

PERFUME SCIENCE



WARNING. Not suitable for children under 10 years. For use under adult supervision. Contains some chemicals which present a hazard to health. Read the instructions before use, follow them and keep them for reference. Do not allow chemicals (undiluted perfume oils) to come into contact with any part of the body, particularly the mouth and eyes (except as instructed). Keep small children and animals away from experiments. Keep the experimental set out of reach of children under 10 years old. Eye protection for supervising adults is not included.

WARNING — This set contains chemicals that may be harmful if misused. Read cautions on individual containers and in manual carefully. Not to be used by children except under adult supervision.



Safety Information

Warnings for Parents and Adult Supervisors

Warning! Contains glass bottles which can break and yield sharp points or edges that pose a risk of injury. Always store this experiment kit in a cool place that is inaccessible to small children. Always close containers tightly and keep them away from sources of ignition or open flames (e.g. candles). Do not smoke.

Caution!

- Never bring the undiluted perfume oils into contact with any part of the body.
- Only the finished perfumes made according to specifications in this manual are suitable for application to the skin and the exterior of the body.
- All liquids are unsuitable for consumption and have been mixed with a bitter additive (denatonium benzoate) to counter accidental ingestion.
- Read the instructions before use, follow them, and keep them ready for reference.
- Do not bring perfume oils, the finisher Finalio, the finished perfumes or perfumed materials in contact with eyes, mouth, or other mucous membranes.
- Keep small children and animals away during experimentation.
- Store the experiment kit box out of reach of small children.

First Aid Information

When conducting experiments with chemicals and in case any accidents should happen during experimentation:

In case of injury, seek immediate medical help.

1. In case of eye contact: Wash out eye with plenty of water, holding eye open if necessary. Rinse from the nose outward. Seek immediate medical advice.
2. If swallowed: Wash out mouth with water, drink some fresh water. Do not induce vomiting. Seek immediate medical advice.
3. In case of inhalation: Remove person to fresh air. For example, move person into another room with open windows or outside.

Poison Control Centers (United States)

In case of emergency, your nearest poison control center can be reached everywhere in the United States by dialing the number:

1-800-222-1222

Local Hospital or Poison Centre (Europe)

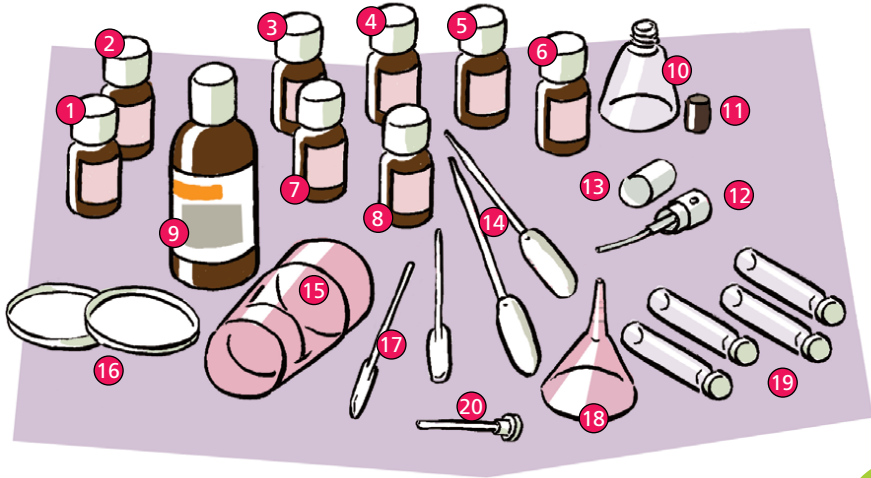
Record the telephone number of your local hospital or poison centre here:

Write the number down now so you do not have to search for it in an emergency.

Keep the packaging and instructions, as they contain important information.

4. In case of skin contact and burns: Wash affected area with plenty of water for at least 10 minutes. Cover burns with a bandage. Never apply oil, powder, or flour to the wound. Do not lance blisters. For larger burns, seek immediate medical help.
5. In case of doubt, seek medical advice without delay. Take the chemical and its container with you.
6. In case of injury always seek medical advice.
7. In case of cuts: Do not touch or rinse with water. Do not apply any ointments, powders or the like. Dress the wound with a germ-free, dry first-aid bandage. Foreign objects such as glass splinters should only be removed from the wound by a doctor. Seek medical advice if you feel a sharp or throbbing pain.

KIT CONTENTS



SHOPPING LIST

No.	Description	Qty.	Part No.
Basic Perfume Oils (10 ml)			
1	"LEMONY"	1	770 420
2	"WOODY"	1	770 421
3	"FLORY"	1	770 422
4	"MUSKY"	1	770 423
Creative Perfume Oils (10 ml)			
5	"TROPICA"	1	770 424
6	"ORIENTA"	1	770 425
7	"MENTHA"	1	770 426
8	"MELLA"	1	770 427
9	"FINALIO"	1	770 412
10	Flacon, 10 ml capacity	1	701 360
11	Cap for Flacon	1	701 362
12	Atomizer	1	701 361
13	Cap for Atomizer	1	701 800
14	Dropper Pipette	2	232 134
15	Measuring Cup	2	065 099
16	Lid for Measuring Cup	2	061 160
17	Stirrer	2	700 831
18	Funnel	1	700 364
19	Mini Flacon, 2 ml capacity	4	701 760
20	Cap for Mini Flacon	4	701 801
21	Labels	1	701 790

The right to technical alterations is reserved. Before beginning, please refer to the list of contents and make sure that all parts are included.

Additional Items

You may need some of the following items to complete some of the experiments and projects. Please read each experiment before starting it, and make sure you have all of the items you will need for that particular experiment.

Common tools from around the house:

Scissors, Pencil, Ruler, Spoons, Cups, Knife, Paper towels, Book (old and heavy), Cooking pots (large and small), Jelly jars with lids (2), Markers or watercolors, Bowl or small plate, Sewing thread, Sewing needle, Sewing pins, Knitting needle, Cotton or nylon thread, Teaspoon, Cloth (silk or cotton), Large plate

Common materials from around the house:

Paper, Cotton pads or balls, Construction paper, Aluminum foil, Water (hot and cold), Thick Cardboard, Coffee filter, Small plastic bags

Special materials you may need to buy:

Yogurt (two different fruit flavors), Chamomile tea bag, Peppermint tea bag, Vegetable shortening or soft margarine, Fragrant rose petals (from florist or market), Lavender flowers (from florist or craft store), Flowers or flower petals (fresh roses, carnations, etc), Dried herbs, Chamomile flowers, Dried lemon peel



IMPORTANT INFORMATION

INTRODUCTION FOR PARENTS AND ADULT SUPERVISORS

Fascination with Fragrances

This experiment kit gives your child the opportunity to explore the fascinating world of fragrances and smells through experiments with perfume oils. By doing this, children will learn about the chemical characteristics of perfumes and the physiology of smell.

Children can take a peek behind the walls of the perfume industry and discover how perfume designers work, what perfumes are made of, and how fragrances can be obtained from natural substances. Together, you and your child will discover the exciting world of fragrances.

Safety Tested and Certified

For a kit that contains perfume oils and perfume finishing solution, you probably have questions about safety. This kit was designed to comply with US and European safety standards. These standards contain obligations for manufacturer and require that parents or adults supervise their children when using the kit.

Highest Quality Cosmetics

The components of the kit were carefully selected to provide your child with the best experience, in terms of both play and learning. The perfume oils were put together by experienced perfume designers and will not give unpleasant results in any conceivable mixing ratios.

Your child can create his or her own custom fragrance from the perfume oils provided. The perfume oils, and therefore also the finished perfumes, have excellent skin compatibility and meet the European Standard for Child Cosmetics.

However, as for all cosmetic products, an allergic reaction or a non-intended application cannot be totally excluded. In the tables on the inside back cover, we have listed the exact composition of all eight perfume oils and the finisher so that you can be aware of all the contents.

This kit is meticulous with respect to customer information and manufacturer's responsibility, because the safety and health of your child are especially important to all of us.

Basic Rules and Advice

You and your children are about to enter into a fascinating area of chemistry. Even though the procedures are simple, we would like to provide you with a foundation for safe experimentation so that you can avoid possible dangers.

Please leaf through this manual and pay

special attention to the Ground Rules (next page) as well as the First Aid Information (inside front cover). Select the experiments that you find suitable for your child. We have included safety and first aid advice that is standard for a chemistry set, even though some of those risks are extremely unlikely to present themselves given the contents of this kit. It is important that your child learn to experiment responsibly and have insight into possible dangers. The field of chemistry is broad, and perhaps your child will venture into other areas of chemistry in the future.

Discuss the safety advice with your child before starting the experiments. You will find advice for setting up your lab area and using your equipment on the following pages. During experiments with hot water, heed the required fire and burn safety. Please store the kit and all its components away from heat and open flames.

Tell your child specifically that he or she must read all safety rules, follow them and have them ready for reference, and that only the experiments described in the manual may be conducted.

You should select a suitable place for your work area. Spilled liquids may leave spots, so make sure that these will not cause damage to furniture or floors.

GROUND RULES FOR EXPERIMENTS WITH FRAGRANCE

All of the experiments described in this manual can be performed safely when you follow the advice and directions. Although you are dealing with rather harmless liquids in this kit, you should always work with precision and care, like a real perfumer.

- ▶ **1. Read the directions** before beginning any experiment, follow them, and have them ready for reference. Note the quantities and the sequence of the individual steps. Perform only the experiments described in this manual.
- ▶ **2. Keep small children and animals away** from the experiments and lab area.
- ▶ **3. While working with the perfume oils, Finalio and the finished perfumes, be careful not to get the liquids in your eyes, mouth, or on other mucous membranes.** Be especially careful when testing the perfumes.
- ▶ **4. Avoid splashing** the liquids when working with them.
- ▶ **5. Do not use any equipment other than what was supplied** with the kit or specifically recommended in the instructions.

IMPORTANT INFORMATION



› **6. Do not apply the diluted perfumes to any clothing without first testing it** on an unexposed part of the cloth to make sure the perfume does not discolor the cloth. It is okay to apply the diluted perfume to your skin after you have checked to see that you are not allergic to any of the ingredients the inside back cover of this manual.

› **7. Never spray your perfume with the atomizer over an open flame.**

› **8. Clean all containers with detergent soap** after use. Close all bottles carefully so that nothing can leak out, and put them back at their spots in the kit box.

› **9. Clean your work area carefully** after finishing the experiments, and wash your hands thoroughly.

› **10. Store the original perfume oils, Finalio, and the finished perfumes in sealed containers,** out of reach of small children.

› **11. Store the experiment kit box out of reach of small children.** Make sure it is not stored near sources of heat, such as room heating components.

› **12. Do not eat, drink, or smoke while experimenting.** Do not use any eating, drinking, or other kitchen utensils for your experiments, except where specifically recommended.

When experimenting with chemical substances, including perfume oils, one cannot avoid products that involve certain risks if handled improperly. The Finalio contained in your kit is ranked as a **hazardous substance**. It is marked with the official **hazard symbol for flammability**, which you will find on the label. For Finalio and the two perfume oils Lemony and Musky, Hazard and Precautionary statements apply. It is important that you are well informed about the substances you will be working with. See the next page for specific information.

Caution! For all liquids: Store well sealed and out of reach of children. This means specifically small children, but also older ones who may not have been appropriately advised by their parents.

IMPORTANT INFORMATION ABOUT HAZARDOUS SUBSTANCES

Proper Waste Disposal

As you can see from the warning statements, large quantities of the perfume oils should never be poured down the drain. Always put perfume oil waste into the garbage can. Finalio can be poured into the sink when it is diluted with lots of water.

International Nomenclature of Cosmetic Ingredients (INCI)

The components of cosmetic substances, including perfumes, are designated by INCI-names. INCI is the abbreviation for *International Nomenclature of Cosmetic Ingredients*, and it is accepted internationally for such substances. This has given uniform designations for the ingredients, which in many cases do not correspond with the chemical designations or those used in the pharmacy. This is why we have described the liquids with both designations (you will find the precise composition of the perfume oils and Finalio on the inside back cover of this manual).

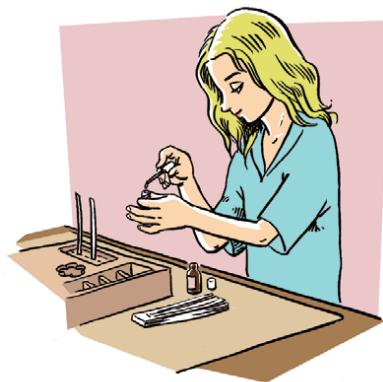
Preventing Accidental Ingestion

The liquids in this kit all contain a bitter additive (denatonium benzoate), which children will immediately reject and spit out, in order to prevent accidental swallowing.

Safety First: How to Play it Safe

Always read the instructions carefully before every experiment:

- › Use only materials that are listed in the instructions. It is pointless and can even be dangerous to experiment with unknown materials.
- › Be extremely careful with hot stove burners and open flames. Never perform experiments near them, unless it is specifically called for, and always have adult supervision.
- › Make sure nobody smokes while you work.
- › Spills should be wiped up immediately with a paper towel, and the paper towel disposed of properly in a trash can.
- › Handle the glass containers, for example the flacons, carefully. If something should break, put it in the garbage can, so that nobody can cut himself or herself.



HAZARDOUS SUBSTANCES AND MIXTURES (CHEMICALS)

Hazard Statements



DANGER

“Finalio” (70% ethanol, ethyl alcohol, 30% water)

Highly flammable liquid and vapor.

Keep away from heat/sparks/open flames/hot surfaces. – No smoking – Keep container tightly closed – Ground/bond container and receiving equipment – Use explosion-proof electrical/ventilating/lighting/equipment – Use only non-sparking tools – Take precautionary measures against static discharge – Wear protective gloves/protective clothing/eye protection/face protection

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower

In case of fire: Use CO₂, dry chemical, or foam for extinction

Store in a well-ventilated place. Keep cool
Dispose of contents/container to an approved waste disposal plant



WARNING

“Lemony” Perfume Oil

Causes serious eye irritation.

Wash face, hands and any exposed skin thoroughly after handling – Wear protective gloves/protective clothing/eye protection/face protection – Wear eye/face protection

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention



WARNING



WARNING

“Musky” Perfume Oil

May cause an allergic skin reaction – Harmful to aquatic life with long lasting effects.

Avoid breathing dust/fume/gas/mist/vapors/spray

– Contaminated work clothing should not be allowed out of the workplace – Wear protective gloves – Avoid release to the environment.

IF ON SKIN: Wash with plenty of soap and water

– If skin irritation or rash occurs: Get medical advice/attention – Wash contaminated clothing before reuse

Dispose of contents/container to an approved waste disposal plant

The other oils do not have Hazard or Precautionary statements.

Warning!

The following applies to all chemicals: Store locked up. Keep out of reach of children.

This applies to all children except for the experimenting child who is being instructed and supervised by an adult.

Also follow this precautionary statement:

IF SWALLOWED: Get immediate medical advice/attention and have product container or label of chemical substance at hand.



YOUR LABORATORY AND YOUR TOOLS



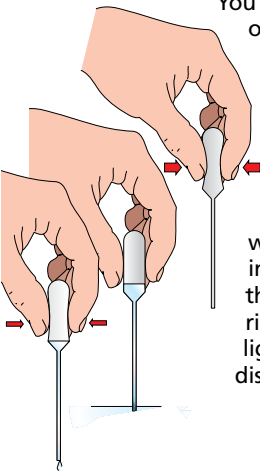
SETTING UP A WORKSPACE

You should set up your work area in a quiet and well illuminated spot. The surrounding floor should be easy to clean up and safe for spills. The work surface should be as steady as possible and have a surface that is easy to clean or is protected by a large cover, such as a plastic desk cover. Always work carefully and systematically and take care not to spill anything, as it might leave spots. Prepare small plastic bags and paper towels so that you can immediately throw away used materials and wipe up spills. You can dispose of used smell strips directly into a covered garbage container, and thus avoid having too many other smells in the air while you are trying to design perfumes. You will need a pencil and paper for writing on the smell strips or taking notes. Air out your work area often, or work near an open window. When you are done, do not forget to clean up and wash your work area with a moist paper towel and possibly a few drops of soap.

TOOLS, MEASUREMENTS AND PROCEDURES

Pipettes

You will need a **pipette**, or dropper, for several experiments. You should practice using it ahead of time. The drawing to the left shows how to use the pipette. When you squeeze the upper part, some air will escape. Dip the pipette into the liquid and release the pressure. Liquid will rise into the pipette. With a light squeeze, you can now dispense liquid by the drop.

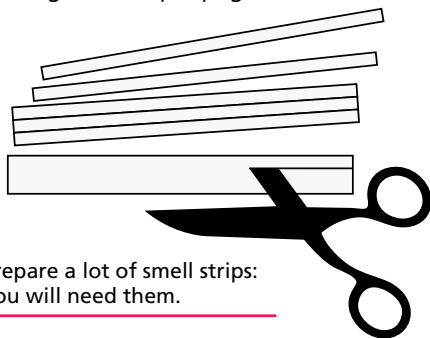


Preparation

Preparing for your experiments properly is very important. Nothing is more disturbing than if you must go and find something in the middle of an experiment. Check that you have all of the items that you will need before beginning an experiment. You will find a complete shopping list on page 1.

Smell Strips

You will need to prepare some **smell strips**, or test strips, for most of your experiments. These are simply long, thin strips of thick paper (blotting paper works best) onto which you can dab a small amount of perfume oil in order to smell it. There are small holes in the kit's tray for holding these strips upright.



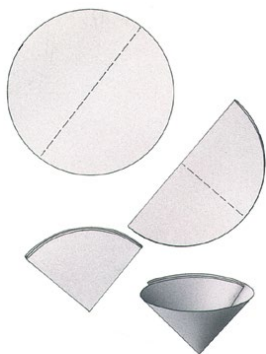
Prepare a lot of smell strips: You will need them.

Volumes

The volume of the liquids for the experiments is indicated in **milliliters**. The abbreviation is ml which means one thousandth of a liter. You will use the small measuring cups for these volumes.

Filtration

Filtration is a method used to separate solid material and fine particles from a liquid. To perform this, take a round coffee filter or cut a circular piece about 3 inches wide from a normal coffee filter. Fold this round filter twice and put it in the funnel as shown in the drawing on the next page.



Put a container under the tip of the funnel and pour the liquid that is to be filtered carefully into the funnel. The solid particles will be left in the filter and the liquid (the filtrate) will drip through.



Decanting
Decanting is used as another separation method in our experiments. To do this, pour out the liquid carefully so that the contained solid components that have settled on the bottom of the container will remain there.

Flacons

A **flacon** (pronounced Fla-kon) is a small, ornamental bottle with a tight cap. When transferring your perfumes from a measuring cup into a flacon, use a funnel without a filter. Put the flacon under the funnel and pour the liquid carefully into the funnel. Pour slowly so as not to spill.

The small **mini flacons** can best be filled using the pipette. Be sure that there is space in the bottleneck, so that the air can escape when you drip in the perfume.

CLEANING THE CONTAINERS AND EQUIPMENT

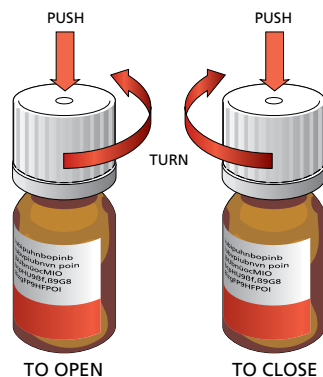
Cleanliness is as important in the making of perfumes as in chemistry in general. Therefore, clean the used containers immediately when you are done with the experiments and before you put them back into the box. Warm water with a few drops of detergent soap is sufficient. Rinse with clean water afterwards and dry the containers with a paper towel. After experiments with greasy or oily substances, you may have to wash several times until the greasy film has disappeared.

You must also flush the pipette thoroughly after each use. To do this, fill

it several times with water containing a little detergent, shake it, and squirt it out. Rinse it with clean water and let it dry. Alternatively, you can flush it with some Finalio that you have poured into a cup.

HOW TO OPEN THE DROPPER BOTTLES

The small dropper bottles in the kit have childproof push-and-turn caps. The illustration here shows you how these can be opened by simultaneously pushing and turning. After opening it, tilt the little bottle upside down carefully. Wait a moment for a drop to form. Then you can dispense the different liquids drop by drop. Always close the bottle immediately after use.



What is the Dropper Insert?

The dropper insert allows you to proportion the costly perfume oils accurately and economically. The insert makes it easy for you to count the drops accurately. This is important when you make your own perfumes.

In addition, the insert will keep the liquid from spilling out if at some point a perfume oil bottle should tip over. Consequently, the dropper insert should never be taken out.

LABELING YOUR EXPERIMENT MATERIALS

Some of the experiments that we present to you will take some time to do. So that you can later be sure what is in each container it is important that you label the containers with the date and description of the contents.

We have included special flacon labels that you only need to write on and attach.

ABOUT YOUR SENSE OF SMELL



Just about everything has a smell. And smells are unavoidable. Practically all other sensory inputs can be avoided. You can close your eyes, you can turn off loud music or plug your ears, you can avoid touching something, and you can avoid tastes by closing your mouth. But there is one thing you cannot do: You cannot stop breathing and thus you cannot stop smelling. So what do we smell? And how does our sense of smell work?

OUR COMPLEX SENSE OF SMELL

Smells are generally a complex mix of different individual components. However, your nose can mostly tell you, based on a few elementary smells, whether a particular fragrance is a freshly brewed cup of peppermint tea or a recently peeled orange.

Scientists working with smells estimate that we can detect between 4,000 to 10,000 different fragrances and smells. But a human being's sense of smell is just average in comparison to the super special smelling capability of some animals.

Humans could never equal the performance of a hunting dog, whose smelling organ can sense the sweat on the feet of a person even though they are covered with thick, recently washed socks inside heavy rubber boots. But even though our nose is not that sensitive, it is receptive enough to differentiate between innumerable smells and their fine nuances.

SUPER DOGS HAVE SUPER NOSES!

When it comes to smelling, dogs are specialists and surpass the smelling ability of human beings by miles. They are especially superior to us when it comes to smells that are important for them, such as fatty acids, because these are found in the scent of deer and other animals. Fruits are irrelevant for dogs, and they do not smell these any better than we do.

FROM THE NOSE TO THE BRAIN

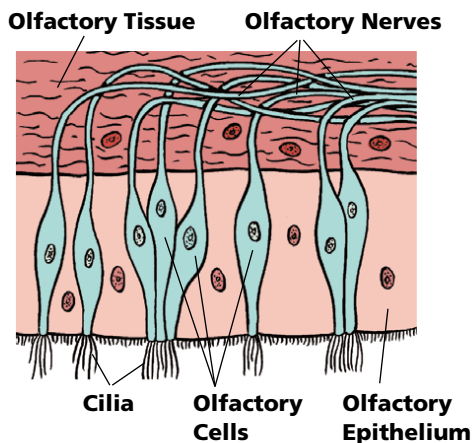
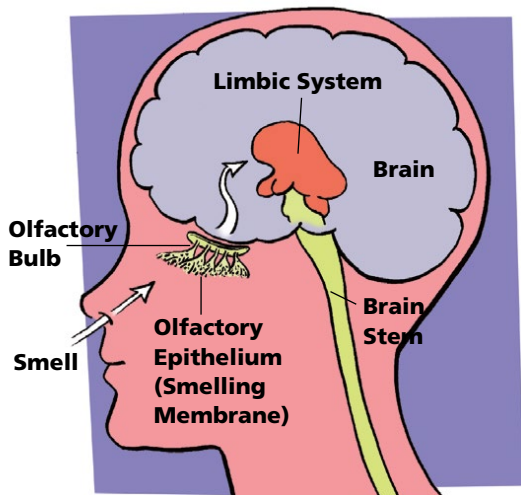
We recognize fragrances and smells and store them in one of the most primitive parts of the brain. Our nose and brain communicate almost instantaneously.

The Physiology of Smell

When we breathe, small particles of fragrance are carried by the air into the nose and transported to the **olfactory epithelium**, a membrane that is located way up in the nasal cavity under your brain. Olfactory (ohl-fak-te-ree) is a word that means relating to the sense of smell. In the olfactory epithelium (eh-pe-thee-lee-im), an area about the size of a quarter, there are more than 10 million **olfactory (or smelling) cells**. Each of these cells has **cilia**, or microscopic hairs, on it. The cilia are sensitive to molecules in the air. In fact, the smelling cells are very specialized and different cells have evolved to sense different smells. Scientists have identified over 20 different smelling cells.

When a fragrance molecule comes in contact with the correct smelling cell for it, an electric impulse, or nerve signal, is released which is passed on instantaneously through the **olfactory nerves** to the **olfactory bulb**. From there, the smelling





1.

THE PATH OF SMELLS

On their way up the nose, fragrances and smells reach the olfactory epithelium (smelling membrane) and the smelling bulb.

message is passed on to other parts of the brain, especially to the **limbic system**.

The limbic system controls our moods and feelings and also participates in a collection and management of long-term memory. This is one of the reasons that we can remember smells so well.

► **Did you know?** About every other month, a smelling cell dies and is replaced by a new one.

What Do I Smell Here?

If the smell is strong enough, the message will be passed on to a developmentally younger part of the brain called the **olfactory cortex**. Its nerve cells translate the impulses they receive from the olfactory bulb into an identifiable impression of a smell, such as a flowery fragrance or foul odor. Without the olfactory cortex, we would have no conscious awareness of smells.

2.

CROSS SECTION OF THE OLFACTORY EPITHELIUM

The smelling cells — specialized cells for detecting smells — are located here.

You Can Learn to Smell

The olfactory cortex stores the incoming smell, or “smell pattern,” like data is stored in the database of a computer. When you smell freshly baked bread for the first time and learn what it is, the smell pattern is recorded in your olfactory cortex. If the smell pattern of freshly baked bread is already present in the data bank, the olfactory cortex will signal you when this smell is present again. In a way, it will tell you “here is some freshly baked bread.” Because this smell information also brings back memories that were stored in the limbic system, the smell of the bread will probably be accompanied by certain feelings. Your brain may make the connection that soon you will be enjoying a delicious piece of bread.

The more smells and associated memories stored in the olfactory cortex’s data bank, the more different smells and flavors you can differentiate and define.

DID YOU KNOW..

... THAT SMELLING AND TASTING ALWAYS GO TOGETHER?

For two different people who are describing the same thing, one might say, "That smells fishy to me," whereas the other might say, "That leaves a bad taste in my mouth." How is it that smells and tastes are so closely related? Anyone who has had the sniffles knows how dull and uninteresting even the spiciest dish can taste because the nose is plugged up and smelling is almost impossible. Everything we eat has a smell and when we eat it, its smell is sent to the olfactory cells through the connection between our mouth and nose cavity.

Anyone who has once come to know and enjoy the flavor of fresh bread will have a pleasant memory of it through the feeling and impressions stored in the limbic system.



SMELL MEMORY GAME: CAN YOU WIN BY A NOSE?

Here's a fun game. Test your memory for smells against that of your friend.

► **Materials from the kit:** all 8 perfume oils

► **Additional materials:** construction paper, aluminum foil, scissors, pencil, ruler

Preparation

From the construction paper, cut 16 squares that are each 2 x 2 inches. From the aluminum foil, cut 16 squares that are each 2 1/2 x 2 1/2 inches. Put one of the construction paper squares in the middle of an aluminum foil square and bend the protruding edges of the foil around

This special version of the classic memory game can be difficult because your nose quickly loses its ability to discern smells when it is overwhelmed with fragrances. Taking short breaks keeps your nose in the game!



the construction paper. Do this for all 16 squares. Every small memory card will now have a paper side and a foil side.

Divide the 16 cards into eight pairs of two. On the paper side of both cards of a pair, place a few drops of your perfume oil. Similar to how visual memory games work, there are two matching cards for each perfume oil. To make sure that there is no conflict during the game whether the correct pair of smells has been found, you should write the name of the perfume oil on the paper hidden under the foil.

The Game

The 16 cards are put down with the paper side down. The object of the game is to find the matching pair of fragrances by turning two cards over at a time, and sniffing.

In each turn, the player can turn two cards. Anyone finding a matching pair should let it lie paper side up, and can then select two more cards. If two cards are turned and are not a pair, they should be placed back in their spots foil side up, and it is the next player's turn.

▶ **A tip:** To store the game, put the smell pairs with the perfumed sides towards each other, and place them all into a plastic bag.

PEACH OR CHERRY? TESTING YOUR TASTE BUDS

Your sense of smell is very closely linked to your sense of taste. As soon as you clamp your nose, you will no longer be able to tell whether you are eating a peach or cherry yogurt.

▶ **Materials:** one each of a yogurt with peach and cherry flavor (you can also use other fruit flavors), 2 spoons

The Game

Close your eyes and clamp your nose firmly with your fingers. Breathe only through your mouth. For the test, let a friend serve you a spoonful of the peach-flavored yogurt and then a spoonful of the cherry yogurt to taste. Make a bet whether you can tell the two flavors apart. Can you?

▶ **How can this be?** While our sense of smell is very sensitive, our sense of taste is much simpler. While we have at least 20 smell receptors, we only have five known taste sensors, which are classified as: sour, salty, bitter, sweet, and umami. The latter is Japanese and means "delicious" tasting. In the umami category, we can recognize sodium glutamate, which is used to amplify the taste of foods. In contrast to our 10 million smell sensing cells, we only have approximately 300,000 taste sensing cells.

▶ **A tip:** Large pieces of fruit make it easier to recognize what taste it is — a cherry has a different texture than a piece of peach.



Is it peach or is it cherry? In this test make sure that there are no pieces of fruit on the spoon to tip off the taster.

FIVE MILLENNIA OF PERFUMES AND SWEET SMELLS



It's natural to want to be in an environment that smells pleasant, and move away from unpleasant smelling ones. In the same way, we want to smell appealing, and certainly not offensive, to other people. For thousands of years, people have altered the scents of their environments and their bodies with chemicals derived from smells found in nature.

As perfume designers will tell you, perfume is like art for the nose just like a painting is art for the eyes, fine cuisine for the palate, and music for the ears. Just like these other art forms, perfume has a long history.

THE HISTORY OF PERFUMES

For as long as history has been recorded, fragrances have been used for healing, personal hygiene, allure, and religious ceremonies.

The first perfumes were made approximately 5,000 years ago by high priests in Mesopotamia. Aromatic plants, spices, or sweet smelling resins (tree saps) were burned to please the gods and to drive away illnesses. These ancient people learned that balsams and resins would release their aromas most intensely when heated. From this comes the term **perfume** that is derived from the Latin term "per fumum," which means "through smoke."

Perfumes in Egypt

At about the same time, the priests in Egypt also used the mysterious effects of fragrances. They can probably be considered the first true perfumers. They made perfumed creams and oils that were sold to rich worshipers. At the time of King Ramses II (13th century B.C.), men applied cosmetics and perfume with the same enthusiasm as did women. Creams and perfume oils were in such demand that, for example, during an economic crisis, people complained more about the rationing

of the costly creams and oils than about having short supplies of corn and flour.

Ancient Mediterranean

The Greeks and Romans loved to surround themselves with precious fragrances. They took baths in perfumed water, cared for their hair with perfume oils, and massaged their bodies with fragrant creams. Even food and beverages were perfumed. No elaborate celebration would be complete without a wine spiced with roses, violets, cinnamon, or even lavender or vermouth.

Arabia and Venice

Between the eighth and tenth centuries, the Arabs discovered new methods for the distillation and making of perfumes. They created new fragrance mixtures by combining fruits, flowers, and spices with animal substances like musk, amber, and civet.



MERIT'S COSMETIC BOX

This box belonged to the wife of a building contractor in Thebes, and contains several bottles for fragrant oils (1411-1375 B.C.).

DID YOU
KNOW...

... THAT THE ANCIENT ROMANS WERE FANATICS FOR FRAGRANCES AND BATHS?

In ancient Rome, anyone who could afford it would only bathe in perfumed water. The Roman thermal baths could be compared to the present day beauty salons. The demand for fragrant substances was enormous in Rome. It is known, for example, that in Emperor Nero's time (37-68 A.D.), rooms were not only ventilated but also given fragrance via silver piping.

In the 15th century, perfumes and the knowledge of how to make them arrived in Europe from the Middle East via the ocean trading routes. Most of them came through the wealthy and powerful city of Venice, Italy. The Italians improved the art of distillation, thought of new recipes, and supplied the rest of Europe with precious fragrances.

In 1533, Catherine of Medici from Florence, Italy, married the future king of France, Henry II. She brought the fine cuisine and the modern perfumery of Italy to her new country. In her time, perfume-scented gloves were very much in style, and anybody who wanted to be recognized in the royal court would have to wear a pair.

Right: Roman glass flacon
in the shape of a date
(first-second century A.D.).
Below: Greek cream jar
(500-520 B.C.)



Grasse – The Cradle of Perfume Making

Since the Middle Ages, the costly raw materials that were required for the making of high quality perfumes were grown in **Grasse**, in the South of France. This region is still one of the most important centers of the fragrance industry even today. The climate and the soil were and still are ideal for growing the flowers and plants required for the extraction of fragrances.

In addition, Grasse was the center for the leather industry at that time. Leather was perfumed to cover up its slightly unpleasant smell. Gloves, clothes, shoes, paper, and furniture were perfumed. Over time, as leather crafts began to generate less and less profit, many tanning shops switched to making perfumes. Perfumers and glove makers even joined in one guild.

DIFFERENT TIMES, DIFFERENT SMELLS

Bad and unpleasant smells were considered to be the cause of dangerous childhood diseases for many years. This was not quite correct, but not entirely wrong either. Bacteria are actually the cause of some of these diseases, not the bad smell that the bacteria produce. Even today, an experienced doctor might be able to diagnose an illness based on the smell of the patient.

Before people came to the common understanding that cleanliness and hygiene were important for staying healthy, washing was considered dangerous. This is



because it was widely observed that fruit and meat rotted and went foul when they were moist. In dry conditions, such as dried fruit and meat, they remained edible for many years and did not have an unpleasant smell. Therefore, until the 19th century, humidity and smell were taken as causes for illnesses. Frequent contact with water was avoided for fear of getting infected. Cleansing with clean towels was preferred to washing with water, and very powerful body odors were treated with perfumed powders and sweet smelling washcloths.

Steps into the Present

In the 19th century, thanks to the scientist Louis Pasteur (1822-1895), it was realized that it was not smells that made people ill, but rather microscopic living things, such as bacteria, that often caused the foul smells. People discovered that these could be defeated through cleanliness and hygiene. The stench in the cities was reduced as soon as the sewers were put underground. From that point on, perfumes were not needed to protect against stench and smells that made people ill, but for enhancing the personal impression.

Perfume — a Costly Commodity

Perfume has always been a luxury item. In limited supply and therefore expensive, at one time perfume was only for the rich



and privileged. During outbreaks of the plague, medieval doctors protected themselves from illness and infection with masks and smoke.

and privileged. That is, until chemistry came into play. Why? A single plant produces only a small amount of fragrant oil. For example, to produce one kilogram of rose oil, the almost inconceivable quantity of one ton of rose petals is required. It's no wonder that even today, relatively small amounts of natural essences cost thousands of dollars.

DID YOU KNOW...

... ONCE UPON A TIME, PEOPLE WOULD WEAR PERFUME TO AVOID TAKING A BATH?

The Sun King, Louis XIV (1638 – 1715) of France, could also have been called the perfume king, because he loved perfumes above anything else. He decided on the fragrance of his court according to his mood. Ladies as well as gentlemen powdered and colored their hair, blemishes were hidden with beauty tape, and a heavy layer of paste beautified the complexion. The most important item in the court was the perfume bottle. This stands to reason because the smell in the royal palace in Versailles must not have been very agreeable: There were no toilets or bathrooms and the washbasins were no larger than a soup bowl. On top of that, large amounts of water were considered unhealthy. To please the nobility and cover up the smell, perfume and powder were used obsessively.



In the past, perfumes were costly luxuries. Madam de Pompadour (1721-1764), the lady of Louis XV of France, spent a giant sum equivalent to \$220,000 on perfumes.

Thanks to science, today it is possible to make many fragrances in the laboratory at much lower costs. They are not only less costly, but the number of basic fragrances continues to increase. Madam Pompadour's court perfumer could choose between about 200 fragrances. Today, master-perfumers have more than 25,000 fragrances available to them for their creations. The possibilities are almost unlimited.

Artificial Noses

Thanks to new technologies, perfumers can analyze and produce almost endless numbers of fragrances. With the help of a computer equipped with an artificial nose it is possible to capture the essence of a waterfall, of a warm summer night, or of a fresh and salty ocean breeze. With this tool, one cannot only discover what substances such complex smells are composed of, but also synthesize them correctly. This is because the artificial nose recognizes all fragrance components of an object — be it a flower, a plant, a piece of plastic, an automobile, or whatever.

Fragrance is Everywhere

The perfume and flavor industry is growing more and more every year. The fine fragrance industry collectively takes in tens of billions of dollars per year.

Fragrance formulas cannot be specifically patented in the United States, but the brand names and labels put on them can be protected by trademarks. Still, fragrance formulas are heavily guarded secrets.

Hundreds of new perfumes are introduced every year, and an even larger number of new fragrance products are designed and marketed each year. This is not all that surprising because fragrances are found in thousands of products, not just perfumes. Fragrances are added to face creams, hand creams, body lotions, soaps, hair care products, bathing salts, detergents, disinfectants, and deodorants.

Fragrances are also found in our environments, consciously chosen to make places and experiences more pleasant. In the supermarket, you may smell a fresh lemon essence, the gas station smells like fresh coffee instead of gasoline, in the hotel there is a fragrance of vanilla and sandalwood, and a new car smells like a new car. Have you experienced these? Fragrances affect feelings and moods, so we are often emotionally influenced by our noses. Thus, it's reasonable that we will want to go to places where it smells nice and we feel good.

The number of fragrances for sale today is enormous. There is a perfume for everyone.



HOW DOES THE FRAGRANCE GET INTO THE BOTTLE?



This is an interesting question because smells are almost always ephemeral, or short-lived. To catch them and process them is a real art which can be very exciting. By now, scientists have established that what we most often perceive as fragrances are light evaporating ethereal oils.

The word ethereal comes from the Greek word “*aither*” for “upper air,” and means heavenly or delicate. In nature, ethereal oils play an important biological role. For example, they provide a source of information for insects, and a protective shield for some plants.

HOW A FRAGRANCE IS CAPTURED

If you were to ask a chemist what perfume is, he may answer: “Perfume is a water-alcohol solution of perfume oils from vegetable, animal, and/or synthetic origin.” This is a fine definition, but how do the perfume oils get into this water-alcohol solution?

► **Warning:** In the following experiments, use only the specifically recommended plant parts for your

experiments. The fragrances you will extract by yourself are not intended to be applied to the skin. But they can be used to apply fragrance to several materials. You must never extract anything from sachets, potpourris, or industrially perfumed materials!

BREWING FRAGRANCES IN THE KITCHEN

The oldest and simplest way of extracting fragrant material from plants is to brew them by boiling them in water, similar to how tea is prepared. You have probably already sniffed the strong aroma of fresh peppermint tea.

► **Materials from the kit:** 2 measuring cups with lids

► **Additional materials:** boiling water, 2 cups, 1 bag of peppermint tea, 1 bag of chamomile tea

Experiment

1. Heat the water in a pot or kettle. Let your parents help you with this.
2. Brew one cup each of strong peppermint tea and chamomile tea. Let the teas cool off some.

DID YOU KNOW...

...HOW TO TELL WHEN A PERFUME IS REALLY A PERFUME?

Most fragrances are offered in various concentrations. The difference in price can be enormous, depending on the differences in concentration and alcohol content of the fragrant liquid.



TRADE NAME

Perfume
Eau de Parfum
Eau de Toilette
Cologne

CONCENTRATION OF PERFUME OIL (%)

more than 22%
15-22%
8-15%
less than 5%

3. Fill the first measuring cup with peppermint tea and the second with chamomile tea and seal both measuring cups with their lids.

4. Let the cups sit for a couple of minutes. Then remove the lid from the measuring cups and sniff the tea. Can you smell the difference between the teas even with your eyes closed?

› **Why is this?** When they are heated, the ethereal oils from the peppermint and the chamomile are dissolved in the water, and the released fragrant oils can evaporate. Unfortunately, the heat of the water will partly damage the ethereal oils, so some of the fragrant material is lost. This method is therefore no longer used to extract fragrant material.

1.



When brewing tea, you are using the simplest and oldest way of extracting fragrances. In addition to the fragrances, the hot water also dissolves color and bitter material from the plant parts. Compare the colors: left peppermint and right chamomile.

2.



As soon as you lift the lid, you also uncover the secret. In which of the two cups is the peppermint and in which is the chamomile?

EXTRACTING FRAGRANCES WITH FAT

Another old method of fragrance extraction is the **enfleurage** [French, *fleur* = flower]. In this method, fragrances are extracted from plants with the help of animal fat, such as pork lard. A sheet of glass with a wooden frame is greased with fat. Flower petals are pressed lightly onto the glass. The fat extracts the fragrant material from the plant over the next few days. This process is repeated until the fat can no longer absorb any more fragrance. “The fat is saturated,” as a perfume chemist would say.

The resulting fat and fragrance mixture is called **concrète** [French, *se concreter* = to become thick, firm]. Then, the flour oils are extracted from the fat with the help of alcohol. After that, the alcohol is evaporated, and the result is a clean ethereal oil called **absolu** [French, *absolu* = chemically clean, pure].

› **Materials from the kit:** Finalio, measuring cup

› **Additional materials:** Vegetable shortening (e.g. Crisco®), fragrant rose petals (*rosa officinalis*) or lavender flowers (*lavendula officinalis*) from the florist or market, corrugated cardboard, aluminum foil, knife, scissors, pencil, ruler, paper towel, an old book (weighing about 1 kg, or 2 lbs), small pots, water, jelly jar with lid

Preparation

1. Cut two pieces of cardboard, each about 4 x 4 inches.

2. Wrap a suitably-sized piece of aluminum foil tightly all the way around these. The cardboard must be covered by foil on both sides. All excess foil must be folded onto one side.

Warning Statement

Finalio is flammable. Observe the information of page 4.



1.

This is how you prepare the enfleurage: spread fat on cardboard covered with aluminum foil, and then press rose petals into the fat.

Experiment: Part 1

1. On each foil-covered cardboard piece, spread a layer of fat no thicker than 1/4 inch thick on the smooth foil side.

2. Press the rose petals (or lavender flowers) tightly together onto the fat.

3. Put the two pieces of cardboard together like a sandwich with the layer of fat and rose petals in the middle.

4. Put the "sandwich" on a double sheet of paper towel, and wrap the paper towel around it.

5. Put the heavy book on top of it.

6. After one week, check your enfleurage. Exchange the old flower petals with new ones, and let the fat extract the oils from the petals for one more week.

7. After the second week, your fat-fragrance mixture, or *concrète*, is ready.

8. Remove the petals from the *concrète*, and sniff the remaining fat. Does it smell? Now you can use the mixture for the next experiment...



2.

Just like with a real enfleurage, you can use alcohol (in our case, the Finalio-water mixture) to extract some of the rose fragrance from the fat.

Experiment: Part 2

1. Ask your parents for help with this.

2. Put the fat-fragrance mixture in a small pot.

3. Fill a larger pot halfway full of water and put the small pot inside it.

4. Heat the two pots carefully on a stove set to low heat, until the fat has melted and become a liquid.

5. Remove it from the heat and let the mixture cool a little.

6. After it has cooled a little, but is still liquid, transfer the fat into a glass jelly jar.

7. Make a mixture of 10 ml (2 teaspoons) Finalio and 30 ml (1/8 cup) water.

8. Pour the mixture into the jar of fat.

9. Put the lid on the jar, and let the mixture stand in a warm spot for a week.

10. Shake it every now and then.

11. Now test the fragrance. The Finalio-water mixture should smell lightly of roses. You have successfully separated out the fragrant oils.

DID YOU KNOW...

... WHICH PARTS OF PLANTS EXPENSIVE FRAGRANCES COME FROM?

PLANT PART

Flower petals
Leaves, stems
Grasses
Roots
Mosses
Wood
Needles
Resin
Seeds
Fruit pits
Fruit rinds

FRAGRANCE

Rose, Jasmine, Tuberose, Narcissus, Bitter Orange
Geranium, Peppermint, Sage, Thyme, Bitter Orange
Tarragon
Iris, Angelica
Oak Moss
Sandalwood, Rosewood, Cedar wood
Spruce, Pine, Cypress
Myrrh, Oleoresin (incense)
Cardamom, Pepper
Anise, Nutmeg, Coriander
Bitter Orange, Lemon, Bergamot



CAPTURING FRAGRANCES WITH STEAM

The **steam distillation** process was developed in Persia and Arabia in the Middle Ages. This process is used to extract precious oils from plants with the help of super heated steam. The hot steam opens the plant cells. The oils are released and are carried away from the plants by the steam. The steam cools into water, and the oils are simply separated from the water.

EXTRACTING WITH LIQUIDS

A method that is still used almost everywhere for fragrance extraction is called **solvent extraction** (Latin, *extrahere* = extract). This process was developed about 200 years ago. Fresh plant parts are ground up and covered with a warm solvent that evaporates easily. This is repeated until the remaining liquid is totally saturated with ethereal oils from the plants. After, the solvent is totally evaporated from the extract. This process can be performed at modest temperatures because the solvent is easily evaporated. This makes the method very gentle.

The leftover extract of this process is a wax-like substance, because wax and color are also extracted from the plants in addition to the fragrances. This substance is also called *concrète*. After the wax is removed with some additional processing, the purest version of the fragrance will appear. This is again called *absolue*.

The solvents used in this process must be pure so that they can evaporate without any residue. Additionally, they must not change the nature of the fragrant substances. Long ago, benzene was often used as the solvent. Today, alkenes (like butane or hexane) or alcohols (like methanol, ethanol, or toluene) are used.

► **Materials from the kit:** Finalio, 2 measuring cups with lids, stirrers, funnel, pipette, cotton pad, labels.

► **Additional materials:** lavender flowers from the florist or craft store, 2 air tight closed old jelly jars, water, coffee filter, pencil

Experiment

1. Put one measuring cup of lavender flowers into a jelly jar.
2. Add 10 ml (2 teaspoons) of Finalio and 30 ml (1/8 cup) water.
3. Stir well, and cover the jar with the lid and let it steep in a cool place.
4. After about one week, open the jar and check the fragrance. If it is too light, exchange the used flowers with new ones and let it all stand for one more week.
5. Fold a circular piece of filter paper to form a cone and put it in the funnel.
6. Pour the liquid slowly through the funnel into the second clean jelly jar.
7. Alternatively, you can decant the extract into another jar.
8. Add another measuring cup of new flowers to it, stir and close the glass.
9. When you are satisfied with the fragrance, pour the mixture carefully through a filter into a clean measuring cup and close it tight with the lid.
10. Label the measuring cup.
11. With the help of the pipette, drip some of your lavender extract onto the cotton pad. The cotton pad will gradually release the pleasant lavender fragrance.

► **Why does this happen?** Finalio will slowly dissolve the fragrant oils from the flowers because it contains an alcohol called ethanol. Due to its chemical structure ethanol can dissolve grease compounds, or oils. In chemistry, this procedure is called extraction. By repeating the extraction process several times, the solvent (in this case Finalio) becomes more and more full of fragrant oils, until it finally cannot absorb any more. This is called a saturated solution.



If you wait long enough, the Finalio-water mixture will evaporate slowly by itself, similar to how it is done with the technical help of alcohol in professional manufacturing. All that will remain is the clean fragrant oil.

WHERE DO FRAGRANCES COME FROM?



Now you know how fragrances are captured. But which fragrance sources are especially important for making perfume?

NATURAL SOURCES: FLOWERS, LEAVES, ROOTS

The majority of pleasurable fragrances are derived from plants. Some examples of these are listed on page 23. Interestingly, one of the most bountiful suppliers of fragrances is the orange tree. We derive **neroli** (orange blossom) from its flowers, **orange oil** from orange peels, and **petitgrain** (citrusy and woody smell) from its leaves and twigs. All three of these are bases for many familiar perfumes.

NATURAL SOURCES: FROM ANIMALS

Fragrant materials from the animal kingdom are also used by perfumers. Each material by itself seldom smells very good

and can be rather strong, but diluted and mixed with other fragrances, they add a special touch to many perfumes. Today, fragrances of animal origin are manufactured in chemical laboratories so that no animal must suffer for us to get access to these fragrant materials: **amber** (a secretion from sperm whales), **castor** (a secretion from the perineal glands of beavers), **musk** (a secretion derived from male musk oxen), **civet** (a secretion from civet cats).

SYNTHETIC SOURCES: FROM THE TEST TUBE

Nowadays, chemists can synthesize almost any fragrance in the laboratory. This practice began in 1856 with the discovery of **cinnamic aldehyde**, the main ingredient in the flavor of cinnamon. In 1876, two German scientists named Ferdinand Tiemann and Wilhelm Haarman succeeded in making **vanillin**, which is also an aldehyde. Today, vanillin is used as a synthetic substitute for natural vanilla in foods, drinks, and perfumes.

Aldehydes are made from alcohols from which some of the hydrogen is removed. The research into aldehydes caused a giant step forward in the manufacturing of fragrances. This is because all aldehydes, especially those with fairly long carbon chains, smell rather pleasant to our noses.

The main advantages of artificially derived fragrances as compared to natural aromatic oils are the generally lower manufacturing cost, the consistent quality, and the independence from weather and time of year.

But despite the advantages of synthetics, the “great noses,” as talented perfume composers are often called, will only use the natural versions.



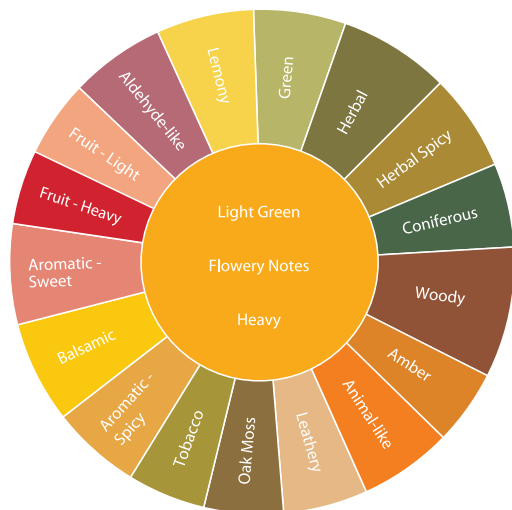
THE ORANGE TREE — A prolific and multitalented source of fragrances.

RECOGNIZING, ANALYZING, AND CATEGORIZING SCENTS



In France, a perfumer is called le nez, which means “the nose.” The nose is the most important tool in the craft, because the nose’s keen ability to smell and recognize fragrances is what allows a perfumer to create the most appealing fragrances.

Normal people can distinguish about 4,000 different smells. But a good perfumer has up to 10,000 fragrance elements in his smell memory. The perfumer works to develop new perfumes by combining scents from hundreds of small bottles in his lab, similar to how an artist paints a picture by combining pigments together to form many different colors. Nowadays, perfumes work with the help of a strong knowledge in chemistry. With chemistry, it is now possible to separate natural fragrances into their individual components. This allows perfumers to not only reconstruct natural fragrances, but also to invent new ones. Only a perfumer’s nose can evaluate the fragrance elements and mix them together in the correct proportions to yield an exquisite fragrance.



The Fragrance Circle

► **By the way**, just like great wines, fragrance creations must also have time to age. Sometimes they are given up to three months to mature. During this time they are checked repeatedly.

THE FRAGRANCE FAMILY TREE

Fragrances can be organized into families. A classic system was established according to the natural origin of the fragrances. Most fragrances are contained in the following family groups:

- **Floral fragrances:** derived from flower oils like rose, jasmine, elder, lily of the valley, and tuberose.
- **Green fragrances:** eucalyptus, pine, citrus, lavender, rosemary, camphor, and basilica
- **Animal fragrances:** musk, civet, ambergris, castor
- **Spicy and woody fragrances:** oak moss, sandalwood, myrrh, cedar, cinnamon and clove bark

Nowadays perfumers are working with even finer differentiations. The new system includes fragrances of synthetic origin, such as aldehydes. This is well illustrated in the fragrance circle to the left.

A PERFUME EVAPORATES IN THREE STEPS

Practically all great perfumes are complicated mixtures of innumerable individual components. Some are composed of more than 700 natural or synthetic fragrances. Classically composed perfumes release their fragrances in three phases or steps:

The Head Note ...

... is the first impression that you receive from the perfume. It lasts only for a few minutes, and should evoke curiosity.

The Heart Note ...

...also called **bouquet**, can only be perceived some time after the application of the perfume. It forms the fragrance character of the perfume that can be sensed for several hours.

The Base Note ...

...also called **fond**, forms the foundation on which the perfume is based. It allows the fragrance to fade out pleasantly, and can last as long as a whole day. This note can only be sensed many hours after application.

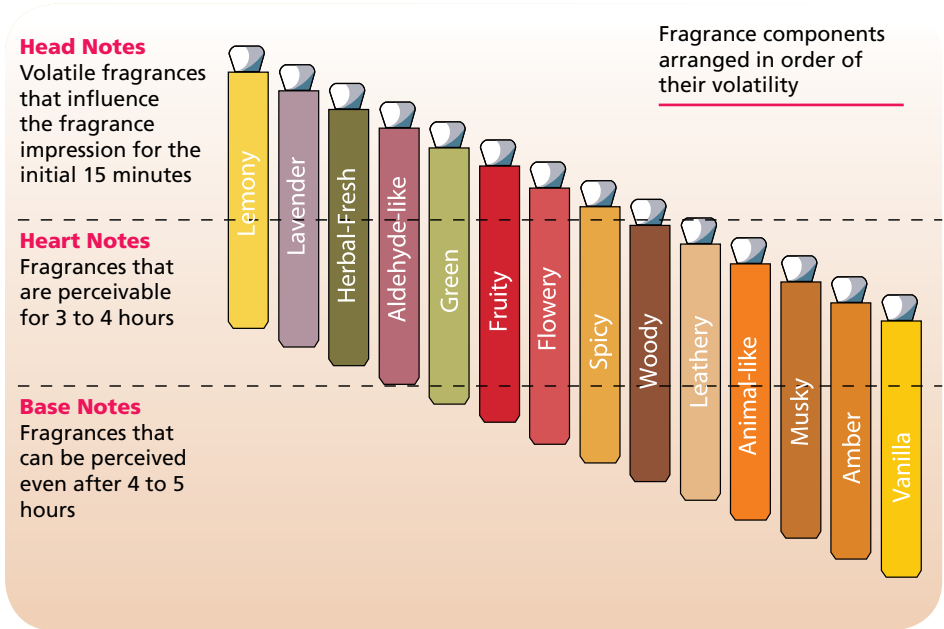
But there are also fragrances with a **single fragrance note**. Typical examples of this are lavender or rose water. Both "waters" result as the by-products of steam distillation of the fragrance oils themselves.

An additional group is called the **linear fragrances**. For these perfumes, the character of the fragrance does not change even over an extended period of time. The fragrance stays on a single "line."



COCO'S CREATION

Chanel No. 5, the most famous perfume in the world, was first produced in 1921. It became not only the most successful fragrance creation, but was also the first one to contain a fully synthetic material, namely an aldehyde. It also contains natural ingredients: ylang-ylang flowers are the core of the fragrance.



TRAINING THE NOSE OF A MASTER PERFUME DESIGNER



EVEN NOSES NEED TO TAKE A BREAK

Did you know that in a smelling test, after about five fragrances, the nose can hardly tell the difference and really needs a break from sniffing?

► **Materials from the kit:** all 8 perfume oils

► **Additional materials:** smell strips (see page 5), pencil, paper

Experiment

Before starting this experiment, spend some time getting to know the smells of the eight fragrances in the kit. Do this well ahead of time, such as the day before.

1. Prepare eight smell strips, and label each with one of the eight perfume oil names, a little below the middle of the strip.
2. Add one drop of the named perfume oil to each strip.
3. Put the strips with the fragrant side up in the strip holders in the kit tray.
4. One by one, put each strip to your nose and smell, without peeking at the name.
5. Write down what you smell on each strip, keeping track of the order.
6. After you are finished testing all eight strips, check to see if you guessed all the smells correctly.
7. Repeat the test after about 30 minutes in a different sequence.

For both tests, you probably found that you made a mistake with the last few fragrances, even though the last few fragrances were different each time. Why could you distinguish certain fragrances in the first test, and different ones in the second?

► **Why does this happen?** After receiving many different fragrance impressions one after the other, your

smelling organ and your brain have reached a kind of agreement. They have combined all the various smells together into one impression, rather than many different impressions, and your nose stops reporting all of the individual smells to the brain.

Another example of this occurs when you come into the kitchen in the morning. At first, it smells like coffee or tea, bacon, and toast. But after a short time, you don't even notice the smells anymore, because your nose and brain have gotten used to them. You can experience this in other places as well, such as the supermarket, the movie theatre, or a friend's house.

YOUR UNIQUE NOSE

Now try to find out how your nose works with your brain. To do this, conduct the following test with your friend and remember to take good notes.

► **Materials from the kit:** all 8 perfume oils

► **Additional materials:** smell strips (see page 5), pencil, notepaper



Experiment

1. Put one or two drops of one of the perfume oils on a small strip.
2. Sniff it very intensively and have your friend do the same.
3. Write down what you smell and what this fragrance reminds you of. It is quite possible that your friend has a completely different memory from yours in connection with each of the smells.
4. Tell each other what the fragrance meant to you and continue with the other fragrances.

► **What is going on?** The nose reports a fragrance to the limbic system in your brain. This system will immediately determine what this fragrance means to you. If you have experienced this fragrance earlier, your memory of it will be revived and you will know immediately what fragrance it is or in which situation you have smelled it before. For example, one fragrance reminds you of a sunny green meadow with cows.

PAINTING PICTURES WITH FRAGRANCES

Fragrances can help us recall memories. Now, let's use this knowledge for another experiment.

► **Materials from the kit:** perfume oils

► **Additional materials:** smell strips (see page 5), pencil, markers or watercolors, paper

Experiment

1. Prepare some smell strips as in the previous experiment.
2. Sniff a smell strip and draw or paint a picture, first in your head, then on paper. Draw what you feel. It can be a single color, a shape, an abstract picture, or a realistic scene.
3. Perhaps only one drop of a single fragrance is enough to evoke a complete picture. If not, supplement the picture with the impression from additional drops of fragrances, or draw a complete story of several pictures.

► **A tip:** If you do this experiment with a friend, you will probably have two totally different pictures. But with some fragrances, you may both paint the same picture because you both associate a fragrance with a similar memory.

► **By the way:** You can also try this experiment with music. Sniff a fragrance and think of a song that it reminds you of.

DID YOU KNOW...

... HOW MUCH PLANT MATERIAL IS NEEDED TO PRODUCE 1 KG OF FRAGRANT OIL?

FROM THIS MUCH RAW MATERIAL...

1,000 kg bitter orange flowers
700-1,000 kg rose flowers
700-1,000 kg jasmine flowers
700 kg geranium leaves
6 kg dried flower buds
from a clove tree
1,000 kg bergamot fruit rind
1,700 kg rind from sweet oranges
3,000 kg rind from mandarins
25 kg anise fruits
50 kg dried pepper corns
75 kg juniper berries
12 kg cardamom seeds
30 kg grated cedar wood
200 kg lemon grass
50 kg sage plant
500 kg pine needles
20 kg myrrh bush

YOU GET...

1 kg neroli oil
1 kg rose oil
1 kg jasmine oil
1 kg geranium oil

1 kg clove flower oil
1 kg bergamot oil
1 kg orange oil
1 kg mandarin oil
1 kg anise oil
1 kg pepper oil
1 kg juniper berry oil
1 kg cardamom oil
1 kg cedar oil
1 kg lemon grass oil
1 kg sage oil
1 kg pine needle oil
1 kg myrrh oil



This is what is leftover from 1,000 kilograms of rose petals after extraction.

BEGINNING YOUR WORK AS A PERFUMER



BASIC AND CREATIVE PERFUME OILS

You should now be somewhat familiar with the eight perfume oils in your kit. Four of these are your **Basic Perfume Oils**, with which you will establish the basic fragrance note of your perfumes. Their names all end with a “y.” The other four are **Creative Perfume Oils**, which you can use for special impressions. Their names all end with an “a.”

Basic Perfume Oils

NAME	FRAGRANCE TYPE
Flory	Flowery
Woody	Wood-like
Lemony	Citrus-Fruity
Musky	Spicy-Cool

Creative Perfume Oils

NAME	FRAGRANCE TYPE
Tropica	Fruity
Mentha	Minty
Mella	Spicy-Sweet
Orienta	Spicy-Cool

In general, you can mix any Basic Perfume Oil with one or more of the other and then add a completely unique direction to your composition with one or more of the Creative Perfume Oils. It is amazing how many possibilities there are for new and different perfumes from just eight fragrances.

FINALIO — THE FRAGRANT FINISH

Professional perfumes and Eau de Toilettes actually contain only a very small amount of concentrated perfume (usually 15-20%). Our perfume oils are already somewhat diluted. You will also use Finalio, a kind of perfume finisher, to achieve the correct concentration and give the perfume its final fragrant polish.

Finalio contains alcohol, which is highly flammable. This changes the smell and consistency of the perfume. Therefore, add Finalio only at the end of your perfume creation. Add Finalio only when you are satisfied with your perfume and are finished making adjustments.

Warning Statement

Finalio is flammable. Observe the information of page 4.

FRAGRANCE IMPRESSIONS CHANGE OVER TIME

Perfumes need some time to unfold entirely. First, you will smell the **head note**, and only after about 15 minutes the **heart note**. This means that the first impression of a perfume can change significantly in a short time. Always wait a little while before you decide whether a fragrance pleases you and decide it is finished.

WRITE DOWN YOUR FORMULAS

Even though perfume design has a lot to do with feelings, do not rely only on internal impulse and feeling. A certain amount of discipline during the process is helpful. For your creations, always write down how and in which sequence you developed it, so that you can repeat it later or make slight modifications. Maybe one perfume you made pleased your mother so much that you would like to give it to her another time.

FILLING AND LABELING

As soon as you are satisfied with your fragrance composition, fill it carefully into a small flacon with the funnel or into a mini flacon with a pipette and seal it off.

Write a name or a number on one of the labels provided with the kit so that you know what it is. The small labels are intended for the mini flacons and the larger ones for the flacons.

› **A tip:** Clean the glass surface of the flacon or mini flacon with paper towel and some Finalio so that they are absolutely free of grease. Let them dry and then attach the label.



Fragrances can revive memories better than any other stimulus.

ADVANCED TRAINING FOR YOUR NOSE

Before you go on to mixing different perfumes, here is another short training exercise for your nose.

› **Materials from the kit:** all 8 perfume oils, 2 measuring cups, stirrers

› **Additional materials:** smell strips (see page 5), pencil, notepaper

› **A Friend:** This experiment works best if you do it with your friend.

Experiment

1. Mix two different perfumes. For each of them, take two or three fragrances, put three drops of each into a measuring cup and mix with a stirrer.

2. Write on a sheet of paper which perfume oils you used, turn the paper over and set the measuring cup on the sheet of paper listing its contents, so you cannot read them.

3. Now have your friend try to sniff out the fragrances in each cup. To do this, dip a smell strip in one of the cups, wipe it off at the edge of the cup and smell it. Can you figure out which fragrances it contains? Of course, you must do this without peeking at the sheet of paper.

› **Important:** Do not forget that the perfumes will change. Note first the head note, wait a while, and then sniff the heart note of the perfume. Also remember to take small breaks for your nose, such as going outside for a breath of fresh air.



The tools of the trade.

IN THE PERFUME LAB — COMPOSING AND DEVELOPING



You have probably been to a concert or some other musical performance. The work of perfumers can be compared to that of composers because perfumes are like melodies that consist of individual notes. In this case, the notes are fragrances. All of the fragrances in the kit are already compositions or melodies. They consist of carefully selected and mixed fragrance materials just like notes that form a specific song.

Just like composers must learn the individual musical notes before they can compose beautiful melodies, so must the perfumers get to know their perfume oils before composing beautiful perfumes. Fragrances can be thought of as perfume building blocks. Next, you will learn how this is done.

GETTING TO KNOW YOUR PERFUME OILS

As you know, you have four Basic Perfume Oils in your perfume laboratory. They are called Flory, Woody, Lemony, and Musky. The Basic Perfume Oils are the foundations for the perfumes that you will compose.

In addition, there are the four Creative Perfume Oils: Orienta, Mentha, Mella, and Tropica. They are responsible for the unique notes of your perfume melody.

► **Materials from the kit:** all 8 perfume oils

► **Additional materials:** pencil, note paper, smell strips

Experiment

1. Start by getting to know the Basic Perfume Oils.

2. Prepare four smell strips by writing the names of these oils below the midpoint of each strip.

3. Begin your “nose-training” with Flory. This flowery Basic Perfume Oil is the starting point for many perfume creations. Put 1 or 2 drops of Flory on the smell strip with this name on it.

4. Sniff the smell strip briefly and note the fragrance. Perhaps you can even imagine a picture with it. Then sniff it again with your eyes closed. Memorize the picture from before.

5. Now put the smell strip into one of the slots in the kit tray for at least one minute to give your nose a break.

6. Now repeat step 4. Sniff the smell strip. Can you recall the fragrance and its picture? If not, take a short break and test the smell strip again. This time, you will surely succeed.

7. Familiarize yourself with the other perfume oils in the same way. Allow yourself at least a five-minute break between each fragrance. This is the only way that your nose will not be overwhelmed.

► **Important:** In the beginning, get to know the four Basic Perfume Oils and take a 15-minute break. Then do the same thing in the reverse order and see if you can

Perfumers command the multiple notes in their “fragrance organ,” which is the name of the huge collection of fragrant oils in vials on their shelves. It is called this because of its resemblance to a pipe organ.



recognize the fragrances and their names. Repeat this several times until you can determine the Basic Perfume Oils without fail and imagine them to yourself.

By the time you have command over the Basic Perfume Oils in your sleep, so to speak, you can continue to get to know the Creative Perfume Oils in the same way.

YOUR FIRST PERFUME MIXTURES

Now that you can refer to your notes and have memorized the Basic and Creative Perfume Oils, you probably want to begin composing perfumes! But wait, not so fast. First you must be able to “play” a prescribed fragrance “melody.” Here too, practice makes perfect. Only after you can recreate a simple perfume formula from a written recipe, should you begin to tackle your own complex compositions.

› **Materials from the kit:** all 8 perfume oils, measuring cup, stirrer, Finalio, pipette

› **Additional materials:** pencil, notepaper, small bowl, smell strips, cotton pads

Rosali — Perfume No. 1

1. Add 5 drops of Flory to 3 drops of Orienta in the measuring cup. Mix with the stirrer.

2. Take a smell strip, label it with “Rosali” and dip it in the perfume mixture. Wipe the smell strip lightly at the edge of the measuring cup and sniff. How does your first perfume smell?

3. Now add 8 drops of Finalio to your perfume mix. Stir again carefully and dip the smell strip. What does your nose tell you now? Can you tell the difference? Finalio has changed your perfume. It has probably made it more intense. But what do you think?

› **What have you learned?** Each perfume can be used as a pure mixture, or it can be processed further with Finalio.

Fragrances that are to be applied with the atomizer must always be thinned with Finalio. The perfume oils only become sprayable after the addition of Finalio.



Do not overload your nose. Learn the perfume oils in stages. Tackle the Basic Perfume Oils in one day and save the Creative Perfume Oils for the next day.

› **A tip:** Would you like to introduce your first perfume to your parents or a friend? Take a cotton pad, put it in a beautiful small jar and add a couple of drops of Rosali to it with the pipette.

REFINING YOUR PERFUME FORMULAS

Finally, you are ready to go from being like a musician to being like a composer who writes his or her own music. Your instrument is this kit, the notes are the perfume oils, and the volume you can determine with Finalio.

› **Materials from the kit:** all 8 perfume oils, measuring cup, stirrer, Finalio, flacons or mini flacons, funnel, pipette

› **Additional materials:** pencil, notepaper, smell strips

Fantasia — Perfume No. 2

1. Begin with the versatile Basic Perfume Oil Flory, and put 5 drops of it into the measuring cup.

Warning Statement

Finalio is flammable. Observe the information of page 4.

2. Take a smell strip labeled Flory, dip it in the cup.

3. Now think about what additional fragrance you would like to combine with Flory. Select one of the Creative Perfume Oils.

4. If the fragrance note of Flory needs a light trace of mint, select Mentha. Would you like to add some sweet, caramel flavor? Then take Mella. If you would like the flowery fragrance of Flory to be a little dryer, then add Orienta. Or maybe you would like to round off the flowery Flory with a fruity note? Then Tropica is the proper Creative Perfume Oil.

5. When you have decided, add 1 drop of the specific Creative Perfume Oil to the Flory.

6. Mix with the stirrer, dip a smell strip and smell the result. If the creative note seems too low, add 1 more drop of the same Creative Perfume Oil — up to a maximum of 5 drops — until you are satisfied with the result.

▶ **Be Careful!** With a simple formula, never use more Creative Perfume Oil than Basic Oil.

Finalio — When and How Much?

Depending on what you are doing with your perfume, you will probably need some Finalio. You will need Finalio if you plan to use the perfume in the flacon with the atomizer.

▶ Start by adding as many drops of Finalio as you have used of Basic Perfume Oil (in this case, 5 drops). Test the result with a smell strip. If you are not yet satisfied, increase the amount of Finalio.

▶ **Rule of thumb:** You can increase the amount of Finalio up to twice the total number of drops of perfume oils you have used.

This means for this first perfume a maximum of 20 drops of Finalio, because you have used 5 drops of Basic Perfume Oil and at most 5 drops of Creative Perfume Oil.

▶ **A tip:** Compose at least five simple

creations of your own according to this procedure before you try out the next perfume, Atlantis. Use different Basic Perfume Oils so that you get a good feel for each one. Practice makes perfect.

Atlantis — Perfume No. 3

1. Now we will combine two Basic Perfume Oils and refine them afterwards with Creative Perfume Oil. Begin with a Basic Perfume Oil of your choice. Put 5 drops of it into the measuring cup.

2. Which of the other Basic Perfume Oils will suit the first one? Begin by smelling all the remaining Basic Perfume Oils. Select one and add 1 drop of it into the measuring cup, mix with the stirrer, and test the result with a smell strip.

3. Add more drops until you are satisfied with the result. Now you have mixed your own new Basic Perfume Oil.

4. Next, consider which of the Creative Perfume Oils you might use to add a special note. Add some drops of this oil until your nose is pleased with the result.

5. When you are satisfied, decide if you also need Finalio.

▶ **A variation:** Perhaps you would like to use yet another Creative Perfume Oil? You can add this, also drop by drop, until you have made the desired fragrance.

▶ **A tip:** Repeat the creation of perfumes from the same pattern as Atlantis a few times, until you are confident that you can judge the influence of the individual perfume oils well.

More Perfume Formulas

Wanderer	5 drops Musky 3 drops Woody 8 drops Finalio
Citrus Breeze	5 drops Lemony 1 drop Mella 6 drops Finalio
Storm	5 drops Woody 4 drops Orienta 1 drop Mentha 10 drops Finalio

FREESTYLE PERFUMERY

Now for the greatest challenge in perfume creation: the free style combination. This method is the method most often used in the development of classical perfumes or eau de toilettes. Begin with a large amount of the Basic Perfume Oils to which you gradually add more perfume oils.

› **Materials from the kit:** all 8 perfume oils, measuring cup, stirrer, Finalio, flacons or mini flacons, funnel, pipette

› **Additional materials:** pencil, notepaper, smell strips

Experiment

1. Decide which type of perfume you wish to compose. To do this, review page 24 where you will find the different fragrance descriptions.

2. Select a fragrance direction, for example Lemony if you wish to get a fresh, citrus perfume, or Tropica if your perfume should have a pure fruity note.

3. Put 20 drops of the first oil of your choice into the measuring cup and check it with a smell strip. This is the starting fragrance note.

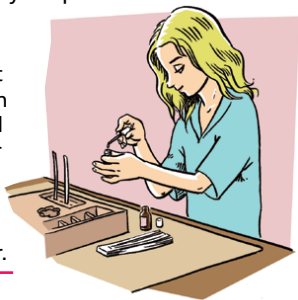
4. Where would you like to take it now? Sniff the other bottles if you can't remember their fragrance precisely.

5. Once you have decided, add the second perfume oil drop by drop until you have reached your goal for the fragrance.

6. Now you can add more perfume oils according to the same procedure.

7. When you are sure that you have achieved the optimal fragrance, it is time for Finalio. If your perfume seems too oily or it is difficult to spray, carefully add Finalio drop by drop.

Do not forget to write down the individual steps for your formula so that you can recreate the perfume later.



Professional Tips

- › Smell carefully at each step and write everything down. Take a break for at least three minutes when the perfume oils begin to smell more and more similar, or when your composition does not seem to change significantly any more.
- › Add only one perfume oil at a time until you smell the desired change.
- › Using more perfume oils does not mean that the perfume will be better. Limit yourself to a few oils per creation.
- › Add Finalio only after you have completed your composition.
- › The more often you test the result with your nose, the more certain you can be to achieve your favorite perfume.
- › The final smell testing of the finished perfume, diluted with Finalio, must be done a few times. Allow at least one minute between tests. Your nose will refuse to recognize any further variation in the fragrance until after the pause.
- › After enough practice you can increase the volume per perfume creation by beginning with a larger quantity of the Basic Perfume Oil, for example 20 drops.
- › If you want your perfumes to be made exactly for the flacons in the kit, you must do a little calculation. Your parents might help you with this. Here is the important information from which to calculate the quantities: 30 drops of perfume oil or Finalio are equivalent to about 1 ml liquid. You can find out the capacity of the flacons from the contents list.
- › With more experience, you can design perfumes with less frequent smell tests and breaks. This protects your nose so that you can work longer without a break.

THE LAWS OF PERFUME DESIGN

FOLLOW ALL OF THESE RULES TO BECOME A MASTER PERFUMER!



- ▶ All bottles must always be closed immediately. The pure perfume oils have such an intensive fragrance that they could disturb the creation of new perfumes. And it would not be good if they were to tip over and spill.
- ▶ Always smell compositions as clean mixtures of the perfume oils. Only add Finalio when the mixing of perfume oils is finished.
- ▶ Never add more than twice the volume of Finalio to a perfume mixture. Otherwise the smell will be too weak and the perfume too dull.
- ▶ Note the quantities (drops) for your perfume oils and Finalio so that you can make the same perfume another time or adjust it.
- ▶ During breaks, always cover the measuring cups containing your current composition with lids and ventilate the work area.
- ▶ Pour finished perfumes into flacon (with a funnel) or into mini-flacons (with a pipette). Close them tightly. For the flacon there is a threaded cap and an atomizer. With this atomizer the perfume can be distributed in very fine quantities. For the mini-flacons there are threaded caps with a pin. Perfume can be applied to skin with this pin.
- ▶ Try out the atomizer on blotting paper to observe the fine distribution on a rather large surface.
- ▶ Write on the labels before you attach them. Before attaching them, de-grease the flacons or mini-flacons with Finalio.
- ▶ Rinse pipettes, measuring cups, and stirrers immediately after use with soapy water. Flush the pipettes with clean water only. Especially stubborn fragrances can be removed with Finalio.
- ▶ Used smell strips and cotton pads should be put in small plastic bags and disposed of in a garbage can with cover.

DID YOU KNOW...

FUN FACTS ABOUT FRAGRANCES FROM AROUND THE WORLD!

- ▶ A professional "nose" can tell more than 2,000 fragrances apart and perceive up to 10,000 smells.
- ▶ On an average day, our nose has to deal with more than 40 different fragrances from such things as shampoos, soaps, lotions, and deodorants.
- ▶ A perfume consists of 60 to 100 ingredients on average. Some have as many as 700 different ingredients!
- ▶ Women generally have a better sense of smell than men. But for both genders, the sense of smell begins to diminish from age 40.
- ▶ There are about 400 perfumers in the world; about half of them live in the USA.
- ▶ "4711 Genuine Eau de Cologne" is one of the oldest and most successful fragrances still used today. It was designed more than 200 years ago.
- ▶ The most expensive raw material used in perfume making is extracted from iris roots, called Orris. It costs about \$50,000 for 500 grams, or about 1 pound.



SPECIAL CRAFTS FOR YOUR PERFUMES



Now that you have made great smelling perfumes, you probably want to use them. There are many different applications for perfumes, made of many different materials and in many different shapes. Use the following suggestions for inspiration. You no doubt will have other brilliant ideas.

A SWEET SMELLING ROOM DEODORIZER

Use cotton pads is a quick and simple means to make your environment smell pleasant.

› **Materials from the kit:** undiluted perfume, pipette

› **Additional materials:** a decorative jar or small plate, cotton pads

Instructions

1. Put a cotton pad in the jar.
2. Add a couple of drops of your perfume to the pad with your pipette.
3. Place the jar somewhere in the room that is inaccessible for small children and animals.

› **A tip:** The perfume will add fragrance to the room because it can “spread” out on the cotton pad. The surface of the small droplets of perfume will enlarge to cover the full surface of the pad, and therefore evaporate more quickly. If you put the jar in a warm place, such as on a heater, the heat will help spread the fragrance even better.

COLORFUL FLOWER POTPOURRI

Potpourris, or fragrant mixtures of flowers, herbs, or spices that are usually kept in jars, are perfect for sensitive noses that do not like strong fragrances.

› **Materials from the kit:** homemade finished perfume, pipette

› **Additional materials:** decorative jar (with or without cover), plate, flowers or flower petals, newspaper or paper towel

Instructions

1. In the warmer months, you can find most of what you need for a flower potpourri outside in nature or in the garden. You will also need your perfume.
2. Collect flower petals or entire flowers from your favorite plants. To dry them, put them on a large plate covered with paper towel or newspaper, and let them dry for many days.
3. Put the dry flowers or flower petals into the jar so that the petals have plenty of space.
4. With the pipette, sprinkle some drops of your perfume on the flowers.



A PRETTY SACHET FOR YOUR DESK

Our grandmothers knew and loved sachets, or small bags containing perfumed powders or potpourris. Even today there are many uses and applications for sachets.

► **Materials from the kit:** homemade, undiluted perfume (fresh or lemony), pipette

► **Additional materials:** dried leaves from lemony herbs, dried lemon peel, chamomile flowers, bowl, cotton or silk remnants, chalk, scissors, pins, sewing thread, needle

Instructions

1. Copy the cut out pattern on this page and transfer the cutting line and the dotted sewing line onto two 5 x 5 inch pieces of fabric.
2. Cut out the two heart shaped pieces of fabric.
3. Sew the two heart pieces together along the dotted line leaving an opening of about 1 inch.
4. Turn the piece inside out.
5. Mix one handful each of the dried leaves and flowers in the bowl, sprinkle some of your homemade perfume on them with a pipette and fill the heart shaped sachet with the mixture.
6. Turn the edges of the filling opening inward and sew it together as neatly as possible with fine stitches. Your sachet is finished.



A FRAGRANT NECKLACE FROM FLOWER PETALS

Here is a special gift for a very good friend.

► **Materials from the kit:** homemade, undiluted perfume (fresh or lemony)

► **Additional materials:** fresh petals from roses, carnations or sage, paper towel, large plate, cotton thread, knitting needle

Instructions

1. To make the flower necklace, collect leaves from pleasant smelling flowers or herbs — like roses, carnations, or sage.
 2. Pick off the leaves and roll them into small firm beads. You can decide the size of the beads from the quantity of available leaves and petals.
 3. Let them dry on a plate covered with a paper towel in a well-ventilated location.
 4. Before the beads are quite dry and hard, pierce them with the knitting needle and thread them onto a strong thread of cotton or nylon.
 5. Tie the two ends together and the fragrant necklace is done.
- **A tip:** If the flower necklace should lose its fragrance over time or if the fragrance is too light for you, revive it with a few drops of your favorite perfume mixture.

Compositions of the Perfume Oils and Finisher

Contents of Flory	Amount [%]
Dipropylene glycol	90–100
Methyl dihydrojasmonate	1–10
3-Methyl-5-phenylpentanol	0.1–1
Tetrahydrolinalool	0.1–1
2-Phenoxyethyl 2-methylpropionate	0.1–1
Dimethyl benzyl carbinyl acetate	0.1–1
4-Methyl-3-decen-5-ol	0.01–0.1
6,10-Dimethyl-5,9-undecadien-2-yl acetate	0.01–0.1
Jasmone	0.01–0.1
Frambinone	0.01–0.1
5-(2,2,3-Trimethyl-3-cyclopentenyl)-3-methylpentan-2-ol	0.0001–0.01
10-Undecenal	0.0001–0.01
Denatonium benzoate	0.0001–0.01

Contents of Woody	Amount [%]
Dipropylene glycol	90–100
4-tert-Butylcyclohexyl acetate	0.1–1
1-(2,2,6-Trimethylcyclohexyl)-3-hexanol	0.1–1
Cedrenyl acetate	0.1–1
Cedrol	0.1–1
4-tert-Butylcyclohexanol	0.1–1
Dodecahydro-3a,6,6,9a-tetramethylnaphtho(2,1-b)furan	0.0001–0.01
5-(2,2,3-Trimethyl-3-cyclopentenyl)-3-methylpentan-2-ol	0.0001–0.01
2-Methylundecanal	0.0001–0.01
Methyl atrarate	0.0001–0.01
Denatonium benzoate	0.0001–0.01

Contents of Lemony	Amount [%]
Dipropylene glycol	90–100
Tetrahydrolinalool	1–10
Dihydromyrcenol	1–10
2-Ethynyl-2,6,6-trimethyltetrahydropyran	0.1–1
6,10-Dimethyl-5,9-undecadien-2-yl acetate	0.1–1
3,7-Dimethyl-2(3),6-nonadienenitrile	0.1–1
Peonile (2-Cyclohexylidene-2-phenylacetoneitrile)	0.1–1
Lime oxide / Monoterpenes C ₁₀ H ₁₆ & Cyclic Monoterpene Ethers C ₁₀ H ₁₈ O	0.01–0.1
Denatonium benzoate	0.0001–0.01

Contents of Musky	Amount [%]
Dipropylene glycol	90–100
Oxacycloheptadec-10-en-2-one	1–10
Cyclopentadecanolide	1–10
Methyl dihydrojasmonate	0.1–1
5-(2,2,3-Trimethyl-3-cyclopentenyl)-3-methylpentan-2-ol	0.01–0.1
Frambinone	0.01–0.1
Dodecahydro-3a,6,6,9a-tetramethylnaphtho(2,1-b)furan	0.0001–0.01
Skatol	0.0001–0.01
Denatonium benzoate	0.0001–0.01

Contents of Tropica	Amount [%]
Dipropylene glycol	90–100
4-Undecanolide	1–10
Ethyl 6-acetoxyhexanoate	0.1–1
2-tert-Butylcyclohexyl acetate	0.1–1
Hexyl acetate	0.1–1
trans-2-Hexenyl acetate	0.1–1
4-(1,3-Benzodioxol-5-yl)butan-2-one	0.1–1
Frambinone	0.1–1
Benzaldehyde	0.01–0.1
Vanillin	0.01–0.1
Ethyl maltol	0.01–0.1
Denatonium benzoate	0.0001–0.01

Contents of Mentha	Amount [%]
Dipropylene glycol	90–100
2-sec-Butylcyclohexanone	1–10
trans-Menthone (trans-2-Isopropyl-5-methylcyclohexanone)	1–10
Denatonium benzoate	0.0001–0.01

Contents of Mella	Amount [%]
Dipropylene glycol	90–100
Octahydro-2H-1-benzopyran-2-one	0.1–1
4-Isobutyrate-3-methoxybenzaldehyde	0.1–1
Benzyl acetate	0.1–1
Vanillin	0.1–1
Ethyl maltol	0.01–0.1
gamma-Decalactone	0.01–0.1
Diacetyl	0.01–0.1
4-Undecanolide	0.01–0.1
gamma-Nonalactone	0.01–0.1
Dodecahydro-3a,6,6,9a-tetramethylnaphtho(2,1-b)furan	0.0001–0.01
1-(4-Methylphenyl)ethanone	0.0001–0.01
Denatonium benzoate	0.0001–0.01

Contents of Orienta	Amount [%]
Dipropylene glycol	90–100
Ethyl ((2-ethyl-6,6-dimethyl) or (2,3,6,6-tetramethyl))-cyclohex-2-encarboxylate	0.1–1
Eugenyl acetate	0.1–1
2-Butyl-4,4,6-trimethyl-2,3-dioxane	0.1–1
p-Anisaldehyde	0.1–1
4-tert-Butylcyclohexanol	0.1–1
Vanillin	0.01–0.1
Ethyl maltol	0.01–0.1
Methyl cyclopentylideneacetate	0.01–0.1
Denatonium benzoate	0.0001–0.01

Contents of Finalio	Amount [%]
Ethanol	70
Water	30
Tert-Butanol	0.0001–0.01
Denatonium benzoate	0.0001–0.01

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