Name_______________________________________ Semester ____ Block____
(Print First and Last Name)

Honors Biology Summer Assignment

Welcome to Biology.

During the course of the year we will be focusing on many topics dealing with living things. This assignment will start the process of helping you to build the foundation needed for the study of Biology.

This assignment has four parts.

- The first part will help you become familiar with safety in the classroom during lab situations. **Sign the contract and answer the questions 1-20.**
- The second part is a review of the scientific method. We will be working on research in Honors Biology and the scientific method is a core topic needed to perform well in this course. **Read through all of the examples and answer the questions 21-64.**
- The third part is basic chemistry. It will help you begin to gain the basic understanding you need for this course about the elements and the periodic table. **Read and use the periodic table to answer questions 65-80.**
- The fourth part deals with making, reading and understanding graphs. Analyzing data is an important part of science and the scientific method. **Follow directions and place answers directly on the worksheet.**

General guidelines for the summer assignment:

- This assignment will be your first grade for the semester.
- It will be due the first day of classes in the beginning of the year.
- Make sure your name is on the packet.
- Make sure you have signed the safety contract and completed the last page.
- 10 points will be deducted each day it is late.

Please e-mail Mrs. Gallen with questions regarding this assignment:
kgallen@nazarethacademyhs.org

I, _________________________________, worked on this assignment by myself. I
(student signature)
know that everything that I take credit for is a reflection of both myself and my character. I promise to take full responsibility for all my actions and strive to give my best at all times.

Name ______________________ Class ______________________ Date ______________

Student Safety Contract

An important part of your biology work will take place in the laboratory. The laboratory is a safe environment in which to work if some general rules are observed and if the people who work in the laboratory are informed and careful.

As a first step toward becoming an informed laboratory worker, read the following safety rules. Discuss them with your teacher, with your lab partners, and with other members of the class. Reread them to make sure that you understand each rule. Ask your teacher about the rules that are unclear to you. After discussions with your teacher and with your classmates, you may want to write additional rules in the space provided. When you are sure that you understand all of the safety rules that are on the list, sign and date the contract in the space provided. Signing the contract indicates that you are aware of the rules of the laboratory.

Dress Code

1. To protect your eyes from possible injury, always wear safety goggles when doing laboratory work. Wear glasses rather than contact lenses when you work in the laboratory.

2. Tie back long hair and loose clothing (ties and scarves) and remove jewelry when you work at the laboratory station. Roll up loose sleeves that might fall into chemicals or become caught on equipment. The use of laboratory coats or laboratory aprons is recommended when you work with acids or with open flames.

3. Do not wear open-toed shoes or sandals in the laboratory. Never go barefoot.

Preparation for Laboratory Work

4. Prepare for the experiment by reading all of the directions before the class begins. Before beginning the experiment, ask your teacher about directions that you do not understand. Discuss the procedures with your lab partner or team. Assign specific tasks to individuals, especially if speed is a factor in the procedures.

5. Before you begin work, make sure that you know how to operate the equipment that will be used in the experiment.

Performing an Experiment

6. Keep your laboratory work area clear of any materials that are not needed for performing the experiment. Texts, notebooks, knapsacks, sweaters or jackets, and other materials should be stored away from the work area.

7. Handle all equipment as directed. Note safety precautions in the instructions for your experiments.

8. Do not use direct sunlight as the source of light for microscopes that have mirrors.

9. Never use double-edged razors. Handle all sharp instruments with extreme care.

10. Do not stir solutions with a thermometer; use a glass stirring rod. If a thermometer breaks, inform your teacher at once, and follow your teacher's directions for cleaning it up.

11. Take extreme care not to spill materials in the laboratory. Report all spills immediately, and follow your teacher's directions for cleaning them up.

12. Keep flammable materials away from open flames. Place burners sufficiently far from the edge of the work area. Never reach across a flame.

13. Use tongs or a clamp to pick up hot containers. Test the temperatures of equipment and containers that have been heated by placing the back of your hand near any object before picking it up. If you can feel heat, the object might be too hot to handle.

14. Dispose of materials only as directed. Do not pour chemicals into a sink or put specimens into the trash. After you have completed your work, turn off all equipment and clean your work area. Return all equipment and materials to the appropriate storage places.

15. Wash your hands before and after each experiment.

16. Never eat or drink in the laboratory. Never eat or drink from laboratory equipment. Never smoke in the laboratory.

17. Perform only those experiments authorized by your teacher. Do not work alone in the laboratory.

First Aid or Emergencies

18. Report any accident to your teacher immediately, no matter how minor the accident might seem. Follow your teacher's recommendations for further treatment.

19. Report all fires to your teacher at once. Smother a clothing fire with a fire blanket, towel, or coat, or put it under a safety shower.

20. Know the locations of the fire extinguisher, safety shower, fire blanket, first aid kit, and other safety equipment. Learn how to use each item.

21. Know the shortest exit route from the laboratory, from the corridor, and from the school building.

Handling Chemicals

22. Read the labels on chemical containers and on reagent bottles twice. Bottles of darkened glass look very much alike; make sure that you are using the materials called for in the experiment. Label all containers into which you put materials.

23. Do not touch, taste, or smell chemicals that are in the laboratory unless directed to do so by your teacher. Do not sniff chemicals directly from containers. Waft fumes toward your nose by waving your hand over the mouth of the container.

24. Open chemical bottles only when you are ready to use the materials within them, and close the bottles quickly when you are done; moisture from the air might react with and spoil the chemicals. To avoid the contamination of chemicals, do not return the unused chemicals to the bottle. Dispose of chemicals only as directed by your teacher.

25. Always pour an acid into water; never pour water into an acid.

26. Rinse any acid off your skin immediately by flushing the area with water. Notify your teacher at once.

27. Do not use your mouth to draw materials through a pipette bulb.

28. Never point the open end of a heated test tube toward yourself or anyone else.

Handling Glassware

29. Do not use cracked, chipped, scored or badly scratched glassware.

30. Never handle broken glass with your bare hands. Clean up the broken glass and dispose of it as directed by teacher.

31. Always lubricate glassware (tubing, thermometers, etc.) with water or glycerin before attempting to insert it into a stopper. Never apply force when inserting or removing glassware form a stopper. Use a twisting motion.

32. Do not place hot glassware directly on the lab table. Always use an insulating pad of some sort.

33. Allow plenty of time for hot glass to cool before touching it. Remember that hot glass shows no visible signs of its temperature, and it can cause painful burns.

Handling Living Organisms

34. Treat all microorganisms as if they were harmful. Use antiseptic procedures, as directed by your teacher, when working with microbes. Dispose of microbes as your teacher directs.

35. Treat living organisms carefully. Do not cause pain, discomfort or injury to an organism. Follow your teacher's directions when handling animals. Wash your hands thoroughly after handling animals or their cages.

36. Wear gloves when handling small mammals. Report bites or stings to your teacher at once.

Your signature on this contract indicates that you are aware of the safety rules for the biology laboratory.

Signature____ **Date**________________

Lab Gone Wrong!

Safety test

1. When working in the laboratory,
   a. Tie back loose clothing
   b. Do not wear open-toed shoes
   c. wear goggles
   d. all of the above

2. You may eat or drink in the lab
   a. after you have washed your hands
   b. only from lab equipment
   c. when there is no lab activity in progress
   d. none of the above

3. Treat all microorganisms as if they were
   a. living
   b. harmful
   c. harmless
   d. antiseptic

4. You should stir solutions with
   a. a pencil or a pen
   b. a thermometer
   c. a glass stirring rod
   d. all of the above

5. Your notebook accidentally catches fire during an experiment. You should
   a. douse it with the nearest beaker that contains a liquid
   b. notify your teacher at once
   c. locate a fire extinguisher
   d. b and c

6. Your hand is accidentally splashed with a few drops of dilute hydrochloric acid. You should
   a. notify your teacher at once
   b. pat your hand dry with a paper towel
   c. flush your hand with running water from a faucet
   d. run out of the lab and into the bathroom

7. At your work area, you find a bottle of chemicals from which the label has been removed. You should
   a. look inside in order to identify the chemical
   b. sniff the chemical in order to identify it
   c. dispose of the bottle in the trash
   d. give the bottle to your teacher

8. The lab procedure calls for the use of a single edged razor, but your kit contains only a double edged razor and a scalpel. You should
   a. Use the double edged razor
   b. Cover one edge of the double edged razor with tape and then use it
   c. Ask your teacher for a single edged razor

9. Your lab procedure instructs you to pour six different solutions into separate beakers for use in a chemical test. You should
   a. Pour all of the solutions into beakers and then label the beakers
   b. Label all beakers first and then pour the correct solution into each
   c. Not worry about labeling the beakers because you will remember which beaker contains each solution

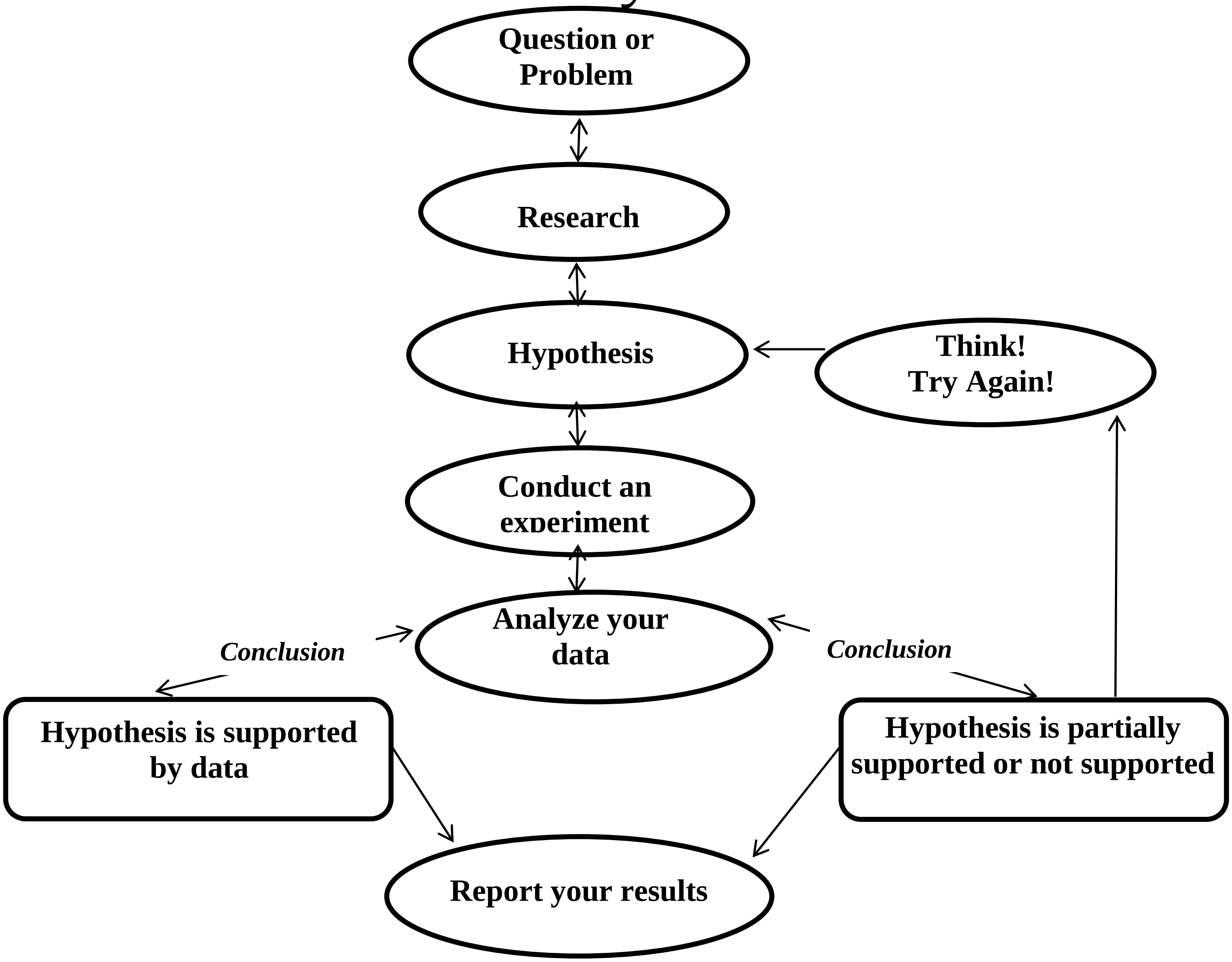
10. When mixing an acid with water, pour
   a. the substance with the smallest volume into the substance with the largest volume
   b. the acid into the water
   c. the water into the acid
   d. any of the above, as long as you are careful not to spill the materials

Lab Gone Wrong!

Use the Lab Gone Wrong Picture and answer the following questions:

11. Which student is following proper lab safety rules?
    a. Duke
    b. Luke
    c. Betty
    d. Bob
12. Which student is not following proper electrical safety?
    a. Tim
    b. John
    c. May
    d. Jim
13. Which student is following proper fire safety?
    a. Carl
    b. Tina
    c. Ben
    d. Sue
14. Which student is not following proper fire safety?
    a. Carl
    b. Tina
    c. Ben
    d. Sue
15. Which student is not properly dressed for lab?
    a. John
    b. Betty
    c. May
    d. Carl
16. Which student is violating rule number 16?
    a. Bob
    b. Joe
    c. Tim
    d. Sue
17. Which student is violating rule number 8?
    a. John
    b. Duke
    c. Tina
    d. Luke
18. Which student is violating rule number 27?
    a. Betty
    b. Carl
    c. Jim
    d. Joe
19. Which student is in danger of cutting (himself/herself) on glass?
    a. Bob
    b. Betty
    c. Ben
    d. Jim
20. What piece of safety equipment is missing from the picture?
    a. Fire blanket
    b. Safety shower
    c. First aid kit
    d. Fire extinguisher

The Scientific Method



Often we think of science as something that only happens in laboratories where people where white lab coats and safety glasses. In reality, scientific processes are performed every day, by everyone. It's the process you go through when you try to solve a problem, such as "Why isn't my car starting?" The steps you might take to answer this question are similar to the steps scientists might take to answer their questions. Most scientists agree to a common language of problem solving called "The Scientific Method," which is often described as a step-by-step methodology for solving problems. To be fair, there are many different ways to practice science, and not all of them use this procedure. For example, Jane Goodall did not use these exact steps to study chimpanzees in Gombe, but she incorporated many of the practices to help her understand chimpanzee behavior.

The following steps outline the general methodology for science process, but it is important to understand that not all research follows this orderly list. There are many different ways to do science!

Step 1: Make an Observation - Most science starts with an observation or identifying that a problem exists. For example, your first observation might be that your car doesn't start, and that is a problem.

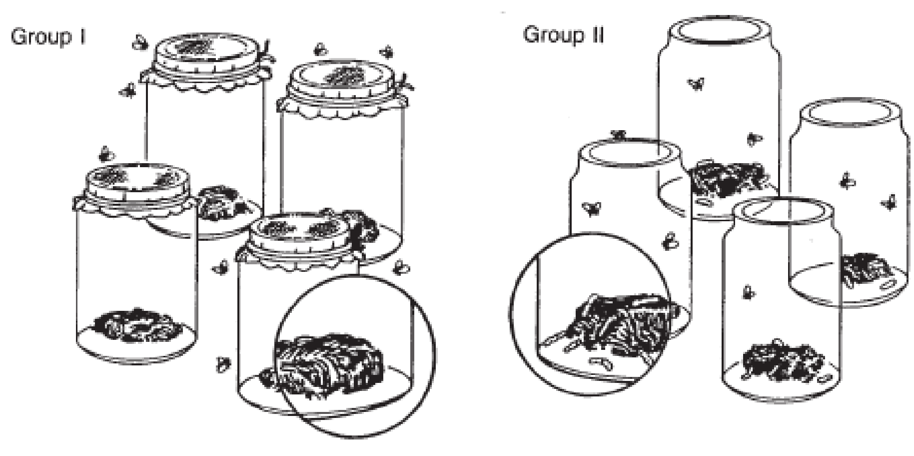
Step 2: Ask a Question - Often these questions are causal as they try to get to the reason or explanation for why something happened or what caused it to happen. Obviously, in our example, the question is: "Why is my car not starting?"

Step 3: Generate a Hypothesis (or hypotheses) - A hypothesis is a possible explanation for a phenomenon. It attempts to explain an observation. When doing science, it is acceptable to generate many possible explanations for the observation or problem.

Step 4: Design a Test
One kind of test, called a controlled experiment is used to test a hypothesis. In its simplest form, a controlled experiment involves two groups treated identically except for the factor identified in the hypothesis. This factor is called the experimental or independent variable. The experimental group is exposed to the experimental variable and the control group is not.
Before you carry out your experiment, you should also identify the dependent variable. This is the factor that you will measure as part of the test to confirm or reject your hypothesis.
You will also need to decide how many times you will repeat your test to improve reliability and how you will eliminate any other causes for your results.
Step 5: Making Predictions - Predictions state what you think will happen and are usually framed in "If - Then" statements. For example, if my hypothesis is true, then this should happen.
Step 6: Analyze Results - In this step, you perform your test and collect data from the results. This data is usually presented in tables and summarized as graphs. Graphs generally depict averages and don't show repeated results or every single data point.
Step 7: Draw Conclusions - To make a conclusion, you must look at the results of the test and decide whether your hypothesis was supported or rejected. Avoid using the word "prove" in your conclusions. All scientific knowledge is based on tentative or provisional knowledge, nothing is final. Claims made by science are considered to be better or more accepted than others based on the evidence. No knowledge or theory (which embodies scientific knowledge) is final.

Introduction to the Scientific Method Questions

Read the following information and analyze the diagrams to best answer the questions below.
Long ago, many people believed that living things could come from nonliving things. They thought that worms came from wood and that maggots came from decaying meat. This idea was called spontaneous generation. In 1668, an Italian biologist, Francesco Redi, did experiments to prove that maggots did not come from meat. One of his experiments is shown below.



Group I Group II

Redi placed pieces of meat in several jars. He divided the jars into two groups. He covered the first group of jars with fine cloth. He left the second group of jars uncovered. Redi observed the jars for several days. He saw flies on the cloth of the covered jars, and he saw flies laying eggs on the meat in the uncovered jars. Maggots appeared only on the meat in the group of jars left uncovered.

Questions:

____21. Which is not a step in the scientific method?
- a. Problem or question.
- b. Research.
- c. Ask other people for their opinion.
- d. Arrive at a conclusion.

____22**.** What was the problem in Redi's experiment?
- a. How do maggots appear in meats?
- b. How do worms appear in wood?
- c. Is spontaneous generation a valid explanation for maggots in meats?
- d. All of the above are examples of problems.

____23. What do you think his hypothesis was?
- a. Maggots grow through spontaneous generation.
- b. Maggots come from eggs laid by flies.
- c. Maggots find their way into woods and meats.
- d. The problem cannot be solved.

____24. How did he test his hypothesis?
- a. He placed food in two jars, covering one jar and leaving the other uncovered.
- b. He placed food in two jars and left both jars uncovered.
- c. He placed food in two jars and covered both jars.
- d. He put food in one jar and no food in a second jar.

____25. What was the variable in his experiment?
- a. Covering both jars.
- b. Covering one jar and leaving the other uncovered.
- c. Leaving both jars uncovered.
- d. There was no variable in this experiment.

____26. What do you think Redi's conclusion was?
- a. Living things come from other living things.
- b. Living things are created through spontaneous generation.
- c. He did not have enough data to arrive at a conclusion.

Can You Spot the Scientific Method?

Each sentence below describes a step of the scientific method. Match each sentence with a step of the scientific method listed below.

____ 27. Stephen predicted that seeds would start to grow faster if an electric current traveled through the soil in which they were planted.

____ 28. Susan said, "If I fertilize my geranium plants, they will blossom."

____ 29. Jonathan's data showed that household cockroaches moved away from raw cucumber slices.

____ 30. Rene grew bacteria from the mouth on special plates in the laboratory. She placed drops of different mouthwashes on bacteria on each plate.

____ 31. Kathy used a survey to determine how many of her classmates were left-handed and how many were right-handed.

____ 32. Jose saw bats catching insects after dark. He asked, "How do bats find the insects in the dark?"

____33. Justin wondered if dyes could be taken out of plant leaves, flowers, and stems.

____ 34. Alice soaked six different kinds of seeds in water for 24 hours. Then she planted the seeds in soil at a depth of I cm. She used the same amount of water, light, and heat for each kind of seed.

____35. Bob read about growing plants in water. He wanted to know how plants could grow without soil.

A. Recognize a problem

B. Form a hypothesis

C. Test the hypothesis with an experiment

D. Draw conclusions

A. Recognize a problem

B. Form a hypothesis

C. Test the hypothesis with an experiment

D. Draw conclusions

____ 36. Kevin said, “If I grow five seedlings in red light, I think the plants will grow faster than the five plants grown in white light.”

____ 37. Angela’s experiment proved that earthworms move away from light.

____ 38. Scott said, “If acid rain affects plants in a particular lake, it might affect small animals, such as crayfish, that live in the same water.”

____ 39. Michael fed different diets to three groups of guinea pigs. His experiment showed that guinea pigs need vitamin C and protein in their diets.

____ 40. Kim’s experiment showed that chicken eggshells were stronger when she gave the hen feed, to which extra calcium had been added.

Qualitative Observations vs. Quantitative Observations

Many of the observations made during a day are qualitative; that is, you observed a quality about an object (it smelled good, it was green, etc.). Another type of observation is quantitative, meaning that it can be described or measured in concrete numerical terms. The following observations are quantitative: There are 30 students in my class. I weigh 98 pounds. I ate a pound of potatoes.

Determine which of the following statements are quantitative and which are qualitative.

_____41. The cup had a mass of 454 grams.

_____42. The temperature outside is 250^{o} C.

_____43. It is warm outside.

_____44. The tree is 30 feet tall.

_____45. The building has 25 stories.

_____46. The building is taller than the tree.

_____47. The sidewalk is long.

_____48. The sidewalk is 100 meters long.

_____49. The race was over quickly.

_____50. The race was over in 10 minutes.

A. Qualitative

B. Quantitative

Scientific Method - Controls and Variables

Definition of Key Terms

- ***Control*** - A part of the experiment that is not being tested and is used for comparison.
- ***Variable*** - Any part of an experiment that can change.
- ***Independent Variable*** - The part of the experiment that is changed by the scientists or person performing the experiment.
- ***Dependent Variable*** - The part of the experiment that is affected by the independent variable.

SpongeBob and his Bikini Bottom pals have been busy doing a little research. Read the description for each experiment and answer the questions.

Krusty Krabs Breath Mints

Mr. Krabs created a secret ingredient for a breath mint that he thinks will "cure" the bad breath people get from eating crabby patties at the Krusty Krab. He asked 100 customers with a history of bad breath to try his new breath mint. He had fifty customers (Group A) eat a breath mint after they finished eating a crabby patty. The other fifty (Group B) also received a breath mint after they finished the sandwich; however, it was just a regular breath mint and did not have the secret ingredient. Both groups were told that they were getting the breath mint that would cure their bad breath. Two hours after eating the crabby patties, thirty customers in Group A and ten customers in Group B reported having better breath than they normally had after eating crabby patties.

____51. Which people are in the control group?

a. Group A b. Group B

____52. What is the variable?

a. The actual breath mint. c. The secret ingredient in the breath mint.
b. The crabby patties. d. How many crabby patties eaten.

____53. What should Mr. Krabs' conclusion be?

a. The breath mint with the secret ingredient does reduce breath odor.
b. The breath mint with the secret ingredient reduces breath odor over 50% of the time.
c. The breath works, but it is not 100% effective.
d. All of the above.

SpongeBob Clean Pants

SpongeBob noticed that his favorite pants were not as clean as they used to be. His friend Sandy told him that he should try using Clean-O detergent, a new laundry soap she found at Sail-Mart. SpongeBob made sure to wash one pair of pants in plain water and another pair in water with the Clean-O detergent. After washing both pairs of pants a total of three times, the pants washed in the Clean-O detergent did not appear to be any cleaner than the pants washed in plain water.

____54. What was the problem SpongeBob wanted to investigate?

a. Is Clean-O detergent effective?
b. Is the length of time the pants are washed important?
c. How does water temperature affect cleaning pants?
d. Does how often I wash my pants affect how clean they are?

____55. What is the variable?

a. Water temperature. c. Laundry soap
b. Length of wash time. d. Size of washing tub.

____56. What should Sponge Bob's conclusion be?

a. Clean-O best cleans his pants.
b. Plain water best cleans his pants.
c. Cold water best cleans his pants.
d. Clean-O is not effective cleaning his pants.

Squidward's Symphony

Squidward loves playing his clarinet and believes it attracts more jellyfish than any other instrument he has played. In order to test his hypothesis, Squidward played a song on his clarinet for a total of 5 minutes and counted the number of jellyfish he saw in his front yard. He played the song a total of three times on his clarinet and repeated the experiment using a flute and a guitar. He also recorded the number of jellyfish he observed when he was not playing an instrument. The results are shown in the chart.

Number of Jellyfish/Instrument				
Trial	***No Music***	***Clarinet***	***Flute***	***Guitar***
1	5	15	5	12
2	3	10	8	18
3	2	12	9	7

____57. What is the variable?

a. Number of jellyfish.
b. Instrument.
c. Length the music was played.
d. The song he played.

____58. What should Squidward's conclusion be?

a. The clarinet and guitar attracted the same number of jellyfish.
b. The flute attracted more fish than the control (no music).
c. Music attracts more jellyfish than does no music.
d. All of the above.

Super Bubbles

Patrick and SpongeBob love to blow bubbles! Patrick found some Super Bubble Soap at Sail-Mart. The ads claim that Super Bubble Soap will produce bubbles that are twice as big as bubbles made with regular bubble soap. Patrick and SpongeBob made up two samples of bubble solution. One sample was made with 5 oz. of Super Bubble Soap and 5 oz. of water, while the other was made with the same amount of water and 5 oz. of regular bubble soap. Patrick and SpongeBob used their favorite bubble wands to blow 10 different bubbles and did their best to measure the diameter of each one. The results are shown in the chart

***Bubbles* (Diameter in centimeters)**		
Bubble	***Super Bubble***	***Regular Soap***
1	15	10
2	10	5
3	12	16
4	18	14
5	22	11
6	13	12
7	16	11
8	18	15
9	15	15
10	12	6

____59. What did the Super Bubble ads claim?
a. Super Bubble produces bubbles twice as large as regular bubble soap.
b. Super Bubble makes twice as many bubbles as regular bubble soap.
c. Super Bubble bubbles last twice as long as bubbles made using regular bubble soap.
d. Super Bubble is cheaper than regular bubble soap.

____60. What is the variable?
a. Bubble size.
b. Number of bubbles made.
c. Length of time bubbles last.
d. Type of bubble solution.

____61. What should their conclusion be?
a. Super Bubble solution did not produce bubbles twice as large as those made with regular bubble soap.
b. Regular bubble soap lasts twice as long as Super Bubble.
c. Bubbles made with Super Bubble last twice as long as bubbles made with regular bubble soap.
d. There was no difference between Super Bubble and regular bubble soap.

Slimotosis

Sponge Bob notices that his pal Gary is suffering from slimotosis, which occurs when the shell develops a nasty slime and gives off a horrible odor. His friend Patrick tells him that rubbing seaweed on the shell is the perfect cure, while Sandy says that drinking Dr. Kelp will be a better cure. Sponge Bob decides to test this cure by rubbing Gary with seaweed for 1 week and having him drink Dr. Kelp. After a week of treatment, the slime is gone and Gary's shell smells better.

____62. What was the initial observation?
a. Gary's shell is dull in color and hard to see.
b. Gary's shell is glowing in the dark.
c. Gary's shell has a nasty slime and gives off a horrible odor.
d. Gary's shell is developing holes in it.

____63. What is the variable?
a. Rubbing seaweed on the shell.
b. Drinking Dr. Kelp.
c. Both a and b.

____64. What should Sponge Bob's conclusion be?
a. Rubbing seaweed cured the slimotosis.
b. Drinking Dr. Kelp cured the slimotosis.
c. Both rubbing seaweed and drinking Dr. Kelp cured the slimotosis.
d. We cannot determine which cured the slimotosis. The experiment must be re-done, testing one variable at a time.

The Elements

Since we will be studying some molecular biology (similar to biochemistry), we need to know something about basic chemicals.

1. The smallest living thing is the cell but the smallest piece of matter is the atom.

2. Currently, there are 118 different types of atoms. Thus there are 118 different elements. Each element has its own name and symbol. Symbols are in basic print with the first letter alone capitalized. Lower case is used for the remainder of the symbols and that lower case should be no more than half the size of the capital.

3. The elements are organized on a periodic table composed of 18 columns going across. The columns form chemical groups or families. The roman numeral and A or B at the top of the column is the group's name and can indicate how many electrons (e^-) atoms from that group will give/take or share.

   Thus:

   IA (alkali metals) give 1 e^-
   IIA (alkaline metals) give 2 e^-
   B (transitional metals) usually give 2 e^-
   IIIA give 3 e^-
   IVA share 4 e^-
   VA (nitrogen group) take 3 e^-
   VIA (chalcogen nonmetals) take 2 e^-
   VIIA (halogen nonmetals) take 1 e^-
   VIIIA (noble gases) do nothing. (they are inert)

WebElements: the periodic table on the world-wide web

http://www.webelements.com/

I A 1	II A 2	III B 3	IV B 4	V B 5	VI B 6	VII B 7	VIII B 8	VIII B 9	VIII B 10	I B 11	II B 12	III A 13	IV A 14	V A 15	VI A 16	VII A 17	VIII A 18
hydrogen 1 H 1.00794(7)																	helium 2 He 4.002602(2)
lithium 3 Li 6.941(2)	beryllium 4 Be 9.012182(3)											boron 5 B 10.811(7)	carbon 6 C 12.0107(8)	nitrogen 7 N 14.0067(7)	oxygen 8 O 15.9994(3)	fluorine 9 F 18.9984032(5)	neon 10 Ne 20.1797(6)
sodium 11 Na 22.989770(2)	magnesium 12 Mg 24.3050(6)											aluminium 13 Al 26.981538(2)	silicon 14 Si 28.0855(3)	phosphorus 15 P 30.973761(2)	sulfur 16 S 32.065(5)	chlorine 17 Cl 35.453(2)	argon 18 Ar 39.948(1)
potassium 19 K 39.0983(1)	calcium 20 Ca 40.078(4)	scandium 21 Sc 44.955910(8)	titanium 22 Ti 47.867(1)	vanadium 23 V 50.9415(1)	chromium 24 Cr 51.9961(6)	manganese 25 Mn 54.938049(9)	iron 26 Fe 55.845(2)	cobalt 27 Co 58.933200(9)	nickel 28 Ni 58.6934(4)	copper 29 Cu 63.546(3)	zinc 30 Zn 65.38(2)	gallium 31 Ga 69.723(1)	germanium 32 Ge 72.64(1)	arsenic 33 As 74.92160(2)	selenium 34 Se 78.96(3)	bromine 35 Br 79.904(1)	krypton 36 Kr 83.798(2)
rubidium 37 Rb 85.4678(3)	strontium 38 Sr 87.62(1)	yttrium 39 Y 88.90585(2)	zirconium 40 Zr 91.224(2)	niobium 41 Nb 92.90638(2)	molybdenum 42 Mo 95.96(2)	technetium 43 Tc [98]	ruthenium 44 Ru 101.07(2)	rhodium 45 Rh 102.90550(2)	palladium 46 Pd 106.42(1)	silver 47 Ag 107.8682(2)	cadmium 48 Cd 112.411(8)	indium 49 In 114.818(3)	tin 50 Sn 118.710(7)	antimony 51 Sb 121.760(1)	tellurium 52 Te 127.60(3)	iodine 53 I 126.90447(3)	xenon 54 Xe 131.293(6)
caesium 55 Cs 132.90545(2)	barium 56 Ba 137.327(7)	lutetium 71 Lu 174.9668(1)	hafnium 72 Hf 178.49(2)	tantalum 73 Ta 180.9479(1)	tungsten 74 W 183.84(1)	rhenium 75 Re 186.207(1)	osmium 76 Os 190.23(3)	iridium 77 Ir 192.217(3)	platinum 78 Pt 195.078(2)	gold 79 Au 196.96655(2)	mercury 80 Hg 200.59(2)	thallium 81 Tl 204.3833(2)	lead 82 Pb 207.2(1)	bismuth 83 Bi 208.98038(2)	polonium 84 Po [209]	astatine 85 At [210]	radon 86 Rn [222]
francium 87 Fr [223]	radium 88 Ra [226]	lawrencium 103 Lr [262]	rutherfordium 104 Rf [267]	dubnium 105 Db [268]	seaborgium 106 Sg [271]	bohrium 107 Bh [272]	hassium 108 Hs [270]	meitnerium 109 Mt [276]	darmstadtium 110 Ds [281]	roentgenium 111 Rg [280]	ununbium 112 Uub [285]	ununtrium 113 Uut [284]	ununquadium 114 Uuq [289]	ununpentium 115 Uup [288]	ununhexium 116 Uuh [293]	ununseptium 117 —	ununoctium 118 Uuo [294]

Key: element name / atomic number / symbol / 2003 atomic weight (mean relative mass)

Lanthanoids	lanthanum 57 La 138.9055(2)	cerium 58 Ce 140.116(1)	praseodymium 59 Pr 140.90765(2)	neodymium 60 Nd 144.24(3)	promethium 61 Pm [145]	samarium 62 Sm 150.36(3)	europium 63 Eu 151.964(1)	gadolinium 64 Gd 157.25(3)	terbium 65 Tb 158.92534(2)	dysprosium 66 Dy 162.500(1)	holmium 67 Ho 164.93032(2)	erbium 68 Er 167.259(3)	thulium 69 Tm 168.93421(2)	ytterbium 70 Yb 173.054(5)
Actinoids	actinium 89 Ac [227]	thorium 90 Th 232.0381(1)	protactinium 91 Pa 231.03588(2)	uranium 92 U 238.02891(3)	neptunium 93 Np [237]	plutonium 94 Pu [244]	americium 95 Am [243]	curium 96 Cm [247]	berkelium 97 Bk [247]	californium 98 Cf [251]	einsteinium 99 Es [252]	fermium 100 Fm [257]	mendelevium 101 Md [258]	nobelium 102 No [259]

[illegible] symbols, names, and spellings are recommended by IUPAC ([illegible]). Names are not yet proposed for the elements beyond 111 - those used here are IUPAC's temporary systematic names (Pure & Appl. Chem., 1979, 51, 381–384). In the USA and some other countries, the spellings aluminum and cesium are normal while in the UK and elsewhere the usual spelling is sulphur.

[illegible] Apart from the heaviest elements, these are IUPAC 2007 values (Pure & Appl. Chem., 2007, in press). Elements with values given in brackets have no stable nuclides and are represented by integer values for the longest lived isotope known at the time writing. The elements thorium, protactinium, and uranium have characteristic terrestrial abundances and these are the values quoted. The last significant figure of each value is considered reliable to ±1 except where a larger uncertainty is given in parentheses.

[illegible] for a justification of the positions of the elements La, Ac, Lu, and Lr in the WebElements periodic table see W.B. Jensen, "The positions of lanthanum (actinium) and lutetium (lawrencium) in the periodic table", J. Chem. Ed., 1982, 59, 634–636.

[illegible] the numeric system (1–18) used here is the current IUPAC convention. For a discussion of this and other common systems see: W.C. Fernelius and W.H. Powell, "Confusion in the periodic table of the elements", J. Chem. Ed., 1982, 59, 504–508.

Use the periodic table to help you answer the following questions. If you have difficulty reading the table the website from which it was obtained is at the top of the periodic table page.

Matching: match the name to the elements symbol

a. cobalt	ab. oxygen	bd. helium
b. phosphorus	ac. nitrogen	be. silicon
c. carbon	ad. hydrogen	cd. manganese
d. potassium	ae. magnesium	ce. sulfur
e. cadmium	bc. neon	de. calcium

65. C =_______
66. H =_______
67. O =_______
68. N =_______
69. S =_______
70. Mg =_______
71. Mn =_______
72. Ca =_______
73. Cd =_______
74. P =_______

Multiple Choice:

75. Which of the following is the symbol for chlorine
    a. C b. Cl c. Co d. K
76. Which of the following is the symbol for sodium
    a. S b. Si c. Ne d. Na
77. Which of the following is the symbol for iron
    a. I b. Ir c. Sn d. Fe
78. Which of the following is the symbol for potassium
    a. P b. Po c. K d. Pt
79. Which of the following is the symbol for lead
    a. Li b. Pb c. Sn d. Hg
80. Which of the following is the symbol for mercury
    b. Li b. Pb c. Sn d. Hg

Name____________________________________

Deer Population Graphing Activity: Predation or Starvation

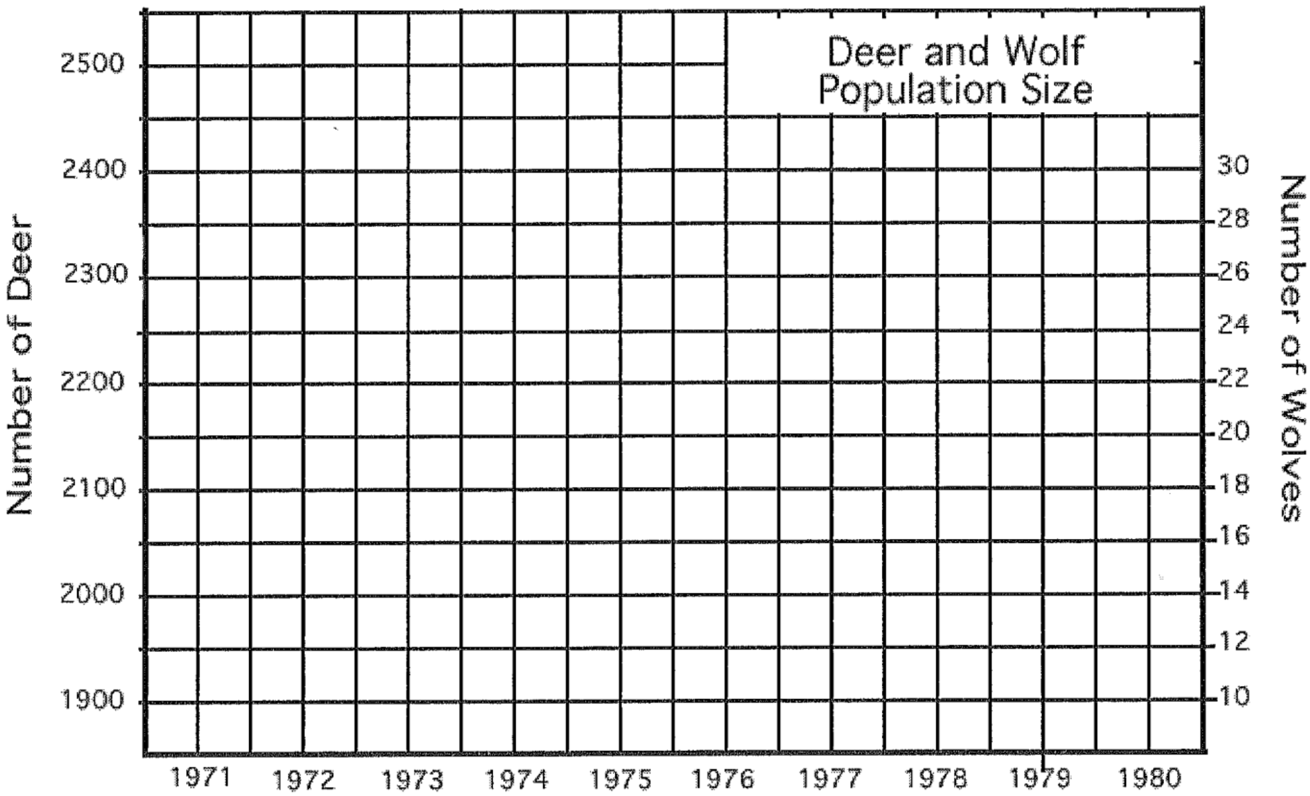
(activity from- http://www.biologycorner.com/worksheets/deer_predation.html)

Introduction: In 1970 the deer population of an island forest reserve about 518 square kilometers in size was about 2000 animals. Although the island had excellent vegetation for feeding, the food supply obviously had limits. Thus the forest management personnel feared that overgrazing might lead to mass starvation. Since the area was too remote for hunters, the wildlife service decided to bring in natural predators to control the deer population. It was hoped that natural predation would keep the deer population from becoming too large and also increase the deer quality (or health), as predators often eliminate the weaker members of the herd. In 1971, ten wolves were flown into the island.

The results of this program are shown in the following table. The Population Change is the number of deer born minus the number of deer that died during that year. Fill out the last column for each year (the first has been calculated for you).

Year	Wolf Population	Deer Population	Deer Offspring	Predation	Starvation	Deer Population Change
1971	10	2,000	800	400	100	+300
1972	12	2,300	920	480	240	
1973	16	2,500	1,000	640	500	
1974	22	2,360	944	880	180	
1975	28	2,244	996	1,120	26	
1976	24	2,094	836	960	2	
1977	21	1,968	788	840	0	
1978	18	1,916	766	720	0	
1979	19	1,962	780	760	0	
1980	19	1,982	790	760	0	

1. Graph the deer and wolf populations on the graph below. Use one color to show deer populations and another color to show wolf populations.



Analysis

1. What caused the decrease in the deer population between 1973 and 1974? Defend your position.

2. What do you think would have happened to the deer on the island had wolves NOT been introduced? Why?

3. What unintended harm could introducing the wolves have on the entire island? Is it worth the risk? Why? Defend your position.