**Unit 1 Study Guide: Scientific Inquiry**

**All statements are FALSE, please underline the incorrect portion of the statement and correct it below.**

1. The independent variable is the effect or outcome.

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2. The dependent variable is the cause.

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3. On a data table the DV goes on the left and the IV on the right.

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4. On a graph, if TIME is a variable it goes on the Y axis.

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5. On a graph, the IV goes on the Y-axis and the DV goes on the X-axis.

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6. In a testable focus question the IV comes after the DV.

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7. In a hypothesis, the DV comes before the IV.

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8. A constant is your comparison group.

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9. When creating a control group, you can either eliminate or average your dependent variable.

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**Multiple Choice**

\_\_\_\_ 10. Which of the following is NOT true about control groups?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | You can average IV. | c. | You use it to compare your results. |
| b. | You can eliminate your IV | d. | You don’t always need one. |

**Problem**

11. Read the **Prompt 1** below and re-organize the data correctly into a table

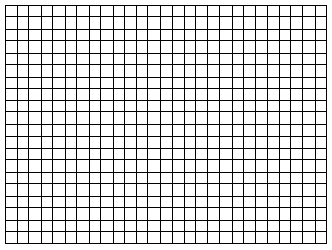
(make sure IV is on the left and DV on the right).

**Prompt 1:**

Two students wanted to see if the amount of fertilizer had an affect on the mass of tomato plants. They planted 5 identical tomato seeds in pots but gave each plant a different amount of fertilizer. After 3 weeks they measured the tomatoes to see which had the greater mass. Plant A was given no fertilizer an it’s tomatoes had a mass of 0.2 kg. Plant B was given 2g of fertilizer an it’s tomatoes had a mass of 0.4 kg. Plant C was given 4g of fertilizer an it’s tomatoes had a mass of 1.2 kg. Plant D was given 6g of fertilizer an it’s tomatoes had a mass of 1.0 kg. Plant E was given 8g of fertilizer an it died.

|  |  |
| --- | --- |
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12. Graph the above data. (Hint:You should have a multiple line graph with time as your independent variable and Plants A-E in your Key).



**Short Answer**

13. List the seven steps of experimental design:

1.

2.

3.

4.

5.

6.

7.

14. If you don’t keep things constant in your experiment, the experiment won’t be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?

15. What goes on the left side of a graph? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. On a graph, if TIME is a variable where will the Independent Variable go?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. What is the process of inquiry?

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18. What is the most important reason that your procedures be clear, specific, and repeatable?

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19. **Prompt 2:**

“Plant growth is dependent on the amount of fertilizer applied.” That was the hypothesis Mel and Bill hypothesized for their science project. They planted identical tomato seeds in the same potting mix, and they used identical pots for each plant. PlantA recieved 0 grams of fertilizer, PlantB recieved 2 grams, PlantC recieved 4 grams, PlanD recieved 6 grams, and PlantE recieved 8 grams. Each pot received the same amount of water, and all the pots were placed in the same location in the greenhouse. After three weeks, Mel and Bill were able to record the height of the tomato plants in centimeters.

Did Mel and Bill word their hypothesis the correct way?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Re-write the hypothesis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the independent variable in the experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the dependent variable in the experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which of the following is **NOT** something that stayed constant?

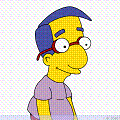
The Location Amount of Fertilizer Amount of Water Pots

Write a correct graph title for this experiment?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which plant was the control group? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. Use **Prompt 3** to answer the questions below.

**Prompt 3:**

Milhouse wants to know how different colors of light effect the growth of plants. He believes that plants can survive the best in white light. He buys 5 ferns of the same species, which are all approximately the same age and height. He places one in purple light, one in blue light, one in green light, one in red light and one in white light. All of the ferns are planted in Miracle-Grow and given 20 mL of water once a day for 2 weeks. After the two weeks, Milhouse observes the plants and records their height in cm.

Write a testable question that Milhouse could use:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the IV?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the DV?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is one thing that was kept constant?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Set up this data table for Milhouse

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

Did Milhouse average or eliminate his IV to create his control group? How? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Unit 1 Study Guide: Scientific Inquiry**

**Answer Section**

**TRUE/FALSE**

1. F

2. F

3. F

4. F

5. F

6. F

7. F

8. F

9. F

**MULTIPLE CHOICE**

10. D

**PROBLEM**

11.

|  |  |
| --- | --- |
| Amount of Fertilizer (grams) | Mass of Tomatoes (kg) |
| 0-Plant A | 0.2 |
| 2-Plant B | 0.4 |
| 4-Plant C | 1.2 |
| 6-Plant D | 1.0 |
| 8-Plant E | 0 (died) |

12. Graph

**SHORT ANSWER**

13. 1.

2.

3.

4.

5.

6.

7.

14. Valid (repeatable)

15. DV

16. In the Key

17. asking questions

18. So that your research is valid and repeatable.

19. No

If the amount of fertilizer goes \_\_\_\_\_\_\_\_\_\_\_\_\_\_....Then the plant’s height will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Amount of Fertilizer

Plant height

Amount of Fertilizer didn’t stay constant because it was your IV

Title: Fertilizer VS. Tomato Growth or The effects of Fertilizer on Tomato Height

Control Group: Plant A

20. How does the color of light affect the height of plants?

Color of light

Height of Plant

Constants: Same species of plant, same age plant, same height, all planted in Miracle-Grow, all given the same amount of water.

|  |  |
| --- | --- |
| IV: Color of Light | DV: Height of Plant |
| Purple |  |
| Blue |  |
| Green |  |
| Red |  |
| Closet |  |

He eliminated color by putting one plant under white light (absence of color).