Bodies as Carbons

This activity requires a lot of room for students to be able to freely move around as they engage in building human carbon compounds. A highly suggested activity site would be a large, flat grassy area. Other suggested activity sites include an open gymnasium or recreational area.

INTRODUCTION

Before beginning this activity, students should observe and discuss their surroundings. Use the following questions as "idea starters" to guide the class in a discussion:

1. How many things do you see that may have carbon atoms associated with them? How do you know?
2. What things do you notice might not include carbons in their chemical make-up? How do you know?
3. Visualize carbon's location on the periodic table. How many valence electrons does it have? What does this imply?

PROCEDURE

After the discussion, students should spread out to form a circle (all students should be facing one another). From the introductory class discussion, students should understand that the carbon atom has four valence electrons, implying that it can make a total of four bonds. Each student will now take on the role of a carbon atom, with each hand (or arm) and foot (or leg) simulating a potential carbon bond.

Students will work together to "bond" with one another and become simple organic compounds (methane, ethane, propane, etc.). Students will "bond" by linking arms, linking legs, etc. The teacher should guide students through the names of the first 10 alkanes, instructing students to form each by bonding their arms and legs. After the first 10 have been formed, briefly review the names and number of carbons again.

Next, explain to students that alkenes are similar to alkanes, but include at least one double bond. Students should think creatively about how they can link themselves together to form the first 9 alkene structures (remember they will start with ethene – not methene). After the first 9 alkenes are formed, again briefly review the names and number of carbons.

Finally, explain to students that alkynes are similar to both alkanes and alkenes, but include at least one triple bond. Now students will really be thinking creatively as they try and form the first 9 alkynes (again, start with ethyne – not methyne). Again, review the names and numbers of carbons after the first 9 alkynes are formed.

As your students participate in this activity, chances are good that the number of students and the number of carbons per compound will not work out evenly every time. Have as many students as possible make the compound being discussed. Students who are "leftovers" can make smaller compounds to quiz the rest of the class or can count the bonds being made in the compound being discussed. Also, the number of hydrogens attached to each compound can easily be visualized by counting the number of "free" hands and feet. A fun game to play at the conclusion of this activity is to have the instructor holler out any compound (alkane, alkene, or alkyne) and have students race to see who can form the compound the fastest. As an introductory activity, students don't need to worry too much yet about proper IUPAC naming.

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