

Lesson: The Candle Model/What Do You Know Revisited

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| Teacher: | Kaylan Duthie |
| Unit Theme/Course: | Human Respiration – 7 th Grade Life Science |
| Date: | November 17 th |
| Timing: | 1 Day |

Rationale/Goal:

- Students will learn about combustion and oxidation through a reading and a candle model
- Problem: How could a burning candle be a model for what happens in your body cells?

Overview:

This lab begins to introduce the concept of combustion through the burning of a candle, including the ingredients and products of combustion, which will be related back to oxidation and cellular respiration in future lab activities. The students will learn about Bromothymol Blue as an indicator, including what it indicates for, and to see how it works, so they understand the results they get in a later lab.

| Learning Objectives (<i>ppa 4A,B</i>) [cognitive, academic, language, socio-cultural] | Assessment Criteria |
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| Students will understand the process of combustion | Students will identify fuel and oxygen as ingredients and carbon dioxide, fire, and heat as products of combustion |
| Students will learn about the use of Bromothymol Blue (BTB) as an indicator | Students will state that BTB indicates for carbon dioxide , and explain that indicators are used to show things you can't see with your eye. |
| Students will formulate a prediction and collaboratively conduct and experiment to test it | Students will write a prediction including reasoning for their prediction, and work as teams to conduct the experiment. |
| Students will define oxidation | Students will define oxidation as the combining of oxygen with another substance. |

Standard/EALR (PPA 6A):

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| 6-8 INQB Investigate | Different kinds of <i>questions</i> suggest different kinds of scientific <i>investigations</i> . | Propose a <i>hypothesis</i> , give a reason for the <i>hypothesis</i> , and <i>explain how</i> the planned <i>investigation</i> will test the <i>hypothesis</i> . Work collaboratively with other students to carry out the <i>investigations</i> . |
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| 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. |
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Preparation Time:

- 30 minutes to make copies and prepare tubs for students

Materials:

- 8 tubs, each with:
 - Bromothymol Blue (BTB)
 - Graduated cylinder
 - Beaker
 - Foil
 - Candle
 - Metal Candle Base
- Lighter (for teacher use)
- Copies of lab sheets for students

Instructional Sequence:

1. For all answers, make sure to alternate male and female(*ppa 6E*)
 - a. If students are not able to come up with answers, ask them to pick someone to help out
2. Bring up the FlipChart from the previous What Do You Know Lesson
 - a. Ask the students to take a few minute and make any changes to the charts in their journals that they would like to (*PPA 4D,6B*)
 - b. As a class:

(PPA 4A,B,C,D,6B)

Is there anything you would like to completely remove from the T-Chart? Why?

Is there anything you would like to move from one column to the other? Why?

Is there anything you would like to add to the T-Chart?

Is there anything on the think you know side that you would like to be able to move to the know you know?

- i.
- ii. Might need to move to a new flipchart page

- iii. See if they can get to: diaphragm moves down when breath in, O₂ exchange occurs through diffusion
 - c. Save flipchart for later
 3. Start new journal Entry: Candle Model (*PPA 6D*)
 - a. Add to stamp-page, start new entry page
 4. Show students a burning candle in the front of the room
 - a. Have discussion to see what they know about combustion
- (PPA 4C,D)*
What is the process of burning called?
What happens when something burns?
What ingredients are used?
Is anything made?
- b.
 - c. Don't give answers at this point – just finding out what they know
 - d. Explain that today they are going to do a lab to see if they can figure out what is used and produced when things burn, and that they are going to learn about a new indicator (BTB) and find out what it tests for (*ppa 6B*)
 5. Safety Review
 - a. Goggles and Ponytails
 - b. No baggy or open shirts
 6. Hand out Candle Model report sheet
 - a. Have student read problem out loud
 - b. Have students write down prediction
 - i. Have a few students share
 - c. Have students read procedure out loud
 7. Have students complete lab (*PPA 6B,D*)
 - a. Remind them that they need to observe carefully both the candle and the BTB solution in the beaker
 - b. When students are ready, go around and light their candles for them
 - c. Make sure to tell students not to take the foil off the beaker until they are done with all of their observations, not just when the candle burns out.
 8. Remind students to complete their materials section while working on conclusion
 9. Have students answer conclusion questions on the worksheet (*PPA 4A,B,C,D,6B*)
 - a. Answer up through number 8
 - b. Do the reading in the book, and then answer the rest
 - c. If they don't finish this part at the end of day one, finish conclusion and discussion on next day
 10. Group discussion to wrap up lab

(PPA 4A,B,C,D,6B)

What is the candle made of?

In addition to the btb, candle, and metal base, what other substance is in beaker?

What two ingredients are involved in burning of candle?

What is released as the candle is burned?

If you wanted to put out the candle, what substance would need to be

- a.
11. Give students another day to work on conclusion *(PPA 4C,D,E)*
 - a. Stamp the journal entry
 - b. Look for completion, as well as accuracy in the answers
 - c. Give students chance to fix anything they didn't get the first time for a stamp.

Assessment

- Grade Lab Handout

Welcome to Science Class! Thursday 11/18

Random Question: What is the largest organ in the body, by weight?



1) Please get out your journal, a properly shaped pencil and sit in your Regular Flavored Seats.

2) Revisit Entry #21: What do You Know?

3) Begin Entry #26: Candle Mode

