**Vernier Labquest Replacement Investigation**

**Grade 7 Kit: SEPUP Gas Exchange Investigation # 17**

**Grade 7 Kit: SEPUP Cells Alive Investigation # 39**

**Title of investigation:** Gas Exchange & Cells Alive

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**Guiding Questions:** How do cells use sugar? Why do organisms breathe?

**Summary of activity:** In “Gas Exchange” the CO2 sensor is used to measure the release from human lungs. In “Cells Alive” the sensor is used to measure the CO2 coming from yeast that has sugar (energy source), yeast with no sugar added, water with sugar, and water with nothing added (to compare). Students should detect higher levels of CO2 from the yeast that has the sugar added.

**Science Standards:** 7.3.1, 7.3.2, 7.3.4, 7.3.7 Cell functions, organelles, needs of cells, and oxygen delivery.

**Equipment used:**

Per group: Vernier Labquest with CO2 sensor and oxygen sensor, 2-Liter plastic bowl with lid with feed-thrus for O2 and CO2 (Vernier), water

Consumable: Yeast (provided by teacher), sugar

**Description of Procedures, notes (teacher manual):**

In Gas Exchange, students would just measure the CO2 from breathing out. This could be in addition to the bromthymol blue in the investigation.

In Cells Alive, a group would demonstrate with the large bowl and sensors and share the data with the class. The group mixes yeast in warm water to activate it (reanimate the cells). They mix some of that yeast mixture with sugar. They place an amount of yeast mixture in one bowl and an equal amount of yeast mixture with sugar in the other bowl. For comparison, another group would also have plain water in one bowl and water with sugar in the other bowl. The sensors would be used to measure the CO2 and O2 released from each sample.

**Scientific questions:**

What basic functions can cells perform?

How does the cell use energy?

What is necessary for it?

**Connections:** Oxygen is necessary for our cells. CO2 is a normal byproduct of cellular function. Cells carry out basic functions of life.