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Changes in a Burning Candle

• Pre-Lab Discussion

What do you observe as you watch a candle burning? You see a bright flame and feel the heat. You may notice an odor if it is a scented candle. As you watch, the candle becomes smaller until, eventually, it is just a small stub. Some changes that occur are physical, and others are chemical. In this investigation, you will determine the physical and chemical changes in a burning candle. In one part of the investigation, you will test for carbon dioxide, using limewater. Limewater is a mixture of water and calcium hydroxide that turns cloudy when carbon dioxide is added.

•Materials *(per group)*

candle	shallow metal dish	20 mL bromothymol blue solution
250-mL beaker	500-mL Erlenmeyer flask	

• Safety

. Use caution when working around an open flame. Tie back long hair and loose clothing. Keep the limewater away from your eyes. If you get some in your eyes, immediately tell the teacher and rinse your eyes for 15 minutes.

• Procedure

1. Stand the candle in the center of the metal dish and light it. If the candle burns too low during the following steps, repeat this step with a new candle. Observe the flame of the burning candle for a minute. Observe what is burning and where the burning takes place. Note the different regions of the flame. Record your observations in the Data Table.

Figure A

2. Fill a 250-mL beaker with cold tap water, dry the outside, and carefully hold it right above the candle flame for about 10 seconds. (See figure A). Record your observations.

3. Pour the tap water into the metal dish to a depth of about 2 cm. Quickly lower a 500-mL Erlenmeyer flask over the candle so that the mouth of the flask is below the surface of the water. See Figure 1. Leave the flask in place for about a minute. Record your observations.

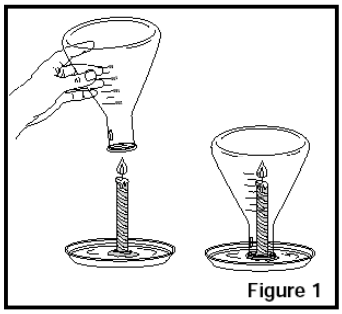

Figure 1

4. Hold the flask by its neck and lift it out of the water.

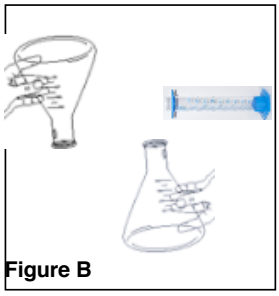

Figure B

CAUTION: *Lift the flask by its neck because the base of the flask may be hot.* Turn it upright, and add about 20 mL of bromothymol blue. Swirl the solution for about a minute. Record your observations.

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Changes in a burning candle- page 66

A. Observations/ Data Table

Procedure	Observations (Physical)	Observations (Chemical)
1. Candle burning		
2. Beaker above flame		
3. Flask over candle		
4. Bromothymol blue in flask		

CONCLUSIONS: (WRITE ANSWERS ONLY in FCS)

1. Pick one of the physical changes that you observed and explain WHY is it a physical change.

2. Pick one of the chemical changes that you observed and explain WHY is it a chemical change.

3. Define combustion. (pg. 243 PH). List two reactants (substances needed) for combustion.

a

b

4. List two chemical products (new substances) that are formed during combustion of a candle?

a

b

5. You can use an equation to describe a chemical reaction. For a one-way reaction, the part of the equation to the left of the arrow gives the ingredients, and the part of the equation to the right of the arrow gives the products. For example, an equation for the chemical reaction that produces mayonnaise is

Eggs + Vinegar + Salad Oil ----------> Mayonnaise.

Write an equation for the combustion of a candle in oxygen. Hint: There are two ingredients and two products.