

# Summer Assignment for Algebra I Pre-AP and Algebra II Pre-AP

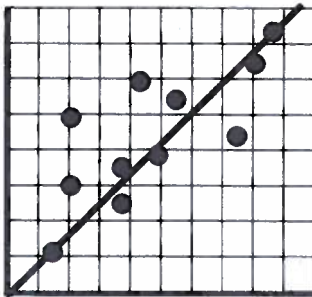
## For both Algebra I Pre-AP and Algebra II Pre-AP

You are going to perform an experiment and make conclusions based on the data you collect. This assignment will be graded for your math class. If you have any question as you complete this project, then feel free to contact Mr. Dixon at [rdixon@llanoisd.org](mailto:rdixon@llanoisd.org) or Mrs. Buttery at [abuttery@llanoisd.org](mailto:abuttery@llanoisd.org).

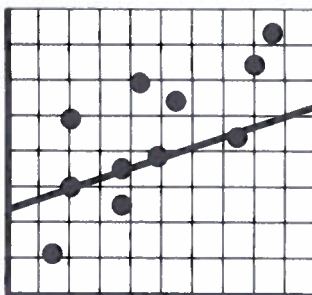
We hope you have fun as you perform this experiment and review your algebra and science skills!

### **Line of Best Fit:**

Even though a scatterplot of data may have a linear relationship, it does not always perfectly follow a line (just an indication that the world is not a perfect place). So, mathematicians and scientists draw a line that fits the data the best. To draw a line of best fit, use a straight edge and position it so that it lies half way between your points. This means that the line follows the direction (correlation) of your data and that there are about as many points below the line as above the line. Usually a good line of best fit can go through at least a couple of the points from the scatterplot.



The figure to the left shows a line that best fits the scatterplot. It follows the direction of the data, goes through a couple of points, is really close to several other points, and has about the same number of points above it as below it. (NOTE: A line of best fit does not necessarily have to go through (0,0).)



The figure to the left does **not** show a line that best fits the scatterplot. Even though it goes through several points, the line does not follow the incline of the data very well. If you were to wrap a rubberband around the blob of points, you would see that the data has a much sharper increase than this line. Besides, there are too many points above the line compared to how many are below.

# Height of a Candle versus Time of Burn

Objective: To determine the relationship between the height of a candle and the time of burn

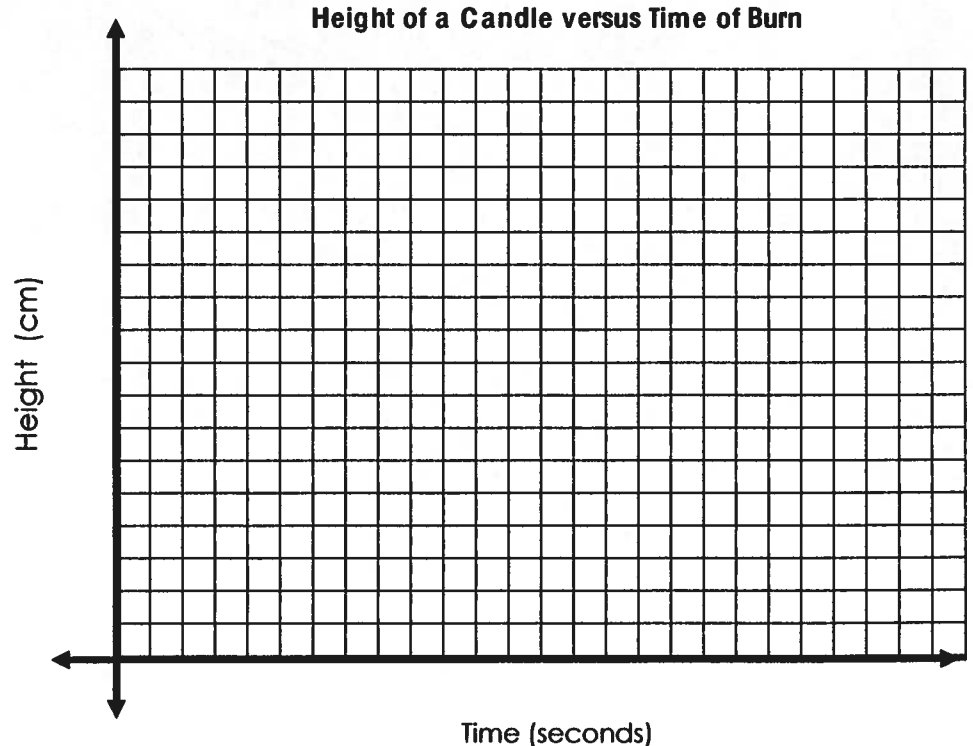
Materials: Foil or plate                      2 Birthday candles                      Matches or lighter  
Metric Ruler                                      Timer/stop watch

## Procedure:

1. Stand a small birthday candle on a heat-resistant plate or sheet of foil paper. Stand the candle up by dripping some melted wax from another candle onto the plate and then setting the unlit candle in the wax.
2. Light the candle and let it burn 20 seconds. Then, extinguish the candle so you can measure the height of the candle (not including the wick) in centimeters. Continue this procedure until the table below is filled in (or until you run out of candle).
3. Graph the data on the grid provided. Make sure your scale is labeled clearly.
4. Using a straight edge, draw the line of best fit for your data.

## Results:

Time (seconds)	Height (cm)
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	



## Conclusion:

1. Identify which variable is independent and which variable is dependent, according to your table and graph.
2. What is the relationship (correlation) between your data: positive, negative, or none? Give the answer with your reasoning in a complete sentence.
3. Where does your line cross the y-axis?

4. What does the coordinate point you wrote for your answer in #3 represent in this situation?
5. What is the slope of your line? Show or explain your process below. You can use the hint given in the previous experiment to help you answer this question.
6. Explain in complete sentences what the slope tells you specifically about the experiment you have just performed.
7. Write the equation for the line of best fit in slope-intercept ( $y = mx + b$ ) form.
8. Use the equation you wrote in #7 to find the height of the birthday candle after it has burned for 130 seconds. Support your answer by showing your algebraic process.
9. Was the answer you got in #8 reasonable according to your table and graph? Give your answer in complete sentences.
10. Give a reasonable domain and range for this situation.  
Domain: \_\_\_\_\_ Range: \_\_\_\_\_
11. There are various factors that affected the accuracy and precision of this activity. These factors are called *sources of error*. A source of error does not necessarily mean that you did something wrong. List all sources of error for this activity.

12. The two experiments you have performed have a linear relationship. Describe another experiment that could be performed that would have data that also has a linear relationship. You are more than welcome to be creative.

13. Identify the independent and dependent variables in the experiment you described above.