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

1. What was proved? 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? _____
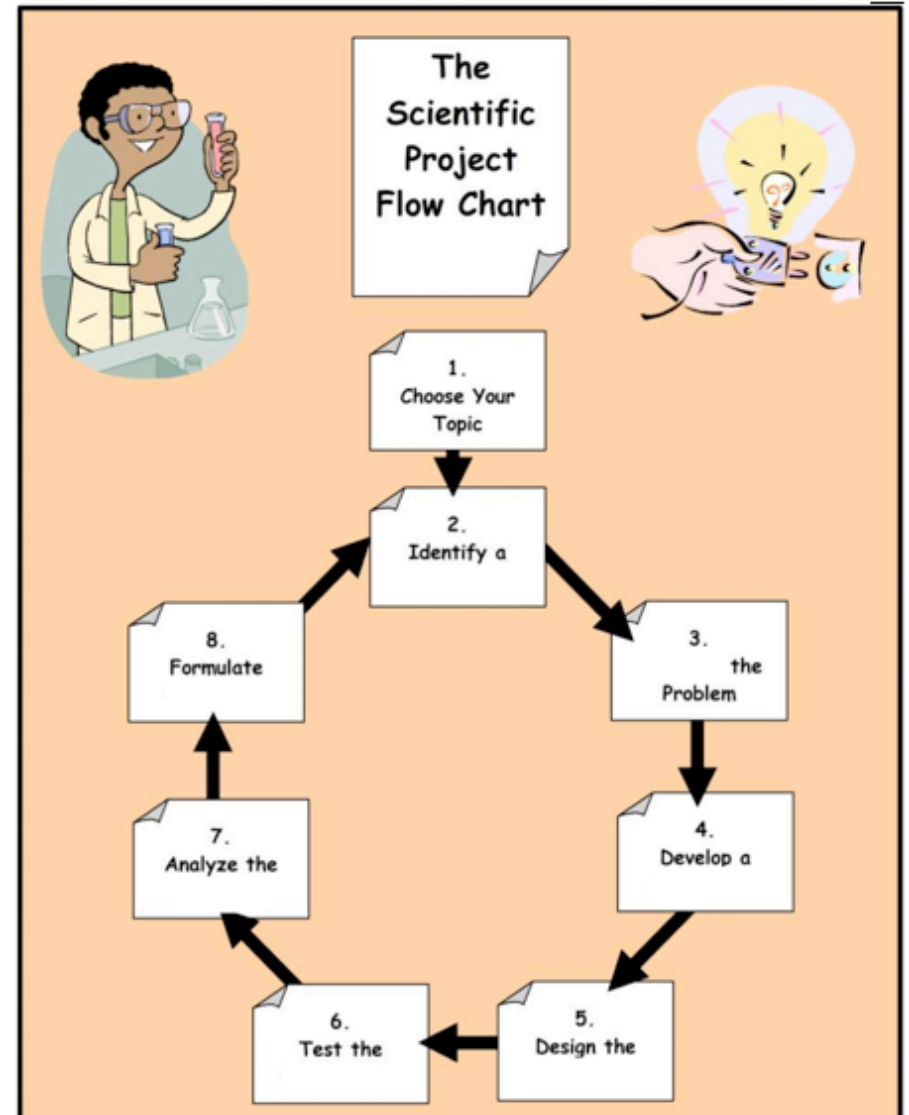_____
_____

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? _____
_____
_____
_____

The Scientific Project Flow Chart

1. Choose Your Topic
2. Identify a
3. the Problem
4. Develop a
5. Design the
6. Test the
7. Analyze the
8. Formulate

Additional Notes: _____
_____
_____
_____
_____
_____

Name: _____ Class Period: _____ Score: _____

SCIENTIFIC METHOD

1 What's the difference between a hypothesis and a theory?

A "Theory" is another word for "fact;" "hypothesis" is another word for "guess"

B Hypotheses can't be proven; theories can

C Theories have been confirmed through tests; hypotheses haven't

D Theories contain many hypotheses; a hypothesis only contains one theory

2 Place the following steps in sequence: A) Recognizing a problem; B) Testing a hypothesis; C) Drawing inferences

A A, C, B

B A, B, C

C B, C, A

D C, B, A

3 In the phrase, "The scientific method is an analytic process for determining why things happen," what's the best synonym for "analytic"?

A Probable

B Amazing

C Incoherent

D Logical

4 What must you do before you make a hypothesis?

A Run an experiment

B Make observations

C Form a theory

D Draw conclusions

5 If you were running an experiment to determine the temperature at which beans sprout the fastest, what would be the variable?

A The number of beans you plant

B The height of the sprouts you grow

C The amount of water you give the beans

D The temperature at which each bean is kept

6 You should run an experiment several times to make sure your results are consistent. In the preceding phrase, what does "consistent" mean?

A Obvious

B Perfect

C Unchanging

D Testable

7 What might cause a theory to change over time?

A New laws passed by the government

B New but untestable ideas

C Changes in public opinion

D The discovery of new evidence

8 Evolution is one example of a theory. From what you know about the scientific method, what can you conclude about this biological theory?

A It's been tested many times

B Scientists don't need to test it anymore

C No one is allowed to test whether it's true or not

D There is very little evidence to support it

9 Which of the following is a testable hypothesis?

A Roses are more beautiful than violets

B A plant needs at least five hours of sunlight per day to grow

C Ice cream is delicious

D Humans will someday land on Mars

10 What happens if you test a hypothesis multiple times and the data doesn't support your prediction?

A Change the data to support your prediction

B Run the experiment again until you get the results you're looking for

C Conclude that your hypothesis cannot be proven

D Re-think your hypothesis

Additional Notes: _____
_____
_____
_____
_____
_____
_____
_____Pg2_____

Graph – create a graph showing the results of the mass comparisons of unpopped and popped bags. (You may also make a computer graph &attach)
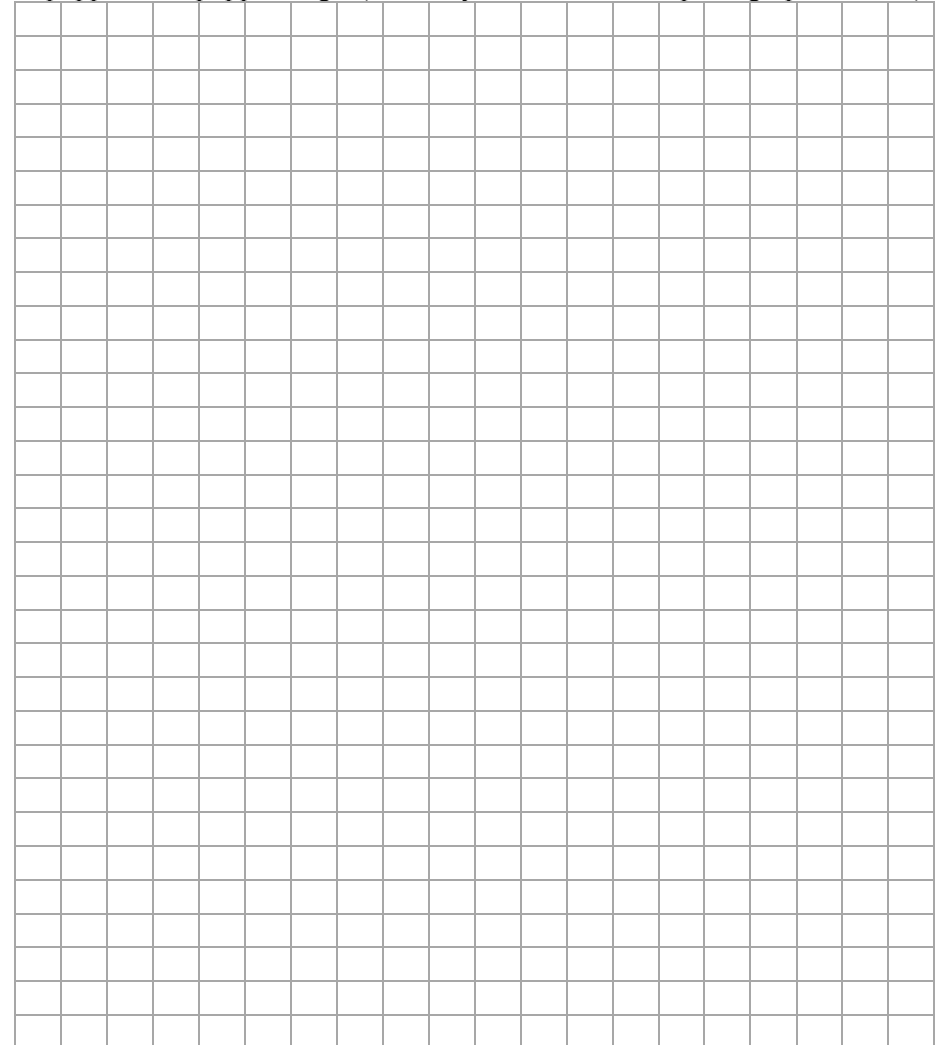
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

In a minimum of 5 sentences, explain what you are showing on your graph. You may include more sentences

1._____

2._____

3._____

4._____

5._____

Graph –create a graph showing **the results of the popped & unpopped kernels**   (You may also make a computer graph and attach)

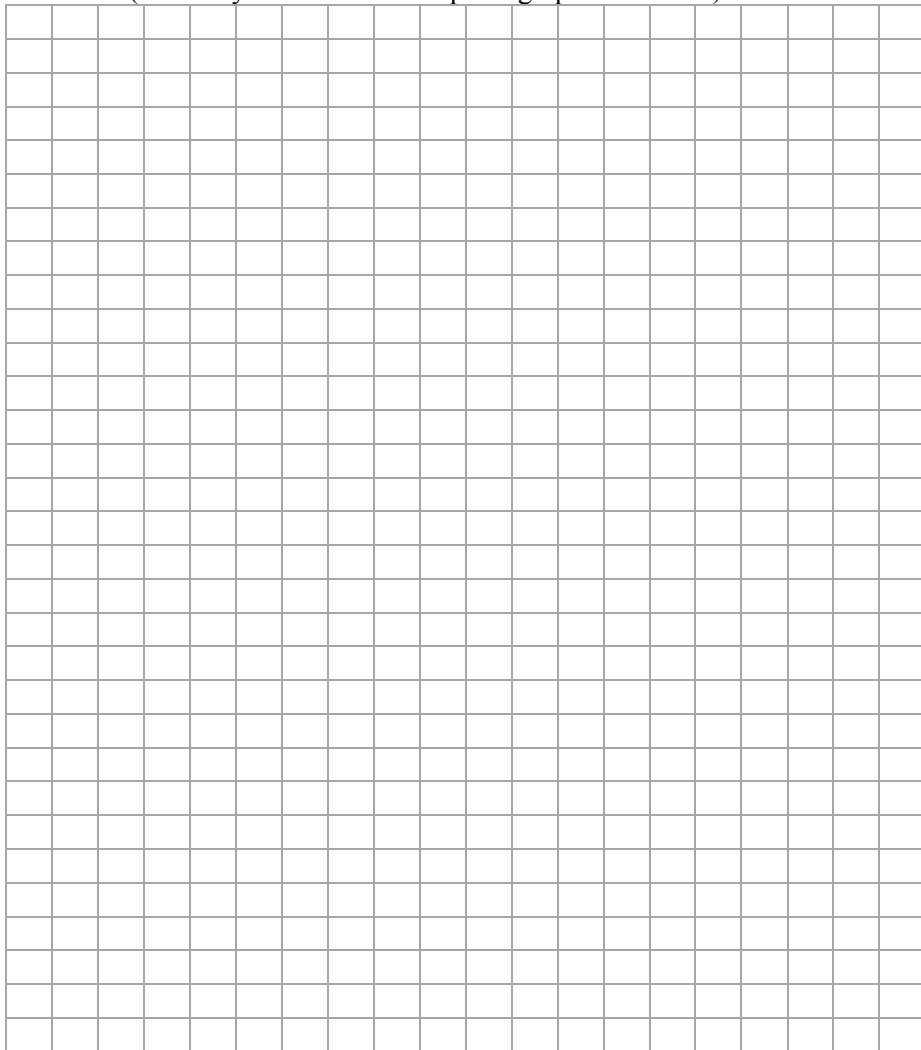|																	

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

In a minimum of 5 sentences, explain what you are showing on your graph. You may include more sentences

1._____

2._____

3._____

4._____

5._____

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… "to see if")

_____

_____

_____

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:

Variables to be changed: What is the one condition that you changed? What are you comparing or testing?

1._____   2. _____

Variables to be measured: What results are your going to measure & record?

1._____   2. _____

3. _____

Controls :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,_____
_____

8. _____
_____

9. _____

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

1._____   **2.** _____

3._____   **4.**_____

5. _____   **6.** _____

7._____   **8.** _____

VIII. Experimental Observations & Results
   A. Observations: (at least 9)

1._____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9,_____

B. Results:

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

	Popcorn Brand	Beginning Mass	Ending mass	Popped kernels	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:					

Write 2 general observations from this data:

1._____

2. _____