

Smelly Balloons

Description: In this activity, students examine balloons that contain flavor extracts.

Recommendation for Groups: Elementary (*choose student handout)

Estimated time: 15 minutes

Key Questions: Why can you smell the scented air from inside the balloons? Why can air move through the plastic balloon but water can't?

Key Science Concepts: diffusion, molecular movement, semi permeable membrane

Content Expectations Addressed: Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision-making and the application of science through history and within society.

Teacher Background: Diffusion is the process by which molecules spread from areas of high concentration, to areas of low concentration. When the molecules are even throughout a space - it is called equilibrium. When a cell membrane is semi-permeable, this means that some atoms flow through the membrane more easily than others. An example of a semi-permeable membrane with which we are all familiar is a tea bag. The tea bag hold in the tea leaves and let water flow through. The balloon is a semi-permeable membrane that allows "selective" molecular movement through its apparent boundary. The extract molecules are small enough to fit through the "holes" in the membrane will diffuse through the membrane. Eventually the diffusing extract molecules reach our nose and are detected as "smell" outside of the balloon. Stored patterns of previous smells in our brain are used to interpret the recognizable smells.

Science Process Skills: Observing, inquiry and communicating

Safety: Wear safety goggles to protect eyes from extract chemicals in case balloon breaks during inflation. Beware of students with LATEX allergies.

Materials: colored latex balloons (various colors), flavor/scent extracts, plastic pipettes,

Teacher Preparation: (please be careful not to contaminate the extracts)

1. Select 10 balloons for the different extracts; choose colors that don't match scent.
2. Prep the balloons. Stretch the balloon several times, inflate, and then let the air out.

3. Label the balloons #1-10 with a permanent marker.
4. Follow the smell key #1-10 below when adding extracts to the balloons.
5. Choose the lettered pipette that corresponds with the labeled extract bottle.
6. Insert the pipette tip into the extract bottle and draw up 2-3 drops of the liquid (—2ml) into the glass tubing only. *Keep the dropper vertical, try not to let the extract into pipette bulb by tipping it, this will contaminate the dropper and it is difficult to clean.
7. Place the dropper tube well inside the balloon before squeezing to add 2-3 drops of food extract. **be careful not to spill extracts on balloons or hands.
8. Please rinse the dropper using soapy water before returning it to its container.
9. Please make sure the lid on the extract bottle is closed before returning to box.
10. Blow up the balloon and tie it shut. *Don't over inflate the balloon.
11. REPEAT steps 6 through 11 for each balloon.

Scent Extract Key:

*If using with lower elementary you might want to use the possible smells list for students.

Smell	Balloon #
banana	5
cherry	2
cinnamon	3
lemon	1
no smell-air only	4
orange	9
peppermint	6
pineapple	8
root beer	10
strawberry	7

Resources:

Smelly Balloons, Bio Fax!, Flinn Scientific Inc., 1999.