Teacher Sheet

LAB ACTIVITY:

WHAT'S SO SPECIAL ABOUT CO_2?

OBJECTIVE: Students will:

- Understand the concept of resonance frequency
- Simulate the resonance frequency of certain molecules using models with different characteristics.
- Analyze data

MATERIALS:

- 12 Styrofoam balls about 2-3 inches in diameter
- 5 3 ft. lengths of thin, springy steel rods, 1/16 in in diameter
- 4 clocks/watches with a second hand
- Pliers or wire cutters
- Paper/pencil

PREPARATION:

1. Before class, cut the steel rods into 1 foot lengths.
2. Color or label the balls to represent C, H or O.
3. Prepare copies of the molecule information card for distribution.
4. In class:
   - Divide the class into 4 teams.
   - Give each team the appropriate molecule information card. (CO_2, CH_4, O_2, N2)
   - Each team will construct a model of a molecule.
   - Go over the introductory information on the **Student Sheet** with the class.
5. When all the models are completed, teams should exchange models so that each group can compare how the different molecules respond to different frequencies of vibration.
6. Be sure that students complete their **DATA TABLE** and the **CONCLUSIONS** section at the end of the activity.

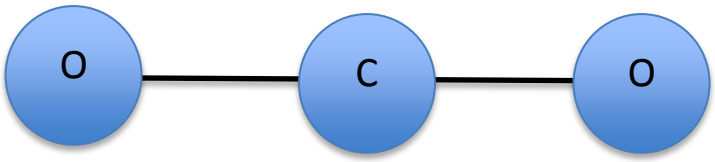
CARBON DIOXIDE (CO_2) TEAM

MATERIALS: 3 Styrofoam balls, 1 3ft. long steel rod, 1 clock/watch

PROCEDURE:

- Insert the metal rod through a ball representing a carbon atom.
- Adjust the rod so that it goes directly into the center of the ball.
- Add a ball to each end of the rod to represent oxygen.

Example:



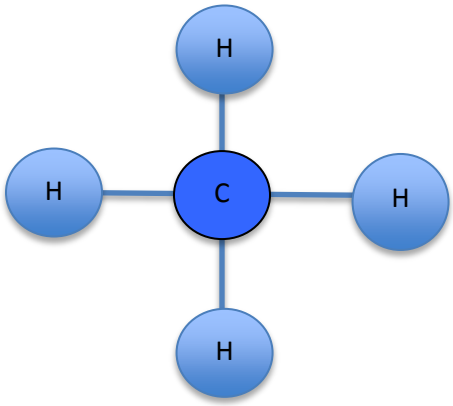
METHANE (CH_4) TEAM

MATERIALS: 5 Styrofoam balls,2 3ft. long steel rods, 1 clock/watch;

PROCEDURE:

- Insert 1, 3 feet long rod through a ball representing a carbon atom;
- Insert a second 3 ft. long rod through the carbon atom at a right angle to the first rod. You should now have a carbon atom with 4 "spokes."
- Add 1 ball to the end of each spoke to represent H atoms.

Example:



OXYGEN (O_2) TEAM

MATERIALS: 2 Styrofoam balls, 2 short (1foot) steel rods, clock/watch

PROCEDURE:

- Insert 2 short rods into one of the balls representing an O atom.
- Push the second ball onto the ends of the 2 rods so the 2 "atoms" are joined by the rods.

EXAMPLE:

NITROGEN (N_2) TEAM

MATERIALS: 2 Styrofoam balls, 3 short (1 foot) rods, clock/watch;

PROCEDURE:

- Insert 3 short rods into one side of a ball representing a N atom. Make the rods parallel.
- Push the second ball onto the other ends of the rods so the two "atoms"are joined by the rods.

EXAMPLE: