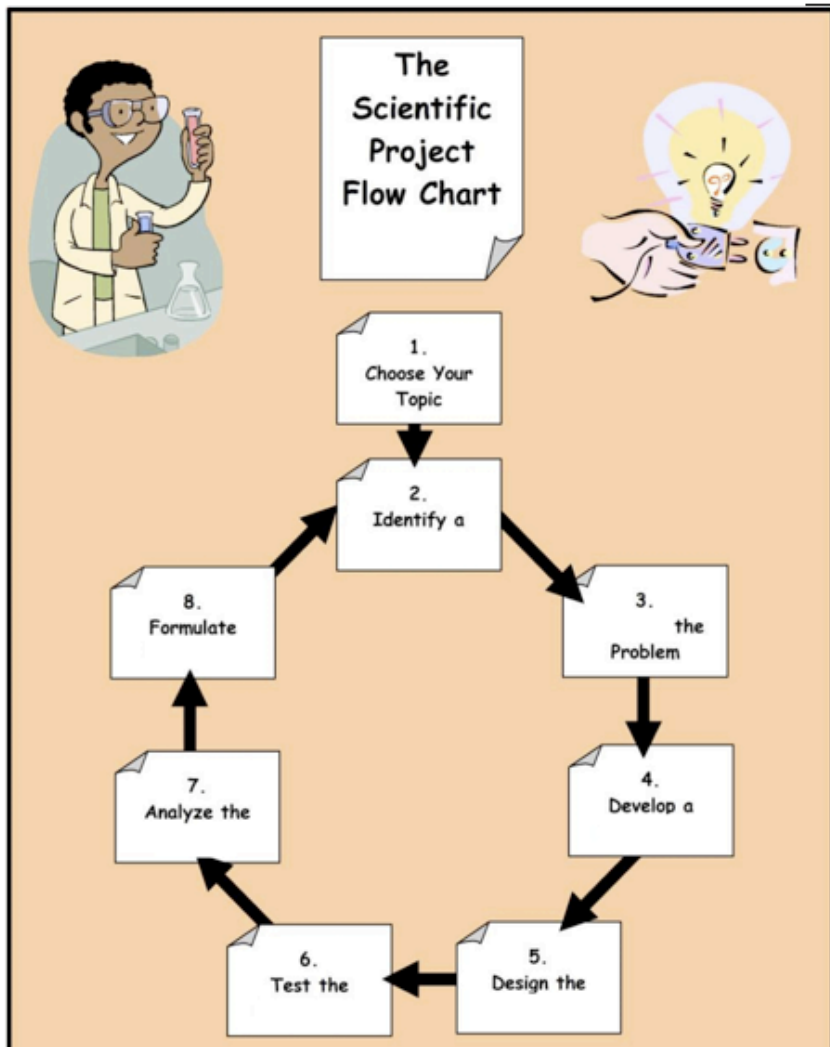


SCIENTIFIC METHOD

Complete the boxes below in the drawing for 5 points



Additional Notes: _____

- What's the difference between a hypothesis and a theory?
 - "Theory" is another word for "fact;" "hypothesis" is another word for "guess"
 - Hypotheses can't be proven; theories can
 - Theories have been confirmed through tests; hypotheses haven't
 - Theories contain many hypotheses; a hypothesis only contains one theory
- Place the following steps in sequence: A) Recognizing a problem; B) Testing a hypothesis; C) Drawing inferences
 - A, C, B
 - A, B, C
 - B, C, A
 - C, B, A
- In the phrase, "The scientific method is an analytic process for determining why things happen," what's the best synonym for "analytic"?
 - Probable
 - Amazing
 - Incoherent
 - Logical
- What must you do before you make a hypothesis?
 - Run an experiment
 - Make observations
 - Form a theory
 - Draw conclusions
- If you were running an experiment to determine the temperature at which beans sprout the fastest, what would be the variable?
 - The number of beans you plant
 - The height of the sprouts you grow
 - The amount of water you give the beans
 - The temperature at which each bean is kept
- You should run an experiment several times to make sure your results are consistent. In the preceding phrase, what does "consistent" mean?
 - Obvious
 - Perfect
 - Unchanging
 - Testable
- What might cause a theory to change over time?
 - New laws passed by the government
 - New but untestable ideas
 - Changes in public opinion
 - The discovery of new evidence
- Evolution is one example of a theory. From what you know about the scientific method, what can you conclude about this biological theory?
 - It's been tested many times
 - Scientists don't need to test it anymore
 - No one is allowed to test whether it's true or not
 - There is very little evidence to support it
- Which of the following is a testable hypothesis?
 - Roses are more beautiful than violets
 - A plant needs at least five hours of sunlight per day to grow
 - Ice cream is delicious
 - Humans will someday land on Mars
- What happens if you test a hypothesis multiple times and the data doesn't support your prediction?
 - Change the data to support your prediction
 - Run the experiment again until you get the results you're looking for
 - Conclude that your hypothesis cannot be proven
 - Re-think your hypothesis

Additional Notes: _____

THE POPCORN LAB & SCIENTIFIC METHOD

I. Title: This should tell what the experiment is investigating. It is the name of the experiment and may be in the form of a question. Be specific. **Write YOUR Title here** _____

II. Statement of the Problem: (Identify the problem that exists) _____

III. Purpose (Why are you doing the experiment/ what do you hope to discover...) _____

IV. Hypothesis: Before you do the experiment, what do you predict will happen? This should be based on Observations and Preliminary Research. "If..., then..., because..." Make this quantitative (ie: it needs a number value) _____

V. Variables & Controls:

INDEPENDENT VARIABLE: What is the one condition that you changed?

What are you comparing or testing? 1. _____

DEPENDENT VARIABLE: What results are your going to measure & record?

1. _____ 2. _____ 3. _____

CONTROLLED VARIABLES :List the things that you plan to keep the same during your experiment, so that they will not affect your results. List 6

1. _____ 2. _____ 3. _____
4. _____ 5. _____ 6. _____

VI. Procedures: (step by step instructions on how to do the experiment) (attach a sheet of paper if you need more space)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

VII. Materials (list everything you will need to do the experiment)

1. _____ 2. _____
3. _____ 4. _____
5. _____ 6. _____

VIII. Experimental Observations & Results

A. Experiment Observations: (at least 2)

1. _____
2. _____

B. Data Table Observations: (at least 2)

1. _____
2. _____

-3- (1x31 answers= pts: _____)

B. Results:

Data Table – complete the attached data table from everyone’s data in class

	Popcorn Brand	Price Per bag	Beginning Mass (g)	Ending Mass(g)	Popping Time (s)
brand 1					
brand 2:					
brand 3:					
brand 4:					
brand 5:					
brand 6:					
brand 7:					
brand 8:					
brand 9:					
brand 10:					
brand 11:					
brand 12:					
brand 13:					
brand 14:					
brand 15:					
brand 16:					
brand 17:					
brand 18:					
Avg:					

-4- (18 x 1.5= 27 pts) _____

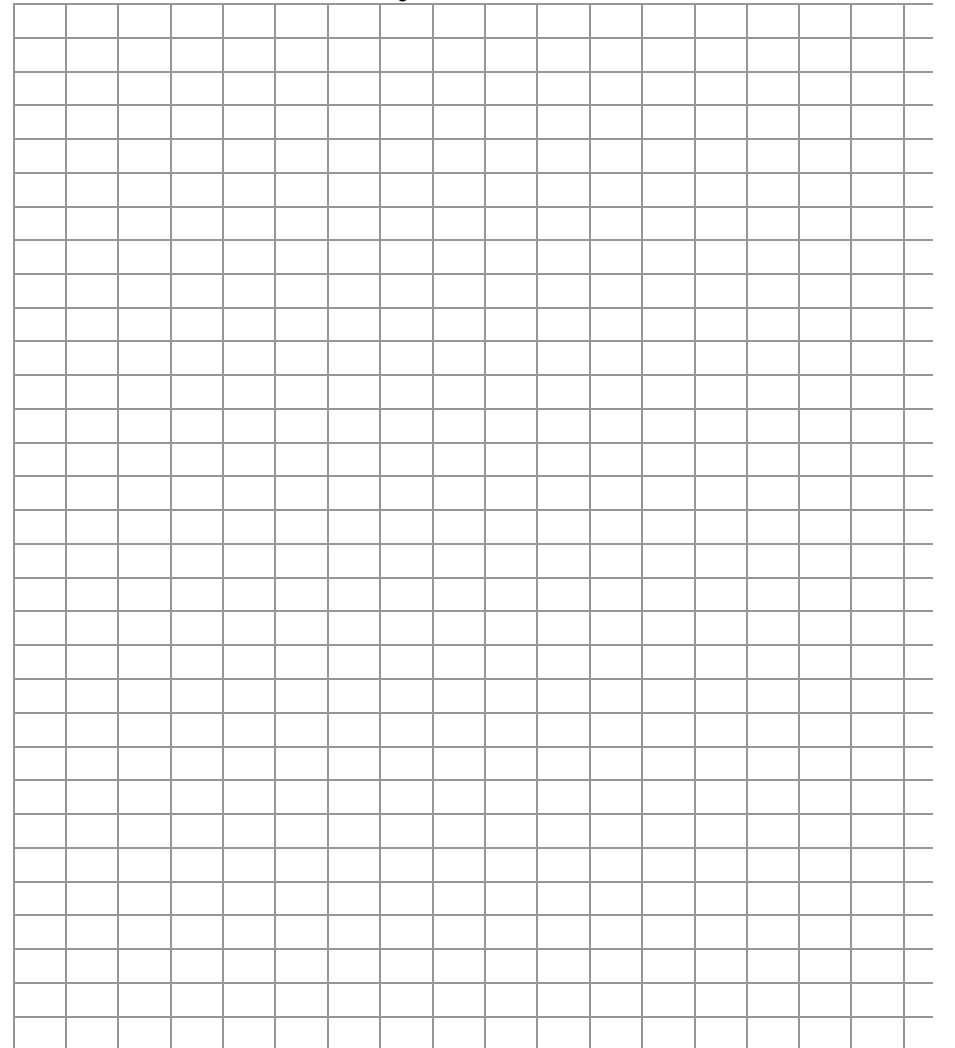
B. Results:

Data Table – complete the attached data table from everyone’s data in class

	Total # of Kernels	# of Popped Kernels	% of Popped Kernels	# of Unpopped Kernels	% of Unpopped Kernels
brand 1:					
brand 2:					
brand 3:					
brand 4:					
brand 5:					
brand 6:					
brand 7:					
brand 8:					
brand 9:					
brand 10:					
brand 11:					
brand 12:					
brand 13:					
brand 14:					
brand 15:					
brand 16:					
brand 17:					
brand 18:					
AVG:					

-5- (18 x 1.5= 27 pts) _____

Graph –create a graph showing **the results of the popped & unpopped kernels** (You may also make a computer graph and attach for extra credit. **HAND DRAWN GRAPH IS REQUIRED!**)



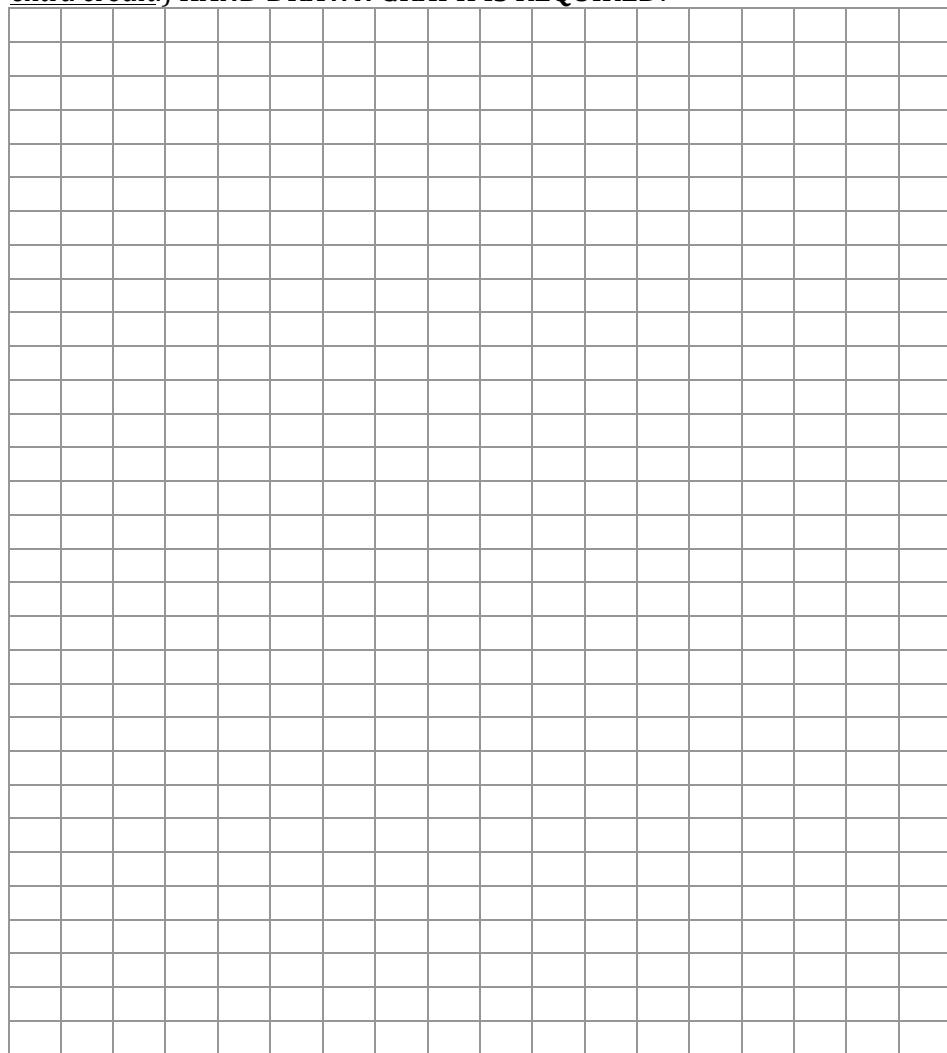
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Split the boxes vertically to bar graph the popped & unpopped numbers
In a minimum of 4 sentences, explain what you are showing on your graph.
You may include more sentences (attach a separate piece of paper).

1. _____
2. _____
3. _____
4. _____

-6- (18 x2= 18pts: ____ +4= 22 pts)

Graph – create a graph showing the results of the **mass comparisons of unpopped and popped bags**. (You may also make a computer graph and attach for extra credit.) **HAND DRAWN GRAPH IS REQUIRED!**



In a minimum of 4 sentences, explain what you are showing on your graph.
You may include more sentences (attach a separate piece of paper).

1. _____
2. _____
3. _____
4. _____

-7- (18 x1= 18pts: ____ +4= 22 pts)

IX. Conclusion (Each question should have 2-3 sentences)

1. What was concluded by the results? Analyze what your results meant.

2. What conditions may have affected our results, causing an experimental error?

3. How would you change the design of the experiment to eliminate the problems and make it better? _____

4. What were some of the conditions that were impossible to control?

5. What did you learn from the experiment that you did not expect?

6. Do you believe the results are accurate? Explain. How would the results be different if we had a larger sample size (if you looked at all of my classes data vs. just our class? _____

7. If your results are accurate, what recommendations would you make as a result of your experiment? _____

8. If there is a difference between the initial mass of the corn and the popped corn, what happened to account for this change? _____

9. What happens to the reliability of the results as the sample size is increased?

10. What practical problems are there in counting the unpopped kernels and the popped corn? How could you limit these? _____

X: Recommendations: If you were to do this experiment again, what would you do different? _____

-8- (11 x 2pts each= 22 pts)