Name: Key

Prologue 2 Study Guide

A. Scientific Method (Experimental Design)

1. What are the 5 steps of the scientific method?

① Question
② Hypothesis
③ Experiment
④ Interpret Data
⑤ Conclusion

2. KEY Vocabulary

A) Independent variable (manipulated variable)-the variable "I" purposely changed and tested.

Example: The temperature of water

B) Dependent Variable (responding variable)-the factor that may change as a result of the independent variable. It is the variable you are expecting to change. Example: How fast alka-seltzer dissolves(solution rate)

C) Experimental Group- the setup in the experiment whose conditions you manipulate(change)

Example: crushed tablet/hot water/stirring of the alka seltzer tablet

D) Control Group- also called "THE CONTROL"- this group is only used for comparison; its setup is based on normal conditions and conditions are NOT changed for this setup.

Example: Alka-seltzer tablet in room temperature water

E) Controlled Experiment- an Experiment with a control group and an experimental group with all conditions the same for both groups, expect for the independent variable in the experimental group.

F) Constant/Control Variable - the factors in an experiment that are not manipulated and must be kept the same for the entire experiment. If constants are changed then you would not know what really affected your experimental group.

3. What should you do when your data results are not what you expected?

Conclude hypothesis/expectation may be wrong and re-test your hypothesis

4. Why is it important an experiment is controlled?

So we know what will change our results

5. Why is it important to perform an experiment more than once?

Get consistant results

6. In an experiment set-up, everything has to be the same except what variable?

Independent/Manipulated

7. In an experiment where I want to test alka-seltzer tablets dissolve faster in hot water or cold water, what could be my hypothesis? Independent Variable? Dependent Variable? Constants? Control Group? If alka-seltzer is put into hot water, then it will dissolve faster because the heat will cause it to dissolve.

IV: temp

DV: Rate/Speed

Control: Amt of

8. Define rate of change:

How fast something changes

9. What is the formula for rate of change?

$$ROC = \frac{\text{Change in distance (value)}}{\text{change in time}}$$

10. What is the rate of change for a person commuting to work from home if he traveled 293 feet in 55 minutes? Show work.

$$ROC = \frac{\text{change in distance}}{\text{change in time}} = \frac{293}{55} = 5.3 \text{ ft/min}$$

11. Graphing

Year	Temperature
1991	64
1992	66
1993	70
1994	72
1995	73