



## ELP and ESP Station Handout Candle Making

### **INTRODUCTION**

This handout will teach you how to run the Candle Making station on an ELP or ESP day. You will also learn the history and craft of candle making as it would have been done at Sutter's Fort in the 1840s. Through the Candle Making station, your students will also learn about the history of candles and have the opportunity to make their own candle to take home.

### **HISTORY**

Candle making was developed independently in many places throughout history. It dates back over 2,000 years in Asia, where candles were made from whale fat. In parts of Europe, the Middle-East and Africa, however, where lamp oil made from olives was readily available, candle making remained unknown until the early middle ages. Candles were primarily made from tallow and beeswax until about 1850, but subsequently have been made from spermaceti, purified animal fats (stearin) and paraffin wax.

Tallow, which is rendered animal fat, was used for candle making at Sutter's Fort. Tallow was generally stored in a rawhide bag sewn with the hair out, averaging 25lbs., called an arroba. Tallow was made from beef, mutton, or venison and was used not only for candles, but also for soap, hide dressing, water proofing, lubrication, and as a base for some medicinal salves.

The only known reference to a chandler (candle maker) at Sutter's Fort occurs in a letter from Sutter to U.S. Consul Thomas Larkin on July 15, 1845. As postscript to the letter, Sutter appends a list of immigrants who arrived from Oregon on July 10, 1845 along with their occupations. Included on this list is an F. Lichtenstein, soap maker and chandler. The Bancroft Pioneer Register shows a Lightston, Frank, 1845, German soap maker and chandler, original name Franz Lichtenstein, who came from Oregon in the McMahon-Clyman party in the spring of 1845.

### **The Period Craft**

The way in which candles were made in the 1840s at Sutter's Fort differs slightly from the way in which candles are made today for ELP and ESP. The process, materials and place are all slightly different; the following paragraphs explain the way in which candles used to be made while the rest of the handout focuses on how to make candles on your program day.

**The Wicking:** 1840s period wicking was soft loose cotton yarn, usually cut to double the candle's length and twisted. It was either home spun or purchased in bulk as wicking yarn. All sources of references agree that Turkish cotton produced the best wicks. This wicking was being imported to Yerba Buena and it is reasonable to believe Sutter obtained his wicking there. It is also possible that Sutter made his own wicking; as early as 1844, cotton was grown by Sutter.





The Tallow: Beef, mutton, or venison suet is cooked in an iron cauldron. When the grease is cooked out and fibrous portions (cracklings) float on top of the grease, they are removed. The tallow remaining is strained with a sieve to another tub where it is washed with boiling water. When the dirty water has settled to the bottom and the purified tallow floats on the top, it is skimmed off and set in tubs to harden. Tallow at this stage is yellowish in color. It can be bleached by re-melting and floating it thinly on cold water. The resulting flakes are then laid in the sun and occasionally sprinkled with water until white.

The Candle Making Process: Wicking was cut to length and tied to sticks called broaches. Usually, two to seven wicks were secured to each broach. The tallow was melted in a double boiler and using the broach as a handle, the wicks were dipped in the melted tallow and allowed to cool on a cooling rack between dippings. It took about 30 dippings to make a decent sized candle. If the candles had too heavy a wick, or were made too big, they would smoke and drip excessively. If the tallow was too hot, it would melt the previous coat of tallow off of the candle. If the tallow was too cool, the candle would be bumpy instead of smooth and sleek.

The Place: While the existence of a storage shop for candles, oil, and lanterns within the walls of the Fort is supported by the Kunzel map of 1846, candles were probably actually manufactured in the East Yard or outside the Fort walls.

### **Place**

The candle making station used to be run in the candle room in the Fort. However, in the fall of 2014, due to safety concerns, the candle room was closed to all candle making activity. Subsequently, candles moved to the outdoor fire pit in front of the Vaquero room in the West Yard of the Fort. This is where you will set up for candle making on your ELP or ESP day.

### **Materials You Need to Provide**

- Wax and wick – These need to be purchased beforehand; see wax and wick purchasing suggestions below to learn more.

### **Materials the Fort Provides**

- Broaches and broach rack
- Knives and scissors
- Tables and chairs

### **Wax and Wick Purchasing Suggestions**

Most schools buy wax and wick from the Sutter's Fort Trade Store (gift shop) and this is what we recommend due to convenience. If purchasing from the gift shop, one order will cost around \$40; one order has enough wax and wick to make 30-40 candles. If you have a group of 40-80 students, or want to have two candles for every student, you will need to buy two orders. Once you purchase the wax and wick, you will be given a receipt; bring that receipt to your ELP or ESP day and the wax and wick will be here waiting for you.



## Set Up

- When you arrive, several of the candle making items such as the broaches, broach rack and table will not be set up by the outside fire pit. You will need to set up the station by bringing the items out of the candle room. If you have questions or need help, the ELP Coordinator will help you get these items set up.
- Using the cutting block provided, cut the wick. The appropriate length, 24 inches, is the length from the end of the cutting block to the groove cut into the block.
- Because each length of wick you are cutting will make two candles, cut half as many as the number of students you have (each student gets one candle). You can also cut a few extra so you have candles to use during nightwatch or just in case you need a few extra. For example, if your group has 40 kids, cut 23 lengths of wick or so.
- Once you have cut the wicks to the appropriate length, place them on the broaches. String the wicks through the two holes in each broach and adjust them so the ends of the wick hanging down are even. This will allow you to make two 10 inch candles with each broach.
- Get two buckets of water to keep the proper water level in the double boiler and for fire safety. The water level in the outer pot should be close to the top of the pot.
- Your group's fire starter will start the fire under the pot. If it is not started by 8:30, please inform the ELP Coordinator. The melting time of the wax is about 2 to 2.5 hours.
- While the fire starter should start your fire for you, it will be up to you to keep it going. In the morning, as you are getting set up, make sure the fire is very large. The bigger it is, the faster the wax will melt. If the fire starter has not left a pile of firewood for you, you can go get some from the woodpile. The smaller rounds are the best pieces to use.
- If the water starts boiling over in the morning, as you are getting set up, that is fine. Don't worry about adding water to cool it down yet, as it will slow down the wax melting process.

## MAKING THE CANDLES

### Safety Procedures

- Two buckets of water should be always be near the fire.
- No pushing or crowding near the fire. The children should line up in a single file line and dip **one at a time**. The students should walk clockwise around the broach rack under the tent and should not circle the cauldron.
- An adult must be present at all times.
- Report any accidents or injuries to the ELP Coordinator.
- Make sure the students don't touch the pots as they will be extremely hot.
- Watch for unsafe situations to occur and stop them before they get out of control.
- Adults are the only ones to place wood in the fire under the candle pot.
- If you have to refill the cauldron with water using the buckets, make sure to refill those buckets immediately.

## **The Process**

- When you get a group, have the students line up next to the broach rack.
- They will each pick up one broach and walk in a line to the double boiler. The first child will then dip his or her wick into the wax. Ensure that the broach is kept parallel to the ground so that the end of the broach doesn't go into the wax.
- Once they have dipped the wick, have them continue to hold the broach over the pot as wax will still drip off for a few seconds.
- Once the wick has been dipped, have the child put the broach back on the rack and pick a new broach while the next child in line dips his or her wick.
- After the first dipping, stretch the wicks as they cool to straighten them.
- Continue like this so that all the wicks get dipped in a rotating pattern. The wax needs time to cool and harden so ensure that children don't simply dip the same broach again and again without letting it first cool down.
- As a result of this rotating pattern of dipping, the children will not be making only their own candle and they will not take a candle with them after they are done at the station. Every child is contributing to all the candles and at the end of the day, you will have completed the number of candles you need; you can then cut the wick in half and distribute the candles to the children.
- If the candles start to bend during the day, they can be straightened by gentle pressure while the candle is warm.
- Trim the lower end of the candle after about 20 to 25 dips to keep the wax from extending too far beyond the wick.
- Trim the candle again when it is finished. Candles should be 3/4 to 7/8 of an inch in diameter (approximately 30 dippings). Put these wax trimmings back into the wax pot.
- It is not usually necessary to add wax during the day. If you feel that the wax level is getting too low, please inform the ELP Coordinator.
- Keep an eye on the fire during the day. While the fire should have been very big with boiling water in the morning, this should not be the case during the day as the children are dipping their candles. During the day, there should be a bed of coals under the pot with one log burning at a time. Once the log has burned down, place another on. You can stop adding logs between at around 4pm; the wax won't harden before the end of the day.
- Also keep an eye on the water during the day. You don't want the water boiling as it could splash the children and you don't want to let the water level get too low. Add water from the buckets to the pot throughout the day to keep the water from boiling and from getting too low. The water level should be kept at about 2 in below the top of the pot.

## **Clean Up**

- Scrape the wax off broaches
- Clean wax shavings from the cutting board
- Return equipment to its proper place in the candle room