

WARNING — This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

Name _____
Period _____ Date _____

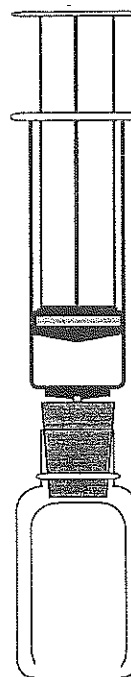
HOW MUCH GAS? A

Materials for each group

- | | |
|-----------------------------|----------------------------------|
| 1 Jar of sodium bicarbonate | 2 Rubber stoppers, #1, with hole |
| 1 Jar of citric acid | 2 Syringes, 35-mL |
| 2 Spoons, 2-mL | 1 Waste container |
| 1 Plastic cup, 250-mL | 1 Tray or basin |
| 1 Stirring stick | • Water |
| 2 Glass bottles | • Protective eyewear |

Procedure

- Get a basin of *group materials* for your group.
- Get a bottle-and-syringe system for each pair.
- Put on protective eyewear.
- Make a stock citric acid solution. Dissolve one level, 2-mL spoon of citric acid in 100 mL of water.
- Put one level, 2-mL spoon of sodium bicarbonate into the bottle. Twist the stopper into the bottle.
- Take up exactly 5 mL of citric acid solution in the syringe. Insert the tip of the syringe into the hole in the stopper.
- Push the solution into the bottle. *Don't* remove the syringe. Observe and record.
- Dump the used experiment and conduct two more trials. It is *not* necessary to wash out the bottle between trials.



Volume of Gas Produced (mL)			
Trial 1	Trial 2	Trial 3	Average

Name _____

Period _____ Date _____

HOW MUCH GAS? B

Analysis/Summary

1. What caused the syringe plunger to go up during the reaction between citric acid and sodium bicarbonate?

2. Why is a syringe more useful than a balloon to conduct this experiment?

3. What do you think might happen if you doubled the amount of citric acid solution?

Why do you think so?

4. What do you think might happen if you doubled the amount of sodium bicarbonate?

Why do you think so?
