

Lesson: Double Trouble

Teacher:	Kaylan Duthie
Unit Theme/Course:	Human Respiration – 7 th Grade Life Science
Date:	November 22 nd , 23 rd
Timing:	2 Days

Rationale/Goal:

- Problem: Does the human body produce oxygen or carbon dioxide as waste during cellular respiration?

Overview:

In the previous labs, students identified the ingredients and products of combustion of a candle, and learned that heat is a product of cellular respiration by breathing into water and noticing a temperature change. In this activity, students will use a breathing model to explore what gases are ingredients and products of cellular respiration by looking for evidence within the model. After this, they will be aware of the two products of cellular respiration: heat and carbon dioxide.

Learning Objectives [cognitive, academic, language, socio-cultural]	Assessment Criteria
Students will understand the flow of air through the breathing model	Students will label a diagram of their model with colored arrows moving in the correct direction and indicate which test tube the BTB changed color in.
Students will learn what gas is produced during cellular respiration	Students will identify carbon dioxide as a product of cellular respiration and include evidence from the activity such as the color change of the BTB indicator in the exhalation test tube
Students will identify the two products of cellular respiration that are the same as combustion	Student will state that heat and carbon dioxide are products of both cellular respiration and combustion

Standard/EALR:

6-8 INQB Investigate	Different kinds of <i>questions</i> suggest different kinds of scientific <i>investigations</i> .	Plan and conduct a scientific <i>investigation</i> (e.g., <i>field study</i> , <i>systematic observation</i> , <i>controlled experiment</i> , <i>model</i> , or <i>simulation</i>) that is appropriate for the <i>question</i> being asked. Work collaboratively with other students to carry out the <i>investigations</i> .
6-8 INQC Investigate	Collecting, analyzing, and displaying data are essential aspects of all <i>investigations</i> .	<i>Communicate</i> results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. *a
6-8 INQE Model	<i>Models</i> are used to represent objects, events, <i>systems</i> , and processes. <i>Models</i> can be used to test <i>hypotheses</i> and better understand <i>phenomena</i> , but they have limitations.	Create a <i>model</i> or <i>simulation</i> to represent the behavior of objects, events, <i>systems</i> , or processes. Use the <i>model</i> to explore the <i>relationship</i> between two <i>variables</i> and point out how the <i>model</i> or simulation is similar to or different from the actual phenomenon.
6-8 LS1C	<i>Multicellular organisms</i> have specialized cells that perform different <i>functions</i> . These cells join together to <i>form</i> tissues that give organs their structure and enable the organs to perform specialized <i>functions</i> within organ <i>systems</i> .	Relate the structure of a specialized cell (e.g., nerve and muscle cells) to the <i>function</i> that the cell performs. <i>Explain the relationship</i> between tissues that make up individual organs and the <i>functions</i> the organ performs (e.g., valves in the heart control blood flow, <i>air sacs</i> in the lungs maximize surface area for <i>transfer</i> of <i>gases</i>). <i>Describe</i> the components and <i>functions</i> of the digestive, circulatory, and respiratory <i>systems</i> in humans and how these systems interact.

Preparation Time:

30 minute to prepare materials and make copies

Materials:

- Copies of the lab for all the student
- 8 tubs with:
 - 2 large test tubes
 - Beaker
 - Graduated cylinder
 - BTB solution
 - Funnel
 - Breathing Apparatus

Instructional Sequence:

Day 1

1. Refresh the students on combustion and cellular respiration

- *What is oxidation?*
- *What is combustion? What are the products of combustion?*
- *What is cellular respiration?*
- *What is one of the products of cellular respiration we have already discovered from our experiments?*

- a.
2. Hand out the double trouble lab
 - a. Have students write in the problem: Is oxygen or carbon dioxide produced as a waste product of cellular respiration?
 - b. Go over the procedure for the lab
 - i. Show students the apparatus
 - ii. Test tubes are round and roll...always hold by the top or put them in something
 - iii. Breath slowly and steadily
 - c. Have students go through the procedure

By the end of the period, students should have labeled the diagram of the apparatus with arrows indicating the flow of air.

- 3.

Day 2

1. Students should be starting at step #6 on the procedure for the day
 - a. Review safety for BTB:
 - i. Breathe gently into the straws
 - ii. If you get BTB in your mouth, don't worry...tell the teacher, and then you can go rinse your mouth using the water fountain
 - iii. BTB can go down the sink
2. After completing the experiment and cleaning up, the students should work on their conclusion.

- *Students answer the problem and provide evidence*
- *List 4 products of combustion*
- *List two products of combustion that are also products of cellular respiration*

- a.
3. Group Discussion if time

- *What is the gas we produce when we breathe? How do you know?*
- *What is BTB an indicator for?*
- *What is combustion? What is an example we have seen?*
- *What is similar between combustion and cellular respiration?*

a.

Assessment

- Grade Lab Handout

Welcome to Science Class! Monday 11/22

Not So Random Question: What are the products of combustion?



1) Please sit in your Regular Flavored Seats with your journals and a properly shaped pencil out.

2) Begin Entry # 28: Double Trouble