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**Student Activity- Stoichiometry of a Gas**

**Learning Objective SPQ-1.A** Calculate quantities of a substance or its relative number of particles using dimensional analysis and the mole concept.

**SPQ-4.A** Explain changes in the amounts of reactants and products based on the balanced reaction equation for a chemical process.

**Science Practice: 5.A** Identify quantities needed to solve a problem from given information.

Observe the demonstration of what happens when different volumes of butane gas (C4H10) are placed in an 850.0 mL tennis ball canister and ignited with a an electric spark. Explain what is happening in the reaction and solve the problems.

**Observations**

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1. Write down and balance this reaction for the combustion of butane

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2. Air is approximately 21.0% oxygen. Calculate the proportional volume of oxygen (in mL) of the 850.0 mL tennis ball canister.

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3. Using stoichiometry, calculate the volume of butane required to react with all of the oxygen in the tennis ball canister.

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4. Why does this reaction not work when the volume of butane used was increased to 60.0 mL?

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5. Using stoichiometry, calculate the volume of gas required to react with all of the oxygen in the tennis ball canister if the butane was replaced with propane (C3H8).

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6. How many grams of propane would be required to react with all of the oxygen in the tennis ball canister in Problem #5 under the following conditions? The temperature of the room was 22.0 oC and the pressure that day was 758 torr.

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