



Curiosity Guide #510 Diffusion and Osmosis

Accompanies Curious Crew, Season 5, Episode 10 (#510)

Design a Reed Diffuser

STEM Challenge

Description

Combine ingredients to make a delivery system for delectable smells!

Materials

- Mason jar or vase
- Rubbing alcohol or apple cider vinegar
- Water
- Carrier oil like safflower, sweet almond, fractionated coconut, or grapeseed
- Essential oils like lavender, lemon, orange, peppermint, jasmine, cedar wood, eucalyptus, or thyme
- 5 to 10 bamboo skewers or 8-inch rattan reeds
- Scissors
- Pipette
- Measuring cup

Procedure

- 1) If using bamboo skewers, trim the pointed ends off with scissors. Set aside.
- 2) Try one of the following recipes or develop your own in a mason jar or vase.
- 3) Option 1: Combine $\frac{1}{4}$ cup rubbing alcohol with $\frac{1}{4}$ cup hot water and 20 to 25 drops of selected essential oil. Stir with skewer or reed.
- 4) Option 2: Combine 3 parts essential oil to 7 parts carrier oil and stir.

- 5) Option 3: Combine $\frac{1}{2}$ cup carrier oil with 30 drops of essential oil and stir.
- 6) Arrange a number of reeds (5-10) in the jar of liquid.
- 7) Set the jar on the counter to work.
- 8) How long will your diffuser last?

My Results

Explanation

Reed diffusers are a less expensive way to make a room smell nice, but how do they work? As the base of the reeds are submerged in the oil, the liquid begins to enter the reed. The reed becomes soaked or saturated with a high concentration of fragrant particles. All matter is made up of molecules. These molecules are always in motion and colliding with one another. The particles move into the air through the process of *diffusion*. This means the particles spread out and increase their concentration where they weren't before, and you can enjoy the aroma throughout the room!

The reeds soak up thinner oil more easily than thick oil. The base oil is a thinner oil and thins out the essential oil. The base oil should also be less fragrant in order to complement and not compete with the essential oil. That thinner oil combination is able to soak up in the reeds. In the first recipe, alcohol, which evaporates quickly, achieves the same thinning purpose, so no carrier oil is required.

Here's another way to think about it: Diffusion is the process where tiny particles move and spread out. Our reed diffusers hold a lot of fragrant particles in a high concentration. As those particles move, they bump into each other and spread out. The fragrant particles will continue to mix with other particles, like the air particles around the reed. Even when the particles are evenly distributed, diffusion keeps happening because the molecules never stop moving and bumping into each other. "Oh, pardon me, I was just diffusing." Ah, that smells nice, too!

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