

# DAILY LIFE IN A MISSION

## MAKING HOMEMADE SOAP

**NEED  
TO  
KNOW**

### TEACHER INFORMATION

**Background:** *For thousands of years, Southwestern Indian tribes used yucca to wash clothing, hair, and as a ceremonial bath. Yucca soap produces an interesting lather. Spaniards and other settlers from Europe used soap made of lye and animal fat. Soap was used for bathing and washing clothes. Cleansing bars you buy at the store and use in the shower or bath are detergents and not truly soap. Soaps are made by combining animal fats or vegetable oils with lye and water in a process called saponification. Detergents contain petroleum distillates rather than fats or oils.*

*Soap can be made in two basic ways: the cold process or the boiling kettle method. In the cold process, saponification takes several days to complete. Glycerin, a natural by-product of saponification, remains in the soap. Cold soap is easier to make because it does not need to boil; the sun does the work of the fire.*

*Most European settlers used the kettle method. Through the process of boiling, steam is directed through the soap mixture. After saponification takes place, salt is added, causing soap to rise to the surface and glycerin to sink to the bottom. Glycerin is collected, purified and sold separately. Traditionally, soap making took place right after hog slaughtering so the fat was available for the process.*

*Today commercial soaps use the "continuous process", in which the ingredients are under pressure in a large vat. This method permits raw ingredients to be added continuously to one end of the vat while soap is removed from the other end. The high pressure and temperatures in the vat and the addition of a catalyst cause immediate saponification of the ingredients. Glycerin is removed from most commercial soaps.*

**Do not distribute the Student Page until you have completed the Engagement Activity and the spilled juice has been mopped up.**

TEKS (Texas education standards)

- *Demonstrate safe practices during field and laboratory investigations.*
- *Plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology.*
- *Construct simple graphs, tables, maps and charts to organize, examine and evaluate information.*

## **Materials**

- *Lye, 13 oz. can (antidotes for lye exposure, as listed on can)*
- *Grease, 6 lbs. (lard)*
- *Baking pan, shallow*
- *Pitcher, Pyrex, not metal*
- *Water, 2 ½ pints*
- *Spoon, wooden*
- *Thermometer, laboratory or candy*
- *Safety goggles (pair for each student)*
- *Gloves, plastic (pair for each student)*
- *Apron (one for each student)*
- *Bunsen burner, hot plate or heat source*
- *Pick*
- *Knife*
- *Water*
- *Hammer*
- *Pantyhose*
- *Potholders*
- *Clock*
- *Mixing bowl, Pyrex*
- *Yucca roots (may be purchased at local nursery)*

## **Procedure for Engagement**

*Place a tray holding a pitcher of grape juice and a glass in front of your students. As you fill the glass purposely spill liquid onto the tray. Grab an old cup towel to mop up the spill. Exclaim that you have now stained the fabric. Have the students suggest ways to remove the stain. Test the methods that are suggested.*

Distribute student page.

Procedure:

1. *Students should state a hypothesis about which method will remove the stain better.*
2. *Students should design a test that will fairly (scientifically) prove or disprove the hypothesis. Student suggestions might include:*
  - *Rinse fabric under running water for one minute.*
  - *Put fabric in a bottle of water and shake for one minute.*
  - *Scrub fabric with water and one's hands for one minute.*
3. *Someone will suggest soap, but do not have it available. Suggest that the idea might work, but Native American Indians and European settlers would have made the soap themselves.*
4. *Try each of the suggestions made in Step #2. (Small student groups could try one suggestion.)*
5. *Prepare a chart to show results.*
6. *Write a sentence or two that answers the question, "Which method removes the stain better?" (Conclusion)*

## Teaching Hints and Safety Precautions

1. *Because of the caustic nature of lye and the high temperature of some of the ingredients, the recommendation is to have the class prepare the soap as a group. The teacher WILL DEMONSTRATE the potentially hazardous steps. To demonstrate the causticity of lye to skin and eyes, place a sample of hair in a small clear glass bowl of lye (many drain cleaning products).*
2. *Have the antidotes that are listed on the lye can available to use if unintentional exposure should occur.*
3. *Both teacher and student(s) must wear plastic gloves and safety goggles when handling hazardous substances (lye).*
4. *Avoid inhaling fumes during the soap making activity. Proper ventilation is necessary.*
5. *Students should keep their hands away from their faces when handling science materials.*
6. *Wear short-sleeved and well-fitted clothes when working with a flame. Keep hair tied back.*
7. *Before using any homemade soap, test a small area of skin for possible allergic reactions.*
8. *If yucca roots are dug up by you or the class, use safety precautions recommended for using garden tools. Be sure to get permission from the landowner before digging. Plants may not be collected on federal, state, county, and city property. Yucca plants can be purchased in your local nursery.*
9. *Yucca plants have spines on the ends of long narrow leaves. Use caution.*
10. *The pulp of the yucca root may be preserved by freezing, or by drying it in the sun and storing it in a cool place.*
11. *Stress the ethics of collecting plant material only where permission has been granted and never in national, state, or city parks.*

## References

Coney, Norma. *The Complete Soapmaker*. New York, NY: Sterling Publishing Company. 1996.

Tull, Delena. *A Practical Guide to Edible and Useful Plants*. Austin, TX: Texas Monthly Press. 1987.

*"Mrs. Ware's Cold Water Soap"*, Pamphlet from Fort Davis Historical Park.

[www.alcasoft.com/soapfact/history.html](http://www.alcasoft.com/soapfact/history.html)

# DAILY LIFE IN A MISSION

## MAKING HOMEMADE SOAP



### STUDENT INFORMATION

**Objective:** You will be able to follow a recipe to make homemade soaps similar to those made by Spanish settlers and Southwest Indians.

### Engagement

Your teacher will have placed a tray holding a pitcher of grape juice and a glass in front of the class. Were you watching carefully as she filled the glass with the juice? Any juice that was spilled was cleaned up with an old towel. Grape juice stained the fabric. How should the stain be removed? Be prepared to suggest how to remove the stain. Your method may be the best way to remove it.

After the class tries several methods to remove any stains, write a sentence or two that answers the question, "Which method removes the stain better?"



### Exploration

Your teacher will help you make soap in a manner similar to one used by settlers.

1. Review safety rules and put on safety equipment.
2. Melt grease in a shallow baking pan. Remove pan from heat and pour grease into a Pyrex mixing bowl. Allow grease to cool to 95 degrees Fahrenheit.
3. Slowly and carefully add lye into a Pyrex pitcher filled with 2 ½ pints of cold water. The chemical reaction will cause the liquid to be heated (exothermic). Allow this to cool to 95 degrees Fahrenheit.
4. **THE LYE MUST NOT BE HOTTER THAN THE GREASE.** Check each with a thermometer to see that they are about 95 degree Fahrenheit. Pour the lye into the Pyrex mixing bowl holding the grease, mixing well with a wooden spoon.
5. Stir mixture constantly for about ten minutes. Pour mixture into the shallow baking pan.
6. Set soap aside to harden.
7. Clean the Pyrex pitcher thoroughly with soap and water.
8. Check soap every thirty minutes for the first few hours. If it has separated, stir the mixture.

9. When it begins to set (harden), lightly cut the surface into 2" squares.
10. The soap will take 2-3 days to set completely. When it has set, cut the squares completely.



### Explanation

1. Describe the characteristics of soap after the mixing has been completed.
2. Describe the characteristics of soap after it has "set" for several days.
3. Are there any other tests you would want to do before you could completely describe the soap's characteristics in question #2? If so, describe the tests.
4. Why did the settlers make soap?
5. Why do we not make homemade soap today?



### Elaboration

In this activity, you will make soap similar to the way the Southwest Indians, such as Coahuiltecans, Comanches and Apaches, made soap.

1. Dig up the roots of the soap yucca plant. Collect plant material only where permission has been granted, and never in national, state, county, or city parks.
2. Scrub loose dirt from the roots.
3. Peel off the tough outer covering and chop the roots into small pieces.
4. Pound root to a pulp with a hammer. Observe safety procedures when handling the hammer. The pulp may be stored for further use.
5. When you are ready to use some soap, add a handful of yucca pulp to a quart of cold water and stir until it makes suds (lather). Strain the solution through a piece of panty hose to remove fibers.
6. Add warm water to the strained solution, which is now ready for use.



### Explanation

1. In early days, when the missions were being established or when your great-grandmother was young, do you think people made lye soap or yucca soap? Why?
2. Is lye soap or yucca soap more convenient to use? Why?
3. What are the characteristics of yucca soap?
4. What might have mission Indians used to strain the solution in order to remove yucca fibers?

## **Evaluation**

Plan and do an investigation to test whether yucca soap or lye soap removes grape juice stains better.

Evaluation Criteria:

40%

Your experiment in the evaluation section has a hypothesis you can test.

You did the investigation scientifically.

You showed your results clearly.

Your answers are based on accurate observations.

60%

You completed all parts of the investigations.

You completely and accurately answered the questions.