



Topic: Good Clean Fun!

Make your own fragrant soaps with basic ingredients

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Lesson-Planning Approach

Some learners perceive their “world” as a whole, where all things are interconnected and dependent upon each other. These “integrated” students face major challenges in coping with our dominant educational, social, and economic systems, which tend to present information in a linear fashion without the necessity of integration into meaningful context. Integrated students are at-risk of failing as they attempt to grasp information in ways that do not match their experience. Among large populations of at-risk students are many from Native American and similar cultures that do not regard their world as a sum of parts but as a blend of all that they experience.

This lesson plan does include some traditional, linear approaches to delivering information (checklists, rules, analysis, problem solving and organization). In addition to the traditional, linear delivery of information, this lesson plan also includes some of the following strategies, designed to appeal to at-risk students as they learn academic/life skills:

- ❖ Integration of technology
- ❖ Story telling/anecdotal information
- ❖ Non-competitive group and team work
- ❖ Performance-based assessment and rubrics
- ❖ Visual presentations and practice through technology and other means
- ❖ Project-based assignments that integrate family and community
- ❖ Activities appealing to multiple intelligences (Gardner)
- ❖ Application of Scientific Method to formulate and solve a problem.

Lesson Overview

This lesson offers safe and fun methods for making homemade soaps as educational projects. Students acquire and apply understanding chemical reactions, use measurements, ratios, and plant identification. Students learn about the skin and how it functions, and combine a variety of ingredients to produce healthy soaps for personal use. Students also research soaps and soap making history in the process of producing their own soaps.

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Lesson Objectives

Project: Home made Soap

Project Objectives: When students complete this session, they will be able to...

- ❖ *Research* the principles behind soap properties and saponification.
- ❖ *Create* cost and amount spreadsheet
- ❖ *Make* simple soaps of their choice
- ❖ *Apply* measurements, combine plant and soap ingredients
- ❖ *Identify* common plants that can be used in simple soap recipes
- ❖ *Apply* the scientific method to surfactant experiment
- ❖ *Use Technology* to research topic information on the web, accomplish writing, and create spreadsheet

Integration of Other Functional/Academic Skills: (Critical thinking is required throughout the lesson.) Students will be able to...

- Math:** Use math to measure and understand costs, ratios and proportional change
- Reading:** Read information on the history of soap making, skin function and care, and soap recipes.
- Writing:** Write their own recipes, use word processing or Powerpoint to present their project.
- Technology:** Search the internet for relevant sites, use computers to prepare a Powerpoint or Word presentation on results
- Science** Apply scientific method and correctly format an experiment, understand chemical change.
- History** Read and understand the geographical and practical origins of soap making and changes through history.

State/National Standards

<http://www.cde.state.co.us/cdeassess/sci.htm#standards>

Reading and Writing

1. Students read and understand a variety of materials.
2. Students read, select, and make use of relevant information from a variety of media, reference, and technological sources.
3. Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.
4. Students apply thinking skills to their reading, writing, speaking, listening, and viewing.
6. Students read and recognize literature as a record of human experience.

Science

1. Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.
2. Physical science: Students know and understand common properties, forms, and changes in matter and energy.
3. Life science: Students know and understand the characteristics and structure of living things, the processes of their life, and how living things interact with each other and their environment.
5. Students know and understand interrelationships among science, technology, and human activity and how they affect the world.
6. Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.
- 7.

Mathematics

3. Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.
4. Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.
6. Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

Websites

Required: (Use these sites for reading and background information)

<http://www.sdahq.org>, Soap and Detergent Association: the history, chemistry, human safety, environmental safety and effective use of personal cleansing products, laundry products, dishwashing products, and household cleaning products

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Mountain Plains Distance Learning Partnership



<http://www.eAudrey.com> Includes basic instructions on making soap and cosmetics, trouble-shooting, and recipes for adding herbs and oils.

Support: (Use these sites for additional information and future reference)

<http://www.terrificscience.org/natlstds/fcstds/foursoaps.shtml> Ohio State University lesson website with great easy soap making activity explaining basic chemistry of lipids

<http://users.silverlink.net/~timer/soapinfo.html> Home made soap: comprehensive details and instructions about making your own soap, including lots of links. More sites about: [Crafts > Soap making](#)

<http://www.soapteacher.com/> Soap teacher: dedicated to helping the amateur and professional soap maker.

<http://members.aol.com/oelaineo/soapmaking.html> Soap recipes: soap recipes and directions.

<http://www.sunsoap.com> Natural handmade soaps, soap makers' supplies and glycerin soap recipes

Caveman to chemist: <http://cator.hsc.edu/~kmd/caveman/projects/soap/> Extensive chemical explanation of the saponification process and history of soap making.

Pre-requisites

Read at fifth grade level or above

Possess basic computer skills to conduct word processing, search the web, and conduct basic science activity.

Required Materials

- ❖ One-quart double boiler and heat source for melting the soap base
- ❖ 2 cups glycerin soap base per recipe (available from health food stores, craft stores or mail-order suppliers given in websites or suggested materials.)
- ❖ Measuring spoons and cup measures
- ❖ Stirring spoons or sticks (old chopsticks work well)
- ❖ Cheesecloth
- ❖ Plastic soap molds, candy molds, plastic food storage containers, or other interesting containers with a 2-cup capacity
- ❖ Assortment of herbs or oils for the recipes
- ❖ Liquid glycerin (available from pharmacies or health-food stores)
- ❖ Plastic cherry tomato or strawberry basket to demonstrate water tension

Suggested Materials

Soothing Soaps by Sandy Maine. Interweave Press, Inc., Loveland, CO. 1997

The Skin Care Book by Kathlyn Quatrochi. Interweave Press, Inc., Loveland, CO. 1997

Glycerin soap base can also be mail-ordered from Sunfeather Natural Soap Company (SUN), 1551 Hwy 72, Potsdam, NY 13676

Handouts

- ❖ Glycerin Soap Making Guidelines and Recipes (Handout One)
- ❖ Easy Native Plants to Add (Handout Two)
- ❖ Lesson Rubric (Handout Three)

Required Equipment/Technology

Network accessible computers, also equipped with a word processing

THE LESSON

Note: Students do not learn from what you do but from what you have them do.
PART I

Preparation

Day One

Activity	Instructor Notes
1. Discuss the topic of soap making. Make a list of desirable qualities for a good soap.	<ul style="list-style-type: none"> • Establish prior knowledge with students. What kinds of soaps are we familiar and what are the ingredients? Have students check family history to see if any family members have made their own soaps or cosmetics in the past. The list created can be used later for evaluation sheets.
2. Read and review the history of soap making and the saponification process at www.sdahq.org/cleaning/chemistry . Also read definitions of basic soap-making terms and other recipes at www.eAudrey.com	<ul style="list-style-type: none"> • Identify and review the terms <i>lye</i>, <i>saponification</i>, <i>fat</i>, <i>lime</i>, and <i>soda ash</i>.
3. Fill a bowl or sink with water and place a plastic basket (cherry tomatoes) on the surface. It will float although full of 'holes' (or needle, razor blade, etc.). Now place a drop (or more if needed) of dishwashing detergent in the water. Observe and record what happens and why.	<ul style="list-style-type: none"> • This experiment illustrates saponification, the "coating" or recharging of water molecules by fat/oil molecules to reduce the molecular tension of water, thereby dispersing water and oil molecules. In summary, a soap is a combination of a fatty acid and a metal ion, usually sodium (salt). When dissolved in water, the fatty acid and metal ion separate. If left to themselves, the fat droplets in the water group together in large puddles. Fatty acids prevent this from happening by burying their "nonpolar" tails in the fat droplet and their negatively-charged polar heads out in the water. The fat droplet is now covered with negative-charges and the droplets will now repel each other,

	<p>much like the negative ends of two magnets. You can also check out http://www.terrificscience.org/natlstds/fcstds/foursoaps.shtml</p>
<p>4. Review various soap recipes and choose your ingredients and molds. Make list of needed ingredients, amounts, and cost. Adjust the amounts depending on how much soap you want to make. Obtain your added ingredients from a health food store or grocery store, or collect your own herbs using the guidelines presented here.</p>	<ul style="list-style-type: none"> • A variety of easy recipes using local resources are included in Handout One. More easy milled soap or glycerin soap recipes can be found at www.eAudrey.com or www.sunsoap.com. Students may research the costs of all ingredients as they make their ingredient lists and create cost and proportion spreadsheet to see changes in costs and amounts relative to amount of soap.

Performance and Practice

Day Two

<p>Make your soap(s). Pour into molds and cool.</p>	<ul style="list-style-type: none"> • Making soap from the original lye and fat methods has not been presented here due to the hazards of dealing with lye. Making the actual soaps from the prepared glycerin base should be relatively easy. Caution, of course, should be kept in mind around the heat source. The group may make individual soaps or work together in groups.
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Presentation

Day Three

Activity	Instructor notes
<p>1. While soaps are cooling and curing, design an evaluation sheet to sample other students' soaps.</p>	<ul style="list-style-type: none"> • A word processing program may be used here.
<p>2. Have a "Suds-n-Duds Day". Bring all the soaps and have people sample and compare soaps and cleansers. Fill out evaluation sheets and put together as a class presentation.</p>	<ul style="list-style-type: none"> • A class or group can compile their results into a group presentation for use at a science fair or school presentation
<p>3. Discuss Rubric</p>	<ul style="list-style-type: none"> • Have students perform self-assessment of their performance in reading, writing, scientific method, use of technology, and creation of soaps. .

Lesson Assessment Strategy (Formative – As the lesson progresses)

Preparation, Presentation and Overall Implementation (Instructor)

1. Are the instructions and expectations for the class clear from the beginning?
2. Am I spending sufficient time on modeling the skills I want students to acquire?
3. Is there enough variety in the lesson to appeal to most learning preferences?
4. How many learning intelligences am I addressing?
5. Are students “connecting” to lesson objectives? How?
6. How is this lesson “integrated?”

Performance and Practice (Student)

1. Do all students have the skills to follow instructions? If not, what measures am I taking to address the challenge?
2. Are all students participating in the activities either by active observation or by voicing their thoughts?
3. Am I identifying the strengths of each student and pairing/grouping people accordingly? What results am I getting?
4. How are students performing? Are all of them able meeting 80% of the lesson objectives? If not, what am I doing to help them achieve more?

Technology

1. Is the technology working? Do the students need help with the video or tape recorders?
2. How are students reacting to the technology, and what do I need to remember when I teach this lesson again?
How are students applying or wanting to apply their technical skills in other areas?

Activity Checklist

• Discuss soap making and establish prior knowledge.	
• Read required websites.	
• Conduct saponification/surfactant experiment.	
• Review recipes and choose soaps	
• Assemble ingredients	
• Make soap. Document steps	
• Write evaluation forms.	
• Have Suds-n-duds Day. Evaluate products with summary statements.	
• Discuss lesson rubric.	

Handout One: Glycerin Soap Guidelines

(Adapted from "Soothing Soaps" by Sandy Maine. Interweave Press, Loveland, CO)

This soap-making lesson has been soothingly simplified to focus on designing your own soap ingredients and making healing soaps. After reading the history and chemistry of soaps, it is easy to see that making your first soap from the original ingredients of lye and fats or oils can be complicated if not potentially dangerous. Working with lye takes careful planning and concentration. Here are ways to make your own soap using a glycerin soap base that's already been saponified. All you need to do is melt it down and add your own ingredients!

One of the most amazing uses of soap is its ability to heal. When fats are saponified with lyes, the surface tension of water is decreased, allowing the soap ingredients to draw infectious agents and other unwanted substances away from the skin. When we add healing herbs or grains to the soap, we increase its powers to cleanse, soothe and protect in a natural healthful way. Many popular recipes begin with a clear glycerin base of saponified vegetable oils. It is especially kind to troubled or weathered skin. It also combines well with soothing herbs, essences, and other special ingredients. These qualities, plus the ease of making these types of soaps, make glycerin soap base the foundation of these recipes. These recipes include plants that are easy to find growing wild throughout most of the western United States or as herbs in the grocery store. However, if you would like to try something else, feel free to experiment with other safe plants

All recipes assume that the glycerin soap base has already been melted down, so that two cups of soap base equals two cups of melted liquid soap. Start by melting it gently over medium heat in a double boiler. Add your own ingredients and stir. Then pour the thick liquid into a mold and let it cool. And best of all, there's very little waiting. Your soap creations will be complete and ready for use within an hour.

Recipes

Common Plantain Soap (Antiseptic)

Plantain is a familiar and abundant broad-leafed wild weed. Freshly gathered and mashed plantain yields juice that is excellent as a wound healer due to its mild antiseptic qualities. It helps stop blood flow and reduces inflammation. You may gather the plant fresh or purchase plantain oil ready-made.

Ingredients

¼ cup glycerin

Cheesecloth

2 cups glycerin soap base

¼ cup strained plant juice/glycerin mixture (or 2 tablespoons oil)

Blend a handful of the leaves with ¼ cup glycerin and 1/8 cup water. Strain through cheesecloth and add to glycerin soap base. Stir until blended, then pour into molds and cool.



Calamine Soap (for Poison Ivy Relief)

Calamine is a pink powder that is actually produced from minerals (zinc oxide mixed with ferrous oxide). You can use either calamine powder from a pharmacy or the familiar Calamine lotion. Calamine Soap is mild and soothing for any type of skin irritation, particularly those that cause itching.

Ingredients

- 1 tablespoon calamine powder (or two tablespoons calamine lotion)
- 1 tablespoon bentonite or cosmetic-grade clay
- 2 tablespoons liquid glycerin
- 1 cup glycerin soap base

Mix together the calamine, clay, and liquid glycerin until smooth, adding a small amount of water if needed. Whisk the mixture into the soap base, pour into molds, and cool. This soap will remain effective for two years.

Lavender and Rosemary Soap (antiseptic, anti-inflammatory, and beneficial for treating blemishes and wounds)

Lavender and rosemary have a mild yet stimulating effect on skin. Use fresh or dried rosemary and lavender flowers. You may also make a quick infusion by steeping the herbs together for a day.

Ingredients

- 3 cups glycerin soap base
- ¼ cup infusion of dried lavender flowers and rosemary flowers
- 1 ½ teaspoon lavender oil
- 1 ½ teaspoon rosemary oil
- 1 teaspoon dried ground rosemary (optional)

Combine the melted base and herbal materials. Stir until blended, then pour into molds and cool.

Juniper Soap (Antiseptic, astringent, useful in treatment of acne)

The small and fragrant blue berries are used in the production of gin and several types of medicinal and fragrant oils. Juniper berries can be collected during the spring and summer, dried, and macerated.

Ingredients

- 2 cups glycerin soap base
- 2 tablespoons tincture of juniper berries or macerated berries (no seeds)
- 1 teaspoon essential juniper oil (optional)

Combine melted base and herbal materials. Stir until blended, then pour into molds and cool.

Oat and Barley Soap (Penetrate and moisturize skin)

The feel and scent of oatmeal and barley powders in soap is a wonderful softness and natural color. Oats and barley are both healing grains. They are rich in vitamins and minerals. They soothe sensitive skin, moisturize dry skin, relieve itching, irritation and inflammation. Oat bran contains an ingredient called Beta glucan which is often used to deeply moisturize skin. The following recipe uses both powdered and cooked grains. You may add a teaspoon or two of dried sage to this recipe for added aroma.

Ingredients

1 cup glycerin soap base
 ¼ cup cooked grains liquid
 ½ cup crushed or powdered oatmeal
 1 teaspoon barley powder
 Cheesecloth

To begin this recipe, cook ¼ cup of oatmeal and ¼ rolled barley in 1 ½ cups boiling water at medium heat for 15 minutes. Cool the mixture and place into a double layer of cheesecloth.

Squeeze out and collect as much liquid as you can and discard the remaining grain. Mix the slurry into the soap base, pour into molds, and cool. This is a good all-over soap that nourishes both dry and oily skin without irritation.

Yucca Cleanser (for dry skin)

This recipe does not include glycerin soap base, but a small amount of yucca root powder does the cleansing. Honey attracts moisture from the air and is good for peeling away dead cells. Powdered milk also helps cleansing by breaking down dead skin cells, dirt, and other impurities. Yucca is a naturally saponic plant with foaming qualities.

Ingredients

1 tablespoon honey
 1 teaspoon powdered milk
 1 teaspoon powdered yucca root
 1 teaspoon warm water

Mix the honey, powdered milk, and yucca root together with warm water to form a paste. Let stand for 10 minutes. Apply to wet face or skin with a light circular motion. Remove by rinsing in warm water and follow with moisturizer. This cleanser may be used up to twice a week.

Handout Three: Easy Native Plants

Huntin' and Pickin' Notes

Please be sure of the plant you are picking. If any herb makes you feel queasy or sick to eat or drink, take less of it or none at all.

When picking plants, avoid picking unhealthy looking plants (brown or yellowing leaves, or leaves full of insect holes). Please practice conservation while picking your plants. If there is a large population, never take more than a third. If the total population is small or only a few individuals, check around for a new location.

A small plastic shopping bag (grocery store kind) makes gathering fresh greens a snap! Sprinkle a few drops of water in the bottom of the bag to provide humidity and moisture to the leaves until you get them home. This works to keep them quite fresh. Remember not to leave the bag out in the sun or heat. The greens can be stored in the refrigerator or cooler in their bag for up to a day or two until use.

Be aware of where you pick your greens. Avoid plants that are close to highways, roadways, or near areas that are contaminated by vehicles, gas, trash, or many feet, as these plants may have taken up toxins into their tissues.

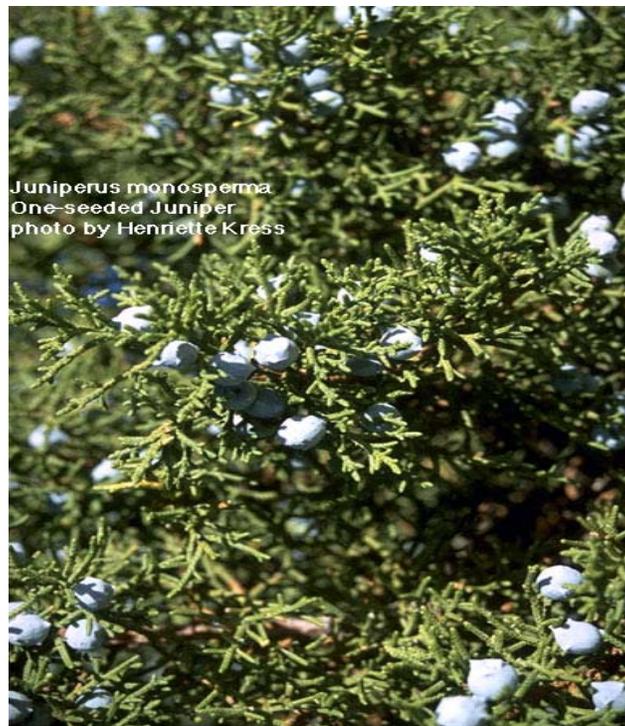


Photos courtesy of the Southwest School of Botanical Medicine, Bisbee, AZ

Common Plantain (*Plantago major*)



One-seed Juniper (*Juniperus monosperma*.)



Banana Yucca (*Yucca baccata*)

