

gps

GIRLS PURSUING SCIENCE



# BEAUTY of STEAM SERIES

The Beauty Of Perfume Science

# GETTING STARTED



- 1.** Inventory your supplies and science tools. Contact us for missing or damaged items.
- 2.** Read through and complete the **STEAM** questions before making your perfume.
- 3.** Adhere to the **WARNING NOTES**.
- 4.** **NEVER MIX OTHER CHEMICALS WITH THE BOSS CHEMICALS.**
- 5.** Go to the **Girls Pursuing Science** YouTube channel to watch the **BOSS** "how to" videos.
- 6.** **START EXPERIMENTING!**



# Beauty Tips

- ◆ **Read** through ALL the steps before you start. We know that it is tempting to start with the procedure section where the products are made; however, if you understand the science behind the product, you can make a perfect product.

**Read** the notes and follow the GPS Scientist's advice.

- ◆ **Before** you begin making your product, clean (sanitize) your work area. Wipe your work surface with a light solution of bleach in water or use a sanitized wipe.
- ◆ **Gather** all of your ingredients before you start making your product.
- ◆ The fragrance oil in your kit is **highly concentrated**. Always start with a small amount and add additional amounts until you are satisfied.
- ◆ The gel colorant is very concentrated. **Stir** until all of the colors are well blended. You will know that your product is well blended if you do not see any streaks.
- ◆ You may **measure your ingredients** by weight using a digital scale, or by using measuring spoons and cups.
- ◆ Before reusing your pipettes, wash in warm soapy water.
- ◆ If you do not understand some of the words or math process, research for the answer. Research is a key component of science.

# BOSS KIT CONTENTS



- ◆ Full-color Lab Booklet
- ◆ Instructional videos
- ◆ 5ml - Perfumers Base
- ◆ 1- Beaker
- ◆ 1- Pair Lab Glasses
- ◆ 3- Pipettes
- ◆ 3 - 10ml Fragrance Oils
- ◆ 3- Perfumers Bottles

# UNBOX THE BOSS!

## Ingredients Used to Create Your Perfume?

Perfume is a mixture of different compounds with distinctive smells. (Compounds are chemical substances made up of two or more elements-An element is a pure substance that is made from a single type of atom.) that are chemically bound together in a fixed ratio)

These compounds are usually liquid and are combined to make a desired scent. To make perfume, you will need two ingredients, fragrance oils and an alcohol-based liquid, known as perfumers base.

Perfume is considered a mixture of chemical compounds which increases their volatility.

The BOSS Kit includes three 10ml bottles of Francene oils and a 5ml bottle of perfumers' base (alcohol and water mixture), that allows you to create highquality perfume blends.

The suggested formulation "a scientist recipe", to make your perfume is a ratio of 80% Perfumers Base to 20% fragrance oil however, you are the scientist here, so have fun and explore! Alter it as you desire.

As a scientist, understand that formulations are based on the result that you are trying to achieve. The ratio of fragrance oil to perfumers base determines the type of perfume. There are 5 common types of perfumes. These include parfum, eau de parfum, eau de toilette, eau de cologne, and eau de fraiche.

In the market place, fragrances are categorized as perfume or cologne and are often associated with female or male types.

However, it's the science that determines the fragrance type.

The majority of perfumes contain 10% to 20% of fragrance oils and 80% to 90% perfumers base. Colognes, on the other hand, often feature a 3% to 5% oil to 80% to 90% perfumers base.

The final product contains 10% water. While spritz has the lowest levels of fragrance oils, only 2%.

Lower percentages of oil creates a lighter scent. Higher percentages of oil creates a stronger scent. Thusly, perfume are the strongest scents.



## PERFUME SCIENCE



There are two types of oils, synthetic (made in a lab) and essential (derived from a natural source). Essential oils are extracted from different parts of plants.



Perfumers Base is an alcohol and water mixture that is used as a carrier to make fragrances. The alcohol allows the perfume to be sprayed from a bottle and applied directly to surface. As the alcohol in the fragrance evaporates, it allows for a stronger presence.



Scientists use safety glasses to protect their eyes, not to look smart! Lab glasses protect the eyes from chemical splashes, irritating mists, vapors, and harmful fumes.



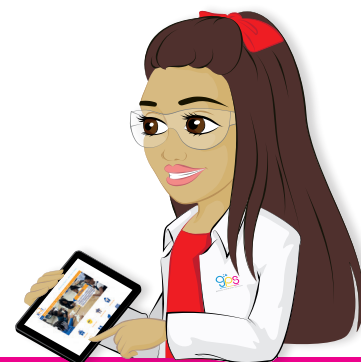
Product Containers. Scientists choose product containers based on how the product will be used. i.e. sprayer, pumped, or poured, Your BOSS Kit includes 3 sprayer bottles that makes it easy to spritz your perfume from the bottle.



Science Tools. , Scientists use a variety of different tools to observe, measure, and experiment. The BOSS Kit includes all the tools you need to accurately measure and make your product.

# GPS Experiment

## The Beauty of Perfume Science



### 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 art of making perfume. This will help you to understand the science behind your product. You can use sources such as trusted websites on the Internet (with your teacher's permission of course), encyclopedias, and books from the library).

? Define the word "volatility".

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? Why would volatility be important when creating a perfume?

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? Question 3: What is an essential oil?

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#### Pre-Lab Activity: The Beauty of Fragrance

The secret to making perfume lies in the percentage of fragrance contained in the entire mixture. Different percentages of fragrance create different products. Analyze the chart below and answer the questions that follow.

PRODUCT	PERCENTAGE OF FRAGRANCE	AMOUNT
Eau de Toilette	15 - 18 %	5.3 - 6.6 ml (1 - 1.3 tsp)
Eau de Parfum	19 - 22 %	7.0 - 8.5 ml (1.4 - 1.7 tsp)
Perfume	23 - 28 %	9.0 - 11.7 ml (1.8 - 2.4 tsp)

**Infer:** Based on your definition of “volatility”, which fragrance is the most volatile and why?

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**Choose the amount of fragrance oil you will be adding to your perfume mixture using the reference chart above.**

I will use \_\_\_\_\_ % of the fragrance oil, which is equivalent to \_\_\_\_\_ ml or \_\_\_\_\_ teaspoons.



### **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 changing the formulation for the fragrance oil.

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! 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** \_\_\_\_\_.*

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! **Hypothesize:** Write your own hypothesis for changing the volatility of your perfume.

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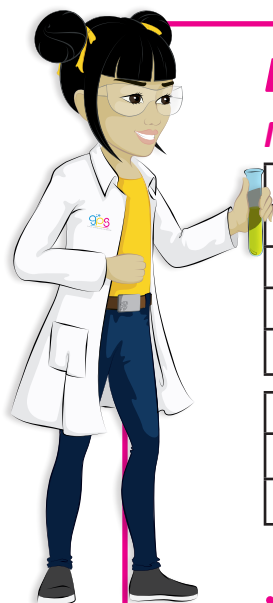
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## Let's Make Perfume!

### Materials

EQUIPMENT IN YOUR KIT	QUANTITY	CLASSROOM EQUIPMENT	QUANTITY
Safety Glasses	1	GPS Lab Jacket	1
Pipette	1	Paper Towels	As needed
Beaker	1		
15 ml (1 oz.) Mist Spray Bottle	1		

INGREDIENTS IN YOUR KIT	FORMULATION	CLASSROOM INGREDIENTS	FORMULATION
Perfumers Base	30 ml (1 oz.)		
Fragrance Oil	15% - 28%		

### NOTE!

*Use caution when using the ingredients in your kit.*



**DO NOT INGEST ANY OF THE INGREDIENTS!**



### Procedure

- Step 1:** Read the entire procedure, all 9 steps, 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:** Waft all of the fragrance oils towards you in order to get an idea of which scent you would like for your perfume.
- Step 5:** Choose which fragrance oil you will use.
- Step 6:** Select your fragrance oil and pour it into the beaker.
- Step 7:** Use your pipette to measure 1.5 ml of perfume base, add the base to the fragrance oil and use your stirrer to mix the base and the fragrance.
- Step 8:** **Slowly** pour the mixture into the spritz bottle, place the sprayer top back on it and shake it vigorously to mix.
- Step 9:** Spray and **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 perfume.

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

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? **Question 2: Perfume is usually made with an essential oil, water, and alcohol. What do you think is the purpose of the alcohol in the mixture?**

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? **Question 3: Based on what you know about chemical reactions, explain why perfumes smell differently on each person.**

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