**BIOLOGY**

**Measurement Topics 1, 2 & 3**

*What is Science? Science Process, Theories, Laws & Models*

**MiniSummative 1**

**Directions: Select the best answer to each of the following questions.**

1. Which of the following is **NOT** a testable statement?
	1. Salt in soil may affect plant growth.
	2. Plant growth may be affected by the color of the light.
	3. Bacterial growth may be affected by temperature.
	4. Of all flowers, roses smell the best.
2. A student uses a metric ruler to measure the length of a lizard. Which of these is the student using to gather data?
	1. Hypothesis
	2. Observation
	3. Independent (test) variable
	4. Conclusion
3. A student wanted to design an experiment to test the hypothesis, “Temperature affects the reproductive rate of bacteria.” What should the **independent (test)** variable be?
	1. The temperature of the environment
	2. The type of bacteria studied
	3. The culture medium of the bacteria
	4. The reproductive rate of the bacteria
4. A student carries out an investigation on a strain of bacteria that is used to decompose oil spills. She places equal numbers of the bacteria in three different salt solutions: 2.5%, 3.5%, and 4.5%. She keeps all the solutions in a lighted incubator at a constant temperature of 22oC. After three days, she removes the samples and counts the number of bacteria in each. **Which question is the student investigating?**
	1. Do oil-decomposing bacteria grow well in a warm, lighted environment?
	2. Are the bacteria being studied the best strain to use in clearing oil spills in ocean water?
	3. Do bacteria in a saltwater solution grow best at 22oC?
	4. Does salt concentration affect the growth of this strain of bacteria?
5. You are outside on a bright summer evening. You notice many yellow dandelion flowers growing in a lawn. That night, you notice that the dandelions have closed up so the flowers are no longer visible. When you go outside the next day, you observe that the yellow flowers are visible again. Which is a likely **inference** that would explain your observations?
	1. Dandelion flowers open in response to light.
	2. Dandelions die when the sun goes down.
	3. Dandelions live for only one day and are then replaced by new dandelions.
	4. Sunlight has no effect on the time of day when dandelions flower.
6. Which of the following is **NOT** a characteristic of a scientific theory?
	1. They are based on a wide range of observations
	2. They will never change
	3. They can change based on new evidence
	4. They are not easily accepted in science
7. Which is the main reason why scientific journals are typically the most reliable sources of science information?
	1. They are written by scientists.
	2. They are peer reviewed by other scientists.
	3. They are edited by the government.
	4. Authors are heavily fined if information is incorrect.
8. Sometimes studies are so large that they cannot be completed “in the field”. Which of the following is the best example of a **scientific model**?
	1. A group of zoo monkeys to represent behavior in a natural environment
	2. A computer simulation of Earth’s climate changes
	3. An X-ray showing multiple fractures on a bone
	4. A salt-water aquarium in the home of a fish enthusiast

**Use the diagram below to help you answer question #9:**

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1. Why might some steps of the scientific method/process be skipped during an investigation, or be performed in a different order?

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1. A student wants to test the hypothesis that plants need soil to grow. Identify the independent (test) and dependent (outcome) variables for this experiment, and two constants/variables the student should control during the experiment.
2. Independent Variable\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Dependent Variable\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Constant/Variable 1\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Constant/Variable 2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Use the diagram below to help you answer question #11. ANALYZE THE ENTIRE GRAPH CAREFULLY!**

 **Effect of Plant Growth in Two Soils**

**Plant Growth (cm)**

Soil 1 Soil 2 Soil 1 Soil 2

 **FERTILIZED UNFERTILIZED**

1. A scientist wants to know how a certain fertilizer affects the growth of tomato plants growing in two different soils. What **conclusion** can be drawn from the graph shown above?
	1. Soil 1 and Soil 2 are the same.
	2. The fertilizer has a greater overall effect in Soil 1.
	3. The fertilizer has a greater overall effect in Soil 2.
	4. Soil 2 absorbed more fertilizer than Soil 1.
2. Based on the graph above, what would the **control group** be?
	1. Fertilized soil
	2. Unfertilized soil
	3. Soil 1 as well as Soil 2
	4. Plant growth