

# Outdoor Cooking


**Age Range:**

9+ years old

**National Science Education Standards:**
Unifying Concepts and Processes:

K-12: Evidence, models, and explanation

K-12: Change, constancy, and measurement

K-12: Form and function

Physical Science:

K-4: Properties of objects and materials

K-4: Position and motion of objects

K-4: Light, heat, electricity, and magnetism

5-8: Transfer of energy

Science and Technology:

K-4: Abilities of technological design

Science as Inquiry:

K-12: Abilities necessary for scientific inquiry

K-12:

Understandings about scientific inquiry

**Approximate Time Required for Session:**

3 hours 50 minutes

**Purpose:**

- To explore outdoor cooking using two different cooking utensils – foil and sticks.
- To learn basic concepts of heat (energy) transfer.
- Experiment with the design of these utensils, problem solve, test, redesign, and retest while exploring cooking new recipes outdoors with foil and sticks.
- To realize basic cooking concepts, i.e. similar size foods cook in a similar amount of time.
- To learn how to safely cook foods outdoors over hot coals.

**Overview of Activities:**

Campers will explore cooking outdoors over coals or embers using foil and a stick. Part I focuses on foil cooking. In Activity A, campers will prepare and cook a cupcake using the materials provided. In Activity B, campers will make a popcorn popper designed to pop the most kernels without burning the popcorn. Campers will have the opportunity test, redesign, and retest the popcorn popper to optimize results.

In Part II, campers will prepare two recipes using sticks. In Activity A, campers will make bread on a stick. In Activity B, they will explore making vegetable kabobs and record their observations. They will have the opportunity to test one kabob and then repeat the experiment with a second kabob.

In each activity campers will share their observations, experiences, and results. The discussion is structured to allow them to process and generalize the experience. By taking it one step further campers can apply the learning to a new situation.

**Background Information for Facilitator:**

Outdoor cooking can be a fun recreational activity or a means of survival. Cooking successfully outdoors requires some understanding of the science behind cooking. Let's begin by exploring how food gets cooked (heated). Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature. Heat is transferred to food by means of conduction, convection, and radiation.

Conduction occurs when heat is transferred by contact with a heat source (e.g., burner) or through some other material such as aluminum foil, a pan, or even an apple or orange. For example, food in a foil packet is heated (cooked) when the foil packet touches the hot coals. The heat from the foil is transferred to the food via conduction. Technically speaking, vibrating or colliding atoms and molecules interact with other atoms or molecules transferring energy from the warmer to cooler object.

Convection occurs when heat is transferred to the food by a fluid, such as air, water, or oil. This method of heat transfer occurs when baking in a stove, boiling water, or frying food. Convection involves movement of molecules within fluids or circulation of currents. For example, as fluid heats it becomes less dense. The heat is absorbed by the fluid's molecules and transformed into kinetic energy. This makes the molecules move faster and collide with other molecules pushing them apart. The hotter, less dense fluid displaces the colder denser fluid. As the heated fluid flows upwards it creates more energy and collisions with the atoms and molecules on the surface of the food and transfers energy to them.

Radiation, the third method of heat transfer, occurs when energy is transmitted in the form of rays, waves, or particles. The surface of the heat source gives off light (visible and invisible) of the electromagnetic wave spectrum. Light is energy. Light is absorbed by atoms or molecules on the surface of food and the energy of their motion increases, which increases the surface temperature of the food. Microwaves are a good example

**Tip!**

Whenever food is cooked it is generally the case that more than one method of heat transfer is involved.

**Tips!**

Put dirt on the foil packet to cut down on oxygen supply and trap heat more effectively.

Food should be moist. This protects from burning or browning as much of the heat goes to heating and vaporizing the water. The steam produced transfers heat to the food and helps it cook.

Cooking time will depend on many factors such as the size of the contents and package and heat of the coals.

Tongs or a long stick should be used to turn and remove the packets from the fire.

of cooking with radiation. They cook food with electromagnetic waves called microwaves. Barbecuing also uses radiation. However, the part of the food touching the grill is also being cooked by conduction.

**FOIL COOKING:**

Foil cooking is one of the easiest ways to cook in any outdoor setting. Aluminum foil is lightweight and versatile, which makes it ideal for backpacking. When used in cooking, foil reduces cleanup time.

Aluminum foil is a dense metal. Dense substances conduct heat better because the particles are close and allow heat to transfer faster without any breaks. Use two layers of heavy-duty aluminum foil or several layers of standard foil. The extra thickness will prevent food from burning and will conduct heat efficiently. Newspaper placed between the layers of foil acts as an insulator, as air trapped in the newspaper slows the transfer of heat. Make sure the newspaper isn't exposed, as it could easily ignite.

For best results, seal the foil packet differently depending on the type of food you are cooking. For foods that cook best with steam (e.g., vegetables, popcorn) create a tent over the food. This allows steam to build up and cook the food without browning. For other foods (e.g., cupcakes, meat) seal the package so there is little airspace between the foil and food. The close contact between the food, foil, and heat source browns the food. Regardless of the type of food, ensure the folds of the foil packet are tight. This will trap the steam and juices and keep dirt and ash out. Avoid folding the foil too tight or mishandling it, as this may result in punctures or tears that will cause moisture and heat to escape.

The foil packet can be placed directly on or in the coals for cooking. If coals are hot place the foil packet on the coals; turn when food is half-cooked. If coals are not very hot, bury the packet in the coals. Food will cook evenly; turning is not required.

## FOOD ON A STICK:

This cooking method is easy, requires little equipment, provides tasty results, and takes little time to clean up. There are several varieties of sticks (sometimes called “skewers”). Metal skewers are available for purchase and are made of round or flat food-grade metal, usually with a wooden handle. They are environmentally friendly and can be reused many times. Always clean and sanitize metal skewers thoroughly after each use.

The other, and perhaps most common, sticks are 1/2” diameter limbs in 3- to 4-foot lengths. These homemade skewers are gleaned from downed trees (if permitted in your area). Tree varieties such as oak, hickory, alder, and willow are preferred. Do not use woods like elm, holly, laurel, and yew, as they produce unpleasant flavors in your cooked food. To prepare this cooking stick, scrape off the bark and sanitize the wood. Soak the limbs in water to prevent them from catching fire. In place of a homemade wood skewer, wooden dowels (available at most lumber supply stores) or ready-made skewers (available in camping or kitchen section of most stores) can be purchased.

Different foods require different cooking times, but there are two methods to help ensure all food cooks at the same time. Cut the foods that take the longest to cook into smaller pieces, or place like food items on separate skewers – for example, all onions on one skewer, all meat on another, etc. If following the second method, start cooking the foods requiring the longest cooking time first. Rotating the sticks frequently will help cook the food evenly on all sides and prevent burning. Cook meat so that no pink shows and the juices run clear. The vegetables should be crisp. Cutting notches or small grooves into the surface of the stick can help stop food from slipping on the stick.

There are many ways to cook food on a stick. You can hold the stick, lean the food against a rock or other object to support it, or use a metal grate. Be sure to rotate or turn the food frequently to help cook the food evenly on all sides and prevent burning.

### Tips!

Keyhole fires are ideal for cooking. The fire is built in the large round area to prepare coals for cooking. As coals develop, they are raked into the rectangular area for cooking. As the cooking temperature drops hot coals can be raked in from the circle to the lower part of the keyhole.



Dry sticks will ignite much sooner, and a metal skewer will conduct heat and could burn fingers. Always use mitts or gloves when handling the packets.

# Part I - Foil Cooking

## Activity A: Exploring With Cupcakes



### 4-H SET Abilities:

- Use Tools
- Problem Solve
- Design
- Reason
- Communicate

### Tips!

A JIFFY brand cake mix is recommended because of its smaller volume.

Cupcake Recipe  
(serves 4):

1 box of cake  
mix  
1 egg  
½ cup cold  
water

Have at least  
two different  
types of fruit for  
campers to  
choose from.

### Approximate Time Required for Activity:

1 hour

### Suggested Groupings:

Large groups of up to 20  
Smaller groups of 4

### Introduction:

In this activity, campers will experience a fun, hands-on outdoor cooking activity. Campers will design a foil cooking utensil and prepare a cupcake to cook over hot coals. Campers will explore cooking with conduction.

### Materials Needed:

- Source of heat – either a bed of coals (charcoal briquettes) or embers from a wood fire
- 1 oven mitt for each small group to protect hands while cooking
- Long-handled tongs for each small group
- Heavy-duty aluminum foil, cut in 8 inch squares
- Newspaper
- Kitchen supplies:
  - cutting board
  - knife
  - toothpicks
  - measuring cup
  - bowl
  - whisk
  - spoon

**Materials Needed Continued:**

- Ingredients:
  - cake mix (white, lemon, or chocolate)
  - eggs
  - water
- Fruit with a peel (orange, lemon, grapefruit, apple)
- First-aid kit to treat cuts, burns, and insect bites

**Preparation:**

- 1) Read the background information.
- 2) Review the activity.
- 3) Brush up on knowledge of campfire safety, safe food handling, and proper hand washing techniques.
- 4) Determine the number of large and small groups you will have. Assign at least one trained facilitator to each large group and if possible each small group.
- 5) Gather materials. Each small group will need 1 oven mitt, long handed tongs, several sheets of newspaper, 8 squares heavy-duty foil, 1 set of kitchen supplies, batter, and 4 pieces of fruit. Each camper will make a cupcake.
- 6) Prepare batter.
- 7) Provide hand-washing facilities.
- 8) Decide on the type of camp fire to build and a location that is free of debris. Prepare coals for cooking. It is important to cook on a bed of coals with a non-flame ash or an orange glow to prevent burning and scorching of food.

**Introduction and Opening Questions (10 minutes):**

- 1) Gather the campers. Explain that they will be cooking a cupcake outdoors over coals.
- 2) Review campfire safety, safe food handling, and proper hand washing techniques.
- 3) Divide campers into groups of 20.
- 4) Share experiences of making cupcakes at home. Discuss what materials, supplies, and ingredients were used. How

**Tips!**

Give each camper two sheets of heavy-duty aluminum foil. More sheets are needed if standard foil is used to prevent burning.

Remember to encourage lots of exploration. Avoid answering questions. Ask questions to help campers discover their own answers.

**Tips!**

Place pieces of newspaper between the aluminum foil layers. Because newspaper insulates, it will keep the food from burning. Be certain that the newspaper stays covered!

To prepare fruit: Slice top third off and save. Scoop out the fruit, leaving some on sides and bottom. Make cake mix and fill fruit 2/3 full. Replace top.

Bake time approximately 20 minutes.

Insert a toothpick if it comes out clean it is done.

**Introduction and Opening Questions Continued:**

were the cupcakes cooked?

- 5) Discuss what they know about how food gets cooked over hot coals and conduction (cooking directly on a heat source). What would they like to know more about?

**Experiencing (35 minutes):**

- 1) Present aluminum foil, newspaper, fruit, and batter.
- 2) Discuss ways of using the fruit, aluminum foil, and newspaper to cook the cupcake.
- 3) Brainstorm ways to cook the cupcake over the coals.
- 4) Ask campers to predict how long it will take to cook the cupcake. Record responses.
- 5) After everyone has washed their hands, have campers form groups of 4.
- 6) Give each small group the materials and ask them to prepare and cook the cupcake. Each group member will make a cupcake.
- 7) Have each camper record how long it took to cook the cupcake.
- 8) Try your cupcake!!

**Sharing, Processing, and Generalizing (15 minutes):**

Bring all small groups together to form the larger group of 20.

- Ask each small group to share what they did and the results.
- Some questions to ask each small group include:
  - Discuss what worked well with your foil cooking. What didn't?
  - Share how you used the fruit, aluminum foil, and newspaper.
  - Discuss how you cooked the cupcake. Did your cupcake cook evenly? Did it burn? Why do you think these results occurred?
  - How long did you cook it for? How did you know it was done?

**Sharing, Processing, and Generalizing Continued:**

- Based on the group’s experiences and observations, discuss the best way to cook a cupcake over coals using aluminum foil.
- What if you cooked the cupcake holding it 3 feet above the fire pit or in a microwave? Discuss how these methods of cooking differ from cooking over coals with aluminum foil.
- Why do you think aluminum foil is used in cooking?
- Discuss other food that could be cooked using aluminum foil. Describe any changes you would make to the design of the foil packet for cooking that food.

**Taking it One Step Further:**

- 1) Try cooking another food such as rice or vegetables over coals using foil and compare experiences. Ask campers to discuss any changes they made to the design of the foil packet, how they cooked the food over the coals, etc.
- 2) Share favorite foil cooking ideas with new campground friends. Test new foil cooking recipes and add to your outdoor cooking file.
- 3) Adapt some of your favorite home recipes for foil cooking.





# Part I – Foil Cooking

## Activity B: Camp Popcorn

### 4-H SET Abilities:

- Use Tools
- Design
- Optimize
- Redesign
- Reason

### Tips!

Recently picked 2-foot-long green willow branches are preferable. They contain sap, are less likely to catch on fire, and won't readily conduct heat.

Popcorn Recipe  
(for a team 4):  
2 tablespoons of  
kernels  
2 tablespoons of  
vegetable oil

### Approximate Time Required for Activity:

1 hour

### Suggested Groupings:

Large groups of up to 20  
Smaller groups of 4

### Introduction:

In this activity, campers will design a popcorn popper using aluminum foil. They will then cook popcorn in an outdoor setting over hot coals using conduction. Campers are given an opportunity to redesign the popcorn popper and repeat the activity.

### Materials Needed:

- Source of heat – either a bed of coals (charcoal briquettes) or embers from a wood fire
- 1 oven mitt for each small group to protect hands while cooking
- Heavy-duty aluminum foil, cut in 8 inch squares
- Newspaper
- String, cut 3 ft long
- Stick (approximately 2 feet long) or skewer
- Measuring spoon
- Scissors
- Ingredients:
  - unpopped popcorn kernels
  - vegetable oil
- First-aid kit to treat cuts, burns, and insect bites

**Preparation:**

- 1) Read the background information.
- 2) Review the activity.
- 3) Brush up on knowledge of campfire safety, safe food handling, and proper hand washing techniques.
- 4) Gather materials. Each small group will need 1 oven mitt, 4 squares of heavy-duty foil, a couple sheets of newspaper, scissors, measuring spoon, 2 pieces of string, 1 stick or skewer, 2 sets of ingredients. This provides enough materials for each small group to do the experiment twice.
- 5) Provide hand washing facilities.
- 6) Decide on the type of camp fire to build and a location that is free of debris. Prepare coals for cooking. It is important to cook on a bed of coals with a non-flame ash or an orange glow to prevent burning and scorching of food.

**Introduction and Opening Questions (10 minutes):**

- 1) Gather the campers. Explain that they will be preparing a healthy popcorn snack. They will cook the popcorn over hot coals, using aluminum foil as a cooking utensil.
- 2) Review campfire safety, safe food handling, and proper hand washing techniques.
- 3) Divide campers into groups of about 20 youth.
- 4) Ask campers:
  - How do you make popcorn at home? Share your experiences. Discuss other ways of cooking popcorn.
  - Discuss what makes the kernels pop.
  - Based on what you know, what do you think are important features of designing a popcorn popper out of aluminum foil? Record responses.
  - If you were cooking popcorn over hot coals using aluminum foil as the cooking utensil, discuss ways you could adjust the temperature.

**Tips!**

Give each camper two sheets of heavy-duty aluminum foil. More sheets are needed if standard foil is used to prevent burning.

Remember to encourage lots of exploration. Avoid answering questions. Ask questions to help campers discover their own answers.

Adjust the temperature by moving the popcorn popper closer or farther from the heat source.

**Tips!**

One way to design the popcorn popper would be to place kernels and oil in the center of the foil.

Form a pouch by bringing the four corners up and together.

Make sure that the pouch is big enough to contain the popped kernels.

Twist top to create a handle. Seal open edges tightly. Tie string to the top of the popcorn popper and attach to the stick.

Always eat your food with caution; the steam is hot!

**Experiencing I (20 minutes):**

- 1) After everyone has washed their hands, break campers into smaller groups of 4.
- 2) Give each small group the materials.
- 3) Challenge campers to design a popcorn popper that pops the most kernels without burning the popcorn. They will need to use all of the materials provided.
- 4) Give campers 10 minutes to design the popcorn popper.
- 5) Share your design with the larger group.
- 6) Make any needed changes to the design of the popcorn popper and test.
- 7) Try your popcorn. Evaluate the success of your experiment.
- 8) Record observations and reactions.

**Sharing, Processing, and Generalizing I (10 minutes):**

Bring all small groups together to form the larger group of 20.

- Ask each small group to share:
  - What worked well? What didn't?
  - Did most of your kernels pop? Did your popcorn burn? Discuss why you think these results occurred.
  - Evaluate what could be done differently to optimize the success of your experiment.
- Compare each group's popcorn popper. Discuss similarities and differences.
- If your friends were challenged to design a popcorn popper that pops the most kernels without burning the popcorn, what advice would you give them?

**Experiencing II (10 minutes):**

- 1) Break into the same small groups of 4.
- 2) Repeat the activity to improve the original design of the popcorn popper and success of the experiment. Evaluate the success of your experiment.

**Sharing, Processing, and Generalizing II (10 minutes):**

- Form the larger group of 20.
- Ask each small group to discuss their experiences.
  - Describe the changes you made to the design and cooking process the second time. Explain why you made these changes.
  - Compare the success of the experiment across trials (the first and second time).
- Share one thing you learned about foil cooking.
- Discuss how the experience was similar or different from popping popcorn at home.
- Discuss how cooking the popcorn in the microwave or in a popcorn machine differs from foil cooking.

**Taking it One Step Further:**

- 1) Share your new experiences by giving a demonstration.
- 2) Make a popcorn popper that can be used to cook popcorn on your stove at home. Discuss how this is similar or different from cooking popcorn in foil over hot coals.
- 3) Try other ways of cooking popcorn such as in a microwave or popcorn machine. How do they differ from popping popcorn on a stove or over hot coals? Based on your experiences, hypothesize how heat is transferred to the kernels to make them pop in each of these ways of popping popcorn.

**Tip!**

Refer to the “Background Information” section for more helpful tips!

## Part II – Food on a Stick

### Activity A: Bread on a Stick



#### 4-H SET Abilities:

- Use Tools
- Problem Solve
- Communicate
- Develop Solutions
- Implement Solutions

#### Tips!

Biscuit Recipe  
(serves 12):

- 6 cups flour
- 1 cup nonfat dry milk
- ¼ cup baking powder
- 1 teaspoon salt
- 1 cup shortening

For ease, use readymade biscuit dough.

To save time, make biscuit mix ahead of time.  
Each camper will need ½ cup of biscuit dough.

#### Approximate Time Required for Session:

50 minutes

#### Suggested Groupings:

Large groups of up to 20  
Smaller groups of 4

#### Introduction:

Roasting food on a wooden stick or metal rod is a fun way to cook outdoors. In this activity, campers will cook bread on a stick over hot coals. They will explore radiation as a means of cooking food.

#### Materials Needed:

- Source of heat – either a bed of coals (charcoal briquettes) or embers from a wood fire
- 1 stick or skewer for each camper. The diameter of the cooking stick needs to be 1 to 1 ½ inches.
- 1 box of foil to wrap ends of each stick
- 1 oven mitt for each person to protect hands while cooking
- Ingredients
  - flour
  - nonfat dry milk
  - baking powder
  - salt
  - shortening
- For topping or stuffing: butter, margarine, honey, and/or jam
- First-aid kit to treat cuts, burns, and insect bites

**Preparation:**

- 1) Read the background information for additional tips.
- 2) Review the activity.
- 3) Brush up on knowledge of campfire safety, safe food handling, and proper hand washing techniques.
- 4) Determine the size and number of large and small groups. Assign at least one trained facilitator to each large group and if possible each small group.
- 5) Gather materials. Each small group will need 4 oven mitts, 4 sticks or skewers, 8 pieces of foil, 2 cups of biscuit dough, and topping. Each camper will make bread on a stick.
- 6) Prepare biscuit mix.
- 7) Pre-soak wood skewers or stick to avoid burning.
- 8) Provide hand washing facilities.
- 9) Decide on the type of camp fire to build and a location that is free of debris. Prepare coals for cooking. It is important to cook on a bed of coals with a non-flame ash or an orange glow to prevent burning and scorching of food.

**Introduction and Opening Questions (15 minutes):**

- 1) Gather the campers. Explain that they will be learning about cooking bread on a stick over hot coals.
- 2) Review campfire safety, safe food handling, and proper hand washing techniques.
- 3) Divide campers into groups of 20. Each large group should have at least one trained facilitator.
- 4) Share what you know about cooking outdoors. What more would you like to know?
- 5) Has anyone cooked over a fire before? If yes, ask what they've cooked and how.
- 6) Do you think the stick might burn? If we use wood sticks, what could be done to prevent them from burning?
- 7) Discuss some things that may affect the way food cooks?
- 8) What strategies would you propose to cook bread on a stick over an open fire so it is neither undercooked (raw) nor overcooked (burned)? Please explain your ideas.

**Tips!**

To prepare biscuit mix:

1. Put all ingredients in a 1 gallon, sealable plastic bag.
2. Press air out of bag and seal.
3. Squeeze ingredients together until well mixed.
3. When ready to use, mix 1/3 cup water with 2 cups mix to make biscuit dough (serves 4).

The right kinds of sticks are not always available; you may want to bring ready-made sticks or skewers.

To prevent wooden sticks from burning pre-soak and cover 6 to 8 inches of the tip with aluminum foil.

**Tips!**

Cut strips of dough 10-12 inches long and ½ inch thick. Wrap dough in a corkscrew or coil fashion around the stick.

Slightly flattening the dough will help it to stay on the stick.

To avoid doughy middles, brown breads slowly.

Safety first! Remember, cooking sticks are not toys and must not be misused. Keep them – and yourself – safe!

Food cooks quicker when wrapped in aluminum foil because foil is a conductor of heat.

**Experiencing (20 minutes):**

- 1) After every one has washed their hands, divide campers into smaller groups of 4.
- 2) Give each small group the materials.
- 3) Have them discuss or record a plan as to how to cook their bread.
- 4) Have each small group share their plan with the larger group.
- 5) Give each small group a few minutes to revise their plans after the group sharing.
- 6) Have each camper experiment with putting dough on their stick.
- 7) Now have them cook the bread on a stick.
- 8) Remind campers the bread is hot and to be careful pulling the bread off the stick.
- 9) Butter, margarine, honey, and/or jam can be used for toppings.
- 10) Campers may eat their bread.

**Sharing, Processing, & Generalizing (15 minutes):**

Form the larger groups of 20. Encourage discussion using these questions:

- Explain what worked best with your stick cooking.
- What might you change to improve the experience?
- What suggestions do you have to help avoid problems in the future?
- When do you think it might be better to use a charcoal fire or a wood fire for cooking on a stick?
- What if you covered the bread in aluminum foil? Do you think it would cook slower or faster? Discuss why or why not.
- What more would you like to know about cooking outdoors? How could you find out?

**Taking it One Step Further:**

- 1) Have campers adjust their recipe and cooking plan and cook a second piece of bread. Encourage them to share their observations about their second attempt. Try both a wooden and a metal stick and compare the results. Which one worked better? Ask the youth to explain why they think one worked better than the other.
- 2) Try cooking the bread in aluminum foil over hot coals without a stick. Compare the cooking methods. Is the method by which heat is transferred from the heat source to the bread similar or different? Please explain. Which way cooked the bread quicker? Why do you think this is so?
- 3) Try using frozen bread dough or pizza dough, mix  $\frac{1}{2}$  cup of grated Jarlsberg, Parmesan, or other hard cheese into dough.

**Tip!**

Cooking the bread on hot coals uses conduction, while cooking on a stick above the heat source uses radiation.

# Part II – Food on a Stick

## Activity B: Kabobs



### 4-H SET Abilities:

- Use Tools
- Observe
- Problem Solve
- Test
- Collect Data

### Tips!

If a metal cooking grill or rack is used food touching it will also be cooking by conduction.

To ensure everyone has something they like, provide 6-8 different vegetables for the campers to choose from.

### Approximate Time Required for Session:

60 minutes

### Suggested Groupings:

Large groups of up to 20  
Smaller groups of 4

### Introduction:

In this activity, campers will have fun cooking Kabobs over hot coals. Campers will choose the ingredients, plan how to cut and cook them, and share their observations and results. The activity provides another opportunity to explore cooking with radiation.

### Materials Needed:

- Source of heat – either a bed of coals (charcoal briquettes) or embers from a wood fire
- Cooking grill or kabob rack (optional)
- 1 oven mitt for each small group to protect hands while cooking
- 1 skewer or stick for each small group
- Vegetables
  - Examples: onions, zucchini, mushrooms, potatoes, green or red peppers, broccoli, cauliflower, dill pickles, cherry tomatoes
- Knife
- Cutting board
- French, Russian or Italian salad dressing or oil for basting
- Prepare bread, rice, or noodles to place cooked kabob pieces on (optional)

**Materials Needed Continued:**

- Observation sheet – found in appendix
- Pencils or pens
- First-aid kit to treat cuts, burns, and insect bites

**Preparation:**

- 1) Read the background information for additional tips.
- 2) Review the activity.
- 3) Brush up on knowledge of campfire safety, safe food handling, and proper hand washing techniques.
- 4) Determine the size and number of large and small groups. Assign at least one trained facilitator to each large group and if possible each small group.
- 5) Gather materials. Provide each small group with 1 oven mitt, 1 knife, 1 cutting board, 2 skewers, enough vegetables for 2 skewers, basting liquid, 1 observational sheet, and a pencil or pen. Each small group will make two kabobs.
- 6) Provide hand washing facilities.
- 7) Decide on the type of camp fire to build and a location that is free of debris. Prepare coals for cooking. It is important to cook on a bed of coals with a non-flame ash or an orange glow to prevent burning and scorching of food.

**Introduction and Opening Questions (10 minutes):**

- 1) Gather campers. Explain that they will be learning about cooking on a stick over an open fire. Today we will cook kabobs.
- 2) Review campfire safety, safe food handling, and proper hand washing techniques.
- 3) Divide campers into groups of 20. Each large group should have at least one trained facilitator.
- 4) Explain some things you know about cooking. What would you like to know more about?
- 5) Has anyone cooked food on a skewer? What did you cook? Explain the skewer's purpose.

**Tips!**

Safety first!  
Remember, cooking sticks are not toys and must not be misused. Keep them – and yourself – safe!

A skewer is a stick of wood or metal used to hold small pieces of vegetables or meat for cooking.

**Tip!**

You can adapt the activity so each camper makes 2 kabobs.

To add meat and fruit to the selection see *Taking it One Step Further*.

**Introduction and Opening Questions Continued:**

- 6) How will the food stay on the stick?
- 7) What strategies would you propose to cook kabobs over an open fire so they are neither undercooked (raw) nor overcooked (burned)? Please explain your ideas.

**Experiencing (35 minutes):**

- 1) Divide campers into groups of 4.
- 2) After every one has washed their hands, review knife safety.
- 3) Give each small group the materials.
- 4) Ask each small group to choose 4 vegetables they like.
- 5) Have each small group plan how to cook the vegetables. Decide what size might cook the best, how often to rotate the food, and how long it might take to cook thoroughly.
- 6) Have campers cut the vegetables and test the first kabob.
- 7) Try the kabob!
- 8) Have the group record their observations.
- 9) Evaluate the success of cooking the first kabob. Are the vegetables overcooked (raw) or undercooked (burned)?
- 10) As a group, discuss any changes you would like to make before cooking the second kabob (e.g., size of the vegetables, how often to rotate, cooking time, etc.).
- 11) Cut the vegetables and test the second kabob.
- 12) Eat!

**Sharing, Processing, & Generalizing I (15 minutes):**

- Have each small group come together to form the larger group of 20.
- Ask each small group to share their experiences and observation sheet. Discuss any changes you made the second time and why.
- Encourage discussion using these questions:
  - Different food requires different cooking times, how did you account for these differences?

- What worked best with your stick cooking? What was the most difficult?
- What would you change to avoid problems next time?
- Share some different types of food you might be able to cook on a stick.
- Discuss how what you learned can be applied to cooking at home.

### Taking it One Step Further Continued:

- 1) Add meat and fruit to the selection. Repeat the activity. Discuss how the experience differed from just using vegetables. Each of these foods requires different cooking times, how did you account for these differences? How did you know how long to cook the different foods? Some commonly used items include:
  - Meats: ham, beef, lamb, pork, chicken, turkey, hotdog
  - Fruits: cherries, pineapple, bananas, apples, plums, peaches
- 2) Try both a wooden and a metal stick and compare the results. Which one worked better? When is it better to use a charcoal fire or a wood fire for cooking on a stick? How often should you rotate your stick?
- 3) Collect and share favorite recipes with family and friends.
- 4) Do a 4-H presentation on a tasty meal cooked on a stick.

### Tips!

If meat will be used make sure to have an insulated plastic storage chest to keep food cold.

To give the meat a head start, soak it in a marinade of 2 parts oil and 1 part vinegar for 24 hours, or marinate it in French, Russian or Italian dressing. Do not use leftover marinade on cooked food—it may contain bacteria from raw meat.

Cook meat so that it does not have any pink showing and the meat juices run clear.

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Appendix

Observation Sheet for Vegetable #1: \_\_\_\_\_

	Smallest	Medium size	Largest size
What size cooked the easiest?			
Did rotating the skewers help?			
How long did it take to cook?			
What did it taste like?			

Observation Sheet for Vegetable #2: \_\_\_\_\_

	Smallest	Medium size	Largest size
What size cooked the easiest?			
Did rotating the skewers help?			
How long did it take to cook?			
What did it taste like?			

Observation Sheet for Vegetable #3: \_\_\_\_\_

	Smallest	Medium size	Largest size
What size cooked the easiest?			
Did rotating the skewers help?			
How long did it take to cook?			
What did it taste like?			

Observation Sheet for Vegetable #4: \_\_\_\_\_

	Smallest	Medium size	Largest size
What size cooked the easiest?			
Did rotating the skewers help?			
How long did it take to cook?			
What did it taste like?			