

# Chapter 1 Study Sheet

## Characteristics and material of Life

Be able to do the following:

1. List the characteristics of life. **Made of cells, reproduce, respond to environment, based on common genetic code, Homeostasis, Metabolism, Grow and Develop**
2. What is the smallest unit of life? **Cell**
3. Who needs to reproduce? **The species, no individuals**
4. What material carries our genetic code? **DNA**
5. Why do organisms need to grow? **Because they cannot be born full size yet must be full size to reproduce themselves.** How organisms grow? **By dividing cells and adding more cells.**
6. What is a stimulus vs a response? **A stimulus is any event, thing or action that causes an organism to react. A response is the reaction to the stimulus.**
7. What is the main reason living things respond to the environment? **1. Avoid Danger 2. Locate food, mates, shelter, (needs)**
8. What is homeostasis? Name something other than your temperature that your body keeps within normal limits all the time. **An organisms adjustments that keep conditions inside their body within some "normal" range even when the environment causes it to change. Blood Sugar Level, almost any "normal" measurement that a doctor gets from a blood test)**

9. What causes living things to evolve? **Things evolve when their environment changes.**

Over what length of time do living things evolve? **Over many generations.** Who cannot evolve? **Individuals within their lifetime.**

## Scientific method study questions

1. Independent Variable vs. Dependant Variable

**IV = Thing you alter in an experiment (If I...) DV = result you expect because of what you do (Than it will ...)**

2. Explain why a hypothesis is more than just a wild guess. **It is based on prior knowledge that helps make it more specific and more likely to be true.**

3. What is being controlled that makes an experiment "controlled"?  
**Every variable within your power needs to be controlled.**

4. What is the purpose of the control group? **To compare the experimental group to. So you can see what would normally happen.**

5. Why do you try an experiment more than one time? **One time might show you an unusual outcome. Many trials make it more likely that you are seeing typical results. (The more you try it, the more you trust it.)**

6. Understand the Placebo effect and how a Blind experiment helps solve this problem.  
**Placebo effect = your belief in what SHOULD be affecting what happens.**  
**Blind Experiment hides the truth about what the person is getting (real medicine or sugar pill) so their beliefs cannot alter results.**

7. Understand Direct measurement vs. Indirect measurement and an example of each.  
**Direct = measuring exactly what you are looking for in your dependent variable (expecting more growth, measure height directly. Height IS growth.)**  
**Indirect = measuring secondary signs of the dependent variable. (expecting something to cause an improvement in mood and measuring how many times they laugh. Laugh does not exactly = mood but it is related.)**

Read this paragraph, then answer the questions.

On July 20, 1976, the *Viking I* lander touched down on the dusty red surface of Mars. A few months later, the *Viking II* lander arrived on another Martian plain. The primary mission of these two robot spacecraft was to determine if there was life on Mars.

Conditions on Mars were thought to be far too harsh for large life forms. There is no liquid water on Mars and the atmosphere is very thin. During the course of a day, the temperature on Mars may range from 10°C to -80°C. The large changes in temperature produce strong winds and planetwide dust storms. Because of these conditions, scientists decided to look for microorganisms rather than large life forms.

The Viking spacecraft performed several experiments. In one experiment, samples of soil were taken from different locations. The soil samples were put into a nutrient broth that supported the growth of microorganisms on Earth. The amount of carbon dioxide in the broths was tested over a period of time.

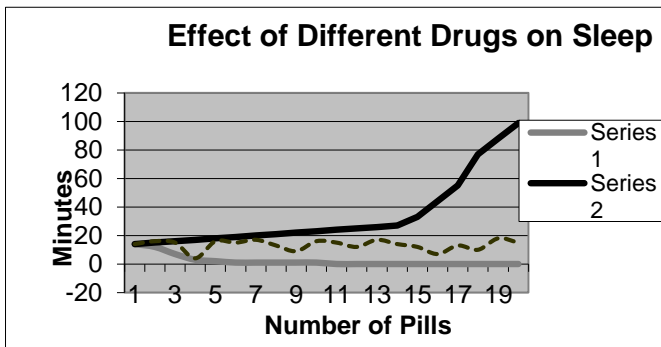
Scientists were excited to discover that Martian soil produced carbon dioxide in the nutrient broth. However, the amount of carbon dioxide produced in the Martian soil was much smaller than the amount that would be produced by living things on Earth. Thus, the results of the Viking spacecraft experiments are not conclusive. Scientists are still not sure if life exists on Mars.

- a. What problem were they trying to answer? **Is there life on Mars**
- b. Were they gathering data by direct or indirect measurement? **Indirect, they were measuring CO<sub>2</sub> as a sign that life was there. Didn't directly look for organisms with a microscope.**
- c. Why did they collect data from many locations? **Same answer as #5.**
- d. What was the data that they collected? **CO<sub>2</sub>**
- e. What was their conclusion? **Not Conclusive (a fancy way of saying "we can't tell from the data we have").**
- f. Why are they still not sure if there is life on mars? **Failure to find life doesn't prove it isn't there. Maybe it is somewhere they didn't look. Maybe life on mars doesn't make CO<sub>2</sub>. All they did prove is that nothing they measured in the places they explored had anything that we recognize as life.**

8. When you sit down to choose your conclusion, what is the only thing you can use to decide? **The Data. Nothing Else. If the data isn't enough to allow you to prove or disprove your hypothesis, then you can't make a decision at all.**

9. What are the three possible conclusions you can come to?

- a. **Confirmed / Supported**
- b. **Not Confirmed / Not Supported**
- c. **Inconclusive**



10. What does it mean if there is experimental error in an experiment?

**Something you didn't expect (Not the Independent Variable) altered the data and made the experiment invalid.**

11. Use the graph to answer

the following questions:

- a. The graph is measuring the number of minutes it took the patients to fall asleep after having been given increasing amounts of one of three different types of medicine.

12. What was the maximum number of pills that any of the three groups was given? **20**

13. Which of the three lines looks like it might be salt pills? -----

14. How many Series 2 pills did it take to keep the patients awake more than 1 hour? **15**

15. Which of the lines would prove the hypothesis: More than 10 pills will make a person unable to stay awake for more than 5 minutes? **Series 1 (Grey Line)**

**16.**

17. Which of the lines prove the hypothesis: The pills will show little effect unless taken in large doses? **Series 2 (Black Line)**

18. Which pill looks like it might be the control group? **The -----**

