

Lab: Can You Handle a Candle!?!

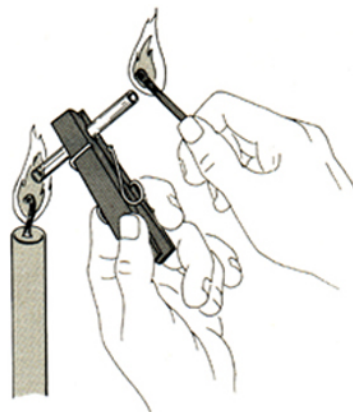
As you investigate a burning candle, no doubt many unanswered questions will come to mind. Perhaps there are other questions for which you will be able to find satisfactory answers. The purpose of this experiment is to help you find clues that will enable you to postulate answers to some of those unanswered questions. As you perform the experiments outlined below, keep thinking about possible answers to the following questions:

1. Why is the flame blue at the base, dark in the center, and yellow elsewhere?
2. What is the purpose of the wick in a candle?
3. Why is it possible to extinguish a flame by blowing on it?
4. Why is the flame shaped as it is?

Procedures:

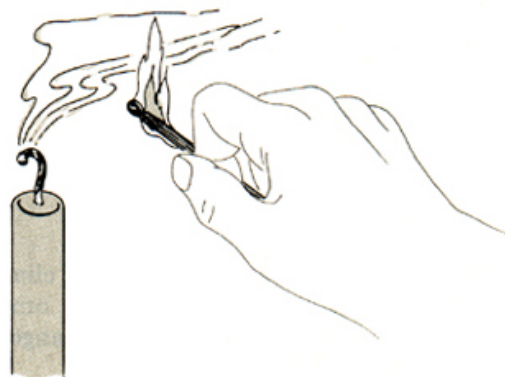
Part A)

- Clamp a piece of glass tubing in a clothes pin
- Hold one end of the glass tubing in the inner dark part of the candle
- Hold the tubing steadily here for a few seconds
- Light a match and hold it to the outside end of the tubing
- Record your observations



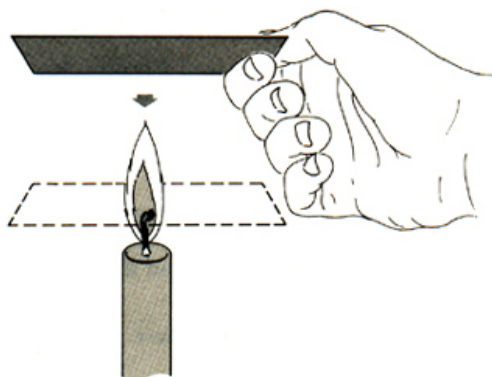
Part B)

- Hold the same piece of glass tubing in the upper bright part of the flame
- Again hold a lighted match to its outside end
- Record your observations.



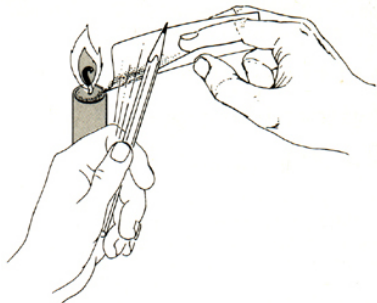
Part C)

- Burn a candle for about 30 seconds
- Light a match and quickly blow out the candle
- Hold the match one inch from the wick in the "smoke"
- Record your observations



Part D)

- Hold an index card horizontally
- Quickly move the card down over the flame
- Hold here just long enough to scorch the top of the card
- If the card catches on fire, place in water and try again with a new card
- Record your observations (Note the pattern of the scorched area)

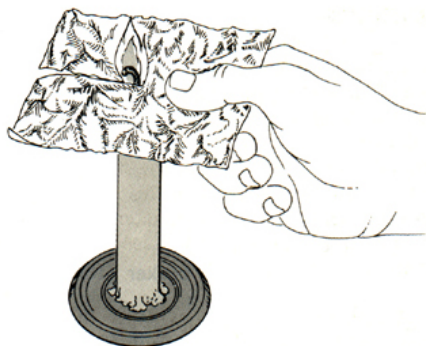


Part E)

- With the scoopula, scrape some “soot” from the glass tubing into the melted wax
- Record your observations (Note the motion of the particles in the liquid)

Part F)

- Lower the coiled copper wire it into the flame
- Quickly raise the wire away from the candle
- Record your observations



Part G)

- Hold a slotted piece of aluminum foil horizontally
- Slide the foil around the wick, below the flame and above the melted wax
- Leave the foil in place for about 30 seconds
- Record your observations.

Questions:

1. Will a candle of larger diameter produce a larger flame?
2. How can you construct a candle so that it will produce a larger flame?

Conclusion:

Write a paragraph describing what you think is taking place within the candle flame. Justify your arguments with experimental evidence. Propose “answers” to as many of the introductory questions as you can (i.e. those questions on page #1).