Name $\qquad$
Date $\qquad$ Period
Page

## Exhaling Carbon Dioxide

## Problem:

Materials:
2 Beakers
Bromthymol blue solution, 30 ml
1 Straw
Ipad or Stopwatch
Graduated cylinder
Paper towels
Procedure:
Part 1

1. Label one beaker "Beaker 1" and the other as "Beaker 2. ." Beaker 1 will be the control in the experiment.
2. Bromthymol blue can be used to test for the presence of carbon dioxide. To see how this works fill each beaker with 15 ml of bromthymol solution.
Caution: Bromthymol blue solution can stain skin and clothing. Avoid spilling or splashing it on yourself.
3. Note and record the color of the solution in both beakers. SEE DATA TABLE 1
4. Place a straw in Beaker 2. Gently blow through the straw into the solution until the solution changes colors. Caution: Use the straw to breathe out only. Do not suck the solution back through the straw.
5. Your partner should begin timing when you first blow through the straw and stop as soon as the solution changes color. Record the time that has elapsed.

Part 2 Exercise and Carbon Dioxide
6. In part 1 you timed the change in color without exercising first. Predict how long it will take the solution to change color if you conduct the test after you exercise.

Prediction $\qquad$
7. Do some type of physical activity (jumping jacks, run in place or push ups) for 2 minutes without stopping.
8. Place the same straw in Beaker 1. Gently blow through the straw into the solution until the solution changes color. Your partner should begin timing when you first through the straw and stop as soon as the solution changes color.
Caution: Use the straw to breathe out only. Do not suck the solution back through the straw.
9. Record the time that has elapsed. SEE DATA TABLE 1

Data Table 1:

| Activity Level | Time to Color Change (seconds) |
| :---: | :---: |
| Resting |  |
| 2 min of exercise |  |
|  |  |

Analyze and Conclude:

1. Measuring: How long did it take for the solution to change color the first time you did the test (without exercise)?
2. Drawing Conclusions: How did exercising affect the amount of time it took for the solution to change color?
3. Predicting: What was your prediction in step 5 based upon? Was your prediction accurate?
4. Communicating: Write a paragraph that relates the results of your experiment to the process of cellular respiration. Why CO2 produced at greater levels during exercise than when resting?

## Write the paragraph on the back of this page

5. Some plants grow in water: If you added bromthymol blue to the water, do you think it would turn color?
