



## ELP and ESP Station Handout The Bakery

### **INTRODUCTION**

This handout will teach you how to run the Bakery station on an ELP or ESP day. You will also learn the history and craft of baking as it would have been done at Sutter's Fort in the 1840s. Through the Bakery station, your students will also learn about the history and how the bakery at Sutter's Fort functioned and produced bread emphasizing cooking techniques, tools, and ingredients of the 1840s.

### **OBJECTIVES**

- The students will be able to interpret the interrelationship of various fort activities related to the bakery, such as the wheat fields, granaries, grist mill and cooper shop.
- All students will participate in the variety of techniques involved in bread making and churning butter, such as following directions, measuring, kneading, cutting, and churning.
- The students will mix and bake the adobe bread used at Sutter's Fort in the 1840s.
- The students will churn the butter needed for the food preparations in the bakery and/or kitchen.
- The students will participate with an adult in fire building and maintaining the proper oven temperature needed for baking in an adobe oven.
- The students shall recognize how modern technology has saved man time and energy in meeting his everyday needs.

### **THE BAKERS**

The Sutter's Fort bakery was primarily run by two men employed by John Sutter. These men were George Davis and David Dutton. Since ovens were scarce, the use of the bakery and ovens probably were used for personal use by the immigrants on occasion. The women might possibly have infiltrated here, when the men were otherwise occupied fighting in the Bear Flag Revolt, as good cooks were in demand.

Sutter's cooks and bakers often served double-duty. Cooking in the 1840s was a skilled craft, and baking was probably the most inexact science of them all. So a man or woman, who could cope with vague measurements and instructions and still turn out a tasty product, was a person to be cultivated.

### **THE PLACE**

Early maps show the bakery in more or less the same location currently occupied. While easterners were using either outside beehive ovens ("hornitos" or "hornos" in Spanish parlance), brick ovens built into the wall of the kitchen, or in a bakehouse, things were different in California. In California, the style was that of the beehive oven, but was usually built outside or occasionally in a corner of a room. Evidence indicates that Sutter's oven was outside and was indeed the adobe "hornito" used by locals. A terse comment in October, 1845, notes that "The oven fell down today." This indicates an adobe "hornito", as outside ovens are adversely affected by firing after the start of the





rainy season, when the adobe becomes damp. Presumably, the oven was periodically reconstructed, when disasters of this sort befell it.

Sutter baked not only to answer the needs of the fort, but also made "ship's bread", a hard cake of baked flour and water, to sell to the shipping trade. At this period, he was raising and milling his own flour and was making plans for a water-driven grist mill. His supply was abundant enough that he sold both wheat and "ship's bread" to the Russian fur traders.

### **THE CRAFT**

The bread baked at the fort, was the common plain bread of the 1840s. It was not sourdough, nor did it use ingredients such as oil, which became a vogue in the 20th century. It was made with either sponge or leaven. Sponge has much in common with modern sourdough starter, except the yeast was not allowed to go sour. Until the first tasty sourdough sponge showed up around the time of the gold rush (at least post-1850), the mark of a bad baker was soured sponge, which tasted spoiled. (Sponge is to sourdough as wine is to vinegar: both products are caused by yeast, but with widely varying results). Leaven was cakes of flour and sponge which had been allowed to dry. These could be comfortably transported in a flour sack or barrel.

What if you did not have any sponge or leaven? Then you had to "catch" the wild yeasts. To do this, you made a batter out of flour or potato gruel (a popular yeast medium), and set it in an open bowl in a warm place for a couple of days. This allowed the wild yeasts to settle into the batter. After a few days, the batter either bubbled and smelled yeasty, meaning you had caught a good strain, or bubbled and smelled spoiled and sour, which meant you had to throw it out and start all over again. Baking was always a challenge!

Everyday bread often varied, depending on what ingredients were on hand. Plain bread for everyday use was usually made of unbolted (whole wheat) flour and sponge starter, with salt and possibly a little milk, a little sugar, or a pinch of mace thrown in for interest. An enterprising cook might also add such items as the leftover porridge from breakfast ("waste not, want not" was the pioneer motto) and get a delicious variant. Best bread, for Sunday or company, might be made of white flour and include such extravagances as eggs, cream, or honey.





## Fire Builders

As a fire-builder for the oven, you should be able to safely start and maintain a fire, as well as keep the temperatures consistent to provide for effective baking of the bread.

### MATERIALS TO BRING:

1. Wood (tinder, kindling, small logs--hard, dry wood only)
2. Matches

### MATERIALS AVAILABLE AT FORT

1. Wheelbarrow
2. Shovel
3. Rake
4. Buckets for water
5. 2 Burlap sacks
6. Broom

### PROCEDURE:

NOTE: ADULT SUPERVISION SHOULD BE PRESENT AT ALL TIMES.

### STARTING THE FIRE:

1. Allow 3 to 4 hours to prepare the oven to the proper heat.
2. Choose a small log about 4" in diameter and 16-18" long and place it about 2' inside the door opening.
3. Build tinder up against the log in a leaning way. Light.
4. Add additional twigs or kindling as the flame rises.
5. Add additional logs slowly as the flame rises.
6. Keep the flames **oven-door high** (no higher!) for the first two hours and keep adding logs until the temperature is approximately 500 degrees.
7. After the first two hours maintain even hot coals over the entire floor of the oven to ensure uniform oven temperature.

### MAINTAINING THE HEAT:

1. Once the fire is ready (and the bread has been put on the peels for the second rise), pull the fire with the rake from the oven.
2. Shovel into the firepit beside the oven.
3. Soak broom in water and sweep excess ash from the oven floor.
4. Allow the oven to cool to about 450 degrees.\*
5. Soak a burlap sack in water and place in the back oven vent.
6. *Seal* the front oven opening by first wrapping a wet piece of burlap around the metal door and then placing the door in place.

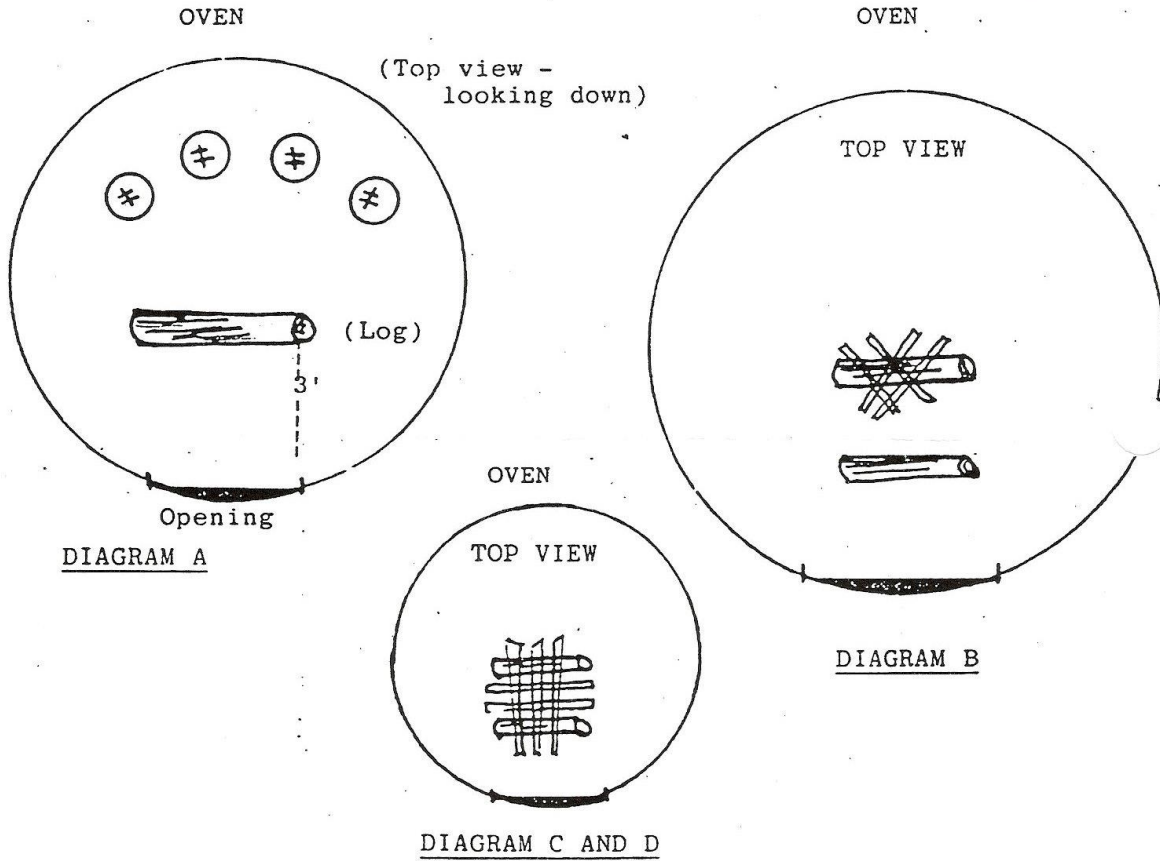
### SAFETY SUGGESTIONS:

1. The adult should be present at all times when the fire is going.
2. The adult should light the fire and build up to log stage.
3. Always have two buckets of water near the front of the oven and one bucket of water at the nearby firepit.
4. Only the adult should rake the fire from the oven. Students should be about 15 ft. away.



\* To check the oven's temperature, throw a handful of cornmeal on the oven floor after removing the fire. If it burns, so will your bread, and the oven is too hot. Let it cool a few minutes and try again. The corn meal should turn brown, but not black after about 80 seconds.

## BUILDING YOUR FIRE IN THE BEEHIVE OVEN





## Bread

**TASK:** The bakery will provide the bread that will be used at the fort as well as the other bakery items.

**NOTE:** Two batches of bread will produce 8 loaves of bread (One batch will make 4 loaves). This should be enough for a class of 30 students and the volunteers. (The 15 lbs. of white & 10 lbs. of whole wheat flour is enough flour make 2 batches of bread, 2 batches of cinnamon rolls, oatmeal cookies & gingersnaps. The yeast & milk would be enough for the bread & cinnamon rolls as well.) The dough recipe for the cinnamon rolls is the same dough recipe for the bread.

### MATERIALS TO BRING:

1. 15 lbs. unbleached flour
2. 10 lbs. whole wheat flour
3. Vegetable oil (small bottle)
4. Salt (1 box)
5. Sugar (1 box of sugar)
6. Yeast (12 pkg. Quick-Rising)
7. Milk (2 pints)
8. Polenta (Coarse ground cornmeal, 2 cups)
9. Dish towels
10. Dish soap
11. Dish cloth
12. Measuring spoons
13. Measuring cups
14. Hot pads and oven mits

### MATERIALS AVAILABLE AT THE FORT:

1. Large wooden, metal, and crockery mixing bowls
2. Wooden spoons
3. Kneading boards
4. Cutting boards
5. Knives
6. Peels (paddles) for moving bread

### RECIPE:

Dissolve in a bowl:

- 2 packages of yeast
- 2 1/2 cup warm water

Add:

- 1/3 cup cooking oil
- 1/2 cup sugar

Mix the above.

Let rest 10 minutes.

Add:

- 3 tsp. salt
- 1/2 cup milk
- 4 cups whole wheat flour
- 1 cup white flour

Knead until smooth, adding up to 3 cups white flour.

Let it rise until it doubles in volume. Keep the whole batch in one bowl as it rises.

When oven is emptied, divide into 4 loaves, place on the peels and let rise until the oven is the right temperature.

Place in oven and bake for 20-25 minutes (depends on the size of the loaves).





## Cinnamon Rolls

For approximately 30 students, you will need to have two batches of cinnamon rolls. (This means 2 of the basic bread recipes). That should give you enough cinnamon rolls for breakfast for the students and volunteers.

### INGREDIENTS:

2 batches of the bread recipe (same ingredients as for the bread)  
1 can cinnamon  
1 can nutmeg  
1 lb. box white sugar  
1 box raisins (optional)  
1 lb. butter or margarine or butter that you churned  
1 bag nuts (optional-keep in mind allergies)  
1 jar honey

### MATERIALS TO BRING:

All ingredients mentioned above  
Dental floss for cutting the rolls  
Dish towels for covering the rolls

### MATERIALS AVAILABLE AT THE FORT:

Mixing tools (same as for the bread)  
Roughly 15 baking sheets

### RECIPE:

- Make the bread recipe as you would for bread. When you divide the dough into four parts for the bread, take one part and pat or roll the dough into a flat rectangular piece approximately 1/4" thick.
- Spread a thin layer of butter all over the surface except for a 1 1/2" space along length of one side.
- Sprinkle the buttered area with sugar.
- Sprinkle the buttered and sugar area with cinnamon.
- Sprinkle lightly with nutmeg.
- Sprinkle with raisins and nuts (optional).
- Sprinkle with sugar again.
- Roll the dough starting with the buttered side to the side without butter. Paste edge that is not buttered with buttermilk and place against the roll.
- Use the dental floss to cut the rolls approximately 2" wide. (Put the dental floss under the roll, cross the floss and pull.)
- Place flat on a greased cookie sheet and let rise.
- Bake until brown (approx. 10 – 15 min.)
- Remove from oven and pour honey over the top of the cinnamon rolls. The hone is optional. For easy clean up, do not pour honey on rolls when they are on the hot cookie sheets.
- Remove the rolls from the sheets before they are cool.





## Cookies

### RAISIN OATMEAL COOKIES (4-5 dozen)

1 cup shortening or margarine  
1 cup dark brown sugar  
1 cup white sugar  
2 eggs  
1/2 cup dark molasses  
2 teaspoons vanilla  
2 cups flour  
1/2 teaspoon baking powder  
1 teaspoon baking soda  
1 teaspoon salt  
1 1/2 teaspoon cinnamon  
2 cups oatmeal, regular or instant  
1 cup raisins  
1 cup chopped walnuts

Cream shortening and sugars. Add eggs, molasses and vanilla. Sift together flour, baking powder, baking soda, salt and cinnamon and add to creamed mix. Fold in oatmeal, raisins and walnuts. Let stand a few minutes or overnight. Drop by teaspoonfuls on ungreased cookie sheets and press down slightly.

Bake at 350 degrees for 10 to 12 minutes, until lightly browned. Allow to stand barely 1/2 minute before removing from cookie sheets.

### GINGERSNAPS

3/4 cup margarine	2 teaspoons baking soda
1 cup sugar	1 teaspoon ground cinnamon
4 tablespoons molasses	1 teaspoon ground cloves
1 egg	1 teaspoon ground ginger
2 cups flour	
bowl of sugar for topping	

Cream margarine and sugar. Stir in molasses and egg. Sift together dry ingredients and beat into shortening mixture until smooth. Cool dough. Shape into 1" round balls and roll in bowl of sugar. Place on greased cookie sheet 2" apart.

Bake 375 degrees for 8-12 minutes depending on desired cookie (soft or crispy).





## Tortilla Making

Tortilla making was a new job for many of the pioneer women, but it allowed them to feed their families when other supplies were low. Many pioneer women learned tortilla making from the Californio women.

**TASK:** As a tortilla maker, you will provide food for the hungry people at the fort. You will grind wheat or flour and prepare and cook tortillas.

### MATERIALS TO BRING:

1. Wheat or corn for grinding
2. Enriched corn meal or wheat flour
4. Flour (white, sifted)
5. Salt
6. Shortening or butter
7. Cup and spoons for measuring
8. Gloves (heavy work type)
9. You can also just use dough from the bread recipe

### MATERIALS AVAILABLE AT THE FORT:

1. 2 mortars with pestles
2. Adobe bricks
3. Iron griddle
4. Bowls
5. Spatula and sauce pan
6. Mixing spoon

### RECIPE:

- 2 cups wheat or white flour, or com meal 2 tablespoons shortening
- 1 cup boiling water
- 1 teaspoon salt

Combine ingredients. Form into 12 walnut size balls. Put flour on your hands to prevent sticking, then pat the balls into thin round tortillas. Cook on lightly greased griddle, turning when light brown. Butter with fresh churned butter.

### SAFETY:

1. An adult should be present at all times.
2. Use the heavy gloves when attending fires and when removing hot griddle.
3. Watch carefully the girls' long skirts around the fire.
4. The children should not be lifting the mortars or metates.

## Butter

**TASK:** Churning butter will provide the needed butter for the bakery as well as for the cooking at the Fort.

**NOTE:** Two batches of butter will probably be needed for all the cooking for approximately 40 to 50 people.

### MATERIALS TO BRING:

1. Heavy whipping cream (2-4 quarts)
2. Salt

### MATERIALS AVAILABLE AT THE FORT:

1. Ceramic churn with wooden dasher







3. Cheesecloth (1 sheet)
4. Dish towel to cover churn (It helps to keep the mess under control.)
2. Butter paddle
3. Wooden bowl (Use to wash butter.)
4. Pitcher to catch buttermilk drained from butter.

#### PROCEDURE:

1. The cream should be purchased the day ahead and allowed to reach room temperature. (If the cream is too cold, set in a pan of hot water.)
2. Rinse out the churn with warm water.
3. Pour four pints of cream into the ceramic churn. Put the lid on with the churn dasher handle coming out through the center of the lid.
4. With a steady up and down twisting motion, not too fast or too slow, work the cream until it becomes a heavy lump of solid butter. (Don't let the dasher hit the bottom of the churn, as you don't want to break it.)
5. Check inside the churn occasionally to see what is happening. It needs to be steady and constant for approximately 30 minutes to an hour depending on the temperature. (On cold days fill the chum with warm water before churning or place a warm cloth around it.)
6. When you have a solid mass of butter, pour the contents of the chum into a piece of cheesecloth placed over a bowl or pitcher.
7. Place the butter in a bowl and press out excess milk with the butter paddle.
8. Wash the butter by pouring cold water over it to get the excess milk out. Keep washing until the water is clear and no longer a milky color. (Milk left in the butter causes it to spoil faster.)
9. Salt the butter lightly and shape into a ball or desired shape.
10. Use the buttermilk for other cooking or drinking.

**SAFETY:** An adult should be present at all times.

**NOTE:** Butter churning was one of the chores given to the younger children They spent several hours at the task if the family had several cows and a lot of cream.





## Safety in the Bakery

1. **An adult must be present around all fires.**
2. **A bucket of water must be near all fires.**
3. **Only an adult should rake the fire from the oven.**
4. **The sharp knives should only be used by the adults.**
5. An adult must supervise the butter churning.
6. An adult must be in the bakery room with the children.
7. Have only two people working at the kneading board at a time.
8. No running or rough-housing in the Fort.
9. Do not stand on the brick platform around the oven.
10. Respect the Fort's property at all times.
11. Report any problems, injuries, or accidents to the Fort staff.

## Clean-up For the Bakery

1. The large iron kettle on the firepit beside the oven should be heating water during the day for clean-up.
2. The large tub in the bakery may be used for a wash tub and placed outside on the bench.
3. All equipment should be washed outside the bakery, such as the knives, spoons, cups, bowls, boards, etc.
4. Use dish cloth, soap, and dish towels for washing and drying equipment and replace them in their proper places.
5. Clean the kneading boards with the scraper. Then wash with hot bleach water, rinse, dry thoroughly with a clean towel and replace on stand.
6. Wipe off the cabinets, wooden box, bread peels, etc., with warm bleach water and dry.
7. Wash the butter churn and dasher with warm soapy water, rinse, dry and replace in the pie-safe leaving the dasher and lid off for airing.
10. Oven:
  - a. Be sure the oven is empty of all food, coals, etc.
  - b. Remove burlap from the vent plug and oven door. Layout to dry.
  - c. Lean the door against the opening to provide a slow cooling of the oven.
  - d. Return the shovel, rake, and bread peels to the bakery.
  - e. Return the wheelbarrow to the firewood area.
11. Dump the water from the iron kettle slowly onto the fire under it to extinguish the fire.
13. Return all equipment to its proper place ready for inventory with the Fort staff person.





## Tentative Schedule

1. Fill the cast iron kettle with water (with hose) and fill as many containers as needed. Kettle should be about  $\frac{3}{4}$  full (Note: The cast iron kettle must be filled with water whenever there is a fire near it.)
2. Start Fires:
  - a. Oven first
  - b. Fire in the firepit next to kettle is optional (it really depends on weather).
3. Build up fire in oven and keep fire tended.
4. Get all ingredients, milk, utensils, etc., organized in bakery.
5. Students wash tables and pans.
6. Start students churning butter.
7. Start students making dough. Dough should be mixed and rising by 11:00 a.m.
8. Afternoon students make cinnamon rolls.
9. If cookies are to be made, mix the dough after the bread is mixed.
10. Students wash all utensils, bowls and pans outside and replace.
11. Cool bread on table, cover with towels.
12. Replace everything as it was.
13. Pick up all trash and garbage.

## Baking

Note: Your baking time will be determined by the size of your loaves. It is important that all loaves be approximately the same size. Risen loaves of 8"-10" in diameter bake best.

Bake items requiring the most heat first: Loaves first, then cinnamon rolls, and cookies last.

1. Place the bread in the oven by shuffling it off the peels. If there are fewer than approximately 12 loaves, use only the front half of the oven. The oven is hottest in the back.
2. Drape a soaking wet burlap in front of oven doorway and secure the door.
3. Let the bread bake for 5 minutes, then observe it by removing the door.
4. If the bread appears (dark spots on the loaves) to be getting too done, use the coal rake to pull the loaves as far forward as they will go and pull the rear plug. Replace the door and continue baking about another 5-15 minutes, depending on the size of your loaves. The bread is ready when it rebounds from a poke. If the oven is at the proper temperature, the bread will take a total baking time of approximately 20-25 minutes depending on loaf size.
5. Remove the baked bread using the iron rake. Scoop it from the oven and place it into the waiting wool aprons of some of the pioneer women or back onto a wooden peel.
6. Place the bread on a table for cooling.
7. Immediately put the cinnamon rolls into the oven and reseal the door.
8. Check the cinnamon rolls after 5 minutes and pull forward if burning. The rolls will usually take between 15-20 minutes to cook.
9. The cookies go in last. Reseal the oven and continue to bake.
10. Check the cookies after 5 minutes.





11. The cookies will take between 5 and 15 minutes.

### **Guidelines for the Outdoor Oven** (Steve's Brief Version)

#### **Building and controlling the fire:**

1. Use only small pieces of wood and begin with small split pieces.
2. The secret to properly heating the oven is to use a fire that is low and slow.
  - After the initial lighting, flames should never be higher than the top of the door.
  - Flames should **never** be coming out the door or the rear vent hole.
  - Use the coal rake to knock down the flame before adding wood. You are trying to make coals, not build a big fire.
3. Leave a 6" border on the sides and a 10" border at the back of the oven.
  - After the initial lighting, never add more than two pieces of wood.
  - Once the fire and coals are established, small rounds work well.
4. After heating the oven for between three and four hours, there should be a bed of coals and flame that stretches from border to border and is 4"-6" high.

#### **Preparing the oven for baking:**

1. After the bread dough has been placed on wooden peels, well lubricated with polenta for the second rising, and the cinnamon rolls are being put on cookie sheets, it is time to prepare the oven for baking. On a warm day, the oven should be raked as soon as the bread is on the peels. On a cool day, let the bread rise for 5-10 minutes before raking the oven. The cinnamon rolls should be started because the oven should never sit empty. The cinnamon rolls go in as soon as the bread comes out.
2. Use the coal rake and scoop shovel to remove the hot coals from the oven.
3. Use a wet broom to sweep the oven clean.
4. Place a very wet burlap sack in the rear vent hole.

#### **Testing the oven for proper temperature:**

1. The most common **mistake** is having the oven **TOO HOT!**
2. The oven usually takes 15-40 minutes to cool to the correct temperature (based on many factors, including ambient weather conditions).
3. Testing the oven temperature with polenta:
  - Throw a large handful of polenta into the middle back of the oven. We are not concerned with the scattered meal or the large pile. Observe the edges of the large pile. They should not brown before 30 seconds or burn before 60 seconds.
4. Testing with your hand (only for the brave or stupid).
  - You should be able to put your hand and arm inside the oven for a full 10 sec.





## Horno Procedures and Baking Tips by Wendy Rosell

- Get buckets from the bakery and empty the cauldron, pouring the water down the drain in front of the office.
- Refill the cauldron with water from the hose about  $\frac{3}{4}$  of the way to the top.
- Fill a bucket of water to soak the burlap and broom.
- Keep two buckets of water near the fire at all times.
- Bring wood over to feed the fire.
- Keep feeding the fire with a couple logs at a time. When the logs start burning well, spread them out a little and add a few more logs across the top of them. You want to build a bed of coals, not ash, covering the floor. At no time should flames be coming out the front of the oven, and the flames should not be hitting the ceiling.  
From initial flame, it takes about 3 1/2 to 4 hours for the horno to be ready to remove the coals for baking. (A bed of coals approximately 4 inches thick should cover the oven floor for at least 1 hour during this heating process before it will be ready).
- As you are tending and building the fire, you will have student groups that you will be helping to learn about the baking process in the 1840s .
- Station rotations are usually about 30 minutes split between the inside and the outside bakery.
- Make butter with student groups.
- Help students engage in the pioneer experience and answer questions from the public.
- Have students write in their journals before they leave.
  
- When the dough has sufficiently risen (doubled in size) and there has been a bed of coals covering the oven floor for over an hour, the indoor bakers should put the bread on the peels for the second rise & the outside bakers should rake the coals out of the oven using the rake and the shovel. Try not to get the coals on the shelf brick in the front of the oven (It is soft and eroding quickly).
  
- Then takes about 30-45 minutes for the oven to cool down to bread baking temperature. That is why it is important for the inside bakers to check with the outside bakers on oven status. When the dough is ready and placed in loaves on the peels, the outdoor bakers should be notified. That gives the bread about 30 to 45 minutes to rise on the peels. If the bread has not risen on the peels, it will be more difficult to bake. In cold weather the peels should be placed in a somewhat warm location to assist in the rise.
  
- When polenta sprinkled on top of the oven floor (not the grout lines) toasts, but does not burn in 80 seconds, the oven is ready for the bread.
- Wet the burlap and place on the door and in the vent hole. Re- wet the burlap once during the baking. Note the time that the bread is placed in the oven. After about 5 minutes check to see if it seems to be baking too fast. If so, remove the cloth from the draft hole. The crust sometimes darkens quickly, but leave the bread in. It needs to continue to bake inside. Depending on several factors it takes 20 to 25 minutes for the





loaves to bake. Test a loaf with a thermometer. It should have an internal temperature to 180 degrees.

- Use the rake to remove the loaves from the horno, NOT the wooden peels.
- Keep the oven door closed as much as possible to reserve the heat for the next baking. Cinnamon rolls take about 15 minutes to bake, but may take longer if the oven has cooled. Cinnamon rolls also bake best when they have had a chance to rise, so the inside bakers should begin making the cinnamon rolls as soon as the other dough is put on the peels.
- Communication between the inside and outside bakers is essential. Inside bakers relay information if the dough has risen sufficiently for the first rise & how many loaves of bread are being baked. The bread loaves should all be ready to bake at one time. If baking for a big group 12 to 16 loaves can be baked a time. Keep in mind that much of the heat will get used up through and cinnamon rolls will take a little longer and should be ready to go in when the bread comes out. They may need to rebuild a little fire in the oven to recharge it for the cookies, but it would not be the full process of getting a bed of coals as it did in the initial heating.
- On cold, windy days the oven can cool down quickly and the dough is less eager to rise.
- You do NOT want a large fire under the cauldron. Too hot and you will cook the dough.  
If you place a bowl of dough, or tool near the oven or fire remember to check it and rotate it often so that it doesn't burn. Do not put dough in wooden bowls if you plan to have it rise in the cauldron or near the bake oven.
- As the weather warms up, it will not be as much of a challenge to get the dough to rise. It will also take longer for the oven to cool down.
- When baking the cinnamon rolls remember to place the hole of the cookie sheet toward the door so you can use the hooked rod to pull them out.

### **!!Making Fire with Flint and Steel!!**

#### **Flint and Steel Kits are sold in the Fort's Trade Store**

(Prepared by Steve Beck. Sutter's Fort State Historic Park)

#### **Objective**

The objective of this training is to demonstrate how the ability to make, maintain, and control fire gives people power over their physical environment. The training will also show that the ability to make fire using simple technology aided in the Euro-American colonization of the American West.

#### **Goal**





The goal of this training is to teach participants to make fire using the technology known as "flint and steel." Each person will be given the proper materials and training and each participant will make fire.

### **Materials**

One hardened high carbon steel bar, flint or other suitable rock/mineral substitute, "char-cloth" (a flammable fabric cooked "charred" under low oxygen conditions). One metal can for making char-cloth, "tinder" or jute (the starting fuel).

### **Brief History of Fire from Flint and Steel (and a little science):**

Archaeological evidence suggests that pre-humans (*Homo erectus*) learned to make and control fire about 1,000,000 years ago. The ability to control fire allowed them to leave the warm tropical regions and populate the higher latitudes. Scant physical evidence exists today to show the technique these early people used to make fire. But, the stone tools they manufactured were made from flint and similar siliceous micro crystalline rock/minerals. In banging rocks together to make tools they created sparks. The sparks were generated by pieces of metallic minerals that occurred naturally in the rock. Experimentation helped refine which rocks and which metals worked the best to make sparks. The combination that makes the best sparks is a rock with a sharp edge that is harder than the metal it is striking. Metal with high carbon content makes better sparks. The rock must also have enough tenacity (resistance to breaking) that it won't shatter upon impact with the metal.

When *Homo sapiens* appeared on Earth they refined the fire making process. Individuals carried "fire kits" with them, much as we carry a lighter or matches. This greatly enhanced their ability to control their environment as they traveled. The use of flint and steel for making fire is strongly associated with the trappers, or "mountain men," who traveled alone into the mountains during the freezing winter months in search of beaver and other fur bearing animals. The trapper's skill at using flint and steel often meant the difference between life and death. Later, emigrants heading west in search of land and opportunity used flint and steel to make fire along the trail. They also experimented with different fuels such as sagebrush and buffalo dung which became known as "prairie coal." Using flint and steel was so commonplace with pioneers they seldom mentioned it in their diaries unless something out of the ordinary happened during the process. Just such an event happened to the "Forlorn Hope" members of the infamous Donner Party. The following is taken from *Ordeal by Hunger* by George Stewart.

Saturday morning broke, the day after Christmas. They had now been beneath the blankets for more than thirty hours, and the situation was becoming no longer endurable. To light a fire in the brunt of the storm outside was still impossible, but in desperation Eddy attempted to get one started beneath the shelter of the blankets. He used some gunpowder for tinder, and by some accident blew up the whole powder horn. He was badly burned about the face and hands and two of the women also suffered.





But the grim will to live still held. It outlasted the storm, and when the clouds finally broke on Saturday afternoon, Eddy, a little stronger than the others because of his bear meat, crawled from beneath the blankets and set to making a fire. But all the wood was soaked, and even their clothing offered scarcely a dry shed. They discovered, however, that Mrs. Pike's mantle had a lining of cotton and some of this seemed fairly dry. They exposed it to the sun's rays, struck sparks into it with flint and steel, and finally managed to blow it into a glow. After this they set fire to a large dead pine tree, and gathered weakly around rejoicing at last in the comfort of the flame.

### **Technique for Using Flint and Steel (Kits are sold in the Sutter's Fort Trade Store):**

1. Make "char-cloth."
  - a. Put a hole in the top middle of the tin can.
  - b. Loosely pack the can with a flammable cloth that has been shredded or cut into small squares.
  - c. Place the can into the coals of a fire or in an oven. Heat the can until it stops smoking.
2. Separate the tinder (jute) into small hairs and loosely ball the hairs into a "birds nest."
3. Put some char-cloth on the piece of flint near the edge you are going to strike. Grip the flint firmly in one hand with your thumb holding the char-cloth in place.
4. Hold the steel striker in your other hand and using a long smooth sweeping motion, strike the steel against the edge of the flint. Don't jab at the flint or use short choppy strokes. Sparks will fly and one or more of those will land on the char-cloth. You will see a small ember appear on the char -cloth. Remove the char-cloth from the flint and loosely wrap the bird's nest around the char-cloth.
5. Lightly blow on the bird's nest to stoke the ember. Remove your hat or bonnet and hold the bird's nest away from your face. The bird's nest will start to smoke and will suddenly burst into flame (be prepared)!
6. Immediately place small pieces of flammable material on the burning bird's nest and you have successfully made fire!!! **Congratulations!**

### **Bibliography**

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