Name _____ Date _____

Cellular Respiration: Yeast, Sugar and Gas Bubbles

Directions: Read the passage and study the table. Then answer each question.

Yeast, Sugar and a Gas Test

Your cells need a steady supply of energy, and they get it from food. Inside each cell, sugar from food is broken down, and the energy stored in the sugar is released for the cell to use. When this happens with oxygen, it is called cellular respiration, and it gives off carbon dioxide gas and water.

A yeast is a tiny fungus made of just one cell, and a spoonful of dry yeast holds billions of them. Yeast cells also break down sugar to release energy. They can do it with oxygen, by cellular respiration, or without oxygen, by a process called fermentation. Either way, yeast give off carbon dioxide gas.

A class tested how the amount of sugar affects the gas that yeast give off. Each bottle got 100 mL of warm water from the same container, so the water was the same temperature in every bottle. Each bottle also got 5 g of dry yeast. Then the class added 0 g, 5 g, 10 g or 20 g of sugar. A tube from each bottle carried the gas into a measuring tube. After 30 minutes, the class read the volume of gas in milliliters (mL). They ran three trials for each amount of sugar.

Gas collected from each yeast bottle after 30 minutes

Sugar added (g)	Trial 1 gas (mL)	Trial 2 gas (mL)	Trial 3 gas (mL)
0	2	3	1
5	20	24	22
10	36	40	38
20	37	35	36

1. According to the passage, why do yeast cells break down sugar?

A. To build up a bigger supply of sugar
B. To create new energy that did not exist before
C. To release the energy stored in the sugar
D. To turn carbon dioxide into sugar

2. The class kept some things the same in every bottle so the test would be fair. Which three did they keep the same?

☐ A. The amount of water
☐ B. The temperature of the water
☐ C. The amount of yeast
☐ D. The volume of gas collected
☐ E. The amount of sugar

3. What was the mean volume of gas for the three trials with 5 g of sugar?

_____ mL

4. The class ran three trials for each amount of sugar instead of just one. How does this help?

A. It lets the class test three different amounts of yeast.

B. It gives the yeast more time to use up the sugar.

C. It makes sure every trial gives exactly the same volume of gas.

D. It shows whether the results repeat, so one odd bottle does not mislead the class.

5. Find the mean volume of gas for the trials with 10 g of sugar and for the trials with 0 g of sugar. How many more milliliters is the 10 g mean than the 0 g mean?

_____ mL

6. A student predicted that more sugar would always mean more gas. Which evidence from the table goes against that prediction?

A. The 10 g trials collected more gas than the 5 g trials.

B. The 0 g trials collected the least gas.

C. The 20 g trials collected less gas, on average, than the 10 g trials.

D. The 5 g trials collected more gas than the 0 g trials.

7. Which claim does the evidence from this test support?

A. In this test, adding sugar caused the yeast to give off much more gas.

B. In this test, the more sugar the class added, the more gas the yeast gave off.

C. In this test, warmer water made the yeast give off more gas.

D. In this test, the yeast with no sugar gave off no gas at all.

8. Suppose the class set up one more bottle with warm water and 10 g of sugar but no yeast. What would most likely happen after 30 minutes?

A. More gas than the 10 g yeast bottles would collect, because no yeast would be using up the sugar.

B. Little or no gas would collect, because no living cells would be there to break down the sugar.

C. About as much gas as the 10 g yeast bottles would collect, because the gas comes from the sugar dissolving.

9. A student says the gas from the yeast bottles was oxygen, like the oxygen that plants give off. Which statement corrects the student?

A. The gas was air that the sugar let out as it dissolved.

B. The student is right, because all living cells give off oxygen.

C. The gas was water vapor that rose from the warm water.

D. The gas was carbon dioxide, which yeast give off when they break down sugar.