**Scientific Method Assessment**

1. Scientific Method
2. Observation
3. Inference
4. Qualitative
5. Quantitative
6. Hypothesis
7. Experiment
8. Variable
9. Independent variable
10. Dependent variable
11. Procedure
12. Trials
13. Constants
14. Control group
15. Data
16. Data table
17. Graph
18. Conclusion

**Part A: Vocabulary**

*Match the above words to one of the statements below. (Write the letter of your answer next to the statement it matches.) NOT ALL WORDS ARE USED!*

1. \_\_\_\_m\_\_\_\_ Factors that are always the **same** in each trial of an experiment
2. \_\_\_h\_\_\_\_\_ A factor that **changes** in an experiment
3. \_\_\_\_i\_\_\_\_ A **variable** that **you change** in your experiment; usually follows ‘if’ in a hypothesis
4. \_\_\_j\_\_\_\_\_ A **variable** that **responds** to what is done in the experiment; usually follows ‘then’ in a

 hypothesis

1. \_\_\_\_r\_\_\_\_ This is the **end** of an investigation where you write your results for the lab and make inferences
 as to why something happened.
2. \_\_\_\_e\_\_\_\_ A type of **observation** that is measured in **numbers** (ex. The pencil is 8-cm long)
3. \_\_\_\_d\_\_\_\_ A type of **observation** that is expressed by the **five senses**; you can see, touch, hear, smell,
 or taste it (ex. The shirt is black)
4. \_\_\_\_o\_\_\_\_ This is the **recorded observations** from an experiment. It can be numbers or observations.
 We usually record it in a table during the lab.
5. \_\_\_\_q\_\_\_\_ A **visual display** of quantitative data (pie chart is an example)
6. \_\_\_\_k\_\_\_\_ The **step-by-step directions** of what to do during an experiment
7. \_\_\_c\_\_\_\_\_ An **opinion/guess** based on an observation that isn’t necessarily a fact
8. \_\_\_f\_\_\_\_\_ An “**If…then…” statement** that attempts to answer the question/problem; a testable inference
9. \_\_\_\_n\_\_\_\_ The **“normal” group**­­ used for comparison
10. \_\_\_\_b\_\_\_\_ **Gathering information** using your senses and/or measurements

**Part B: Multiple Choice**

*Circle the letter of the best choice*

1. A scientist testing the effects of a chemical on apple yield sprays an orchard with the chemical. A second orchard does not receive the chemical. In the fall, the number of apples harvested from each forest is counted. Which of the following is the independent (manipulated) variable in the experiment?
2. the first orchard
3. the second orchard
4. the chemical
5. the number of apples
6. In order for the apple tree experiment to be valid scientifically, both orchards must: receive the same amount of sunlight, receive the same amount of water have the same species of apple tree, etc. These factors that are kept the same are called \_\_\_\_\_\_\_\_\_\_.
	1. observations
	2. constants
	3. controls
	4. variables
7. How many variables should you change in an experiment?
 a. one
 b. two
 c. three
 d. four
8. When doing an experiment, Doug thought, “If I add mentos to diet and regular Coke, then the diet Coke will react more.” This is the part of the scientific method called the \_\_\_\_\_\_\_\_\_.

 a. conclusion

 b. purpose

 c. hypothesis

 d. observation

1. \_\_\_\_\_ data is usually based on observations using the 5 senses.
2. Descriptive
3. Quantitative
4. Qualitative
5. Scientific
6. An experimenter can make sure an experiment is repeatable by having more
7. Hypotheses
8. Variables
9. Observations
10. Trials

**Part C: Making Observations**

1. **** *Look at the picture and write two observations and one inference about it.*

 **Observations: Answers May Vary (2)**

**Inference: Answers May Vary**

**Part D: Differentiating Between Two Types of Data**

*Write QN if the data is quantitative. Write QL if it is qualitative.*

1. The lemon was 17 cm around : \_\_\_QN\_\_\_\_\_
2. The lemon was yellow:\_\_\_\_QL\_\_\_\_\_
3. The lemon was lumpy:\_\_\_\_QL\_\_\_\_\_
4. The lemon had 2 spots: \_\_\_\_\_QN\_\_\_\_\_\_\_\_

**Part E: Writing a Hypothesis**

*Write a hypothesis for the following question. In the question underline the independent variable and circle the dependent variable.*

1. **Question:** How does amount of sunlight (full sun, partial sun, and no sun) affect plant growth?

|  |
| --- |
| **Hypothesis:** If a plant is placed in partial sun, then it will grow the tallest. |
|  |
|  |
|  |

**Part F: Doing an Experiment**

*Identify the following based on the experiment below.*

 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 3 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.

1. What is the independent variable? Type of instrument
2. What is the dependent variable? The number of jellyfish observed
3. What is a possible hypothesis? If squidward plays his clarinet, then more jellyfish will be observed.

30. What are the constant**s**? Same song, same number of times played, squidward played all the instruments; same amount of time played

31. What is the control group?

Clarinet

**Part G: Collecting and Analyzing Data**

32. Do the following: 1) **Identify the variables and control group (1 pt each)** , 2) **make a data table (4 pts)** and 3) **graph the averages (4 pts)** for the following investigation.

Jose wanted to see how the amount of compost used on his garden would affect the height (cm) of his tomato plants. He set up 3 garden beds with 3 tomato plants in each. In the first bed he added no compost, in the second he added 900 g and in the third bed be added 300 g. Below is his data.

No compost: 10, 9, 11, avg: 11 Independent variable: \_\_\_\_Amount of Compost\_\_\_\_\_\_\_\_\_\_\_\_\_\_

900 g compost: 17, 15, 16, avg: 16

300 g compost: 15, 14, 13, avg: 14 Dependent variable: \_\_\_\_\_\_Height of plants (cm)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*2) Data Table:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Effects of Compost on Plant Height |  |  |
| **Amount of Compost** | **Height of Plants (cm)**  |
| Plant 1 | Plant 2 | Plant 3 | Average |
| No compost | *10-cm* | *9-cm* | *11-cm* | *10-cm* |
| 900 g | *17-cm* | *15-cm* | *16-cm* | *16-cm* |
| 300 g | *15-cm* | *14-cm* | *13-cm* | *14 cm* |

Effects of Compost on Plant Height

*3) Graph:*

Plant Height (cm)

20

18

16

14

12

10

8

6

4

2

0

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

 No compost 900 g 300 g

Amount of Compost

33) For the graph below, what is the independent variable? What is the dependent variable? What can you conclude from the graph?

Independent variable: Month

Dependent variable: Bathing Suits sold

Conclusion: June has the highest number of

bathing suits sold