Name_____ Class_____ Date_____

Introduction to biology review questions
Process of science

1. Compare and contrast: Observation & Inference

2. Compare and contrast: Hypothesis, Test, Prediction

3. Describe your understanding of the process of science (nature of science), how does science go about answering questions. *(Hint: think about the 3 hole bottle lab)(Do we ever prove our hypothesis?)*

4. Compare and contrast: Scientific theory, hypothesis, scientific law

5. Give an example of pure science vs. applied science.

Matching: Science is & science is not

REPEATABLE	BASED ON PROOF
SEARCH FOR TRUTH	MEASURABLE
A SEARCH FOR UNDERSTANDING:	BASED ON EXPERIMENTATION
OPEN TO CHANGE	ABLE TO SOLVE ALL PROBLEMS:
BUILD UPON TESTABLE PREDICTIONS	DISPROVABLE
CERTAIN	FAIR
BASED ON AUTHORITY	A COLLECTION OF FACTS
MADE STRONGER BY DIFFERENT LINES OF EVIDENCE	LIMITED TO THE NATURAL WORLD
DEMOCRATIC	BASED ON BELIEF

Experimental design:

After studying about recycling, members of Allison's biology class investigated the effects of various recycled products on plant growth. Allison's lab group compared the effects of different aged grass compost on bean plants. Because decomposition is necessary for release of nutrients, the group thought that older grass compost would produce taller bean plants. Three flats of bean plants (25 plants/flat) were grown for 5 days. The plants were then fertilized as follows:

1. Flat A: 450g of 2 month old compost
2. Flat B: 450g of 6 month old compost
3. Flat C: 0g compost

The plants received the same amount of sunlight and water each day. At the end of the 30 days the group recorded the height of the plants (cm).

Pro./Ques	
Hypothesis	
Prediction	
I.V.	
I.V. & Levels	
D.V.	
# of trials	
2 constants	
Control	
Type of data	
2 improve.	

Describe the importance of each parts of an experiment

Compare the following:

Inductive reasoning	Deductive Reasoning

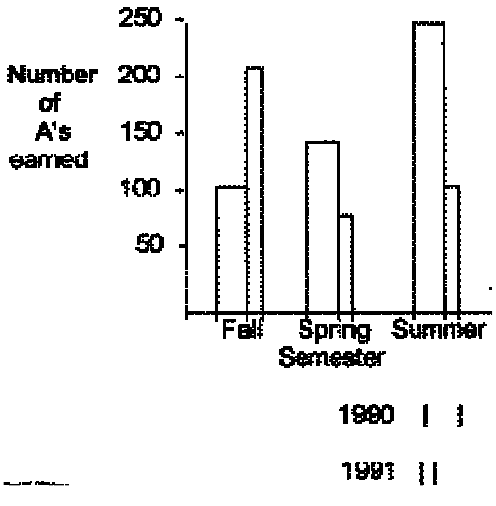
Which one of the following statements is most clearly inductively derived?

A. If any animals observed require organic molecules as nutrients, then it can be concluded that all animals require organic molecules as nutrients.
B. If all flying animals are birds, then bats are birds.
C. Because worms lack bones, they are classified as invertebrates.
D. A paramecium moves by means of the rhythmic motion of its cilia.
E. An elephant is warm-blooded because it is a mammal.

A company was testing a new drug they thought would help decrease the risk of transmitting viruses from mother to fetus. In an experiment to test the compound, a worker gave 400 pregnant female rats a small dose of the experimental drug and inoculated each with a type of virus known to cause disease in rats. 400 additional pregnant rats were given only the virus. 203 of the rat pups born to the females that received both the virus and the drug showed no symptoms of the disease; 207 rat pups born to virus-only females showed symptoms. From this test, we can best conclude _____.

A. that the drug is 2% effective and testing on humans should begin
B. that the drug seems to have little effect on viral transmission at the dosage given
C. nothing, because no independent variable could be identified
D. nothing, because no control group was used in the test of the drug
E. the drug enhances disease progression

This graph represents the number of A's earned in a particular college algebra class. Answer the following questions:



a. How many A's were earned during the fall and spring of 1990?
b. How many more A's were earned in the fall of 1991 than in the spring of 1991?
c. In which year were the most A's earned?
d. In which semester were the most A's earned?
e. In which semester and year were the fewest A's earned?

Interpreting data – graph the following

A student notices that plants in the desert that are able to grow quickly tend to have a better chance of surviving. After doing some research the student finds out that fertilizers can help a plant grow. Of the different brands the student wonders which of the brands will cause a plant to grow the fastest.

The Experiment:

- Use 4 identical plants.
- Each get the same soil type and sunlight conditions.
- Give water to each plant equally on Fridays.
- Plant 1 will just get water.
- Plant 2 will get water with fertilizer A added (Scotts).
- Plant 3 will get water with fertilizer B added (Miracle Grow).
- Plant 4 will get water with fertilizer C added (Pennington).
- Measure the height of each plant (in centimeters) on Mondays.
- Run the experiment for 9 weeks.
- Graph the data collected to determine which one of the fertilizer brands causes the plants to grow the fastest.

The Data

Week	Plant # 1 - cm	Plant # 2 - cm	Plant # 3 - cm	Plant # 4 - cm
1	12	12	12.5	13
2	12.5	13	13	15
3	13	14	14	17
4	13.5	15.5	15	18
5	14	16.5	16	18.5
6	14.5	17	17	19
7	15	18	18.5	19.5
8	15.5	19	19.5	20
9	16	19.5	20.5	21

1. Name the independent variable and the dependent variable
2. Describe the control
3. From the data which of the fertilizers caused the fastest growth during the tested time period. Explain your answer.