

Dutch Oven Cooking

Project Manual
Unit 2



BUL 939



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Acknowledgments

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Note to Project Helper

Congratulations, a young person has asked you to be his or her leader. Your role as a leader is very important to the total educational experience of the young person. Not only will you be providing encouragement and recognition, you will also be the key person with whom the young person shares each of the experiences outlined in the member manual.



The Dutch Oven curriculum is intended to help youth have fun and be safe while cooking outdoors. The curriculum is designed to help youth learn valuable life skills through participation in Dutch oven cooking activities. By using the experiential learning model described in the next few pages and purposefully introducing life skills, youth will learn skills beyond cooking that they can apply for a lifetime!

Introduction

Dutch oven cooking is a special activity that can be enjoyed by all. The fun comes not only from eating, but also along the way to the finished product. This project was written for those who love being in the outdoors, whether that means the mountains, at a state campground, or right in your own backyard. Unit 1 gave the basics to get started. Unit 2 will explore the history of Dutch oven cooking and will help youth increase their skill at coordinating temperatures and controlling several Dutch ovens at one time. Unit 2 also introduces youth to more advanced cooking methods involving food types that emphasize meats and yeast breads.

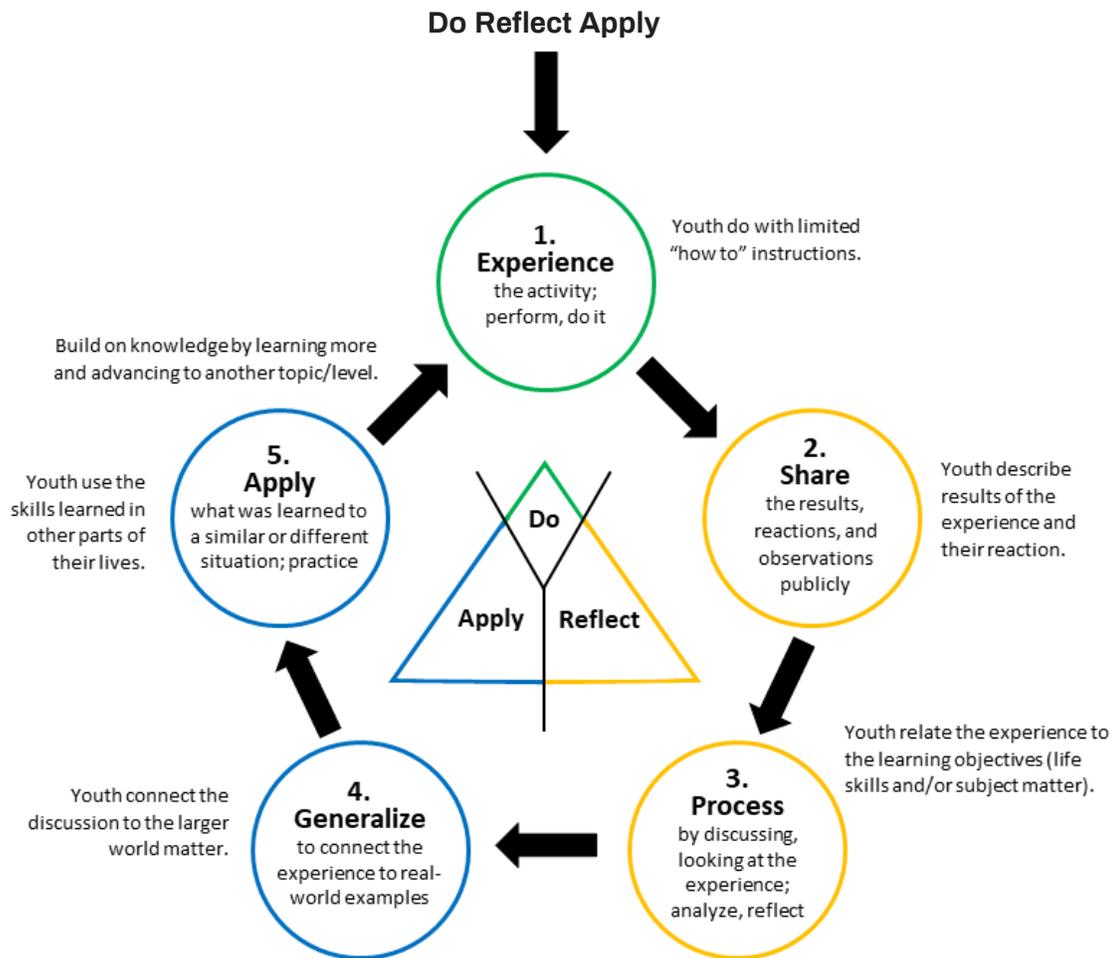
Because of the nature of this project (lifting heavy Dutch ovens, lighting charcoal and handling hot coals and ovens) the recommended minimum age is 12 years and the 4-H member should have completed Dutch Oven Unit 1 before beginning Unit 2.

Note to project helpers: There is one project Helper's Guide for both units of this project. This guide includes additional information and helpful advice for you to guide youth through the Dutch oven project.



Experiential Learning Model

The Experiential Learning Model (see “Do Reflect Apply” figure below) is used to help guide learning throughout this manual. The five steps encourage youth to try to do an activity before being told or shown how (**experience**). The project leader or helper will ask youth to describe what they have experienced and their reaction (**share**). The questions throughout the manual may be used to help youth analyze what they’ve accomplished (**process**). Youth will also want to think about how the activities and skills gained can help in future experiences (**generalize**). The last step asks youth to share how they can use this/these skill(s) in other parts of their life (**apply**). Do not hesitate to ask your leader or an Extension educator for help.



Courtney F. Dodd, Ph.D. Assistant Agency Director & State 4-H Program Leader. Texas A&M AgriLife Extension Service. Used with permission.



Project Requirements

Put a check ✓ by each requirement as you complete it. *This project may be repeated; each year complete the following:*

- Complete** In member's current manual:
 - Complete all reflection questions
 - Complete 3 Beyond Cooking activities
- Complete** 4-H Involvement Report
 - 4-H Project Record Book
- Cook** A minimum of 10 recipes (using new recipes not previously used), with at least one from each category and no more than two from each of the following categories:
 - Soup or Stew
 - Dessert
 - Vegetable
 - Meat (beef, pork, lamb, game)
 - Yeast Breads or Rolls
 - Fowl (turkey, chicken, game hen)
 - Sweet Rolls or Specialty Breads

At least once, each youth will cook two or more Dutch ovens at the same time.
- Create** Continue keeping a recipe file or book (started in Unit 1) that includes everything you have cooked in previous years plus additional recipes cooked this year to total a minimum of 34 recipes.
- Give** An oral presentation related to this project.
- Optional:** Participation in a Dutch oven cook-off is encouraged but not required.

Exhibit Requirements

1. Completed Project Manual, Record Book, and Involvement Report.
2. Your Dutch oven recipe file or book. All recipes should be neat and orderly. There should be a minimum of 34 recipes—there can be more although extras will not affect the judging outcome.
3. A nonperishable yeast bread, roll, sweet bread, or specialty bread cooked in the Dutch oven. Include the recipe used. Must be displayed on a plate, NOT in the Dutch oven. **DO NOT BRING YOUR DUTCH OVEN.**

OR

A poster (14" x 22") or display illustrating what you learned from this project this year.



Dutch Oven Cooking Project

Prepare at least 12 recipes, no more than two from any category. Recipes may be used from the recipe book that accompanies this project or from other sources. Recipes should be different from those previously used.

List the foods you cooked the *first* year in this unit under the appropriate category.

Soup or Stew

1. _____

2. _____

Vegetable

1. _____

2. _____

Dessert

1. _____

2. _____

Yeast Bread or Roll

1. _____

2. _____

Sweet Roll or Specialty Bread

1. _____

2. _____

Meat (beef, pork, lamb, game)

1. _____

2. _____

Fowl (turkey, chicken, game hen)

1. _____

2. _____

List the foods you cooked the *second* year in this unit under the appropriate category.

Soup or Stew

1. _____

2. _____

Vegetable

1. _____

2. _____

Dessert

1. _____

2. _____

Yeast Bread or Roll

1. _____

2. _____

Sweet Roll or Specialty Bread

1. _____

2. _____

Meat (beef, pork, lamb, game)

1. _____

2. _____

Fowl (turkey, chicken, game hen)

1. _____

2. _____



Empower People To Make Healthy Shifts

Making changes to eating patterns can be overwhelming. That's why it's important to emphasize that every food choice is an opportunity to move toward a healthy eating pattern. Small shifts in food choices—over the course of a week, a day, or even a meal—can make a big difference. Here are some ideas for realistic, small shifts that can help people adopt healthy eating patterns.



High Calorie Snacks → Nutrient-Dense Snacks



Fruit Products with Added Sugars → Fruit



Refined Grains → Whole Grains



Snacks with Added Sugars → Unsalted Snacks



Solid Fats → Oils

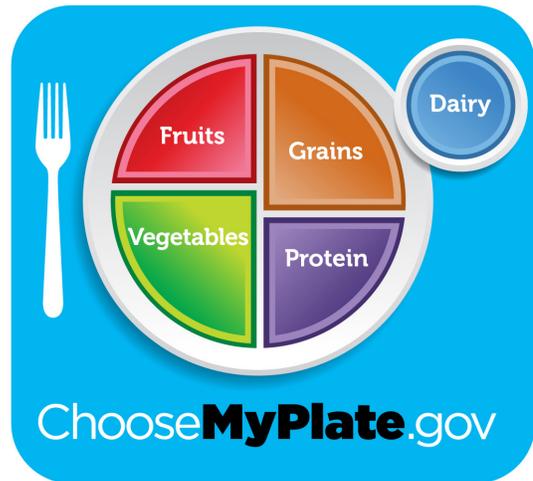


Beverages with Added Sugars → No-Sugar-Added Beverages

Source: U.S. Department of Health and Human Services and U.S. Department of Agriculture, https://health.gov/dietaryguidelines/2015/resources/infographic/Press/DGA_Static-Fig-2-2.jpg.

MyPlate is a picture or icon used to help understand how to make better food choices. It is based on the 2015 Dietary Guidelines for Americans.

www.ChooseMyPlate.gov



Source: United States Department of Agriculture, www.choosemyplate.gov.



Food Safety

Many experienced cooks think they know when food is fully cooked just by “eyeballing it.” They look at it and trust their experience. Experience is good, but sometimes it can be misleading. For instance, determining if meat is fully cooked simply by the color of the meat is definitely misleading. Meat color—pink or brown—can fool you! Think about this ... one out of every four hamburgers turns brown in the middle BEFORE it has reached a safe internal temperature, according to recent USDA research.

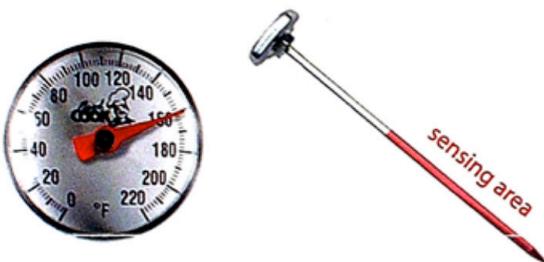
Source: United States Department of Agriculture, www.fsis.usda.gov/wps/portal/food-safety-education/teach-others/fsis-educational-campaigns/is-it-done-yet

Use a food thermometer.
Keep your family safe.
Be a better cook.

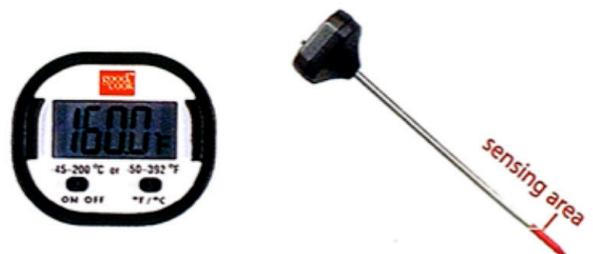
How to Use a Food Thermometer

To correctly measure the internal temperature of food being cooked, food thermometers must be properly inserted into the item being checked.

- For dial thermometers, the stem should be inserted, either straight or at an angle, about 2 inches into the thickest part of the food, without touching bone or fat. The temperature should register in about 15 seconds. Thin foods such as hamburgers, chicken breasts, or pork chops may require insertion in the side.
- The stems of digital thermometers should be inserted about half an inch or less, straight into the center of the thickest part of the food, or at an angle without touching bone or fat. The temperature will take about 5 seconds to register. Digital thermometers are ideal for thin hamburgers, chicken breasts, and smaller pieces of meat or poultry.



Dial thermometer



Digital thermometer

Image source: Sandy McCurdy. “Ready, Set, Food Safe.” University of Idaho Extension, 2002.



Beyond Cooking

Is It Safe to Eat?

Match the food to the safe final cooking temperature on the thermometer by drawing a line from the food to the thermometer. Some temperatures will have multiple answers. After completing this activity, refer to the Dutch Oven Cooking Project Manual Unit 1 for a review of safe final cooking temperatures for each food listed below.

Discuss with your project helper why ground meat, steaks, and roasts require a different final cooking temperature.



Hamburger



Roast Beef (well done)



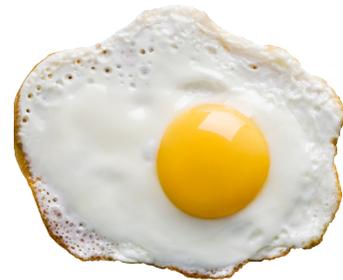
Fish



Poultry



Pork Chops



Eggs



History of Dutch Oven Cooking



Dutch oven cooking has a rich history in America dating back to when the colonies were first settled. Historically, the Dutch oven played a significant role in everyday cooking. Dutch ovens are sturdy and versatile. They can be used for cooking, baking, or frying foods including breads, soups or stews, meats, vegetables, and other side dishes and desserts.

The Dutch oven was a mainstay in every camp kitchen of settlers moving west, hunting camps in the wilderness, and most home kitchens. The number and type of Dutch ovens varied depending on the size of the household, wagon train, or hunting camp. While the cast iron oven is the most popular, aluminum ovens offer the benefit of being lighter weight for travelers. In addition to cast iron and aluminum, ceramic ovens are also manufactured and more typically used indoors. Dutch ovens have continued to evolve over the years in size and materials.



Beyond Cooking

To understand the importance of Dutch oven cooking and how it has been used in the past for everyday survival, write down your hypothesis to each of the questions below. (A hypothesis is a supposition or proposed explanation made on the basis of limited evidence and is used as a starting point for further investigation.) Discuss your hypothesis with others doing this activity, then research to find the answers to the questions.

My Hypothesis	My Research and Sources I Used
In what culture did the Dutch oven originate?	In what culture did the Dutch oven originate?
How did the use of the Dutch oven spread to other cultures and countries?	How did the use of the Dutch oven spread to other cultures and countries?
What technology has been developed to diminish the use of Dutch ovens?	What technology has been developed to diminish the use of Dutch ovens?
Why is it important to know the history of Dutch oven cooking?	Why is it important to know the history of Dutch oven cooking?



Choosing a Dutch Oven and Cooking Tools

When buying a Dutch oven, choose the size that fits your needs. The 12-inch Dutch oven is probably the most universal size used. It holds 6 quarts and serves about 8 to 12 people.

When purchasing a Dutch oven look for quality characteristics such as:

The lid fits snugly and doesn't rock. When cooking, a seal is formed between the lid and the pan and creates slight pressure so it is important that they fit together well.

Side walls and bottom are uniform thickness. If they are uneven, the heat will be uneven and food can burn more easily in the thin spots.

The inside surface is smooth, flat and free from large runs in the metal. The grainy texture is due to manufacturing methods. Usually, seasoning will correct a grainy texture and any small runs.

Adapted from: Joan S. Larsen. *Lovin' Dutch Ovens: A Cookbook for the Dutch Oven Enthusiast*. LFS, 1991.

The selection of the right oven depends on the type and amount of food to be cooked. The diameter of the oven determines the size. A number, usually cast on the lid, indicates the diameter.

Lodge Manufacturing sets the standard for most Dutch ovens. They have been casting ovens since 1896. Dutch ovens may be purchased at local hardware stores, grocery stores, or places that specialize in camping gear. The following chart applies to Lodge Dutch ovens. All sizes are 4 inches deep.

SIZE	CAPACITY	SUGGESTED USES AND SERVINGS*
8"	2 qts	Main dishes, 2–6 servings Side dishes, up to 10 servings
10"	4 qts	Main dishes, 2–12 servings Side dishes, up to 20 servings
12"	6 qts	Main dishes, 6–18 servings Side dishes, up to 30 servings
14"	8 qts	Main dishes, 8–25 servings Side dishes, up to 40 servings
16"	12 qts	Main dishes, 12–38 servings Side dishes, up to 60 servings

**Servings may vary. Main dishes are based on a 10-oz serving. Side dishes are based on a 6-oz serving.*



Listed below are recommended accessories and tools that make Dutch oven cooking easier and more convenient. Dutch Oven Cooking Unit 1 Project Manual has in-depth explanations of basic equipment.

Basic Equipment for Your Dutch Oven Tool Box

Charcoal bucket	Charcoal starter	Apron
Lid lifter and lid holder	Heavy oven mitt or leather gloves	Cooking stand
Charcoal and lighter	Charcoal tongs	Food tongs

Suggested Additional Equipment

Wind shield	Serving spatulas	Shovel
Whisk broom	Serving ladle	
Long-handled spoons	Hot water container	

Cooking Equipment

Mixing bowl	Measuring spoons	Large knife
Mixing spoons	Vegetable peeler	Cutting board
Measuring cups	Small paring knife	Can opener

Other Supplies

Paper towels	Cooking oil	Plastic or silicone
Aluminum foil	Dish towel	Scraper
Garbage bags	Dishcloth	

Reflection Question

First year: How would you adapt if you forgot or didn't have an essential accessory such as a lid lifter or a charcoal chimney?

Second year: Now that you have more experience, would your answer this year stay the same? If not, how would you change your answer?



Care and Keeping of Dutch Ovens

Typically, Dutch ovens may be purchased pre-seasoned or unseasoned. If the oven is purchased unseasoned, seasoning it must be done before the first use. If the oven is purchased pre-seasoned, it still needs to be washed with hot water before use. Iron and water have an affinity for each other causing rust to form instantly on the oven if it is not seasoned properly. Seasoning means simply baking layers of oil onto the surface of the Dutch oven to create a non-stick surface which makes cleanup easier and retards rust.

Before Using a New Dutch Oven

- Wash the oven in hot sudsy water using a brush or a plastic scratching pad. This takes off the factory finish that helps retard rust during shipment and storage. Avoid abrasive cleaners.
- Coat the inner and outer surfaces of the Dutch oven with a thin coat of vegetable oil or *food-grade* mineral oil (NOT butter, margarine, or lard). Spread it on with a rag and absorb any extra oil with a paper towel.
- Place the oven and lid separately in an unheated conventional oven. Heat the conventional oven to 300°F–350°F and bake the Dutch oven for 30–60 minutes. Allow oven to cool to room temperature.
- Spread another thin coat of vegetable oil over all surfaces of the Dutch oven. Bake again. Repeat this procedure 5 or 6 times.

The more times this is repeated, the better “seasoning” the oven will have. The finish is built up during this process. As this seasoning process causes some smoking, you may want to do this outside on a gas barbeque.

Cleaning and Storing

Cleaning your oven as soon as possible after every use is important. A dirty oven will deteriorate the seasoning. One of the best cleanup tools is a hard plastic or silicone scraper. This can scrape out the leftover food and not scratch the surface you have worked hard to build up. Wash the oven with warm water, do not use soap. Put the oven on a medium or medium low heat just long enough to dry it completely. Spread a thin coat of vegetable oil on the inside bottom and sides of the Dutch oven. Add a drop about the size of a nickel of vegetable oil. Put a paper towel in the oven to absorb any moisture and put the lid on the oven and store.

When deciding where to store your Dutch oven, choose a cool dry place. Do not store it where it will be damp because rust can easily start under these conditions. Crumpled newspaper or a paper towel inside the oven will absorb any moisture that may occur during storage.

Although the Dutch oven is very strong, it is also fragile. Just because it is metal does not mean it will not break. Dropping, banging together, or tossing it may cause cracks and splits that will ruin the oven.



Responsible Use of Fire

Keep safety in mind at all times when working with fire and hot coals. Stay alert and maintain respect for fire, hot coals, and hot Dutch ovens when preparing coals and cooking. Always be aware of your surroundings.

- Keep coals together. Coals are very hot and can easily burn a person or other flammable material.
- Do not drop charcoal briquettes or coals on the ground. Check the area often for stray coals.
- Burn charcoal briquettes outside only. Briquettes give off a toxic gas as they burn that is dangerous in confined areas.
- Use a lid lifter, heavy oven mitt, or leather gloves to handle hot lids and ovens. If using a Dutch oven tool, be sure the oven is secure and stable before moving or lifting and after repositioning.
- Use charcoal tongs and/or a shovel to move hot coals.
- Wear closed toe, sturdy shoes when cooking. Many shoes are made of synthetic materials that will melt if in contact with hot coals.
- Do not wear loose-fitting clothing that may hang into hot coals and catch fire. Be sure tablecloths and towels are away from hot coals.
- If possible, let coals completely cool in the same place they are used, or in a fire pit or grill. Never leave hot coals unattended.
- To properly dispose of used coals, place in a metal container and wet them down. Do not use plastic, wood, galvanized metal (hot coals and galvanized metal will give off noxious fumes) or other combustible material for a container. Keep container away from anything combustible such as vegetation, wood, or plastic.

Reflection Question

Answer the following before continuing with the project. *(Please write in complete sentences.)*

First Year: Describe an unsafe cooking situation you have been in or observed and what you did to make it safe.

Second Year: What advice would you give to an inexperienced Dutch oven cook to set up a safe cooking area?



Charcoal Chimney Starter Method

There are many ways to start briquettes. The charcoal chimney starter method is a good way to shorten the heating time of briquettes and to maintain even heat. The chimney starter is useful for more rapid heating of briquettes when lighter fluid is used. The chimney will ensure an even heat for the fuel. Charcoal chimneys may be purchased commercially; however, they may also be easily made from a few simple supplies.



To make your own chimney, use two or three sheets of newspaper, matches or a lighter, and a number ten (15-cup) tin can and follow these steps:

1. Cut off both ends of the can.
2. Punch holes every two inches around the lower edge of the can with a punch-type can opener.
3. Set the can down so that the holes are next to the ground.
4. Crumple two or three sheets of newspaper and place them in the bottom of the can.
5. Place charcoal briquettes on top of the crumpled newspaper.
6. Lift the can slightly and light the newspaper. Prop the bottom edge of the can on a rock to create a good draft into the bottom of the can that will flow through the punched holes. The can will get hot quickly. Be sure to use a heavy oven mitt, leather gloves, or a vise grip when handling the can.
7. The briquettes (now coals) will be ready to use in 30–40 minutes.
8. If a greater draft is necessary, prop the can on small rocks and fan the flames with a paper plate.
9. When the coals have ash around them, they are ready to use. Lift the chimney off the coals and spread out the coals. They are ready to use.

Beyond Cooking

Does a Homemade Charcoal Chimney Work as Well as a Purchased Chimney?

Make your own homemade charcoal chimney according to the directions above (steps 1–3) and have a purchased chimney on hand for the following experiment. In each chimney, light 10 briquettes and record your observations of the following:

Will there be a difference in how long it takes for the briquettes to be ready to use? Which is faster? Why?

Was it easier to light the briquettes in one chimney over the other? Why?

What different lighting techniques did you need to use for each charcoal chimney?

How long did it take before the briquettes were ready to use?



Beyond Cooking

Keeping Used Coals in Mind!

Materials needed: Briquettes, lighter fluid, matches, butane lighter, newspaper, sawdust starter cubes, chimney, tongs, shovel, charcoal bucket.

Lighting Activity 1: Use a double sheet of newspaper and roll it up diagonally into a ring. Repeat this with another sheet of newspaper. Place both rings into the chimney and fill the center with the desired number of charcoal briquettes. Light the newspaper on fire and wait until the paper is completely burned. Shortly after the newspaper is gone, the charcoal should begin to get warm.

Lighting Activity 2: Place 2–3 sawdust starter cubes under the chimney filled with briquettes. Light the sawdust starters on fire and let them burn and light the briquette on fire.

Lighting Activity 3: Fill the chimney with charcoal briquettes and squirt a small amount of lighter fluid on them. Be extremely careful and light the briquettes from the side after they have lighter fluid on them.

Note: All three lighting activities are good ways to start briquettes on fire. Each way should be done cautiously and on an approved safe surface like a cooking table, bricks, or cement surface. No fire should be started on asphalt, on grass, or near buildings.

Reflect on the activity and the importance of the surroundings of the cooking environment.

Was one lighting method more effective or efficient than another? Why?

Which lighting method do you prefer? Why?

What other lighting methods can you think of?

Hot Coals

Now that there are hot coals, what is the best way to dispose of them? There are a couple key components to be aware of when responsibly and safely taking care of used burning coals. The number one concern is the safety of people, buildings, facilities, vehicles, and any other object that could easily catch fire. The best way to properly dispose of the used coals is to have a metal bucket or burn barrel marked for coal disposal. These disposal containers should be carefully placed where they can be observed yet are not near anything that could easily catch fire.

Often there is not a metal bucket or burn barrel to use for coal disposal. This means the coals will have to go somewhere else. The second-best option is to look for a location without brush or dry grass or that is away from people. The coals should be dumped in a small hole that is roughly a foot deep. This way the coals can be covered with dirt and have water poured on them to ensure nothing else catches fire and no one gets burned.

As a very last resort if there is no disposal bucket or barrel, and there is not a safe location to dump the used coals, the next best option is to let the coals burn out in the chimney. This would be a last resort if none of the other options are feasible.

It is extremely important to responsibly dispose of hot coals. If used coals are not taken care of properly someone could get hurt, a building could catch fire, or something else could catch fire.



Using Different Methods of Cooking

Stacking Dutch Ovens

Stacking Dutch ovens to prepare an entire meal will impress your guests and can prove to be an efficient use of both space and coals. There are several elements to consider when stacking Dutch ovens.

- The largest ovens should be on the bottom of the stack, progressing to smaller ovens at the top ensuring the stack is stable before adding the next pot.
- Heat generated will increase from the bottom of the stack to the top, therefore, food items requiring the most heat should be near the top.
- If cooking similar foods (for example, cakes, breads, and cobblers) in a stack, move the ovens from top to bottom as well as rotate the ovens and lids in opposite directions for even heat.
- Stacks will need to be broken down in order to rotate the ovens and lids preventing hot spots. Lifting and rotating full ovens may require assistance and additional Dutch oven tools, leather gloves, or mitts.
- Check the progress of cooking in all of the ovens to ensure the foods are cooking evenly and adjust appropriately.
- Check the coals on each level and replenish as needed.

When stacking ovens, it is especially important to plan meals and determine the timing of starting dishes. Breads and cakes that require less heat on the bottom of the oven should therefore be on the bottom of the stack. Meats that cook longer should be started first, then placed on top of the bread or cake that requires less cooking time. Soups and stews that need to simmer will be best in the top position because the combined heat rises through the stack making the top position the hottest. The top position can be anything with high liquid content (for example, soups, stews, vegetables, or fruit cobblers).

Baking in a Pan inside the Dutch Oven

To cook a meatloaf and potatoes in the same Dutch oven, place each item in two smaller pans and place them in the oven. Make sure that both items have the same amount of cooking time. If they cook different lengths of time, they will have to be placed in the oven at different times. Food can also be placed in one pan and set in the Dutch oven to cook. This is a very good way to bake a pie. Place four or five small rocks in the bottom of a Dutch oven to set the pan on. The rocks allow the pan to sit up off the bottom enough for heat to circulate around the pie, cooking it evenly. This will also prevent the pie from burning on the bottom.



Using Different Methods of Cooking *continued*

Cooking with a Campfire Tripod

Add a new way to cook with your Dutch oven when camping by bringing along a campfire tripod. The campfire tripod sets up over a campfire to cook as if you were using a gas burner on your stove. If you hang your oven low and close to the campfire, you will have a quick start to your cooking or a fast heat-up. As your oven gets hotter, you will want to move the oven higher by adjusting the chain to the desired position for your cooking needs. A good sturdy lid lifter is essential when using a tripod with your Dutch oven. This will allow you to lift and hold the lid with one hand while you are stirring or working with your food with the other hand.

Examples of foods you can heat up using the tripod:

- Soups. Keep them low and close to the fire with the lid off so you can stir as needed to avoid scorching.
- Stews or chili. Begin by hanging them low for about 5–10 minutes, then raise to a medium level until the desired temperature is reached. Keep the lid on to heat faster, but don't forget about stirring to avoid scorching.
- Reheating foods. Meat, fish, biscuits, and many other foods can be reheated by setting them on a grate or crumpled piece of foil in the bottom of your Dutch oven to avoid scorching. Start with the oven hanging low for 5–10 minutes, then raise to a higher level to keep it warm.

Examples of foods you can cook from scratch:

- Thick chunky foods. Meat or vegetable chunks can be started at a medium high position to begin warming as the Dutch oven heats up.
- Cook fast, sear or fry. Start with the oven hanging low and cook food as you would with a skillet.

Cooking on a Propane Camp Stove

Much like cooking on a stove at home, you can use a Dutch oven on a camp stove. Regulate the heat to either cook like a skillet on high or turn it down to a medium or low heat for slower cooking.

- Sear meat using a high flame, and then turn it down to a medium or low flame to cook slow as you would for a stew or large roast.
- Use a high flame to fry fish or steak.
- Use a medium flame to reheat previously cooked foods and then turn the flame down to keep it warm until ready to eat.
- Soups can be heated using the high flame to bring it to the desired temperature, and then turn down the flame to keep it warm.
- To cook pasta, use a high flame to bring water to a boil, and then adjust the flame down to keep it at a slow boil.



Adjusting and Managing Cooking Temperatures

Two-Thirds Timing Method

Just because rolls, breads, cakes, and other foods are baked in a Dutch oven does not mean that they will have crusty, black bottoms. Proper temperature and timing are important. The “two-thirds timing method” means to cook food with both top heat and bottom heat for about two-thirds of the total baking time. Then remove the oven from the source of bottom heat and finish baking with top heat only.

As with all suggestions, time will vary depending on the food item. Some breads need a little longer than two-thirds of the baking time. Sourdough and sweet breads require a little less. This method works well for any food baked flat on the bottom of an oven, especially those without much moisture content. About 3-7 minutes before the foods come off the heat, check the top for uniform browning. Redistribute the heat by placing the coals over the lighter areas.

For example, a recipe for rolls requires a total of 15 minutes baking time. Bake the rolls at the temperature suggested in the recipe for 10 minutes with both top and bottom heat. Then, take the oven off the bottom source of heat, check for even browning on the top, and adjust coals accordingly. Continue baking for 5 minutes with top heat only.

Altitude

When cooking at altitudes over 2,000 feet, you may begin to notice some differences. This is because the higher the altitude, the lower the atmospheric pressure, and therefore, the lower the boiling point of water. Since water cannot get any hotter than boiling, cooking foods will take longer.

Baking is also affected by high altitudes. Cake and bread recipes will require additional adjustments of ingredients and temperatures for best results, especially over 3,500 feet.

What this means for Dutch oven cooking and baking is that, at higher altitudes, you will need more coals to keep the oven hot for a longer period of time or to increase the temperature of the oven. Watch the cooking or baking progress carefully and make notes on the recipe copy about any adjustments necessary because of the altitude where you are cooking.

Altitude (ft)	Boiling point of water (°F)
0	212
500	211.1
1,000	210.2
2,000	208.4
5,000	203
6,000	201.1
8,000	197.4
10,000	193.6
12,000	189.8
14,000	185.9

Adapted from: Peter O. Snyder Jr. Boiling Point/Atmospheric Pressure/Altitude Tables, 2016. <http://ucfoodsafety.ucdavis.edu/files/234958.pdf>.



Reflection Question

Answer the following before continuing with the project. *(Please write in complete sentences.)*

First Year: What types of dishes high in liquids would be affected by cooking at high altitudes and how would you compensate in cooking time or heat adjustments? Why are these adjustments necessary?

Second Year: When baking at high altitudes, why are ingredient and cooking temperature adjustments necessary? (Hint: research how the ingredients interact with each other and how the lower atmospheric pressure affects the interactions.)

Beyond Cooking

Take It a Step Further!

Try an experiment. Find a location at least 3,500 feet in altitude and bake two cakes in a Dutch oven. With one cake, bake as directed from a standard recipe or box mix. Using the same recipe or box mix, make the recommended ingredient and heat adjustments for high altitude. Document the following observations:

1. What adjustments were made? Why do you think these adjustments were recommended?

2. What are the differences in appearance and taste between the two cakes?



Dutch Oven Recipes

Recipes for Dutch oven cooking are readily available on the Internet. There are dozens of Dutch oven recipe books available in bookstores and libraries, in addition to the collection of recipes available with this project. Your favorite conventional oven recipe may be converted for Dutch oven cooking too. When converting a recipe, the ingredients will stay about the same, though more liquid may need to be added depending on the progress of cooking. Slow cooker and conventional oven recipes prepared in a Dutch oven may require adjusting the heat and length of time of cooking.

Slow Cooker Recipes

If a slow cooker recipe calls for a low setting, the temperature is typically between 250°F and 350°F, a high setting is typically between 400°F and 450°F. Temperatures between the low and high settings vary on slow cookers, therefore the cook time is also typically given as a range (for example 6 to 8 hours). Adjust the number of coals used on the Dutch oven to most closely match a low or high setting. The cooking time will also be much less because the heat source surrounds the Dutch oven, including the lid. You will need to experiment with cooking time because it will be closer to half (or less) of the cooking time prescribed in a slow cooker recipe.

A recipe calling for a low setting may also be cooked in a Dutch oven on a “high setting” although the cooking time will be significantly less—approximately a quarter of the time. For example, if the slow cooker recipe calls for a low setting for 8 hours, it could cook in a Dutch oven on a high setting in about 2 hours. Be sure to check on the amount of liquid as the cooking process progresses.

Other Conventional Recipes

It's easy to use the temperature given in a conventional recipe and figure out the number of coals needed for the Dutch oven to reach the appropriate temperature. Review the sections in the Dutch Oven Cooking Project Manual Unit 1 as a reminder.

To help determine baking temperatures for Dutch ovens, use the “3 up 3 down = 325°F” formula. It is based on the oven's diameter and the use of full-sized coals. The diameter plus 3 equals the number of coals required for top heat. The diameter minus 3 equals the number of coals needed for bottom heat. “Top heat” refers to the fuel placed on the Dutch oven's lid. “Bottom heat” refers to the fuel placed under the oven.

This formula heats and maintains the oven at 325°F. Replace coals when they are less than half their original size. For example, a 12-inch oven uses 15 top coals ($12 + 3$) and 9 bottom coals ($12 - 3$) to reach a temperature of 325°F.

Also, review the section in Unit 1 for adjustments to make based on whether you are baking, frying, roasting, steaming, or boiling.



Beyond Cooking

Creating Dutch Oven Recipes

Individual activity: Create a Dutch oven recipe.

- Recipe must be original and contain at least four ingredients. The recipe should include the name of the dish, all ingredients, measurement of ingredients, preparation instructions, size of oven, temperature, number of coals to reach temperature, and cook time.
- Include nutrition information (work with your project helper, Extension educator, or nutrition professional for assistance).
- Include information on the estimated cost of ingredients.

Take It to the Next Level

Group activity: Hold a Dutch oven recipe creation contest.

Everyone can help decide on the rules, the contest's organization, and a specific main ingredient to be included in all recipes. All of the requirements designated in the individual activity above need to be included. If the recipe creation contest will include cooking the recipe, include a specific time frame in which cooking needs to be completed. Also include the opportunity for everyone to taste test each recipe and vote for their favorite.

Record all of the contest rules decided on by the group and distribute them to all participants before the contest.



Baking Yeast Breads

Yeast Breads from Scratch

As with all recipes, read the entire recipe and directions before beginning to bake yeast breads. Gather all of the necessary equipment and ingredients before starting. Especially if baking outside, also think about the work space and work surfaces available. You will need a work surface to assemble ingredients and a clean surface to knead the dough. If you have not baked yeast breads before, refer to the 4-H Baking project for specific considerations and techniques—the concepts are the same when baking yeast bread in a Dutch oven and a conventional oven.

Most yeast bread recipes require using *warm* water or milk (not hot and not cold, but specifically warm water or milk). Decide before starting if you will use your Dutch oven to heat the water or milk or if you will use another source. If using your Dutch oven you will need to be prepared to start two batches of coals, one as you are beginning to mix the ingredients to warm the liquid and a second batch after the dough is mixed, has been allowed to rise, been kneaded, allowed to rise a second time and then is ready to bake.

Yeast breads need a warm place away from drafts to rise. If preparing the recipe and baking outside, think about where you are going to put the dough to rise. Yeast needs a warm place to grow; consequently, for best results pre-warm the Dutch oven before putting the dough in to begin baking. An easy way to transfer the dough into a warm Dutch oven is to allow the dough to rise the final time in an oven liner, then simply put the liner in the warm oven to bake.

Purchase Ready-to-Bake Yeast Dough

To bake yeast breads in a Dutch oven doesn't mean that you have to start from scratch. Frozen bread dough or "brown and serve" rolls make baking quick and easy. Follow the directions on the package paying close attention to the baking directions and translate baking temperatures and time appropriately for a Dutch oven.

Amount of Heat for Baking

As a review of the "3 up, 3 down" method from the Dutch Oven Cooking Project Manual Unit 1, for a 12-inch oven start with the number of coals that is the diameter of the oven (12) times two. For top heat, use the diameter plus 3 coals and for bottom heat use the diameter minus 3 for a 325°F oven. Then add one coal on top and one coal on the bottom for each 25°F increase in temperature.

For baking, adjust 2 or 3 more coals from the bottom to the top so the bread will not bake as hot on the bottom and become too dark. For even baking and browning, rotate the oven 1/4 turn and rotate the lid 1/4 turn in the opposite direction every 5 to 10 minutes. Also, consider using the two-thirds method previously described (completely removing bottom heat approximately two-thirds of the way through the cooking time) to prevent the bottom from getting too dark.

Beyond Cooking

Food Science

There is a basic set of ingredients in all yeast breads, each with a specific purpose. Flour, yeast, liquid, sugar, fat, salt, and eggs. Of course, there are additional ingredients to add flavor and variety too. Discover the purpose of each of the basic ingredients and how they interact with each other.



Cooking Meat and Poultry

Meats prepared in a Dutch oven can be very delicious. There are two basic methods of cooking meat, whether you are using a Dutch oven or a conventional oven: dry heat and moist heat.

Dry heat cooking is commonly used for more expensive cuts of meat such as beef steak, lamb chops, pork fillets or chicken breast. These types of meat are generally more tender than other cuts and tend to have less of the tough connective fibers. Cooking with dry heat is defined as types of cooking where heat is transferred to the meat via air, fat, or metal. Methods of dry heat include grilling, broiling, frying, and roasting.

Moist heat cooking is used for cheaper cuts of meat such as lamb shoulder, pork belly, or beef roast. These cuts of meat have more connective tissue so they need to be cooked longer to reach the desired tenderness. Cooking with moist heat means any type of cooking where moisture is added. These types of cooking include braising and cooking in liquid (such as stews or other slow cooker recipes).

Use High Heat to Develop Flavor

Browning creates a tremendous amount of flavor and is a key step when cooking meat. Browning meat or poultry prior to the Dutch oven cooking process will seal in the natural juices and provide the outer texture and color more typical of conventionally cooked meats.

To ensure that meat browns properly, first make sure the meat is dry before it goes into the pan. If needed, pat it thoroughly with paper towels to remove any excess moisture. Next, preheat your Dutch oven and pour in enough oil to thinly cover the bottom of the oven. Vegetable oil, bacon fat or any other preferred type of fat can be used for browning meat. Place the meat in the hot oil and sear all sides of the meat. Make sure not to overcrowd the oven; there should be at least $\frac{1}{4}$ inch of space between the pieces of meat. If the meat is too close together, it is likely to steam rather than brown. Once the browning process is complete, drain off any leftover fat and cook according to the best method for the cut of meat.

Dry Heat Cooking Methods

Roasting. Roasting is a cooking method that uses dry heat, in which hot air envelops the food, cooking it evenly on all sides, usually in an oven. No water or other liquids are added. Roasting is generally used for large cuts of meat coming from areas of the animal such as the loin or the round. Follow these steps:

- Season as desired. For best results, season several hours in advance or overnight.
- Place meat fat-side up in your Dutch oven. If possible, place a metal rack under the roast to promote more even airflow.
- Do not add water.
- Roast meat at 325°F.
- Baste with drippings during cooking.

Tip: To test for doneness, use a meat thermometer. Remember not to touch bone or fat when inserting the thermometer. The internal temperature shows exactly how done the meat is. Tender cuts of meat will remain tender if cooked to rare rather than well done. On the other hand, less tender cuts may be more tender if they are cooked to medium or well done, rather than rare.



Cooking Meat and Poultry *continued*

Refer to the chart below for USDA recommended cooking temperatures.

Safe Internal Temperatures	
Ground Meat & Meat Mixtures	
Ground beef, pork, veal, lamb	160°F
Ground turkey, chicken	165°F
Whole Cuts	
Beef, Veal, Lamb, Pork	
• Medium rare	145°F
• Medium	160°F
• Well done	170°F
Poultry (all cuts)	165°F
Seafood	145°F

Source: University of Illinois Extension. <https://web.extension.illinois.edu/meatsafety/tempchart.cfm>.

Frying. Frying is cooking the meat in a small amount of fat or oil. Any animal or plant-based fat or oil can be used. Frying is used to cook smaller cuts of meat such as steaks, chops or chicken breasts. It is not recommended for large cuts of meat. Follow these steps:

- Heat a small amount of oil in your Dutch oven over medium heat; approximately 350°F.
- Heat the oil until it's very hot and you see ripples, but it's not so hot that it's smoking.
- Add the meat and season as desired. If you're cooking skin-on chicken, be sure to place it in the pan skin-side down.
- Cover and add a few coals to the top to keep the heat going.
- Take the lid off for the last few minutes to help crisp.
- Turn occasionally until done and browned on both sides.
- Check for doneness with a thermometer.

Tip: Let meat cook until it has a deep-colored sear, or until the breading is deep golden brown. If you think the meat is ready, nudge it or lift one of the corners. If it doesn't stick it's ready to flip. The meat will release when it's ready.



Cooking Meat and Poultry *continued*

Moist Heat Cooking Methods

Braising. Braising is simply a cooking method that involves browning meat in oil, then cooking it in a small amount of liquid in a tightly covered pan, either on the stovetop or in the oven. The small amount of liquid creates steam that in turn helps cook the meat. The source of the steam may be water or other liquid added to the meat, or meat juices. The long, slow cook time helps to develop flavor and turn tougher meat cuts fork-tender. Large, less tender cuts, such as chuck, round, and rump, are braised as pot roasts. Follow these steps:

- Preheat Dutch oven to 325°F. Add a couple tablespoons of oil.
- Season meat with salt and pepper. Add the meat to the hot oil and brown on all sides.
- Remove the browned meat from the pan and pour off any fat. Return the meat to the pan.
- Season as desired using herbs or other seasonings.
- Add a small amount of liquid to the meat; approximately $\frac{3}{4}$ cup.
- Cover and add the desired number of coals.
- Cook in Dutch oven at 325°F or 350°F until tender.
- Check for doneness with a thermometer.

Tip: Transform a braised meat dish into a meal by adding potatoes and vegetables about 30 to 45 minutes before the meat is done. Follow these guidelines:

- Potatoes. Use about 1 pound of potatoes for a typical 2½- to 3-pound roast. Peel and quarter medium-size potatoes and/or sweet potatoes.
- Other Vegetables. Use about 1 pound, total. These should be cut into 1- to 2-inch pieces. Consider peeled butternut squash, peeled carrots or parsnips, snow peas, fresh green beans, sliced celery, trimmed mushrooms, onion wedges or peeled pearl onions, cauliflower, or broccoli.



Cooking Meat and Poultry *continued*

Stewing. This method is similar to braising in that they are both moist heat, slow cooking methods involving less-tender cuts of meat. Stewing is different because it uses small, uniform pieces of roast or stew meat that are totally immersed in liquid. Follow these steps:

- Preheat Dutch oven to 325°F. Add a couple tablespoons of oil or fat.
- Coat stew meat with flour. Add meat to Dutch oven and brown on all sides. If using a large quantity of meat, brown meat in two separate batches.
- Add desired seasonings and enough liquid to cover the meat completely. Recommended types of liquid include beef broth, chicken stock, or other similar liquids.
- Cover and add the desired number of coals.
- Simmer at 325°F until meat is tender.
- Check for doneness with a thermometer.

Tip: Do not use too much flour when coating the stew meat or the broth could get too thick and/or become pasty.

Roasting Poultry

Slow, even heat should be used to produce tender, juicy, evenly cooked poultry. Overcooking will result in tough, dry meat. Follow these steps:

- Rinse a whole bird thoroughly on the outside as well as inside the body and neck cavities. Pat dry with paper towels. If desired, sprinkle salt inside the body cavity.
- Place poultry, breast side up, on a rack in a Dutch oven. Brush with cooking oil or melted butter or margarine and, if desired, sprinkle with a crushed dried herb, such as thyme or oregano.
- Roast at 325°F until done.
- Insert a meat thermometer into the thickest part of the thigh muscle without touching the bone to check for doneness. The inner thigh is the area that heats most slowly. For turkey parts, insert the thermometer in the thickest area.

Tip: Before cooking a domestic duckling or goose, use a fork to prick skin generously all over and omit cooking oil.



Cooking for Groups

When planning a group dinner, know how many people are going to be eating. This will help determine how much food to prepare. Generally, for adults, plan about $\frac{1}{2}$ pound of meat per person and $\frac{1}{2}$ pound of potatoes and onions per person. Because this is outdoor Dutch oven cooking, you may want to add a little extra.

Next, decide on the menu and remember that not all items need be cooked in the Dutch oven. Make sure the menu is balanced and includes meat, vegetables, beans/potatoes and/or bread and a dessert. Here are two sample menus:

Menu 1

Boneless Pork Ribs w/BBQ sauce
Salad
Potatoes and Onions
Rolls
Pineapple Upside-Down Cake

Menu 2

Peppered Tri-Tip
Ranch Beans
Shepherd's Bread
Berry Cobbler

Now that you know how many people you are serving and what you are preparing, determine how many ovens will be needed to prepare each menu item. The following guidelines are based on cooking for a group of 25 people and will be helpful in estimating how many ovens will be needed.

Dish	Ovens	Cooking Time
Shepherd's Bread	2 (10") or 1 (12")	approx. 45 mins
Potatoes and Onions	2 (12") or 1 (14")	45 mins–1 hour
Boneless Roast	2 (12") or 2 (14")	2–3 hours
Cobblers	2 (12") or 2 (14")	45 mins–1 hour
Chicken	3 (12") or 2 (14")	1–1½ hours
Ranch Beans	2 (12") or 1 (14")	45 mins–1 hour

Cooking for a group requires teamwork. Plan to have at least 6 to 8 people helping, though, depending on the size of the group and complexity of the menu, more may be needed. Plan at least one person watching the coals, a couple watching and rotating the ovens, and a few more preparing food, cleaning up, setting tables, etc. It's better to have a few extra people than too few.

Timing is important. Start the longest cooking items first, usually the meat. Then start the menu item that takes the next longest to cook. Desserts should always be started last.

● *Beyond Cooking* ●

Now let's put it all together. Plan and budget a group meal using the template on the next page. If you have the opportunity, plan a meal for a group and cook it.



Dutch Oven Cook-Off

General Information

A Dutch oven cook-off is for all youth contestants to show off their skills and abilities learned throughout the project. The focus of the contest is to see the youth contestant cook dishes from start to finish. All preparation should be done at the location where the cook-off is taking place. No pre-preparation allowed. The contestant will be allowed to have one helper.

The food and contestant will be judged and scored on various characteristics including presentation, taste, smell, appeal of food, quality, cooking knowledge, cleanliness, and difficulty of the dishes prepared.

Rules

Each contestant will cook at least 2 dishes

- One Main Dish. This should be the foundation of the contestant's meal. The main dish should be the staple or focus of the meal.
- One Side Dish. The side dish should complement the main dish. This can, but does not have to be, a dessert, bread (3rd- and 4th-year students are highly encouraged to bake a bread if it complements the main dish) or a vegetable.

Each contestant may have a helper (optional but highly encouraged)

The helper can:

- help set up cooking area, move pots and tables, dispose of coals and maintain hot coals
- clean up and keep cooking area neat and professional looking
- help with other necessary noncooking activities

The helper cannot:

- mix or prepare the food or help with the actual cooking process
- adjust the heat by adding or removing coals while food is cooking

Each contestant/helper is responsible for providing their own:

- Dutch oven and approved cooking table
- briquettes
- ingredients
- bowls, knives, plates, cutting boards, stirring spoons and tools necessary for cooking
- cleaning materials such as soap, water and scrub brushes
- cooking utensils
- food preparation table and chairs
- anything else necessary to complete the Dutch oven cook-off challenge

Preparation and cooking start at 4:00 pm.

All cooking and plating must be complete by 7:00 pm.

Judging of presentation and food will begin at 7:00 pm.



Dutch Oven Cook-Off

Judging

Before the contest begins, cook-off contest organizers need to choose one of two judging styles that will be used. All participants need to be notified which judging option will be used well ahead of the contest.

Option 1: Personalized, themed plating with table setting and presentation

This type of judging style allows the contestant freedom to come up with a table setting and work with the environment and ambience for the meal they are going to present to the judges. Contestants can bring their own plates, table setting and display the meal with their own creativity and ideas.

Option 2: Food is plated and presented to judges in a panel

The cook is required to explain reasoning for dishes, talk about cooking them, discuss challenges encountered, and describe any other pertinent information about the dishes to the judges.

Note: While the contestants are cooking, judges will walk around, observe, interact and gather information from the contestants about what they are cooking. It is a part of the learning process for the contestants to be asked questions about the dishes they are cooking, how they are managing heat with the coals and other pertinent questions about the cooking process. Other questions may be asked on such topics as how the cook approached difficult parts of a dish, or managing time to get dishes done on time and together, etc.

Contestants will be judged on

1. Cooking process

- Food preparation skills
- Food safety practices
- Cleanliness
- Personal appearance/appropriate dress
- Proper tools and techniques
- Time management
- Heat consistency

2. Food

- Taste
- Doneness
- Quality of Aroma
- Appetizing
- Temperature
- Color of food
- Garnish
- Neatness/eye appeal
- Creativity/originality

3. Difficulty

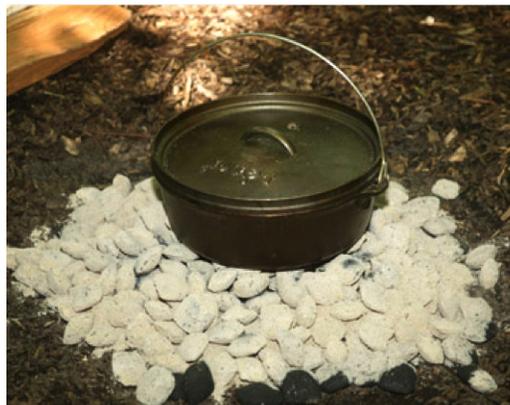
- Dishes made from scratch are more difficult and time consuming, and are worth a higher score.
- If a dish doesn't turn out or challenges present themselves, how a contestant overcomes adversity and makes something positive out of the experience may also be given consideration in this category.



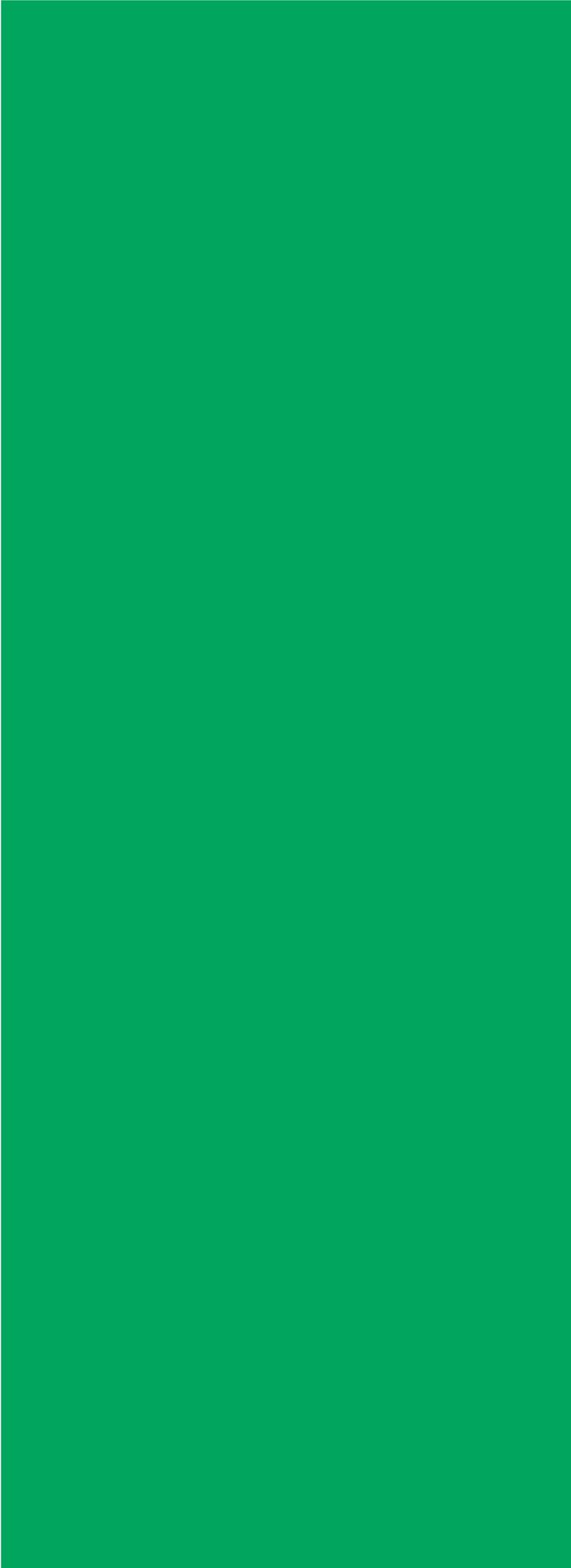
Tips for the Master

The following are Dutch oven reminders that will keep dishes turning out great time after time. Add your own tips and share with your friends.

1. Always start briquettes and get them hot before putting the Dutch oven on them. If using a charcoal starter, this will take about 10 minutes.
2. When baking, use twice as many coals on top as on bottom. Also, pre-heating the lid cuts baking time.
3. Start with fewer coals and add more as needed. It is preferable to feed guests late rather than burn their dinner.
4. To prevent hot spots, rotate the Dutch oven $\frac{1}{4}$ turn every 15 minutes. Rotate the lid in the opposite direction of the pot.
5. Allow air to circulate underneath the Dutch oven to keep the coals alive.
6. Use a wok ring to hold coals on top of a domed lid.
7. Timing how long the dish cooks is an important way to make sure it gets done, but you can use your nose, too. When the aroma reaches you, check the food. It may be ready to eat sooner than you think.
8. Always be careful when removing the lid. Ashes and coals may easily fall into the food in the oven.
9. 100% vegetable oil is best for seasoning a Dutch oven. Grease and animal fat can become rancid. The salt in some fats attracts moisture which promotes rust.
10. If the Dutch oven is hot, never add cold water and NEVER set a hot Dutch oven in a cold river.
11. Ash decreases the efficiency of burning charcoal. Tap coals to remove the ash and they will conduct heat better.
12. Always open Dutch oven lids away from you. The escaping steam can burn. This also helps avoid dropping ashes or coals in the food.
13. Put lid on a clean rock or stand. Food can easily get dirt and ash in it from the lid or stirring tools.
14. Watch hot oils closely. They can burst into flames if they get too hot. Be careful when adding ingredients to avoid hot oil splatter.







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