**Chemistry of Burning**

Description:

Why is CO2 increasing in the atmosphere? Who is doing it? Many people think that CO2 is “pollution”, so that clean burning should be a way to eliminate greenhouse gas emissions. In this demonstration, we review basic chemistry (figure 1) to realize that producing CO2 is an inevitable waste product of burning any fossil fuel.

Materials and Supplies:

* Styrofoam balls in three sizes (1, 1 ¼, 1 ½)
* Paint to color balls, three colors of your choice
* Precut 1 inch long pieces of pipe cleaner
* Candle and match



Models made of Styrofoam balls are used to illustrate the chemistry of combustion.

Set up: prepare a box of different size Styrofoam balls painted to represent oxygen (largest ball, at least 3), carbon (at least one), hydrogen (smallest ball, at least four). Cut several pipe cleaner into1 inch lengths. A candle or oil lamp is a useful prop.

Presentation:

Ask “what is in a hydrocarbon?” (answer: hydrogen and carbon). One carbon with four

hydrogens attached to it is methane, the simplest of the hydrocarbons. Have participants make

some hydrocarbons by linking Styrofoam balls representing hydrogen (small) with carbon

(medium sized) with short pieces of pipe cleaner.

Some good questions to get students thinking are: “How many of you used a hydrocarbon today?” “What did you use?”

Ask “How do we get energy from hydrocarbon?” (Answer: burn it, which means add oxygen to

the fuel in the presence of threshold heat.) If time allows, light a candle or small oil lamp with a

match, and let this sink in (hydrocarbons from candle or oil lamp, oxygen from the air).Add

Styrofoam balls that represent oxygen, and pull the hydrogen off the methane (Say “pop” or

“bang” as you do it to symbolize the release of energy). Add two hydrogens to each oxygen and

two oxygens to each carbon to complete the chemical reactions.

Ask “what are the products of combustion of fossil fuel?” and coach the audience to figure out

the answer from the models (CO2 = carbon–di-oxide and H2O is water). Throw the molecules

in the air to emphasize what happens to them under “business as usual”. People are usually

surprised that water is released by combustion. Ask them to think about what they have seen

coming out of tail pipes of cars or from smoke stacks on a cool morning. (White “smoke” is

water vapor condensing) You cannot see the CO2, but there is at least half as much CO2 produced

as water from most kinds of combustion.