NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_ Block\_\_\_\_\_\_\_ Group \_\_\_\_\_\_

**SCIENTIFIC METHOD PRACTICE PROBLEMS**

Many significant problems in science have been solved through the use of the scientific method.

Read the following descriptions and answer the following questions.

**PROBLEM I.**

Mary investigated the effect of different concentrations of Miracle Grow on the growth of tomato

plants. Mary hypothesized that if higher concentrations of Miracle Grow were added, the plants

would exhibit poorer growth. She grew four groups of tomato plants (10 plants/group) for 30 days.

She then applied Miracle Grow as follows:

Group A, 0% Miracle Grow;

Group B, 10% Miracle Grow;

Group C, 20% Miracle Grow; and

Group D, 30% Miracle Grow.

The plants received the same amount of sunlight and water each day. At the end of 30 days, Mary

recorded the height of the plants (in centimeters) and the color of the leaves (green, yellow-green,

yellow, or brown.)

**BASIC EXPERIMENTAL TERMS:**

\*An independent variable is the variable which is purposefully changed by the experimenter.

\*A dependent variable is the variable which responds to the changed variable.

\*Controlled variables are variables that are not changed during the experiment.

\*A control group is the group in the experiment which allows the experimenter to assess the effect

of any unforeseen variable. It usually represents “normal” conditions.

\*An experimental group is any group in an experiment that is different than the control

group and has one changed variable.

1. In this scenario, what is the independent variable?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What is the dependent variable? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. In this scenario, what are the controlled variables? (Identify at least three.)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

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

4. Which group would be the control group in this experiment?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Some students grew sunflower plants in their school’s biology laboratory. The following table and

graph show the conditions and results of the experiment after three weeks. Use this information to

answer the following questions.

**Temperature Humidity Water Light Color of Light**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Temperature | Humidity | Water | Light | Color of Light |
| Plant A | 21 C | 50% | 30mL | 10 hrs | Violet |
| Plant B | 21 C | 50% | 30mL | 10 hrs | Green |
| Plant C | 21 C | 50% | 30mL | 10 hrs | White (normal) |

1. Was this a controlled experiment? Explain your answer.

2. State a possible hypothesis for this experiment.

IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Which plants are the experimental subjects? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Which plant is the control subject? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What are the controlled variables? (Identify at least three.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Did the experiment prove that the hypothesis that you stated in #2 was correct? Explain

your answer.