequency of 2.45 GHz (a wavelength of 12.24 cm), through the food. Microwave radiation is between common radio and infrared frequencies. Water, fat, and other substances in the food absorb energy from the microwaves in a process called dielectric heating. Many molecules (such as those of water) are electric dipoles, meaning that they have a positive charge at one end and a negative charge at the other, and therefore rotate as they try to align themselves with the alternating electric field of the microwaves. This molecular movement creates heat as the rotating molecules hit other molecules and put them into motion. Microwave heating is most efficient on liquid water, and much less so on fats and sugars (which have less molecular dipole moment), and frozen water (where the molecules are not free to rotate). Microwave heating is sometimes explained as a rotational resonance of water molecules, but this is incorrect: such resonance only occurs in water vapor at much higher frequencies, at about 20 gigahertz.

Working principle of microwave oven

- Microwave oven uses microwave radiation to heat food in the subject inside the oven
- microwave radiation are radio waves with frequencies 2500 MHz and the radio waves at this frequency has an important property

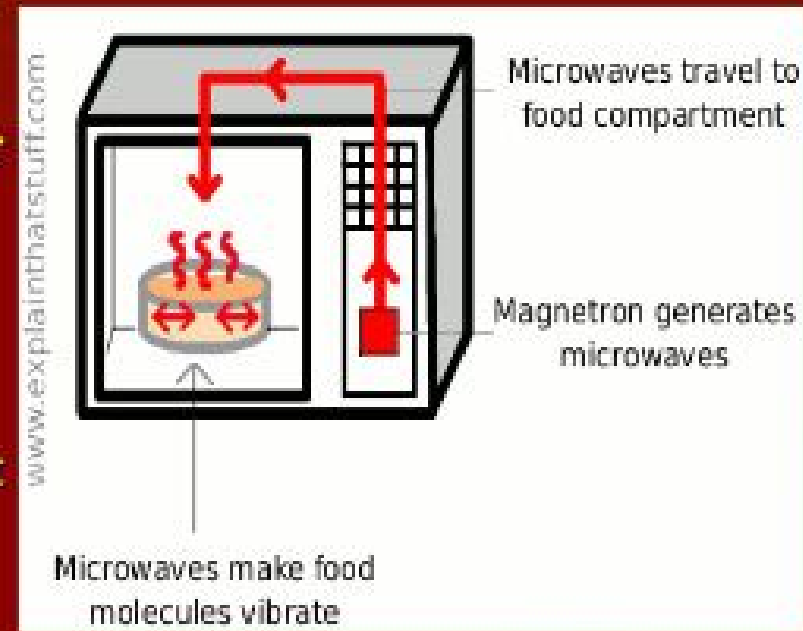


The characteristic

- ✓ **The food particles that contain water, fats and sugars absorb microwave radiation through atoms and molecules of food and absorption of this radiation gives energy make the move significantly and collide and produce heat for heating cooking**
- ✓ **That the material, plastic and glass, ceramics and pottery does not absorb microwave radiation and is not affected, and this means that they will not rise the temperature, and the shiny metallic materials such as aluminum that reflects the rays is therefore prohibited for use within microwave ovens**

How does a microwave oven cooking

- ✓ The microwave oven cook food from the inside to outside
- ✓ Absorbs water and fat and sugar molecules, consisting of food, radio waves
- ✓ Temperature of food particles at the same time and at the same temperature because all the particles are raised at the same time is not transmitted to the heat conduction



APPLICATION

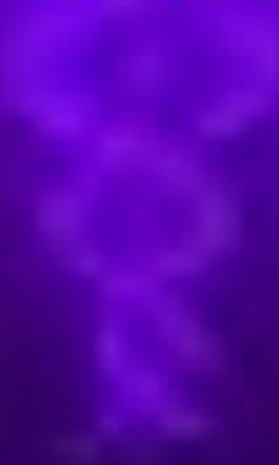
- Microwave ovens are popular for reheating previously cooked foods and cooking vegetables.
- They are also useful for rapid heating of otherwise slowly prepared cooking items, such as hot butter, fats, and chocolate.

the oven is used to heat frying-oil and other very oily items (such as bacon), which attain far higher temperatures than that of boiling water.



HARMFUL EFFECTS

- ❑ CANCER CAUSING EFFECTS
- ❑ DECREASE IN NUTRITIVE VALUES
- ❑ BIOLOGICAL EFFECTS



CANCER CAUSING EFFECTS

- ❑ **CANCEROUS CELLS IN BLOOD**
- ❑ **TUMORS**
- ❑ **CREATION OF AGENTS**
- ❑ **ELEMENTAL FOOD**
- ❑ **UNSAFE FOR BABY'S MILK**



DECREASE IN NUTRITIVE VALUES



□ DECREASE IN SOME TERMS OF FOOD

□ ENERGY CONTENTS

□ NUCLEOPROTEINS

BIOLOGICAL EFFECTS

□ DEGENERATION AND CIRCUIT BREAKDOWNS.

□ MICROWAVE SICKNESS.

□ REPRODUCTIVE SYSTEM.

□ HARMONES.

BIOHAZARD
DANGER



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