

Principles of Cooking

Theory and Practical

We can define cooking as the **transfer of energy** from a **h_____ source** to a **f_____**.

To cook successfully you must first understand the ways in which heat is transferred: **conduction, convection** and **radiation**.

You should also understand what the application of heat does to the proteins, sugars, starches, water and fats in food.

Heat Transfer: Heat is type of energy. When something gets **hot**, its molecules have absorbed energy. Molecules vibrate rapidly and expand. **Try rubbing your hands together really fast. Feel the heat! It is the almost the same principle.**

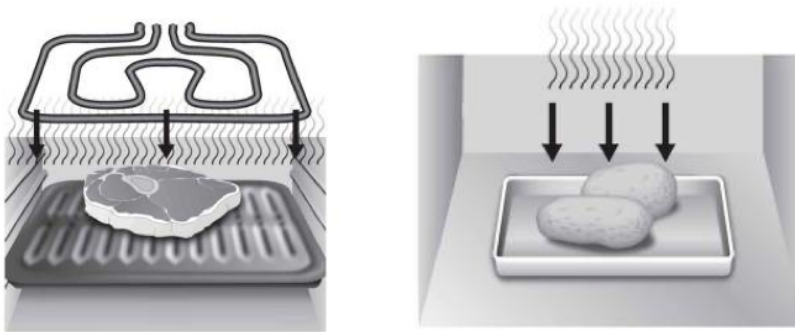
- **Conduction:** Movement of heat from one item to another through **direct** contact



- **Convection:** transfer of heat through a **fluid** (liquid or gas)
 - Natural convection
 - Mechanical convection



- **Radiation:** Different from conduction and convection. Radiation **does not require** physical **contact** between the heat source (where the heat comes from) and the food.
 - Infrared cooking
 - Microwave cooking



The Effects of Heat	
English	Chinese
Proteins coagulate	
Starches gelatinize	
Sugars caramelize	
Water evaporates	
Fat melts	

The Effects of Heat	Example:
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Proteins coagulate	If we cook an egg, it goes from liquid to a solid. These are the proteins 'coagulating'
Starches gelatinize	When we heat (cook) potatoes in water, the starch inside goes softer, lightens (goes clearer).
Sugars caramelize	If we heat sugar, it caramelizes . We often use process when making desserts. We also use this for the brown colour on breads and even meat.
Water evaporates	All foods contain water . When we apply heat, the water evaporates . This happens when food becomes dry.
Fat melts	Fat is the greasy substance in many plants or animals. Take butter (at 5c it is solid), when we heat it, eventually it becomes a liquid . If it then returns to 5c, it becomes solid .

TABLE 9.1 COOKING METHODS

METHOD	MEDIUM	EQUIPMENT
<i>Dry-Heat Cooking Methods</i>		
Broiling	Air	Overhead broiler, salamander, rotisserie
Grilling	Air	Grill
Roasting	Air	Oven
Baking	Air	Oven
Sautéing	Fat	Stove top
Pan-frying	Fat	Stove top, tilt skillet
Deep-frying	Fat	Deep-fat fryer
<i>Moist-Heat Cooking Methods</i>		
Poaching	Water or other liquid	Stove top, oven, steam-jacketed kettle, tilt skillet
Simmering	Water or other liquid	Stove top, steam-jacketed kettle, tilt skillet
Boiling	Water or other liquid	Stove top, steam-jacketed kettle, tilt skillet
Steaming	Steam	Stove top, convection steamer
<i>Combination Cooking Methods</i>		
Braising	Fat, then liquid	Stove top, oven, tilt skillet
Stewing	Fat, then liquid	Stove top, oven, tilt skillet

Cooking Methods

- Dry-heat cooking methods
 - Air
 - Fat
- Moist-heat cooking methods
 - Water
 - Steam
- Combination cooking methods
 - Employ both dry- and moist-heat methods

Dry-Heat Cooking Methods

English	Chinese
Broiling	
Grilling	
Roasting and baking	
Poêléing	
Sautéing	
Stir-frying	
Pan-frying	
Deep-frying	

Moist-Heat Cooking Methods

- Poaching
 - Submersion poaching
 - Shallow Poaching
- Boiling
- Steaming

TABLE 9.4 MOIST-HEAT COOKING METHODS

METHOD	LIQUID'S TEMPERATURE	LIQUID'S CONDITION	USES
Poaching	160–180°F/71–82°C	Liquid moves slightly but no bubbles	Eggs, fish, fruits
Simmering	185–205°F/85–96°C	Small bubbles break through the liquid's surface	Meats, stews, chicken
Boiling	212°F/100°C	Large bubbles and rapid movement	Vegetables, pasta
Steaming	212°F or higher/100°C or higher	Food is in contact only with the steam generated by a boiling liquid	Vegetables, fish, shellfish

Summary of worksheet	Summary of worksheet in Chinese

In your opinion, what is the most important thing to remember?

What are the keywords from this worksheet?

English:	Chinese translation: