

CARBON DIOXIDE

LAB INFORMATION

EXPLORE 1B LESSON 17



Materials

(Per group of 3 students)

- Bromothymol blue
- Three glass or clear plastic containers (min 12 oz)
- Straw
- Aluminum foil (enough to cover each container)
- Stopwatch

Set-Up

Each small group of students will use the materials (listed above) to plan and carry out an investigation to answer the question: *Do we breathe out more carbon dioxide during intense exercise than at rest?*

Options for setting out materials for the lab groups are as follows:

- Place all lab materials at a central lab table
- Place a set of materials at each small group lab station

Notes Regarding Designing and Carrying Out the Investigation

Once students understand how BTB can be used for the purpose of measuring the relative amount of carbon dioxide gas in a solution, their task is to first design an investigation to answer their question. They can use the Lesson 17 Student Handout Experiment Design Tips as a reference tool throughout the design process.

Given the materials, the design of the student investigations will likely have many similarities, such as the control and experimental conditions, including: No treatment, Rest, and Intense Exercise.

Variations in design might show up in the types of exercise that student groups engage in. This and also the procedures related to blowing bubbles into the water will create variety in experimental results. For example, one group may decide they are going to blow into each container of water for 10 seconds and compare the colors. Other groups may decide to blow into the rest container for 10 seconds and then time how many seconds it takes to achieve the same color in the exercise cup.

Expected Outcomes

Control	The water with the BTB appears and stays a light blue color.
Rest	As students blow into the water, it will turn from a light blue to a greenish color and possibly yellow (depending on the design of their experiment).

Intense Exercise	Similar to rest, but the change occurs at a significantly faster rate.
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