Community in the Classroom Presentation Plan

Lesson Name What's that Smell?

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Grade Level 5

Standards Connection(s)
-Using Properties to separate mixtures and identify compounds
-Atoms, Elements and Periodic table

Abstract:
Smells are all around us. In this lesson, we will explore scents and how we can use our nose and machines to separate, identify and characterize the smells.

Vocabulary/Definitions:
-Atom: The basic unit of everything around us.
-Molecule: A collection of atoms.
-Molecular formula: A series of letters and numbers that tells us what atoms and in what quantity they are present in a molecule
-Molecular weight: The sum of the masses of all atoms in a molecule.
-Boiling point: The temperature at which a liquid becomes a gas.

Materials:
We will bring: the fragrances, laptop, and projector
We will need: internet access, white screen for projector, paper/pencil for students

Classroom Set-up:
The students will be separated into groups of 3 or 4.

Classroom Visit

1. Personal Introduction: **2** **Minutes**
I am a graduate student from UC Berkeley. I study chemistry [ask about what chemistry is].

Topic Introduction: **5** **Minutes**
Ask about their favorite smells/scents. Explore their knowledge of how smell works. Introduce atoms and molecules and how some molecules have distinctive characteristics such as smell. Elaborate on how we can use smell to identify molecules in a mixture. Also comment on how all molecules have a certain mass that is related to how many and what types of atoms that molecule is made of. We have made machines that allow us to weight the mass of a single molecule in order to tell us what that molecule is. This can also be used in addition to odor to characterize a compound.

2. Learning Experience(s): **40** **Minutes**
The students will split up into groups of 3-4. Each group will be given: 6 vials containing a small amount of a single fragrant compound. These fragrances range from vanilla, to banana, to curry etc. They will characterize these compounds based on smell. They will then be given more vials which contain mixtures of 2, 3, and 4 of the original fragrances and be asked to identify them based on smell. Hopefully, they will have trouble identifying all the components in the more complex mixtures. I will then introduce a machine (GC-MS: gas chromatography – mass spectroscopy) that allows us to separate compounds in a mixture and identify its molecular weight. This machine

resides in UC Berkeley. I will use my laptop to connect to this machine in real time to tell us what molecules are present in the 4 compound mixture. The results will be projected onto a screen for the students. The students will then calculate the molecular weight of their individual compounds and come to a conclusion on what the complex mixture is made of.

3. Wrap-up: Sharing Experiences and Building Connections 5 Minutes

Talk about how the scents of foods, perfumes, and flowers are actually a complex mixture of several compounds. There are chemists whose job it is to figure out what makes up the smell of a particular item (ie coffee). They use their nose and machines like we just used to help them do their job.

4. Close: 5 Minutes

Next time you smell something like perfume, try to pick out individual smells like flower or melon or musk.

TOTAL 50 – 60 Minutes