



Nanopores in Balloons

All the matter is made up of atoms. Atoms are so tiny that they cannot be measured using conventional units like feet, inches or meters. For measuring very, very small things like atoms, we use a unit called nanometer which is one-billionth of a meter. The diameter of a human hair is 70,000 nanometers! As humans, we cannot see beyond a few thousand nanometers, but we can smell objects that are a few nanometers: molecules! The size of a typical air molecule is one nanometer. Scientists have been using objects in nanometer sizes in everything from cellphones to tiny odor sensing wires.

In this activity, you will use a latex balloon and a variety of flavored extracts to understand how small a nanometer is. Parents are encouraged to setup the activity and ask their children to identify the smells.

CAUTION

DO NOT DO THIS ACTIVITY IF ALERGIC TO LATEX

What you need

- Different colored round latex balloons
- Variety of flavored extracts (e.g. fruit flavor extracts)
- Balloon pump (optional)
- A teaspoon (optional)

What to do

1. Take a teaspoon or a few droplets of flavored extract and put it into a balloon.
2. Blow up the balloon using the pump and tie it up.
3. To evaporate the liquid extract inside, shake the balloon a few times.
4. Repeat the steps for different extracts and colors.
5. Ask the children to identify the smell of the extract and match it to the balloon color.

What you'll see

After shaking the balloons, the liquid extract evaporates. The kids can identify the smell correctly by smelling the extract through the closed balloon.

What's going on?

Humans have sensors in the nose which can detect very, very small scent molecules. Moreover, the latex balloons are made up of tiny pores which allow the nanometer-sized scent molecules to pass through. As the number of scent molecules inside the balloons are more than the surrounding area, they travel through the pores in the latex.