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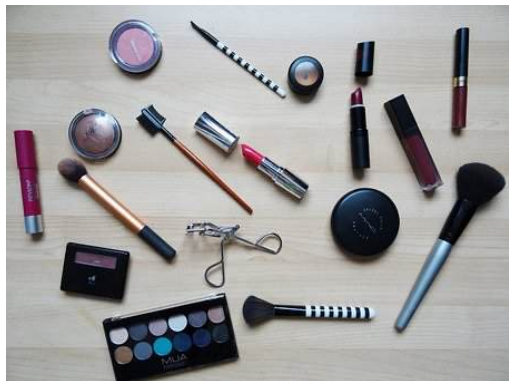
Reading Comprehension Passage & Questions

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The Chemistry of Cosmetics

Cosmetics¹ – makeups, soaps, shampoos, moisturizers, etc. – are everywhere. And they’ve been around a long time. Ancient Egyptians used natural products to decorate their skin as long ago as 3000 B.C.E. They used kohl, which contains lead sulfide, as eyeshadow. They also used red ochre (iron oxide, or rust) to color their lips. Cleopatra took baths in milk to keep her skin soft and smooth.



Now we know that a major ingredient in milk, lactic acid, helps us shed old skin cells and grow new ones. Around the same time, in China, people colored their fingernails to show their status. In 2004, scientists found a skin cream from around 150 A.D., the time of the Roman Empire.

Did You Know?

The United States has a list of at least 12,500 chemicals that can be used to make cosmetics.

One of the methods people had used, adding starch to make the cream feel less greasy, is still used in today’s cosmetics.

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Water

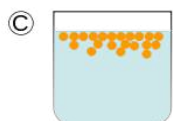
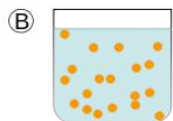
Water is used to dissolve other ingredients. In chemistry, it is called the “universal solvent” because more things dissolve in water than in any other liquid. In cosmetics, it just continues to play the role it’s best at.

¹ **Cosmetics:** makeups, soaps, shampoos, moisturizers, etc.



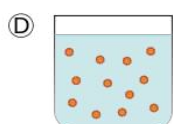
Emulsifiers

Emulsifiers² combine things that don't naturally mix. They have water-loving and water-hating ends. In an oil and water mixture, the water-loving ends poke into the water and the water-hating ends stick into the oil. In this way, they hold the oil and water together and don't let them separate.



Preservatives

Preservatives³ work in cosmetics like they do in food: they keep them from going bad or growing bacteria/mold. There are two main types of preservatives used in cosmetics.



In D, the emulsifier surrounds the droplets of the orange substance, so that it stays mixed.

The first type stops a reaction between the oils in cosmetics and oxygen. This reaction might make the cosmetic smell bad, change color, or not work right. The second type kills mold and bacteria.

Thickeners

Thickeners⁴ do what you'd expect: thicken a cosmetic so that it can be spread. Some thickeners, like wax, are solid at room temperature. If you melt them and mix them with a liquid (like water), you get a thick substance that can be added to cosmetics. Others, like cellulose (from plants) or silica (from rocks), take in water or oil and swell, becoming a gel. Chemists can also make thickeners.



Thickeners are used to thicken cosmetics, so they can be spread.

Ecobottle Sample



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² **Emulsifiers:** substances that combine things that don't naturally mix

³ **Preservatives:** substances that keep things from going bad

⁴ **Thickeners:** substances that thicken cosmetics



Emollients make skin better able to hold water.

Emollients

Emollients⁵ are added to keep skin soft. They make a barrier on the skin that holds water in, so skin doesn't dry out. Most are oils.

Pigments

No makeup would be complete without **pigments**⁶ or **dyes**. They're what give cosmetics color. There are many substances used to color cosmetics, including coal tar, bits of rocks and minerals, rust, bugs, and beet powder. There are two major types of pigment, **organic**⁷ (has carbon) and **inorganic**⁸ (usually metal + oxygen, called metal oxides).



Pigments give cosmetics color.

Ecobottle Sample



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Even unscented products have fragrance.

Fragrance

Perfumes and colognes of course have **fragrance**⁹, as do many soaps and lotions. However, even so-called unscented products have fragrances that cover up the natural smells of the ingredients. The chemical mixtures used to make specific

⁵ **Emollients**: substances that keep skin soft

⁶ **Pigments/dyes**: substances that give cosmetics color

⁷ **Organic**: contains carbon

⁸ **Inorganic**: doesn't contain carbon

⁹ **Fragrance**: a substance that gives a cosmetic a smell or covers up the natural smell of a cosmetic

fragrances are kept secret by the companies that make them. All fragrance ingredients come from a list of nearly 4,000 chemicals. The list includes natural substances like flowers, fruits, and oils, as well as chemical compounds made by scientists.

pH Stabilizers

Ecobottle Sample



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Reading Comprehension Questions

1. What
2. About how many possible ingredients are approved for use in cosmetics in the United States?
3. What
4. What do emulsifiers do? How do they help mix oil and water?
5. How do
6. What do emollients do?
7. About
8. What is the importance of a pH stabilizer?

Extension Questions

9. Choose a cosmetic
10. Parabens are a type of preservative often used in cosmetics, but some people are worried that they're not safe. Do some research to find out if parabens are safe to use in cosmetics. Explain your answer.

Ecobottle Sample



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