

STEM Experiment #4

The Beauty of Lip Balm



Background Information

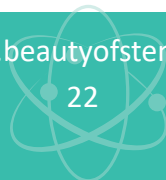
Research Activity

Great scientists like to know as much information as they can about their topic before they start their experiments. Use the questions below to guide your research on the composition of lip balms. This activity will help you to understand the science of creating attractive and effective lip balms. You can use sources such as trusted websites on the Internet and books from the library.

? *What is the purpose of lip balm?*

? *List at least 3 ingredients of lip balm?*

? *Question 3: Who was Max Factor? What was his birth name?*



Pre-Lab Activity: What is lip balm made of?

Lip balms are one of the most frequently used cosmetic products on the market. Lip balms are also very complex products which require the perfect formulation of ingredients to create the desired consistency. The ratio of ingredients controls the form and solidity of the lip balm. Typically, creamier lip balms contain more oil and the harder lip balms contain more wax. Other added ingredients, like fragrance, are very important and must be used with caution. Girls naturally like to make products that smell good; however, the fragrance and flavor properties are combined. Therefore, the chemist must create a formulation that balances scent and taste.

The base ingredients of lip balm are: **oils, butters, fragrance, wax, colorant, emollients, emulsifiers** and **preservatives**.

However, the secret to creating the perfect lip balm is creating the perfect formulation of these ingredients.

Complete the table below, filling in the blank columns.

◆ **Ingredients**

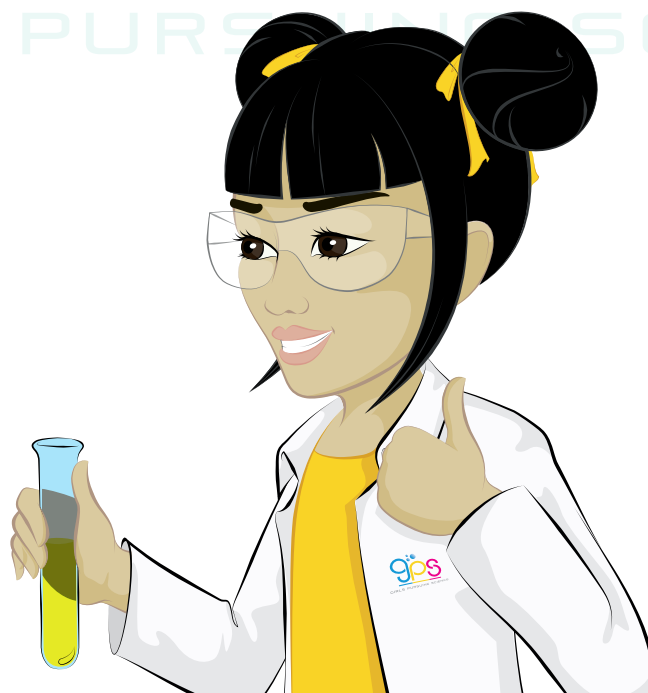
Relatively few ingredients are required to make the perfect lip balm. Each ingredient contributes to the way the balm tastes, feels, and how long it lasts. In the “**INGREDIENT**” column is a list of the typical ingredients of a lip balm. Review each ingredient and complete the “**PURPOSE**” and “**SOURCE**” columns in the table.

◆ **Purpose**

How does lip balm stay on your lips and prevent chapped lips? It is the chemistry behind the ingredients. Before you begin making lip balm, you must research and understand the ingredients that are used to make lip balm and why we use them. In the column labeled “**PURPOSE**,” write the purpose of the ingredient. Example: oils (thick sticky liquids such as olive or coconut oil) usually have a soothing effect and moisturize the lips. Use a dictionary or trusted cosmetic chemistry education websites to complete this column in the table.

◆ **Source**

Write the source next to the purpose. “Source” means where you got your information. Example: “encyclopedia” or if you researched the information online, list the name of the website.



Complete the table below. Fill in the blank columns.

INGREDIENT	PURPOSE	SOURCE
Oils	<i>Thick sticky liquids such as olive or coconut oil have a soothing effect and are used to moisturize the lips.</i>	<i>www.beautyofstem.com</i>
Butters		
Fragrance		
Wax		
Colorant		
Emollients		
Emulsifiers		
Preservatives		

Hypothesis

A **hypothesis** is a prediction that scientists make based on their research and prior knowledge. Based on the background information and research you have completed, write a hypothesis about what you think will happen to the final product if you use too much of a certain ingredient. Write a hypothesis with your predictions.

! To write like a GPS scientist, use the following format to guide you:

*If I add more **fragrance oil** to my perfume, **then** my perfume will be _____, **because** _____.*

! **Hypothesize: Write your own hypothesis for mixing too much oil, fragrance, and wax in your lip balm.**

Let's Make Lip Balm!

NOTE!

Your container for the lip balm measurement is only 2mL or 0.07 oz. Therefore, it will only hold slightly less than 1/2 tsp of lip balm. For that reason, it is best to work as a group to complete this activity.

Materials

EQUIPMENT IN YOUR KIT	QUANTITY	CLASSROOM EQUIPMENT	QUANTITY
Safety Glasses	1	GPS Lab Jacket	1
Lip Balm Containers (2 mL)	2	Measuring Cup	1 oz
Pipette	1	Mixing Container	1
Stirrer	1	Paper Towels	As needed
		Refrigerator	1
		Heating Source (microwave, hot plate, etc.)	1
		Thermometer	1

INGREDIENTS IN YOUR KIT	FORMULATION
Lip Balm Base	1 oz per group of 15
Flavor oil	1-2 drops per oz

Procedure

NOTE!

Use caution when using the ingredients in your kit.

DO NOT INGEST ANY OF THE INGREDIENTS!

In this experiment, you will make your own lip balm using a lip balm base. The lip balm base formulation includes wax that was derived from soy beans, luxury oils and exotic butters. It is also rich in Vitamin E. The lip balm base is made from 100% natural vegetable ingredients and contains no animal products. It also has hydrogenated Soybean Oil, Shea Butter, Cocoa Butter, Sweet Almond Oil, Vitamin E and Apricot Kernel Oil. It has a very creamy consistency, is not sticky, and is long wearing.

To create the perfect lip balm, follow the procedures listed below.

- Step 1:** Read the entire procedure **before** you begin.
- Step 2:** Clean off your work surface and put on your safety glasses and your GPS Lab Jacket to protect your face and clothing.
- Step 3:** Gather all of your **ingredients** and **materials** (see list above) and arrange them in the order that they will be used.

NOTE!

Do not start making your product before you have all ingredients, supplies, and equipment in front of you!

- Step 4:** Place your lip balm containers on paper or a tray on a level surface.
- Step 5:** When working in groups, evenly space each lip balm container to prevent spillage.
- Step 6:** Heat required batch of lip balm base (for the entire group) to 150 degrees Fahrenheit.

NOTE!

Occasionally, use a thermometer to test the temperature before removing the lip balm base from the heat source.

- Step 7:** Once the lip balm base has reached 150 degrees Fahrenheit, remove it from the heating source and use a pipette to add flavor oil. Typically, 1 to 2 drops per ounce is adequate. Example: If you are making 2 oz of lip balm for your group, you will need to add 2 - 4 drops of flavor oil.

NOTE!

The GPS flavor oil is professional grade oil and is highly concentrated. Do not use more than the amounts outlined in this guide.

- Step 8:** Use your stirrer to blend flavor oil completely into the mixture.
- Step 9:** Fill your lip balm container with a pipette until just below the top surface.
- Step 10:** Place containers (with lids off) in the refrigerator and let them harden completely (about 60 to 90 seconds).

ENJOY!

Analysis and Conclusion

After completing an experiment, scientists ask themselves questions in order to see what they have learned about their topic. Answer the following questions about your experiment in creating your own lip balm.

? **Question 1:** *Did your lip balm turn out the way you wanted it to? Why or why not?*

? **Question 2:** *Describe how “smoothing and moisturizing” your lip balm product is. If it is not as smooth as you would like, can you think of a way to make your product smoother?*

? **Question 3:** *Why is it important for scientists to follow procedures in the correct order? Explain the possible errors that could occur if they do not follow the procedure.*

