Making Soap Using Beeswax and Honey

How Beekeepers Clean up with Value-Added Products

Prepared by Landi Simone, Master Beekeeper, Gooserock Farm

Why Make Soap?

- Luxury Value-Added Product
- Excellent return for small amount of beeswax or honey
- Fun to make
- Adds to variety in product line
- Smells great!
- Like your honey, handmade soaps are of the very best quality – milder than any commercial soap – and you and your customers will become addicted to them!

How do Beeswax and Honey Make Soap Better?

- All handmade soaps, even those with no beeswax or honey, are naturally 1/3 glycerin, a humectant which attracts moisture to the skin
- Honey is hygroscopic. Adding it to any cosmetic increases that product's conditioning/moisturizing properties
- Beeswax does three things in soap:
  - It makes the soap gentler on the skin
  - It makes the soap harder and longer-lasting
  - It helps the soapmaker by decreasing the time it takes the soap to "trace." (More on this later.)

What is Soap?

- Soap is a salt of a fatty acid used as a surfactant for washing, bathing, and cleaning.
- Soap is the result of a chemical process called **saponification.**
- Soapmakers combine various **fats and oils** with **lye** (sodium hydroxide) and **water** to create soap.

All Soap is Made with Lye

- BUT, correctly made soap does not CONTAIN lye!
- Transparent (glycerin) soaps are also made using lye and are then further treated with alcohol.
- All the lye added in soapmaking, if the correct amount is used, is chemically bound with the fatty acids in the oils and fats and becomes…..soap! Only if too much lye is used in the first place will there be lye in your soap.

Basic Soapmaking 101

- WEIGH the fats and oils in your recipe, put them in a pot and set them to melt. Then let them cool.
- WEIGH the correct amount of lye.
- MEASURE the right amount of water.
- COMBINE the lye and water and set it aside to cool.
- When the lye water and the fats have cooled to the right temperature, COMBINE them and STIR. This starts the chemical reaction.
- When the soap TRACES, pour it into your MOLDS.
- Next day, unmold and cut the soap into bars. Let cure.


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pyrex
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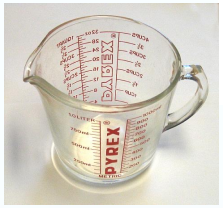
“Trace”: What is it?

- Tracing is a change in the texture of the liquid soap in the pot. It becomes thicker so that a spoonful of the soap drizzled on the surface will leave a “trace.”
- When the soap has traced, the chemical reaction has advanced to the point that the soap can be poured into the molds.
- Beeswax makes soap trace much faster!

Soapmaking Tools



Your Most Important Tool

- Choose a scale that has the capacity to weigh the largest batch of soap you think you might want to make.
- Accuracy to .02 pounds for larger scales or .01 ounce (.006 pounds) for smaller capacity scales.
- Should have a “tare” feature.
- Should have an A/C outlet.
- Should be big enough to securely hold your pot.

What fats go into soap?

- All fats are composed of different combinations of fatty acids, like oleic acid, linoleic acid, lauric acid, etc. These fatty acids contribute different properties to soap such as hardness, conditioning, lathering.
- If you “get into it” and design your own soap recipes, you will need to have a working knowledge of the properties of the various fats and what they contribute to your soap.
- You, can, however, make a great soap by incorporating several basic, important fats.
- There are many excellent proven recipes on-line and in books.

Commonly Used Fats

- Coconut Oil: Makes for a quick, fluffy lather. Essential in a soap that lathers well. Too much can be drying. Most recipes contain coconut oil.
- Palm Oil: Makes smaller, long-lasting bubbles. Makes a brittle, hard soap that is mild.
- Olive Oil: Great moisturizing properties. Poor lathering qualities. Soap made with all olive oil is “castile” soap and is very mild. Use “pure” grade, not extra virgin. Used alone, takes very long to trace (sometimes weeks!)

And More Fats....

- Castor Oil: Makes a beautifully emollient, hard bar of soap when used in combination with other oils.
- Palm Kernel Oil: Makes a white, very hard soap with great lather but can be drying if used in excess. Similar to coconut.
- Other oils: Cottonseed, soy, hemp, cocoa butter, sunflower, tallow, lard, peanut, safflower, jojoba, corn, etc.
- Beeswax is treated as a fat in soapmaking.
- We COMBINE fats to get the qualities we want. Note that the majority of the fats in your recipe should be SOLID (hydrogenated) at room temperature.

Saponification Values (SAP)

- SAP = Milligrams of potassium hydroxide required to saponify 1g of a particular fat.
- SAP values are used to calculate how much lye is needed in your soap recipe.
- Most “soapers” use sodium hydroxide (lye), not potassium hydroxide, so a little math is needed to convert the units.
- There are many easy-to-use lye calculators available on-line: www.thesage.com or www.brambleberry.com are two websites with good ones.

Lye Discounting or "Super-fatting"

- These terms mean the same thing and refer to the practice of adding a little less lye than you need to saponify all the fats in your recipe. In practice, it means adding a little more fat than you need. Lye discounting is a guarantee that you will not have an excess of lye in your soap.
- Most soapers add 5% to 8% extra fat as a lye discount. Less than this risks a harsh soap. More will result in a soap that is soft or greasy.

Let's Design a Soap!

- Most soap recipes are designed by the pound, and then the "unit recipe" is just multiplied for production. Let's try:
  - 6 ounces palm oil (long-lasting lather, hardness)
  - 5 ounces coconut oil (big bubbles right away)
  - 4 ½ ounces pure olive oil (great conditioning)
  - ½ ounce beeswax (conditioning, hardness)

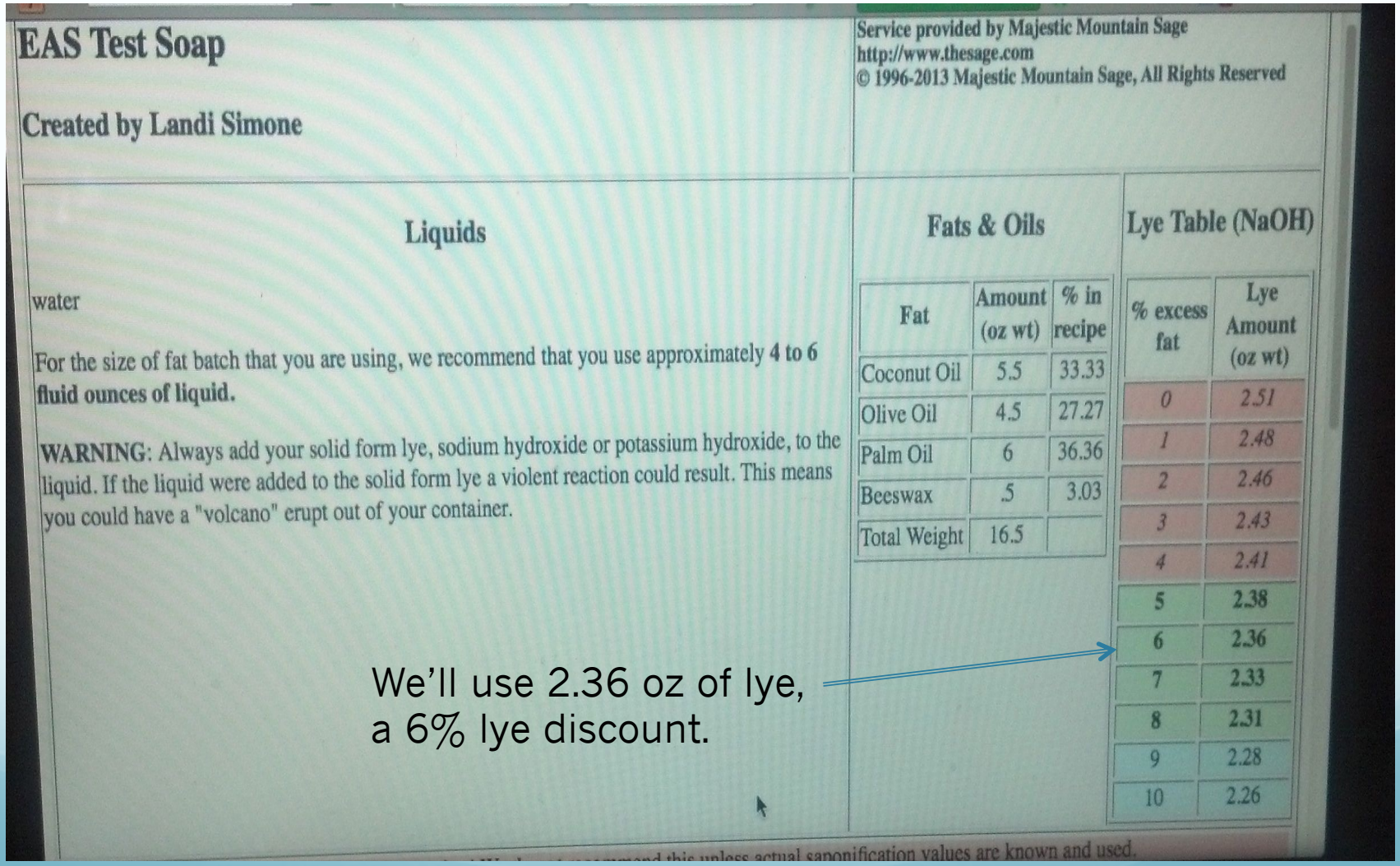
    - 16 ounces total

- This should produce a hard, mild soap with good lather. How much lye will we need?

Use www.thesage.com's lye calculator:

We enter the amounts of the various fats and oils, known as "fixed oils" by soapmakers, and hit the "calculate lye" button at the bottom, and....

Voila! Out pops the answer!



EAS Test Soap

Created by Landi Simone

Service provided by Majestic Mountain Sage
http://www.thesage.com

Liquids

water

For the size of fat batch that you are using, we recommend that you use approximately **4 to 6 fluid ounces of liquid.**

WARNING: Always add your solid form lye, sodium hydroxide or potassium hydroxide, to the liquid. If the liquid were added to the solid form lye a violent reaction could result. This means you could have a "volcano" erupt out of your container.

Fats & Oils

Fat	Amount (oz wt)	% in recipe
Coconut Oil	5.5	33.33
Olive Oil	4.5	27.27
Palm Oil	6	36.36
Beeswax	.5	3.03
Total Weight	16.5	

Lye Table (NaOH)

% excess fat	Lye Amount (oz wt)
0	2.51
1	2.48
2	2.46
3	2.43
4	2.41
5	2.38
6	2.36
7	2.33
8	2.31
9	2.28
10	2.26

We'll use 2.36 oz of lye,
a 6% lye discount.

this unless actual saponification values are known and used.

Making the Soap Smell Wonderful

- Many people comment on how great our Honey House smells, and are drawn to our booth at craft fairs and farm markets.
- Use essential oils for all-natural fragrance.
- Use fragrance oils for some great smells not available in essential oils (like vanilla.)
- Be careful with certain spicy or citrus essential oils and some fragrance oils. They can make your soap curdle, separate, or seize. ALWAYS make a test batch of a pound or two!

Adding Fragrance

- Rule of thumb: Add 1 tablespoon of fragrance/essential oil per pound of soap
- Use less for things like clove or cinnamon e.o.
- ALWAYS test a new recipe in a small one or two pound batch.
- Add fragrance to your fats just before combining with the lye-water.

Adding Botanicals

- “Botanicals” are dried goodies like oatmeal, flower petals, herbs, ground scrubby things (like apricot kernel) that act as an exfoliant and/or make the soap prettier.
- Add them to the cooled fats when you add your fragrance.
- Be aware that many botanicals will discolor under the action of the lye. Always make a TEST batch!

Coloring the Soap

Soap Colorants

- Soap can be colored in many ways, or not at all.
- Some use natural colorants like carrot juice or beet juice. Honey added to the lye water colors soap a rich brown.
- Natural mineral pigments such as iron oxide or ultramarine make beautiful colors, as do mica powders.
- FD & C colors are artificial, but very vivid.
- Some soapers even use crayons!
- Colors can be layered or marbleized for a dramatic touch.
- All colorants are either water-soluble and added to the lye water or fat-soluble and blended into the melted fats. Glycerin is a good vehicle for pre-mixing both types.
- Follow recommended usage guidelines for the type of color you are using. Do not use so much that the soap's lather is not white or color comes off on a washcloth. In the case of soap coloring, less is more! ½ to 1 tsp per pound is a good starting point.

Now let's make some soap! First we weigh the fats.

- The pot is the "tare." It goes directly on the scale.
- Be neat and precise. Accurate measurements are critical for making good soap.
- Don't walk away in the middle of a measurement. Many scales automatically turn off if left for a period of time.
- Put the pot of fats on the stove over medium heat to melt.

Next, we weigh out the lye and measure the water.

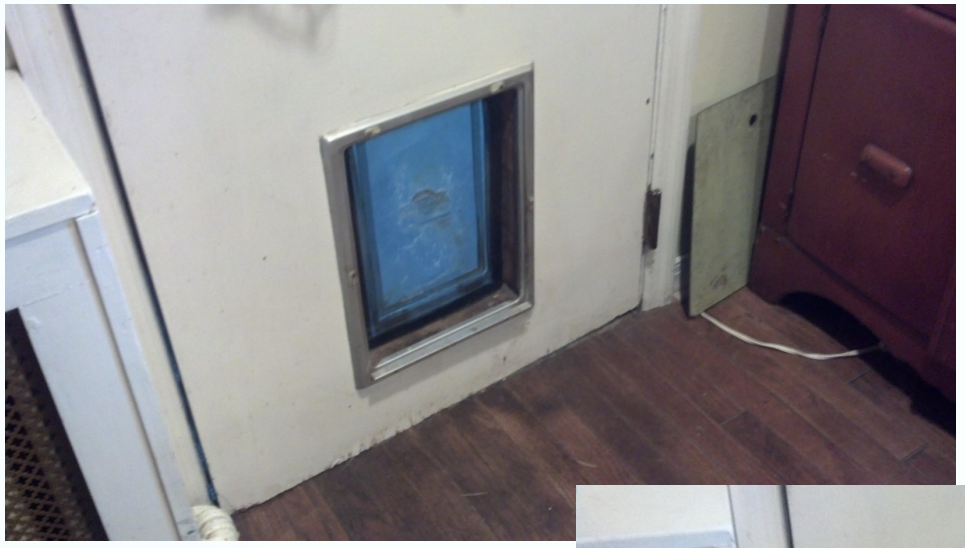
- It's a good idea to wear safety goggles and plastic gloves whenever handling lye, even in the dry phase.
- We usually measure 6 to 8 fluid ounces of water per pound of soap in the batch. The higher amount will take longer to cure but is less likely to do undesirable things like curdle or seize.
- Precision measurement of water is not as important as accuracy in weighing lye and fats.

Pour the water into a thick plastic bucket or container

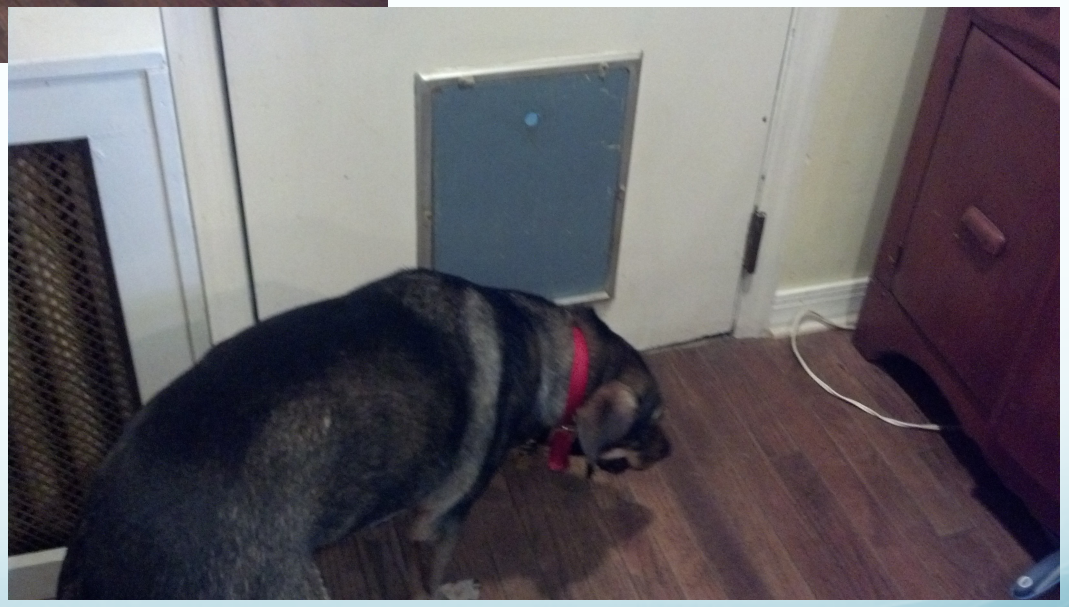
- Remember that once you add the lye, the mixture will get very hot – almost boiling! Do NOT use glass or anything that might break.
- You can test a container by pouring boiling water into it and letting it sit for a while.

Now we combine the lye and the water and stir

- ALWAYS ADD LYE TO WATER, NOT WATER TO LYE! (unless you are fond of explosions.) Remember:
- “It’s always smart to add lye to water. Add water to lye, and you may die!”
- Wear safety goggles, gloves, shoes.
- Smoothly pour the lye into a thick plastic container containing the water, hold your breath, and stir the mixture until combined.
- The fumes are VERY CHOKEY. Do not breath them. Do not let children or animals near the area.
- It’s best to do this outside if possible..



Unhappy, but safe!



More Safety Notes

- Lye is the scariest part of making soap. Stings are the reason more people don't keep bees and lye is the reason more people don't make soap.
- Lye is a caustic chemical that can burn or blind you.
- Use basic common sense and you will be fine.
- Adding lye to water is an exothermic process, i.e., it generates HEAT. The lye water will immediately heat up to around 200º. Water boils at 212º.
- Even a slight whiff of the caustic fumes will set you coughing. Test the direction of the wind and stand upwind. Hold your breath as an added precaution. Mixing the lye water only takes a few seconds. Do it and walk away.

When the fats have melted, take the pot off the stove.

- Beeswax will be the last thing to melt. When it dissolves, your fats will be at a temperature of around 145º to 150º.
- Try not to overheat your oils. Cosmetics never benefit from too much heat!
- Give it all a good stir, get your molds, fragrance, botanicals and colorants ready to go, and read a good bee book while the fats cool.

Temperature is Critical

100° - 120° Is a good range to combine the fats and lye-water,

When to combine the fats and the lye water?

- We always start our fats melting and then combine the lye and the water. By the time the fats have cooled to around 120º, the lye water is also cool enough. This can take a couple of hours for a 20 pound batch.
- We combine at 120º unless we are making a marbleized soap. Then we combine at 125º.
- The "book" suggests ranges of 80 to 130º, but middle ranges above 100º are best for soap with beeswax or the soap will trace too quickly.
- You must experiment to find the best temperature for your particular recipe.
- Combining too hot can cause soap to seize or separate!

Smoothly pour the lye water into the melted fats

- Be sure everything is ready in advance. You will not have time to get goggles, gloves, spatula at the last minute, especially if you are marbleizing or layering your soap.
- Add your botanicals, if any.
- Add your colorant, if any.
- Add your essential oil or fragrance oil.
- Smoothly pour the lye water into the melted fats.
- Stir. Don’t splash!
- You can stir by hand but a cordless drill works well for larger batches. You can use a stick blender for a small batch of a few pounds.

Continue stirring until the soap traces

- The time to trace depends on the temperature, the fragrance or essential oil, the size of the batch, the amount of water used, and the percentage of saturated/unsaturated fats in the recipe.
- Soaps containing beeswax tend to trace very quickly… sometimes TOO quickly!
- Thorough stirring is very, very important!

Pour the soap in the molds

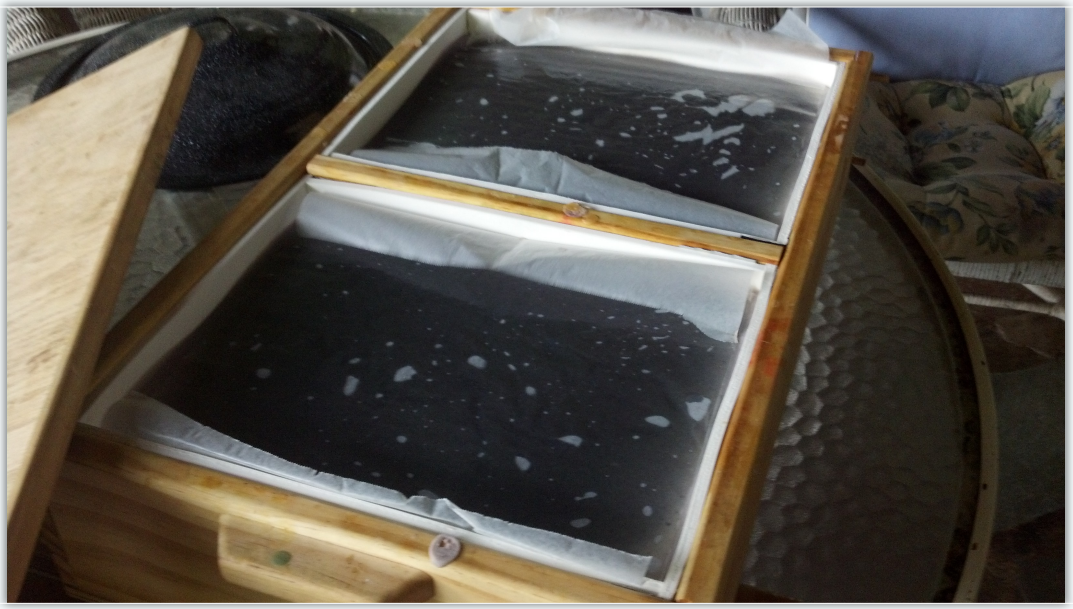
- A good commercial soap mold has a liner – silicone, plastic, or foam. If using a wooden mold, be sure to line it with freezer paper. Fold to fit. Wrinkles will show.
- Be careful not to splash.
- You can and should get all the soap out of the pot with a silicone spatula.

Level and cover with wax paper or freezer paper

- You can gently pat the surface of the soap down after the wax paper is in place to level the surface. The soap tends to be higher in the middle if it is poured at thick trace.
- Wax paper helps prevent formation of a harmless white powdery substance called soda ash which forms as a result of exposure to the air.
- You can also use a spoon to create “waves” and interesting patterns on the surface. In this case, spray with rubbing alcohol to minimize soda ash.

Putting the soap “to bed”

- Some soapers actually wrap the mold in a blanket!
- Keeping the soap warm is more important for small batches that don’t retain heat as well as larger batches.
- Keeping the soap warm helps it to gel



The Gel Phase

- As saponification progresses, the soap heats up so much it becomes transparent, then cools down again.

- A soap that gels will saponify more completely and cure faster.

Leave the soap in the molds for 24 hours

- Soap should be completely cooled before unmolding and cutting into bars.
- It should have the texture of cheese when you cut it: firm but easy to cut.
- Unmold the soap to a slab, cut the slab into logs. Cut the logs into bars.

Cutting the Soap into Bars

Curing the Soap

- Soap must cure completely before it is ready to use.
- During curing, saponification continues and the water evaporates from the soap.
- The soap becomes harder and more mild.
- Some recipes cure very quickly, some take several months.
- Soap shrinks as it cures, so don’t wrap it too soon!

What Went Wrong??

- Soap is chemistry. Accurate measurement is essential in avoiding problems.
- Some fragrances can cause soap to do weird things.
- Be sure to let the lye water and fats cool adequately before combining them.
- Soap can: separate, seize, curdle, get lye or oil pockets in bars
- ALWAYS, ALWAYS, test new recipes or fragrances in small batches!

Fancy Stuff: Marbleized Soap

Several Methods

- The KEY is to work at “thin” trace. Marbleizing takes a little time and the soap, especially with beeswax, tends to set too fast.
- All methods involve getting several colors in the mold and then running a knife or other thin spatula through the soap to draw the colors together in interesting patterns without actually mixing them.
- Anyone who has ever made a marbleized cake knows the basic principles of this method.
- It can help to have an assistant, as speed is vital.

Other Fancy Stuff to Try

- Layering colors: do at medium trace, very carefully spooning each layer onto the one below so the colors do not blend. The interface need not be perfectly straight. Work fast.
- Re-batching: This is a technique that involves cutting up soap and melting it down again, usually adding more fragrance, and putting it in a mold. Re-batched soap is also known as “milled” soap.
- “Confetti” soap: Add chunks or cubes of cured soap in contrasting colors to your current batch.

Resources

- "The Soapmaker's Companion," Cavitch, Susan Miller. This is an excellent reference and should be on every soapmaker's bookshelf.
- "Scientific Soapmaking," Dunn, Kevin M. For those who want a more in-depth treatment of the chemistry of making soap.
- Suppliers:
  - Fixed oils: www.soaperschoice.com. Great prices!
  - Fragrances: www.camdengrey.com, www.lebermuth.com
  - Everything: www.wholesalesuppliesplus.com. One-stop shopping
  - Tutorials, recipes, fragrances, colors, lye calculators, molds: www.brambleberry.com, www.thesage.com.
  - Molds, scales, equipment: www.soapequipment.com, www.oldwillknotscales.com.

Thank you!