

## Science 8 Candle Power: A Burning Question

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_ Group \_\_\_\_\_ Score \_\_\_\_\_

Candles in one form or another have been used by man for many centuries. Whether to light a room or to decorate a birthday cake, candles are still in use today. Once they are lit they'll continue to burn for some time depending on the size of the candle. Candles are simple in construction, usually consisting of a cloth wick which is like a string that is embedded in wax. In this lab we're going to find out the actual function of the wick as well as the wax.

**Problem:** What is the function of the wick and what is the function of the wax in a typical candle.

**Hypothesis:** \_\_\_\_\_

**Variables:** By the time you finish this experiment you will need to identify the different types of variables present in this investigation. Consult your notes for definitions of the types of variables.

**Independent Variables:** \_\_\_\_\_

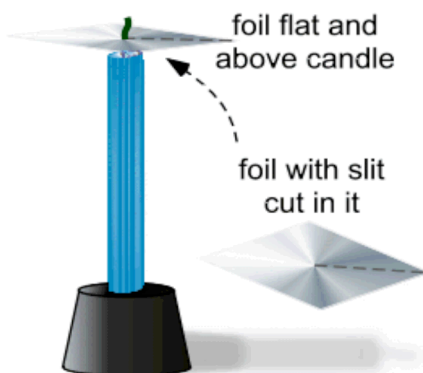
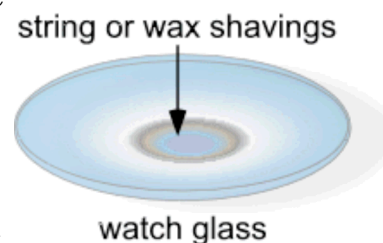
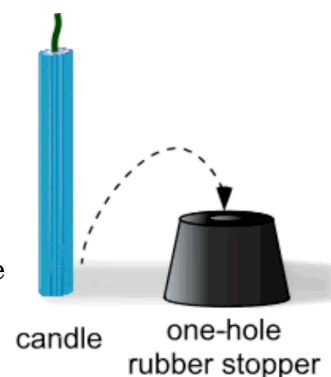
**Dependent Variables:** \_\_\_\_\_

**Controlled Variables:** \_\_\_\_\_

**Materials:** Small birthday candle, one holed rubber stopper, square of aluminum foil, wood splint, short piece of string, scissors, wax shavings, watch glass, alcohol burner

**Procedures:**

1. Take the small birthday candle and place the bottom of it into the hole of a one holed rubber stopper on the end of the stopper with a smaller diameter as shown at the right.
2. Use the scissors to make a cut in the square of aluminum foil from one of the corners to the center. **Do not** cut the foil all the way across.
3. Place the small piece of string onto the watch glass. Light the end of the wood splint using the burner, and then light the end of the string. Record in the data chart if the string is easy or difficult to light as well as how long it stays burning with a visible flame (count seconds or use a watch). Clean the watch glass off before going on to the next step.
4. Now place a **few** wax shavings onto the watch glass. Light them in the same way that you lit the end of the string. Record in the data chart if the wax is easy or difficult to light as well as how long it stays burning with a visible flame (count seconds or use a watch). Clean the watch glass off before going on to the next step.
5. Now light the birthday candle using the wood splint and let it burn for about 15 to 20 seconds, and then blow out the candle.
6. Take the piece of aluminum foil with the slit in it from step 2 and slide the wick through the slit until the wick is at the center of the aluminum foil. Slide the foil down (while still keeping the foil in the shape of a square) the wick until it is **just above** the wax of the candle. Your setup should look like the diagram at left.
7. Light the birthday candle again and record in the data chart if it is easy or difficult to light as well as how long it stays burning with a visible flame (count seconds or use a watch).



8. Take the foil away and light the candle again. Let it burn for about 15 to 20 seconds. Light the end of a wood splint and very quickly blow out just the candle flame. The **instant** you blow out the flame **place the flaming splint directly into the wisp of smoke rising from the end of the wick**. Record your observations on the line below.

9. Observe the setup the teacher has, containing a length of string that has been left to dangle into a container of colored water. Based on what you see, what does the water do when it comes into contact with the string?

**Safety:** Safety goggles/glasses must be worn when using burner.

Object being lit	Easy or Difficult to light	Time object has visible flame (in seconds)
String		
Wax shavings		
Candle with foil		

### **Questions**

1. Out of all the things you were asked to light in this experiment (with the exception of the wood splints), what was easiest to light and what was most difficult to light?

2. Based on what you observed in this experiment, what phase of matter, solid, liquid, or gas lights easiest?

3. Explain why the candle soon went out when the aluminum foil was in place on the wick? Think about the observations to step 9.

**Conclusion:** Determine if your original hypothesis was correct or not (remember both parts of the hypothesis) using the best information collected during the experiment to support your answer. If your answer to the problem was incorrect, give the correct answer, again using the best information collected during the experiment to support your answer. Explain your reasoning by including a brief analysis of your data !

**Sources of Error:** In looking back at the lab you just completed, what were two things someone might have done that made their results less than a hundred percent reliable. They must be **new** and **unique** to this activity, and you must be **specific** about what the source of error is.

## **Additional Teacher Information**

- Each student should be allowed to do this experiment with their own candle, unless these are few in number.
- One alcohol burner shared between every two students.
- Two or three wood splints per student should be sufficient if they blow it out after a test is done. This way they can use the opposite end of the for another test.
- One inch squares of aluminum foil will need to be cut out ahead of time. A few extra per class is advisable since there are usually a few students that just can't cut the foil correctly the first time.
- Have a beaker of wax shavings made ahead of time. A block of paraffin wax held against a cheese grater will quickly give you all that's needed.
- Do a visual check of each students set up, and make sure they have their safety goggles/glasses on before you light their burner.
- For step **9**, a few drops of dark food coloring added to a beaker of water works well. Be sure to point out what the string looks like before and after.