

# Perfume - The Science of Smell

By Cindy Grigg

<sup>1</sup> *Caption: This limestone carving found in an Egyptian tomb shows the making of lily perfume in the 4th century B.C.*



<sup>2</sup> A perfume is any substance that is used as a pleasant fragrance. Many cosmetics contain perfumes. Low priced perfumes called odorants are added to many products including paper, plastics, and rubber products. These help to hide unpleasant odors or to make the products more attractive to customers. Plastic trash bags, for example, may have odorants added to them to hide trash odors.

<sup>3</sup> Perfumes are solutions. A solution is a mixture that appears to be a single substance, but it is made up of particles of two or more substances evenly distributed among each other.

<sup>4</sup> Solutions are often described as homogeneous mixtures because they have the same appearance and properties throughout the mixture. A solution is made up of a solute dissolved in a solvent. The solute is the substance that is dissolved, and the solvent is the substance in which the solute is dissolved.

<sup>5</sup> A solute is soluble, or able to dissolve, in the solvent. Solutions do not settle, cannot be filtered, and do not scatter light. Concentration is a measure of the amount of solute dissolved in a solvent. As the concentration of perfume oils increases, so does the intensity of the scent created. The scent will last longer, too.

<sup>6</sup> Making perfume is an ancient art. It was practiced by the ancient Egyptians who rubbed their bodies with a substance made by soaking fragrant woods and resins in water and oil. Perfumes have been found in the tombs of Egyptians who lived more than 3,000 years ago. From certain references in the Bible, we know that the ancient Israelites also practiced the art of perfume making. Other sources indicate that this art was also known by the early Chinese, Arabs, Greeks, and Romans.

<sup>7</sup> Over time, perfume making has developed into a complicated art. A fine perfume may contain more than one hundred different ingredients. The most familiar ingredients come from fragrant plants or flowers such as sandalwood or roses. These plants get their pleasant odor from their essential oils, which are stored in tiny, baglike parts called sacs. The parts of plants that are used for perfumes include the flowers, roots, and leaves. Other perfume ingredients come from animals and from man-made chemicals.

<sup>8</sup> Perfume makers first remove essential oils from the plants using distillation or reactions with solvents. Then the essential oils are blended with other ingredients to create perfumes. Fixatives, which usually come from animals, make the other odors in the perfume last longer. Oddly enough, most natural fixatives smell awful! For example, the foul-smelling oil from the African civet cat is used as a fixative in some perfumes. The civet cat sprays this bad-smelling oil on its enemies. Other fixatives include castor from the beaver, musk from the male musk deer, and ambergris from the sperm whale.

<sup>9</sup> When you take a whiff from a bottle of perfume, the first odor you smell is called the top note. It is a very fragrant odor that evaporates rather quickly. The middle note, or modifier, adds a different character to the fragrance of the top note. The base or end note is the odor that lasts the longest.

<sup>10</sup> Perfume scents are often grouped according to their dominant odor. The major groups are floral, spicy, woody, and herbal. Some of the commonly used floral scents are jasmine, vanilla, lily of the valley, rose, and gardenia. Some spicy scents are clove, cinnamon, and nutmeg. Woody scents include sandalwood, balsam, and cedar. Herbal scents include clover and rosemary.

<sup>11</sup> The most practical way to start describing a perfume is by its concentration level, the group it belongs to, and the notes of the scent. All of these affect the overall impression of a perfume from the first sniff to the last lingering hint of scent.

<sup>12</sup> Perfume oil must be diluted with a solvent. The undiluted oils (natural or synthetic) contain high concentrations that will likely result in allergic reactions when applied directly to skin or clothing. By far the most common solvent for perfume oil dilution is ethanol or a mixture of ethanol and water. Perfume oil can also be diluted with coconut oil or wax or jojoba.

<sup>13</sup> Today, the precise chemical formulas of commercial perfumes are closely-guarded secrets. Still, we can enjoy the scents, and some of us may even become adept at identifying some of the components, as wine experts can identify vintages by their "nose." You might try sniffing some different perfumes and colognes to try to identify three different notes in each.

## Perfume - The Science of Smell

<p>1. Perfumes are:</p> <p><input type="radio"/> A Any substance that is used as a pleasant fragrance</p> <p><input type="radio"/> B Solutions with particles of two or more substances evenly distributed</p> <p><input type="radio"/> C Homogeneous mixtures that have the same appearance and properties throughout</p> <p><input type="radio"/> D All of the above</p>	<p>2. _____ is a measure of the amount of solute dissolved in a solvent.</p> <p><input type="radio"/> A Fragrance</p> <p><input type="radio"/> B A solution</p> <p><input type="radio"/> C Soluble</p> <p><input type="radio"/> D Concentration</p>
<p>3. As the concentration of perfume oils increases, what else increases?</p> <p><input type="radio"/> A Intensity and longevity (makes the scent last longer)</p> <p><input type="radio"/> B The top note and the fixative</p> <p><input type="radio"/> C The number of ingredients and man-made chemicals</p> <p><input type="radio"/> D All of the above</p>	<p>4. Who were probably the first people to make perfumes?</p> <p><input type="radio"/> A Ancient Romans</p> <p><input type="radio"/> B Ancient Chinese</p> <p><input type="radio"/> C Ancient Greeks</p> <p><input type="radio"/> D Ancient Egyptians</p>
<p>5. What does <i>soluble</i> mean?</p> <p><input type="radio"/> A Intensity</p> <p><input type="radio"/> B Able to dissolve</p> <p><input type="radio"/> C Concentration</p> <p><input type="radio"/> D Longevity</p> <p>7. Most fixatives come from:</p> <p><input type="radio"/> A Plant seeds</p> <p><input type="radio"/> B Animals</p> <p><input type="radio"/> C Plant flowers</p> <p><input type="radio"/> D Plant roots</p>	<p>6. What are fixatives used for?</p> <p><input type="radio"/> A To make the other odors in the perfume last longer</p> <p><input type="radio"/> B To make the perfume stick to your skin</p> <p><input type="radio"/> C To fix bad smells</p> <p><input type="radio"/> D To make the essential oils smell better</p> <p>8. Essential oils must be diluted with a _____ like ethanol or coconut oil.</p> <p><input type="radio"/> A Fixative</p> <p><input type="radio"/> B Solvent</p> <p><input type="radio"/> C Concentration</p> <p><input type="radio"/> D Solute</p>