

# Inflate and Sniff Cell

## Teacher's Guide

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### **The Initial View (Introducing the Activity)**

People think a rubber balloon is a solid which won't let anything out, but molecules are very small and sneaky things. This activity lets kids see how small and shifty molecules are! Don't stretch the balloon too tight or use too much vanilla! One balloon would work for the entire class if you want to do this as a demonstration! (Otherwise have extra balloons on hand.)

### **Take a Deeper View! (More Science)**

**Diffusion** is the traveling of molecules from an area of **Greater Concentration** to an area of **Lesser Concentration**. This is why kids smelled the vanilla outside the balloon. The concentration inside the balloon was very high. As molecules bumped and shoved each other, a few got pushed out through the balloon's walls into the air. You've seen balloons go flat over time, even though they had no leak and were tied tightly? Diffusion of air flattened the balloon. **Osmosis** is an important kind of diffusion, a movement of water across a **Cell Membrane** from where there is more water to where there is less. When a person is exercising heavily they perspire, taking water from their bloodstream and cells to produce sweat. Their other cells start losing water by osmosis to balance the level of water on both sides of the cell membrane. If this continues for awhile, we say the person is **Dehydrated**, or low on water due to this special kind of water diffusion called osmosis. When they drink water, the level of water on the outside of the cell membrane gets higher and now water goes back into the cell! (**Hydration**)

### **More and Bigger Views! (Additional Classroom Ideas)**

1. Drop some food coloring into a clear container of water and see diffusion in action in a liquid. Try hot water and cold water and see if there is any difference in the rate of diffusion.
2. Open a bottle of perfume, vanilla extract or other volatile liquid in the front of the room and have the kids raise their hands when and if they smell it! Some rooms have a pretty strange air circulation pattern!
3. Have the kids observe the smoke or steam from a chimney as it diffuses into the air.
4. Research why power plant's smokestacks are so tall. (It allows for diffusion of the smoke and gasses over a large area.)
5. When a person is ill, they are advised to drink lots of liquids. Have a nurse or doctor explain what is going on here in terms of dehydration, hydration, and osmosis.
6. Find out how many cells a person has. (50-70 trillion, depending on their size)
7. Look up a picture of a cell membrane from a Biology book, research what it's made of and more of how it works.
8. Why do athletes drink those "sport drinks" you see advertised on TV! Do they help?
9. Simulate the diffusion of the vanilla extract by having the kids in a tight group slowly start moving away from the center and wander around the room.
10. Explain how a pollutant dumped in a stream in one place can affect people miles downstream using the terms diffusion or osmosis.
11. A condition called **Sickle Cell Anemia** affects many Americans. What causes the red blood cells to take such a shape? How is this disease carried between people through **Genetics**? How is it treated?
12. Find out from a doctor or nurse how many things we drink actually dehydrate us!

### **Answers**

1. (faster, the molecules would be moving faster)