

# Vegetables

**Unit:** Culinary Arts & Hospitality

**Problem Area:** Fruits and Vegetables

**Lesson:** Vegetables

■ **Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

- 1** Summarize how vegetables are classified and describe how to properly purchase and store fresh vegetables.
- 2** Describe the principles and methods of cooking vegetables.

■ **Resources.** The following resources may be useful in teaching this lesson:

“How to Store Fruits and Vegetables,” *REAL SIMPLE*. Accessed Dec. 22, 2019.  
<https://realsimple.com/food-recipes.shopping-storing/more-shopping-storing/how-to-store-vegetables>.

Labensky, Sarah R. and Alan M. Hause. *On Cooking: A Textbook of Culinary Fundamentals*, 4<sup>th</sup> ed. Pearson, 2007.

McGraw-Hill Education. (2016). *Culinary essentials*. Columbus, OH.

“Selecting Fresh Vegetables,” *Better Homes & Gardens*. Accessed Dec. 22, 2019.  
<https://www.bhg.com/recipes/how-to/cooking-basics/how-to-select-fresh-vegetables/>.



## ■ **Equipment, Tools, Supplies, and Facilities**

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

## ■ **Key Terms.** The following terms are presented in this lesson (shown in bold italics):

- bouquetiere
- bulb vegetable
- flower vegetable
- fruit vegetable
- hasten
- leaf vegetable
- mandoline
- produce
- ripe
- root vegetable
- seed vegetable
- stem vegetable
- tuber vegetable
- unripe

## ■ **Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

*Collect a variety of produce that represents different parts of the plant. Items could include asparagus (stem), peppers (fruit), carrots (root), Brussels sprouts (leaves), garlic or onion (bulb), potato (tuber) and okra (seed). Display these vegetables and ask the following questions "Where have you seen these items before?" "What vegetables are your favorite to eat?" "Do you recognize any of these vegetables?" Begin a discussion on how vegetables are plants and draw or show a picture of the common parts of a plant. Have students guess which vegetable comes from which part of the plant.*

# CONTENT SUMMARY AND TEACHING STRATEGIES

**Objective 1:** Summarize how vegetables are classified and describe how to properly purchase and store fresh vegetables.

**Anticipated Problem:** How are vegetables classified? What should you look for when purchasing fresh vegetables? What market forms of vegetables are available for purchase? How should fresh vegetables be properly stored?

## I. Vegetables

- A. A **vegetable** is a plant or part of a plant used as food, typically an accompaniment to meat or fish. Different parts of the vegetables are eaten, including the flowers, seeds, stems, leaves, roots and tubers. Vegetables are versatile foods that add color, flavor, and texture to any meal.
- B. Vegetable Classifications: Vegetables are classified based on which part of the plant is being eaten. The following are the eight classifications of vegetables.
1. FLOWERS: A **flower vegetable** comes from the flower of the plant. These vegetables can be cooked or eaten raw. Examples of flower vegetables are cauliflower and broccoli.
  2. SEEDS: A **seed vegetable** comes from the seeds of the plant, which is the part of the plant that grows new plants. These vegetables are high in nutrients and require minimal cooking. Examples of seed vegetables include beans, corn and peas.
  3. STEMS: A **stem vegetable** is the edible stem of the plant, when the stalk is the main part of the vegetable. These vegetables are tender, needing minimal cooking. Examples of stem vegetables are celery and asparagus.
  4. LEAVES: A **leaf vegetable** is the edible leaves of plants. Leaf vegetables are tender and can be eaten raw or require minimal cooking. Examples of leaf vegetables include cabbage, lettuce, Brussel sprouts, spinach and kale. When eaten raw they are known as salad and when eaten cooked these vegetables are known as cooked greens.
  5. ROOTS: A **root vegetable** is the fleshy, enlarged root of a plant used as a vegetable. Root vegetables store the entire plant's food supply. Some root vegetables are eaten raw and some require cooking. Root vegetables include carrots, turnips and radishes.
  6. TUBERS: A **tuber vegetable** grow underground on the root of a plant and is the underground system that stores nutrients. This part of the plant must be cooked and cannot be eaten raw. The only tuber vegetable is the potato.
  7. BULBS: A **bulb vegetable** grows underground just below the surface and produces a fleshy, leafy shoot above the ground. Bulb vegetables have fleshy

leaves surrounding the underground part of the stem. These vegetables can be eaten raw or cooked and are used in a variety of recipes. Bulbs include onions and garlic.

8. FRUITS: A **fruit vegetable** is a fleshy product that contains seeds which are sometimes eaten. Most vegetables from the fruit part of the plant can be eaten raw. These fruit vegetables include tomatoes, cucumbers, peppers. Fruit vegetables that are eaten cooked include eggplant and squash.

C. Purchasing Vegetables: The quality of ingredients used to prepare dishes directly affects the outcome of the finished product. Vegetables are no different and understanding how to select fresh, high quality vegetables will help ensure fresh, flavorful dishes.

1. GRADING: The USDA provides a voluntary grading system for vegetables that is used by almost all wholesalers. Grades are based on the appearance, quality, and condition of vegetables when they arrive on the market. Vegetables are graded as:

- a. U.S. Extra Fancy
- b. U.S. Fancy
- c. U.S. Extra No. 1
- d. U.S. No. 1

Premium vegetables are classified as U.S. Extra Fancy. When choosing vegetables to use in a foodservice operation, you should look for the highest quality product. For the retail market, some vegetables are graded differently. For example, onions, potatoes and carrots are graded by an alphabetical system, with Grade A being the best.

2. RIPENING: **Ripe**, is when a vegetable is developed to the point of readiness to harvest or eat. Although many vegetables are fully ripe when purchased, they will continue to ripen when exposed to oxygen in the air. The ripening rate depends on the type of vegetable and the way it is stored. Some vegetables will require continued ripening. For example, tomatoes and other fruit-vegetables may be purchased **unripe**, meaning not ready to eat, so they are less damaged during shipping. With these fruit vegetables you can **hasten**, or speed up the ripening process by exposing these fruit vegetables to ethylene gas.
3. SELECTION QUALITIES: Aside from checking to see if a vegetable is graded highly or ripe, there are a few more qualities to look for when selecting fresh vegetables. When shopping, take a few minutes to inspect the **produce**, which include anything that has been produced or grown, by farming. Look for plump, crisp, bright-colored vegetables that are heavy for their size. The heaviness will indicate that the vegetables has a lot of moisture, which is a good quality to have. Avoid vegetables that are bruised, shriveled, moldy or blemished.
4. MARKET FORMS: Vegetables can be purchased in a variety of ways. To purchase the highest quality of vegetable, purchasing fresh vegetables is the best bet. However, many recipes do not always require vegetables to be fresh

and other forms of vegetables may be a better or more convenient choice. Vegetables can be purchased in the following ways:

- a. Canned: Almost every variety of vegetable is available canned, which brings many advantages to the kitchen. Canned vegetables are already cleaned, peeled, cut into pieces and cooked. Combinations of vegetables combined with seasonings and flavorings are also available canned. Additionally, they have been heat-treated to kill microorganisms. Canning vegetables effectively preserves the flavor and texture of the vegetables, however the heat used during canning softens most vegetables and can cause some nutrient loss. Canning can also dull the color of the vegetables.
  - b. Frozen: Frozen vegetables offer convenience similar to that of canned vegetables, but the quality of frozen vegetables is higher. Most nutrients are able to be retained during freezing and vegetables will also keep their bright colors and flavors because of the quickness with which they are precooked and frozen. Some frozen vegetables are frozen raw, while others are completely cooked and will require only to be thawed and reheated before serving. Some vegetables are frozen with a sauce, for example broccoli and cheese or corn and butter.
  - c. Dried: Dried vegetables are not as common as canned or frozen vegetables. The drying process will affect the appearance, taste, and texture of the vegetables. However, the advantage of using dried vegetables is convenience.
  - d. Preserved: Techniques like canning, freezing, and drying are used to lengthen the shelf life of vegetables. These techniques may affect the flavor and texture of vegetables.
- D. Storing Vegetables: Different vegetables will require different storage conditions. Starchy vegetables, such as potatoes, winter squash and vegetables in the onion family, are best stored at 60°F to 70°F in a dry location. If these vegetables are stored in a refrigerator, they will lose flavor and texture. Most other vegetables should be stored at refrigerator temperatures of 41°F or below. Vegetables should be stored away from fruits that emit ethylene gas, such as bananas, due to the gas continuing to ripen the vegetable and can cause it to spoil quicker.

**Teaching Strategy:** Many techniques can be used to help students master this objective. Use VM–A through VM–E to facilitate a discussion on the classification of vegetables and the principles of selecting and storing vegetables

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**Objective 2:** Describe methods of cooking vegetables.

**Anticipated Problem:** What are the principles of cooking vegetables? What are the different methods vegetables can be cooked?

## II. Cooking Vegetables

- A. Unlike fruits, most vegetables are served cooked. Cooking will soften the vegetables and intensify their flavors. The cooking process will also make them easier to chew and digest. Efficiently preparing and arranging vegetables is an important step in cooking vegetables.
1. **WASHING:** Since vegetables grow outside and often close to the ground, they can pick up sand, dirt, grit, chemicals and even insects. It is very important to clean vegetables thoroughly just before preparation. Since water can remove nutrients from vegetables, clean the produce quickly under cold running water, do not soak. Follow the following guidelines when cleaning vegetables:
    - a. Scrub root vegetables with a strong bristled brush
    - b. Soak vegetables, such as cabbage, in salted water for a short period of time. This will help draw out the insects.
    - c. Store cut vegetables, such as carrots, in the refrigerator until ready to be used.
    - d. Unlike other vegetables, leafy green vegetables are washed in a water bath. This allows debris and sand to settle to the bottom of the vegetable sink. To avoid further contact with the debris, lift the greens out of the water when finished.
  2. **PEELING, CUTTING AND SHAPING:**
    - a. The way you peel, cut and shape vegetables will influence how they will cook and how they will look when they are served. Depending on how the vegetable is being used, will determine how they will need to be prepared.
    - b. Trim off and discard the inedible skins, leaves, stems, and stalks. A vegetable peeler can be used to remove thin layers of skin.
    - c. Cut vegetables into uniform pieces to ensure even cooking. A food processor can also be used to uniformly cut vegetables. A **mandoline** is used for slicing vegetables, such as potatoes.
- B. Cooking vegetables with dry heat
1. Cooking vegetables with dry heat preserves flavors and nutrients. Since vegetables are not submerged in water, there is no risk of nutrients leaching into liquid.
  2. **BROILING AND GRILLING:**
    - a. Broiling cook vegetables quickly with relatively high heat in the oven. Arrange slices or chunks of vegetables on a sheet pan. The heat will caramelize the vegetables and give them a pleasant flavor. Many kinds of vegetables can be broiled, including potatoes, tomatoes, corn, peppers,

squash, eggplant and zucchini. Broiling can also be used to reheat a vegetable that has already been cooked.

- b. Grilling vegetables also utilizes high heat and cooks quickly. Vegetables can be placed onto wooden or metal skewers for grilling, such as mushrooms, onions or tomatoes. Larger vegetables, such as eggplant and squash, can be cut and placed directly onto the grill.
  3. **BAKING:** Baking cooks vegetables at a lower temperature for a longer period of time than grilling or broiling. Squash, onions, potatoes, and other root vegetables are perfect for baking. They should be well cleaned, peeled and unless baked whole, cut into uniform pieces. Vegetables are often baked into casseroles and are a good option for vegetarians or those wanting a healthier meal option.
  4. **SAUTEING:** Sautéing cooks vegetables in a small amount of butter or oil in a hot sauté pan. Sautéing happens quickly due to the heat being on high. This means that all vegetables must be cut and ready to cook before beginning the cooking process. Many vegetable varieties can be sautéed such as mushrooms, summer squash, and onions. Firmer vegetables such as broccoli, Brussels sprouts, carrots, beans, celery and potatoes need to be blanched prior to sautéing, otherwise they will not get soft enough. Sautéed vegetables should be brightly colored and still slightly crisp.
  5. **DEEP-FRYING:** Deep-frying coats vegetables in a batter, then submerges in hot oil. Potatoes are a popular deep-fried vegetable turning into French fries or potato chips. Other vegetables that are commonly deep-fried include onions, mushrooms, cauliflower, okra, and eggplant. It is important to remember to cut vegetables into even pieces to ensure they cook evenly and wipe off any excess moisture prior to deep-frying.
- C. Cooking vegetables with moist heat
1. Moist cooking methods used in vegetable cookery include blanching, parboiling, steaming, simmering, poaching, and braising. Before cooking with these techniques, clean vegetables thoroughly and cut them into uniform pieces, this will allow the vegetables to cook evenly. Clean all surfaces and utensils that touch fresh vegetables with hot water and soap before and after preparation. To retain nutrients, cook vegetables for the minimum amount of time needed and in a small amount of liquid. [NOTE: Green vegetables need to be cooked without a cover to let the acid escape. However, red vegetables need to be cooked covered to keep the acid inside. Red vegetables also need to have an acid such as vinegar added to the water to replace the lost acid.]
  2. **BLANCHING:** Blanching involves plunging foods briefly into boiling water and then plunging them into cold water to stop the cooking process. Blanching is also used to increase the color and flavor of vegetables before freezing them. Often, blanching is a first step for a second cooking process such as sautéing. [NOTE: It can also aide in the process of removing skins from tomatoes.]
  3. **PARBOILING:** Parboiling partially cooks vegetables, then another method of cooking is used to finish cooking; such as grilling or sautéing. Parboiling also removes strong flavors and loosens the skins or peels of vegetables. Winter

squash, root vegetables such as potatoes, and vegetables like cabbage and kale are commonly parboiled.

4. STEAMING AND SIMMERING:

- a. Steaming cooks by being placing vegetables above boiling water in a perforated container.
- b. Simmering cooks vegetables in a shallow layer of lightly boiling water, using just enough water to cover the bottom of the pan, and then cover with a lid.
- c. Both steaming and simmering techniques result in the same: soft, colorful, flavorful vegetables.

5. POACHING AND BRAISING:

- a. Poaching cooks vegetables in just enough simmering liquid to cover the food.
- b. Braising cooks by simmering vegetables in a seasoned liquid or sauce in the oven. Save the liquid and serve it with the vegetables for added flavor. Popular vegetables used for braising are cabbages, celery, leeks, onions, Swiss chard and fennel.

D. Determining Doneness of vegetables

1. Every vegetable has slightly different characteristics when it is properly cooked, so there is not one single rule to follow for cooking time. Instead of relying on a specific cooking time, pay attention to how vegetables look, taste, smell and feel.
2. Most vegetables are done cooking when they are just tender enough to cut with a fork. Leafy vegetables should become brighter in color than when they are raw, and should be slightly wilted.

E. Plating and garnishing vegetables

1. An important factor in cooking vegetables is its visual appeal on the plate. Uniform-pieces arranged in an attractive pattern make the entire plate look appealing. Plate vegetables using the following arrangements:
  - a. Place the main entrée to the front of the plate, with the vegetables to the back.
  - b. Place the main item in the center of the plate with the vegetables placed randomly around the main item. You could also arrange vegetables in a pattern.
  - c. Place vegetables in the center of the plate with the main item leaning against the vegetables. The main item could also be sliced and placed around the vegetables.
  - d. Place a **bouquetiere**, a bouquet of three or more vegetables, arranged on a plate surrounded by other foods.
2. Plating vegetables allows the use of a lot of creativity. Simple garnishes, such as chopped scallions or minced lemon zest can add visual appeal, texture and flavor to the vegetables.

**Teaching Strategy:** Many techniques can be used to help students master this objective. Use VM–E through VM–F to facilitate a discussion on prepping and cooking vegetables. Assign LS–A.

- **Review/Summary.** Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. If a textbook is being used, questions at the ends of chapters may also be included in the Review/Summary.
- **Application.** Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.
- **Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

## ■ **Answers to Sample Test:**

### **Part One: Matching**

1. c
2. f
3. d
4. b
5. a
6. e

### **Part Two: Completion**

1. bulb vegetable
2. stem vegetable
3. tuber vegetable
4. leaf vegetable
5. root vegetable
6. fruit vegetable

### **Part Three: Short Answer**

1. Answers may vary and would be similar to the following. To retain nutrients in vegetables, cook in small amounts of water. Moist cooking methods who utilize large amounts of water would not be the best choices to retain nutrients. Dry cooking methods, such as, grilling, broiling, baking and sautéing, would be better options to retain nutrients.

2. Answers may vary and would be similar to the following. Aside from checking to see if a vegetable is graded highly or ripe, there are a few more qualities to look for when selecting fresh vegetables. When shopping, take a few minutes to inspect the produce, which include anything that has been produced or grown, by farming. Look for plump, crisp, bright-colored vegetables that are heavy for their size. The heaviness will indicate that the vegetables has a lot of moisture, which is a good quality to have. Avoid vegetables that are bruised, shriveled, moldy or blemished.

# Vegetables

## ► Part One: Matching

**Instructions:** Match the term with the correct definition.

- |            |                |
|------------|----------------|
| a. produce | d. bouquetiere |
| b. hasten  | e. vegetable   |
| c. ripe    | f. mandoline   |

- \_\_\_\_\_ 1. When a vegetable is developed to the point of readiness to harvest or eat
- \_\_\_\_\_ 2. Used for slicing vegetables, such as potatoes.
- \_\_\_\_\_ 3. A bouquet of three or more vegetables, arranged on a plate surrounded by other foods
- \_\_\_\_\_ 4. Speed up the ripening process
- \_\_\_\_\_ 5. Includes anything that has been produced or grown, by farming
- \_\_\_\_\_ 6. A plant or part of a plant used as food

## ► Part Two: Completion

**Instructions:** Provide the word or words to complete the following statements.

1. A(n) \_\_\_\_\_ grows underground just below the surface and produces a fleshy, leafy shoot above the ground.
2. A(n) \_\_\_\_\_ is the edible stem of the plant, when the stalk is the main part of the vegetable.
3. A(n) \_\_\_\_\_ grows underground on the root of a plant and is the underground system that stores nutrients.
4. A(n) \_\_\_\_\_ is the edible leaves of plants.



5. A(n) \_\_\_\_\_ is the fleshy, enlarged root of a plant used as a vegetable.
6. A(n) \_\_\_\_\_ is a fleshy product that contains seeds which are sometimes eaten.

### ► Part Three: Short Answer

**Instructions:** Answer the following.

1. Describe the cooking methods that are best to retain the nutrients of the vegetables.
2. Describe qualities to look for when selecting and purchasing fresh vegetables.

# VEGETABLES

Vegetables are parts of plants that are consumed by humans or other animals as food. Vegetables are classified by the part of the plant they come from and include fruits, flowers, seeds, stems, tubers, roots, leaf and bulb vegetables.



## RIPE VS. UNRIPE

A ripe vegetable is when it is at its peak quality and ready to be eaten versus unripe is when the vegetable is not ready to be eaten just yet. When tomatoes are unripe they are green and turn red as they ripen.



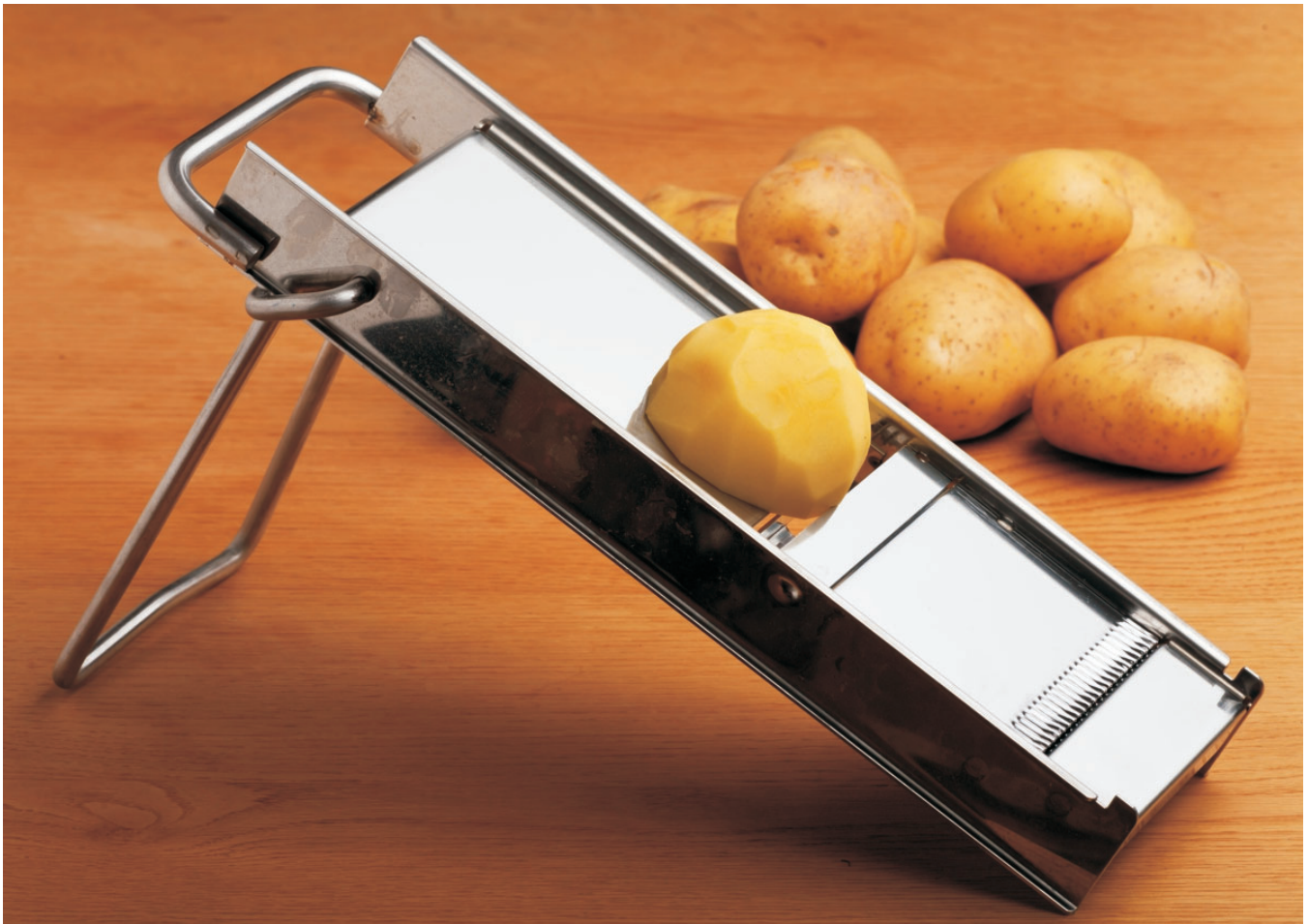
# PRODUCE

Produce consists of things that have been produced or grown, especially by farming, such as, fruits and vegetables.



# MANDOLINE

A mandoline is a cooking utensil used for slicing and for cutting food products. With suitable attachments, it can make crinkle-cuts and julienne cuts. Common vegetables used with a mandoline slicer are potatoes, cucumbers, zucchini, carrots, onions, leeks and more.



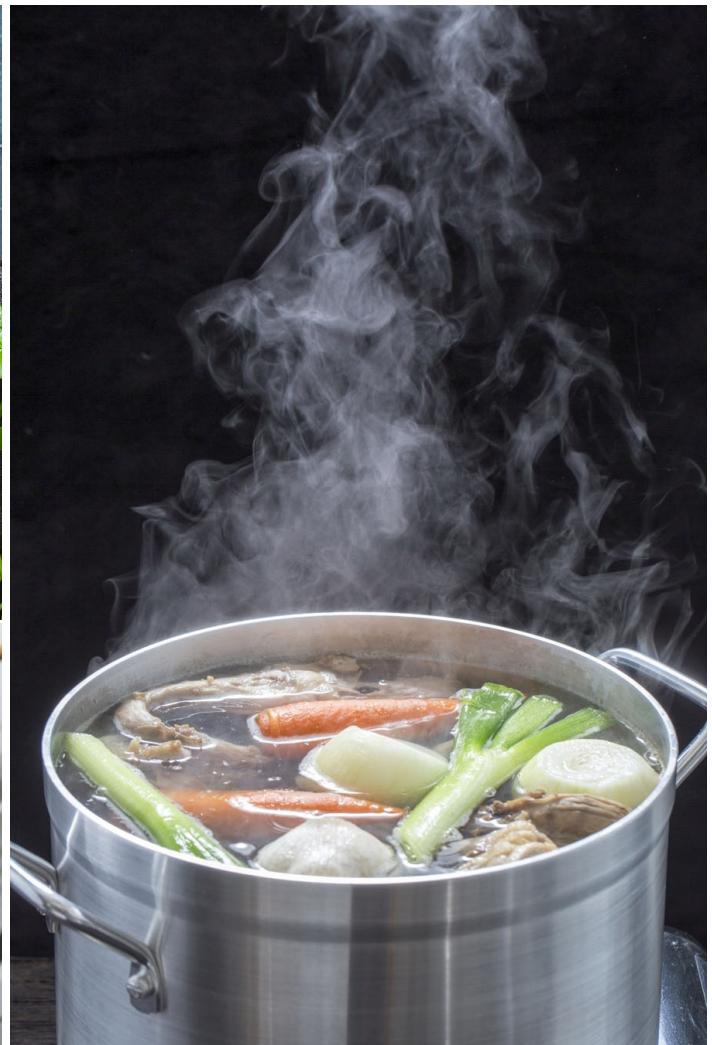
# DRY HEAT COOKING METHODS

There are many dry heat cooking methods that can be used to prepare vegetables. Grilling, broiling, sautéing, and roasting, to name a few. Dry heat cooking methods help preserve flavors and nutrients, since there is no liquid involved.



# MOIST HEAT COOKING METHODS

Moist heat cooking methods are also great ways to cook vegetables. Moist cooking methods, such as, braising, simmering, blanching, poaching and parboiling, result in soft, colorful and flavorful vegetables. Due to the liquid in these cooking methods, nutrients will be lost.



# Vegetable Research and Buffet

## Purpose

The purpose of this activity is to research classifications of vegetables and prepare a vegetable dish using a vegetable from that group.

## Objectives

1. Select a vegetable classification to research.
2. Conduct the research.
3. Create a presentation of the information you collected.
4. Present your dish or food item to the class and to your instructor.
5. Prepare the food item and/or variations of the food item for taste testing during the presentation.
6. OPTIONAL: Take pictures of the dish or food item variations for your culinary arts portfolio.

## Materials

- ◆ lab sheet
- ◆ device with Internet access
- ◆ projection device
- ◆ ingredients as needed to prepare the dish and/or variations of the food item

## Procedure

1. Work with a partner or small group to complete this lab activity. Review your class notes about vegetables.



2. Begin by choosing a classification of vegetable. A list of possible classifications is shown below. Each classification can only be chosen once.
  - a. Flowers
  - b. Seeds
  - c. Stems
  - d. Leaves
  - e. Roots
  - f. Tubers
  - g. Bulbs
  - h. Fruits
3. First, conduct some research about the vegetable classification group chosen in Procedure 2. Collect information on: the vegetables under the classification chosen, selection qualities for those vegetables, storage requirements for those vegetables, cooking methods, recipes utilizing those vegetables and preparation techniques.
4. Second, create a visual that would be used to present your information to the class and your instructor. You will be instructing the class about your vegetable classification and dish. Visuals could include:
  - a. Google Slides
  - b. PowerPoint Slides
  - c. Prezi Presentation
  - d. Infographic
5. Third, prepare the dish or variations of the vegetable. Take pictures of the dish or food item for your presentation and for your culinary arts portfolio.
6. Prepare a 3-minute presentation of the dish or food item.
7. Finally, present your research to the class.
8. Turn your completed lab sheet, research, and a print and/or shared copy of the presentation in to your instructor.