STATION ROTATION

The station activities are the heart of the ELP. They provide structure for the program, they meet National Park Service requirements, and students really enjoy them. Students will be doing things they have never done before and probably will never do again, such as working with horses and a stage, hammering iron at a 1900s forge, and cooking on a woodstove. Stations last 55-60 minutes. Each group rotates through every activity. Do not change the order of the stations. This rotation has been proven to be the most effective for the students.

Adults conducting stations should each receive a detailed description of each activity from the teacher. Provide the adults with all needed materials. Make sure to include paper to cover tables and porches if ink or stain is to be used! At each station adults spend the first 5-10 minutes explaining to students what they will be doing.

Teachers should let students know that adults conducting activities have the same authority as the teacher, and that their instructions must be followed. This authority is especially needed for safety concerns at each station.

Groups	1:00	2:00	3:00	4:00	5:00
Early People	Role Task	Blacksmith	Cook	Skills	Transportation
Artisans	Transportation	Role Task	Blacksmith	Cook	Skills
Transportation	Skills	Transportation	Role Task	Blacksmith	Cook
Living Services	Cook	Skills	Transportation	Role Task	Blacksmith
Guardians	Blacksmith	Cook	Skills	Transportation	Role Task

ROLE TASK STATION

The role task site is adjacent to the Pioneer Yosemite History Center on a few acres of meadow covered with native grasses, pines, and oaks. It is bordered by Chilnualna Falls Road and the South Fork of the Merced River. It is listed as part of a National Register Archeological District, and thus requires special treatment. Do not allow the students to remove "litter" from the area. Bits of broken glass and other items are part of the cultural history of the meadow.

This station lays the groundwork for the town meeting and is where the students determine (in character) how to make use of this portion of Yosemite National Park. **Each individual in the group works independently to develop a presentation**.

Each group visits the site and performs the tasks that their characters would have performed in Yosemite between 1850 and 1920. Students explore the area and become familiar with what it has to offer. Tasks are designed to reinforce the roles portrayed. (The teacher can assign the task ahead of time or on site.) In the town meeting, each member of the group will present the final tasks or projects.

Usually the teacher conducts this station, as the success of the program is dependent on this station. Students learn to work through conflict, find ways to compromise, and use negotiating tools to resolve land use issues. The message is that public land is for all people, and stewardship has different meanings to different people. Students will also learn that no one is completely right or wrong, and that differences of opinion result in a balanced approach to land use. By the end of the town meeting, students will see that stewardship has been and will be best accomplished by working together.

Although students may have time to complete projects the following morning, it is important that they get as much finished at the site as possible. Each group brings all needed supplies.

The National Park Service provides a canvas cavalry tent in the meadow and small boards for use as writing surfaces.

CONDUCTING THE STATION

Pick a year any time between 1850 and 1920. Yosemite National Park has been established. The meadow is in the park. The location is isolated (students imagine long travel and ignore traffic sounds, modern conveniences, and the proximity of the Wawona accommodations.) After each group receives an introduction to the area and is given their assigned task or project, they are to explore the meadow. The adult facilitates the completion of the tasks and projects.

Early People: This group would have been the first to see or occupy the area. How they view the area and what they decide to do with it depends on the background of their characters. They can name and map the area, develop tours, explain the significance of what is there, tell/write stories about this area, map areas of interest, tell/write stories about their discovery, or create an illustration that depicts their feelings. These are shared with the whole class the next day.

Artisans: These students are drawn to the area for a variety of reasons. Its beauty attracted some; others came because of its supply of materials or its potential for profit. They have seen a map of the area and want to look around for themselves. As individuals they can produce drawings, paintings, baskets, photographs, poems, dances, and writings about the area. Students can also list

natural materials for creating baskets or (using supplied materials) create baskets. These are shared with the whole class the next day.

Transportation: These students are the businessmen and women, laborers, cowboys, dreamers, and trailblazers. They want to profit from the increase in tourism and view the meadow as an opportunity. They can:

- map proposed stage routes/operations, trails, railroads, or roads
- list supplies needed for their operations
- map stage stops
- journal a typical day
- write a letter encouraging a friend to come to Yosemite to work

Living Services: These students represent the businessmen and women, laborers, planners, cooks, ranchers, communicators, sheepherders, and miners. They also view the meadow as an opportunity. They can map a proposed town, design and illustrate a hotel or other business, write an advertisement for a job opening, design and write a menu, create a list of supplies needed, develop a budget, design a home, or create a price list for products.

Guardians: This group includes individuals who feel a sense of responsibility for the land. Sometimes they study it as naturalists, residents, and writers, but others might be rangers or other preservationists. They can:

- write letters to congressmen
- list concerns for the area
- make lists or illustrate guidebooks with the natural and/or cultural features
- create a guide for nature hikes
- draft rules necessary to maintain the area in its current state
- map where valuable artifacts are found
- draft speeches for town meetings
- write letters to the editor expressing their opinions

TIPS AND TECHNIQUES

Students are to disregard their personal feelings and popular contemporary beliefs and try to think as their characters might have thought. Structures or facilities outside the Pioneer History Center, if noted at all, should be considered to be far away.

Before students explore the meadow, reinforce the idea that they are in a small and very isolated area and they are to determine its fate. The adult conducting the station will interview each student (as her/his character) to learn what influence s/he had on the development of Yosemite National Park. Students may be prepared and may even know what their character is assigned to do; others may pick from a list of assignments, tasks, and projects to be given onsite. Students should learn how to perform the tasks prior to arrival.

The facilitator of this station should be prepared to ask the students questions regarding their projects and their character. Projects must be completed in the time allotted. If projects are completed ahead of time, be ready with another task.

Meadow Script

Early People

At Wells Fargo Office:

You have heard that there may be a meadow in this area. You will be the first people to see it. To find it we will follow an animal trail for two days. When we get there, there will be a strange looking forest that appears to be a building. I assure you that there are no buildings in the area! So let's hike to the meadow so you can see it.

When you reach the meadow (use this for all groups):

This is the meadow. Let me point out the edges so you know what area we are talking about. The trail next to the river is one side. The trail toward the north is another side. The wide trail with big rocks along it is another side. The grove of pine trees is the last side. We will not be going in the pine tree grove or down by the river. The first thing you will do is to take a good look at the meadow so you know what is here. You can explore in a group or on your own. You need to be able to see me at all times and you must stay inside the edges of the meadow. I will call you back to the tent in a few minutes and give you your assignments. Does everyone understand what to do?

Transportation

At Wells Fargo Office:

You have heard from your friends the Early People that they have discovered a meadow. Because you are interested in improving transportation, you feel that there might be some opportunities for work in this meadow. But first, you need to see it. It is a two day hike by a small animal trail. When we get there, there will be a strange looking forest that appears to be building. I assure you that there are no buildings in the area! Be sure to look for ways you can improve the trail on the way in!

When you reach the meadow:

See above.

Living Services

At Wells Fargo Office:

You have heard from your friends in Early People and Transportation that there is a meadow that we are here to observe. It appears that many people want to come and see it, but there are no places for them to stay. You are interested in developing places where these people can stay, and you'd like to make some money. It is a two–day hike by a small animal trail to get to the meadow. The Transportation people have plans to improve the trail but have not yet begun. When we get there, there will be a strange looking forest that appears to be building. I assure you that there are no buildings in the area! Let's go see the meadow.

When you reach the meadow:

See above

Artisans

At Wells Fargo Office:

I know you have heard from the Living Services group that they have plans for this meadow. This could be a new place for you to paint or write about. You need to see it yourself to be able to do your best work. It is a two–day hike by a small animal trail to the meadow. The Transportation people have plans to improve the trail but have not yet begun. When we get there, there will be a strange looking forest that appears to be building. I assure you that there are no buildings in the area! Let's go see the meadow.

When you reach the meadow:
See above.

Guardians

At Wells Fargo Office:

I know you have heard that many people have plans for our meadow. You have probably seen the drawings and paintings that the artisans have produced, and it is clear that this is a special place. You are concerned that this part of the park needs special attention. You want to see it for yourself so that you can plan to protect it. It is a two–day hike by a small animal trail to get to the meadow. The Transportation people have plans to improve the trail but have not yet begun. When we get there, there will be a strange looking forest that appears to be building. I assure you that there are no buildings in the area! Let's go see the meadow.

When you reach the meadow:
See above.

Suggested Activities For the Role Task Station

William Penn Abrams
Plan a location for a mill. Map his route through the meadow.
Ah-Louie
Plan a menu. Make a list of supplies needed for a month.
Ah-You
List supplies needed for a month. Plan menus.
George Anderson
Plan trails to reach hiking areas. Plan how he would guide people to this meadow.
Thomas Ayres
Sketch important features of the meadow.
Lt. Harry Benson
List staff he would need to protect the meadow. Write consequences for the rules for the meadow.
Harry Cassie Best
Paint a landscape of the meadow. Plan where to take photos in the meadow. Write a song about the meadow.
Sarah Anne Ripley Best
List Paintings and photos she is selling for her husband.
Carrie Bethel
Design a miniature, beaded basket. List materials in the meadow that could be used as basket materials.
Albert Bierstadt
Paint a romantic landscape of the meadow.
Alex Gordon Black
Plan where to put his hotel.
Catherine Black
List supplies needed at the hotel for a month.
Lucy Brown
Map the areas she used in the early days, include names. Design a basket.
Dr Lafayette Bunnell

Map the meadow and name all the features. Make a list of rules for the meadow.

Sally Ann Dick Castagnetto

Design a basket. List materials from the meadow that could make a basket. Plan a vegetable garden to be used to sell to the hotel.

Galen Clark

Plan a hotel for the meadow. List rules for the meadow.

William Edward Colby

List features in the meadow that need to be protected.

John Conway

Plan trails for the meadow. List materials needed to build trails in meadow, include staff.

Jay Bruce Cook

Plan a budget for the hotel.

John Jay Cook

Plan a location for a livery stable. List staff needed to run the hotel.

Adelaide Weldon Crippen Barnard

Plan where the hotel should be located.

Abbie Crippen

Plan a trip to the meadow.

Effie Crippen

Sketch the meadow. Write a poem about the meadow.

Fannie Crippen

Write a song about the meadow.

Kate Crippen

Sketch the plants she found in the meadow.

Steve Cunningham

Design trails for the meadow. Plan what the hotel should look like.

David A. Curry

Plan where the camp should be.

Jennie Foster “Mother” Curry

List staff needed to run the camp.

Marjorie Curry Williams

Plan activities for camp guests. Write rules for care of animals in the meadow.

Mary Curry Tresidder

Plan what the camp should look like. Write rules for the care of plants in the meadow.

Bridget Degnan

List supplies needed to bake one week's worth of bread.

John Degnan

Plan where bakery should be located.

Sally Dutcher

Plan photographic shot for her boss, Carton Watkins.

Caroline “Carrie” Paull Fiske

Plan where to sell photos to visitors.

George Fisk

Plan where to take photos of the meadow.

Daniel Joseph Foley

Design a guidebook for the meadow.

Jesse Benton Fremont

Write an article about the beauty of the meadow. Write a letter to congress about what should be saved in the meadow.

Francisco Georgely

Write a letter explaining what the American Indians in the valley wish to happen.

Elizabeth Glynn
Plan where to place a boarding house.

Tom Gordon
Plan the route for the stage.

Lady Constance Gordon-Cumming
Draw or paint the meadow. Write an article about the beauty of the meadow.

Carlotta C. Hall
Design a guide book for plants of the meadow.

Thomas Hill
Paint a grand landscape of the meadow.

Peter Hilliard
List supplies needed for the stage. List materials needed for maintaining the trails.

Lucy Hite
Map the meadow showing where the American Indian houses were.

Claire Marie Hodges
List consequences for the rules of the meadow.

Gertrude “Cosie” Hutchings
Design activities in the meadow for school children.

Elvira Hutchings
Plan where the hotel should go. Paint a picture of the meadow.

Florence Hutchings
Plan a horseback trip around the meadow.

James Mason Hutchings
Plan what the hotel should look like. Write a headline article about the meadow. Write rules for the meadow.

Angela Ghirardelli Jorgensen
Paint a picture of the meadow.

Christian Jorgensen
Paint a picture of the meadow.

James Chenowith Lamon
Plan where to put his cabin and orchard.

Charles Leidig
Write rules for the meadow.

George Frederick Leidig
Plan where to put the hotel.

Isabella “Belle” Leidig
List supplies needed for a month of cooking at the hotel.

John B. Lembert
Make a guide for all of the insects found in the meadow.

Archie Leonard
List staff needed to work on the road. List consequences for meadow rules.

W.B. “Dusty” Lewis
List rules for building new accommodations in the meadow.

Lt. M.M. Macomb
Map the meadow and include where roads should go.

Barbara Mc Cauley
List supplies needed for a month at the hotel.

James Mc Cauley
Plan where to put a small hotel.

Mark L. Mccord
List rules for the meadow.
Dr. Taylor Mclean
List supplies needed for building a road in the meadow.
Enid Michael
Draw in detail several plants found in the meadow
George Monroe
Plan where the horses will be housed in the meadow.
Thomas Moran
Sketch or paint a grand landscape of the meadow.
John Muir
Write a letter to congress about why the meadow should be protected. Sketch the meadow.
Jean Frances Neal
Plan what the inside of the rooms should look like.
Marianne North
Paint a detailed picture of plants in the meadow.
Frederick Law Olmstead
List life zones found in the meadow. Plan rules for placement of buildings in the meadow.
Charles Peregoy
List supplies needed to build a small hotel.
Mary Peregoy
Plan meals for the hotel.
Nathan "Pike" Philips
Write a tall tale about the meadow. Design a guidebook for the meadow.
James Savage
Map the meadow and name the features. Plan a hotel for the meadow.

James Schwabacher
List the types of baskets he owns from the meadow.
John Smith
List the furniture needed for a fancy hotel.
Albert Snow
Plan a small hotel for the meadow.
Emily Snow
List supplies needed for a month for the kitchen at the hotel.
Sargeant Gabriel Sovulewski
Plan trails for the meadow. List rules for the meadow.
Rose Rider Sovulewski
Write consequences for the rules in the meadow.
Tabuce (Maggie Howard)
Design a basket. List supplies needed to clean the hotel for a month.
Rose Schuster (Mrs. H.J.) Taylor
Write an article about the plants and animals of the meadow. Plan a research project for the meadow.
Lucy Telles (Pa-ma-has)
Design a large basket.
Chief Tenaya
Map the meadow; show where the Indians lived. Plan to tell the group how the Indians feel about the meadow.
To-Tu-Ya (Maria Ydrte)

List the plants and animals she used from the meadow.

Forest Townsely

List rules for the meadow.

Miles Wallace

List consequences for rules in the valley.

Edward Washburn

Plan where the stage stop should go.

Henry Washburn

Plan where to put the hotel. Plan where roads should go.

Jean Bruce Washburn

Write a poem about the meadow. Plan activities for hotel guests. Plan how to make guests comfortable on the stage.

John Washburn

Plan where the stage should go. Plan what the hotel should look like.

Carlton Watkins

Sketch setups for photo shots.

Joel J. Westfall

Plan where animals and plant could be grown to be used at the hotel.

Josia D. Whitney

Map the Meadow.

Capt. Abram Epperson Wood

List rules for the meadow.

Theresa Yelverton

Write a story set in the meadow. Use the other people in your group as characters.

Visitors in the Valley

THE KITCHEN STATION

Cooking over a wood-burning stove, chopping wood to heat the stove, and pumping water to cook, clean, and drink seem like enormous tasks today, but they were standard chores for settler families. These activities all serve to illustrate the contrasts between the lives of the students and those of settlers. The idea of a meal taking at least 5 hours to prepare is foreign to many students, but in this program they provide just such a meal as a finished product.

Every effort should be made to maintain authenticity in the station. Remove plastics and other modern packaging before leaving school. At the Pioneer History Center, hide coolers, use metal or wood utensils, and use fresh food as much as possible. Strive to make the kitchen look like a turn-of-the-century kitchen.

A wood–burning cook stove, wood, cooking utensils, and wood-chopping tools are provided. Students chop wood, prepare the evening meal, and serve it. The menu should be kept simple and should be planned by the students. Students should also prepare shopping lists and shop for the food. The morning meal is also planned by the entire class but is prepared by only one group. They rise early, get the stove going, and cook for the rest of the students. Students are responsible for the success (or failure) of the meal. One class put one cup instead of one tablespoon of salt in the cornbread. All of the students ate the bread, but they certainly learned what to do differently if they made it again!

Prior to the overnight, the adult who will staff the station should review the menu and recipes, and divide the tasks so there are ample chores for five groups. Consideration should be given to the lack of refrigeration. Some foods keep better than others, and some are less dangerous if undercooked.

Utensils brought with the group must be marked so they can be identified at the end of the overnight. Please be careful not to take items belonging to the History Center.

Groups bring all food, individual eating utensils, soap (hand and dish), scrubbing sponges, dishtowels and potholders, and matches. Any surface that has been touched by raw meat (especially chicken and turkey) <u>must be disinfected with bleach</u> before any other food is put on that surface. You can never have too many dishtowels. Students can bring place settings wrapped in a big cloth napkin or drawstring bag; these, too, are handy throughout the program.

Wood chopping is done for the cook stove and for the campfire during this station. Each role group of 6 or 7 students is divided in two and takes turns cooking and chopping wood. Plastic trash bags to line the trashcan outside the kitchen are in the wooden trunk in the kitchen or in the top drawer of the dresser in the front room.

Conducting the Station

Tasks should be divided beforehand so that each group of students is responsible for specific aspects of meal preparation. Before the first group arrives at the station, menus and tasks should be posted so that each group will know what to do. The first group typically concentrates on hauling water, lighting the stove, and preparing ingredients for cooking. They also chop wood. Subsequent groups cook, bake, and chop wood. The last group finishes the cooking, prepares the food for serving, and serves the meal.

Water is hauled from the hand pump just west of the wood chopping area. All dishwashing is done on the wooden rounds next to the chicken coop; washing is not allowed at the hand pump. Dirty dishwater is strained, and food scraps are placed in the trash can outside the kitchen and hauled away before bedtime.

The park provides axes, saws, sledgehammers, wedges, goggles, and gloves. Safety equipment is **required** for all students (and adults) entering the wood chopping area. There will be an introductory safety talk regarding to the tools and a demonstration of their proper use. **The adult conducting the activity must follow procedures and remain at this station whenever a student is chopping wood**. Students must take turns using the tools.

The wood supply is limited and must last for the entire season. Wood should be used judiciously and should not be chopped by adults. Wood chopping is done only during station activities. Wood used in the preparation of the morning meal must be chopped during the previous afternoon. If your group uses excessive amounts of wood, you will be charged for replacing it.

Kitchen Checklist

_____ recipes
_____ schedule for each hour
_____ all food (condiments, spices) in cloth, glass, metal, wood containers
_____ ice
_____ hand soap, dish soap, bleach, and copper scrubbers
_____ lots of dish towels
_____ wooden matches
_____ first aid kit with bandages

Tips and Techniques

The first group of students must light the stove. Prepare the students in the classroom for using the tools. Allow them to use knives, wooden spoons, and other kitchen

implements and let them become familiar with how they operate. The kitchen becomes a learning experience.

Start heating a few large pans of water while the meal is still cooking. Pots and pans can be washed as they are used during the afternoon. A four tub wash system must be used. All tubs should be filled with water. The first is to rinse, the second is to wash with soap, the third tub is to disinfect with bleach, and the last is a final rinse. Dirty tubs should be emptied and refilled.

Remind students not to wash pots or dump food scraps at the hand pump. Food scraps must be placed in the trashcan. Grease should be placed in a metal can (not provided). Encourage students to scrape their plates before washing them.

The kitchen attracts mice. All pots with lids must be covered, pots without lids must be turned upside down, and the kitchen must be thoroughly cleaned after dinner and after breakfast.

Use butcher paper or newsprint to outline tasks and write menus or use handmade booklets. Bring masking tape or string to mount task charts and menus to the walls of the historic buildings. **DO NOT** use nails or tacks.

Example schedule

Group 1 - haul water, light the stove, cut up meat, chop wood

Group 2 - keep the stove going, brown meat, cut or mix any other ingredients, chop wood

Group 3 - keep the stove going, combine and cook ingredients, bake cornbread, chop wood

Group 4 - keep the stove going, cook stew, make butter, prepare and cook cobbler, chop wood

Group 5 - keep the stove going, cook entrée, finish dessert and butter, heat dishwater, prepare food for serving, and serve

Wood Cook stove Operation and Use

To start and maintain a fire:

1. Open all dampers wide

2. Check the ash box and under the cooking surface for ashes; clean if necessary

3. Lift the left burner plates with the handle so that the top of the firebox is open

4. Insert dry, crumpled paper

5. Add very small bits of wood, then crisscross another layer small wood

6. Through the door of the firebox, light the paper

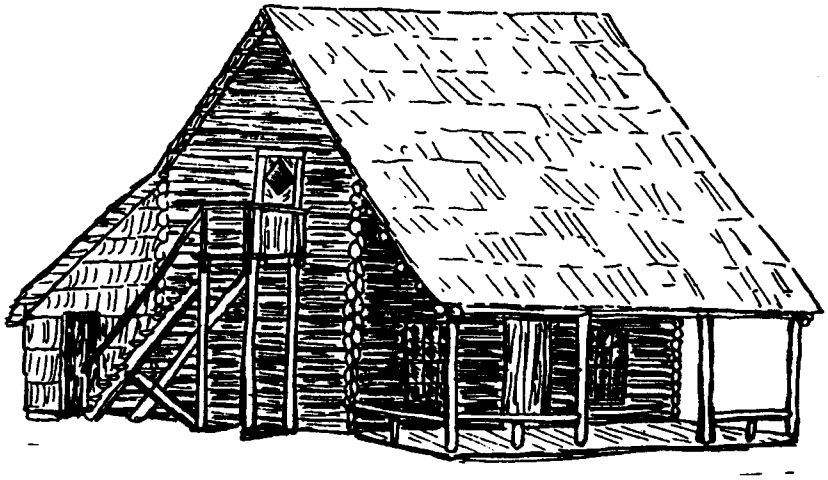
7. When the wood is burning well, add more, allowing space for oxygen flow

8. Add larger pieces, replace burner plates, close fire box.

To cook:

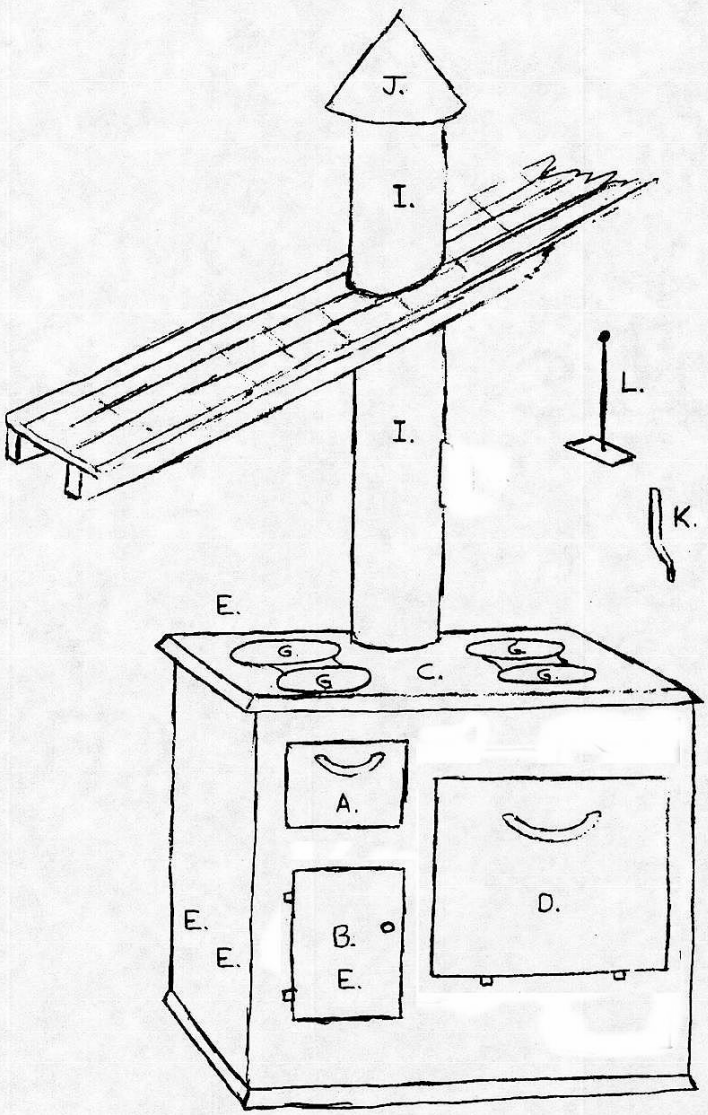
After the fire is well established, slowly close the dampers part way to slow down the smoke and heat going out the chimney and keep the heat in the stove. If smoke begins to seep from the burners, you have closed the damper too much.

Close the oven damper (move to the “C” position) to channel more heat to the oven, or leave it open (to the “O” position) if you are using the burners only. If you are using both burner and oven, lever should be placed in the center (between “C” and “O”).



A WOOD COOKSTOVE . . .

. . . AND ITS OPERATION.



A. FIREBOX: fire is started and fed here.

B. ASHBOX: container for ashes and their removal.

C. STOVETOP: a flat cast-iron cooking surface.

D. OVEN: for baking; heat controlled through dampers and fire size.

E. DAMPER: controls oven heat.

F. OVEN CLEAN-OUT: collects ashes that accumulate.

G. BURNERS: removable for feeding fire and for direct heat cooking.

H. ASH GRATE BOLT: turns to dump ashes from grates into ashbox.

I. STOVE PIPE: carries smoke out of stove; must be at least 4 ft. higher than roof.

J. STOVE PIPE CAP: keeps rain and wind out of stove pipe.

K. LID REMOVER: for lifting burner lids, pushing dampers, opening doors.

L. OVEN HOE: for removing ashes.

Wood Chopping

Safety

Students will be supervised at all times.
All people in the wood chopping area will wear gloves and safety glasses.
No axes should be raised above eye level.
No fires will be left unattended.
A bucket of water must be near each fire.
Outside fires will be completely extinguished.
Adults should stop any activity that could cause injury.
Any injuries or near misses will be reported to the ELP coordinator or ranger on duty.
No extra axes are allowed. Do not bring one from home.

Procedures

Only one student will be allowed in the wood chopping area at a time.
Before chopping wood each student will put on safety gear, assume a wide stance, and check to make sure no one is near.
Split wood will be stacked in the wood area nearest the kitchen.
The chopping area will be raked clean at the end of the last group.
Axes will be locked away by the coordinator or ranger on duty after the last group and will not be available in the morning.

Philosophy

Students are to do the activities themselves (this includes building fires). Adults only step in when a child is in danger of injuring themselves, others, or the buildings.
When a student asks how to do an activity, ask how s/he thinks it should be done.

Soda Springs

THE BLACKSMITH STATION

The blacksmith shop was critically important in the early years of Yosemite. Without the construction and repair services of a blacksmith, stage transportation would have been severely limited.

At this station, students work with iron at the forge. The National Park Service provides coal, safety clothing, and tools. Groups must bring their own iron. **It should be ¼" cold rolled steel. Larger stock takes too long to heat up, uses much more coal, and most students can not bend it.** Stock can be square or round. It should be cut to lengths before your overnight. We recommend 18" for the bell and 6" for a straight ringer/ 8" for a loop end ringer.

The teacher decides what project the students will produce at this station. Many groups make dinner bells. Keep the projects simple and don't strive for a perfect finished piece. Time is limited and there are safety procedures that take up time. There is no time to experiment.

When the group arrives at the History Center, the adult who is conducting the blacksmithing station must report immediately to the blacksmith shop. It takes 45 minutes to get the forge ready. The ranger will light the forge before the group arrives but cannot leave the fire unattended. The adult must relieve the ranger and keep the fire going.

Safety precautions are essential! The shop is small and crowded, and the dangers are many and serious – the fire in the forge, hot metal being carried to the anvil, and hammers hitting hard surfaces. Students must wear leather aprons, leather gloves, welding caps, and eye protection (all are provided) while they are in the shop. Students awaiting a turn stay outside with all of their safety gear on. There are only three students in the shop at any time. The adult in charge has only one student working metal at a time. The adult will also wear safety gear. These cautions cannot be overstated. There should be a second adult at this station to supervise students waiting outside.

At this station there is a fine line between facilitating, directing, and doing. Students should do all the bending of iron. If you choose to hammer any project, it is usually preferable to have the adult hold the hot iron with the tongs while the student does the hammering.

CONDUCTING THE STATION

To ensure safety, follow the diagram below:

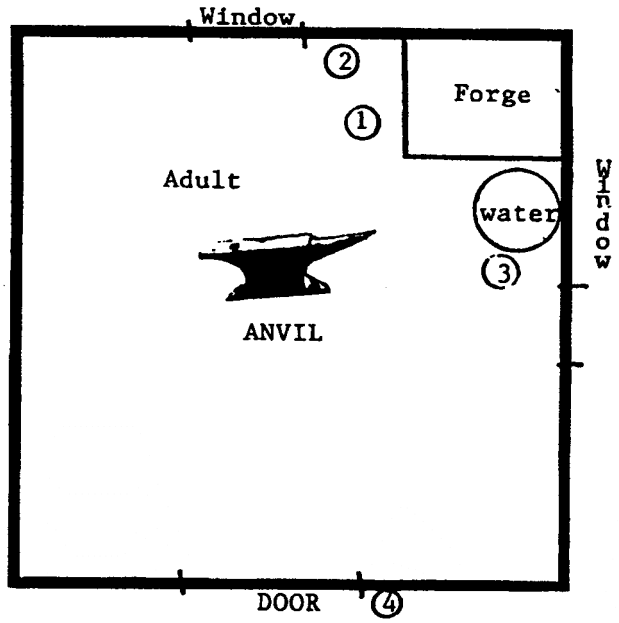
The first student (1), in full safety clothing, works with the adult, moving between the forge and anvil.

The second student (2), in full safety clothing, turns the crank on the blower. He/she also has a piece of iron in the fire.

The third student (3), in full safety clothing, waits for a turn, ready to take over on the blower as soon as the first and second students move to the next position. His/her iron is heated and s/he watches the iron to make sure it doesn't melt or spark.

The remaining students (4) are outside the shop putting on extra sets of safety clothing.
While these students wait for their turns, they stay outside the shop. They might be filing down the sharp ends of the iron, determining where to make bends, cutting leather straps for hanging the items, or doing another activity.

Some may have time after working at the forge to use the wire brush to clean the iron or stamp initials on their work. Students hang completed projects outside the shop to be collected the next morning.



TIPS AND TECHNIQUES

It is helpful to have two adults at this station. One can work with students at the forge while the other helps outside. **Make sure you have planned another activity outside for the students who are waiting**. Journal writing, singing and period appropriate games both work well.

The forge rarely goes out. You will be given your allotment of coal, and it should last through the day. Contact the education office if you need more coal or if you need help.

At the beginning of each group's turn in the shop, discuss safety, explain what they will be doing, and stress the importance of following directions. A piece of hot iron dipped in the water bucket delivers a sizzling message!

Some teachers incorporate mathematics lessons into this station. Students might be asked how many degrees their bends should be if they are make triangles. Or they may be asked to find the length of their iron, divide by the proper number of sides, and determine how long each side should be. It is also a good place to teach about fire.

Bring cloth strips to mark the finished pieces with the name of the owner. If time permits, students can also make a loop or ring on the end of the ringers.

Basic equipment is provided and includes the **forge** and **coal** for fuel. A hand crank **blower** feeds air to the fire, which keeps the fire burning at a high even temperature. **Hammers** are used to pound metal, draw it out to a point, flatten it, or shape it around another tool, such as an anvil or vice. **Tongs** look like long–handled pliers and are used to hold hot metal while heating or shaping. The **anvil** provides a surface for pounding metal. The horn of the anvil is used to make bends and shape rings and hooks. There are two holes on the anvil that are used when pounding out nails or punching holes in metal or for shaping and cutting. The bending fork is used to bend metal by placing the hot metal between the fork tines and pulling the metal around the outer edge of the fork until the desired angle is formed. The **vice** is used to hold metal while it is being hammered, bent, or twisted. The **cone mandrel** is used to make or enlarge rings by heating and pounding them down. **Wire brushes** clean burned material from finished products.
After each bend is made, the iron must be cooled in the **water bucket**.

WORKING WITH IRON

Heat the iron in the forge at the point to be shaped. Keep the iron in the hottest, whitest area of the coals. Watch for a change in color. When it is orange/yellow, it is soft and easily hammered or bent. When it is light yellow or white, it is too hot and will spark and melt. If the iron is too cold, a dull or medium red, it is still hard and brittle and may crack or break when bent.

Using tongs, take the iron out of the forge and over to the anvil. Shape the metal by bending or using the hammer. Only try to shape the iron while it is hot. If it starts to cool before the desired shape has been made, return the metal to the forge and heat and shape it again.

When the project is complete, dunk it in the water bucket and let it cool. Dry off the project, scrape it with the wire brush, and buff it with some wax or oil to prevent rusting

SAFETY

Always wear protective clothing, including apron, gloves, eye protection, and a cap. Wear long-sleeved clothing made of cotton or wool without loose strings or flaps. Sparks can fly from the forge and bits of hot metal are pounded off when working with the hammer and anvil. Clothing provides a layer of protection from burns.

Treat all metal as though it were hot. Temperatures range from 2,200°F at white-hot to approximately 900°F at dull red. When metal appears gray and cool it can still be extremely hot and dangerous.

THE SKILLS STATION

At this station students work individually or as a group to complete a craft, learn songs or games, create a melodrama, and/or write in a journal. Students learn that cultural traditions are an important part of the Yosemite experience.

The teacher should select an activity that meets the needs of the group. Some groups conduct this station like they conduct the cooking/wood chopping activities - the group of 6 or 7 students is divided in two and they take turns working on a skill and performing another task (writing in a journal). Other teachers select a project that the students can build or illustrate within the allotted time.

The activities should be completed within 55–60 minutes, and students working on a product should feel a sense of accomplishment. The activities should be appropriate for the time period and the place. All supplies are to be provided by the group.

Craft ideas include tinting postcards, embroidery, pomander balls, Jacob's ladders, needlepoint, shadow boxes, wooden benches, picture frames, photograph albums, quilting, wooden toys, and leatherwork. Games, which can also be part of the blacksmith station, include jacks, hoops and sticks, horseshoes, and marbles. Alternative ideas include preparation for an evening melodrama, poetry writing, or a nature hike around the area.

Cedar Cottage in the old village

THE TRANSPORTATION STATION

Transportation businesses in Mariposa provided access to Wawona and Yosemite Valley in the early days. Healthy horses and mules and a well-maintained stage were essential. Stage drivers' knowledge of horses, stage handling, and trail and weather conditions were all part of the service. Early road builders, stage operators, and blacksmiths contributed greatly to the opening of new land. Students learn the importance of horse care, what types of transportation were available, and associated terminology. After learning about the stage, students ride it through Wawona and learn about the time period.

Conducting the Station

The stage driver conducts this station, but another adult must accompany each stage. This is usually the group leader with each group of students. The students will be asked questions as if they were the characters they portray. The students assist the driver as needed.

Terminology

The stage driver will teach the students a whole new vocabulary and will quiz them as if they were applying for work as drivers.

Buckshot in the snow