



## Practice Identifying Parts of the Scientific Method

**Directions:** The following are experimental scenarios. Read the experiments and then identify the components of the scientific method by completing the graphic organizer provided.

### Experimental Scenario #1

A student investigated whether ants dig more tunnels in the light or in the dark. She thought that ants used the filtered light that penetrated the upper layers of earth and would dig more tunnels during the daytime. Ten ant colonies were set up in commercial ant farms with the same number and type of ants per ant farm. The same amount of food was given to each colony, and the colonies were in the same temperature. Five of the colonies were exposed to normal room light and five were covered with black construction paper so they did not receive light. Every other day for three weeks the length of the tunnels was measured in millimeter using a string and a ruler. Averages for the light and dark groups for each measured were then computed. The averages are listed in the following chart.

Length of Tunnels (mm) Constructed by Ants in Different Light Conditions

	Day	Light	Dark
	1	5	7
	3	10	15
	5	20	25
	7	26	32
	9	32	47
	11	50	62
	13	61	93
	15	66	110
	17	90	115
	19	95	120
	21	103	136

### Experimental Scenario #2

A student investigated the effect of radiation on the germination of bean seeds. He thought that exposure to radiation would limit the seeds ability to germinate (grow) much like ultra-violet light causing skin cancer. Three hundred seeds were soaked in distilled water for one hour. They were then divided into three groups. One group was placed in a microwave oven on high for three seconds. Another group was microwaved on high for six seconds. The last group was not microwaved. The seeds were then planted in three separate flats and given the same amount of water. The seeds were then planted in three separate flats and given the same amount of water. The flats were placed in a location with a constant temperature of approximately 27 degrees Celsius. Each day for two weeks the number of seeds that germinated each group was recorded.

Total Number of Bean Seeds Germinated after Microwave Radiation

Three Seconds of Radiation

54

Six Seconds of Radiation

26

No Radiation

88

### Experimental Scenario #3

A student investigated the effect of aged-grass compost (fertilizer made from decaying plant material) on the growth of bean plants. She thought that the compost would provide extra nutrients and make plants grow faster. Thirty bean seeds were divided into three groups and planted in different flats (boxes). All seeds germinated after 12 days and were allowed to grow for five days. The flats were each given the same amount of water and the same amount of light. Flat A was then fertilized with 3-month old compost; Flat B was given 6-month old compost; and Flat C was given no compost. At the end of 14 days the height of each plant was measured in centimeters.

Final Heights of Bean Plants

<u>3-month old Compost</u>	<u>6-month old Compost</u>	<u>No Compost</u>
7.6	10.1	6.5
5.4	9.5	7.2
8.2	12.1	8.4
9.3	13.0	11.0
8.2	8.5	6.9
6.9	13.1	6.8
7.3	12.4	6.3
9.4	11.6	10.7
10.2	14.8	9.9
12.0	10.8	10.6



**Analysis of Experimental Scenarios  
– Graphic Organizer –**

**Problem/Observation:**

**Question:**

**Hypothesis:**

**Experiment:**

Procedures

Independent Variable

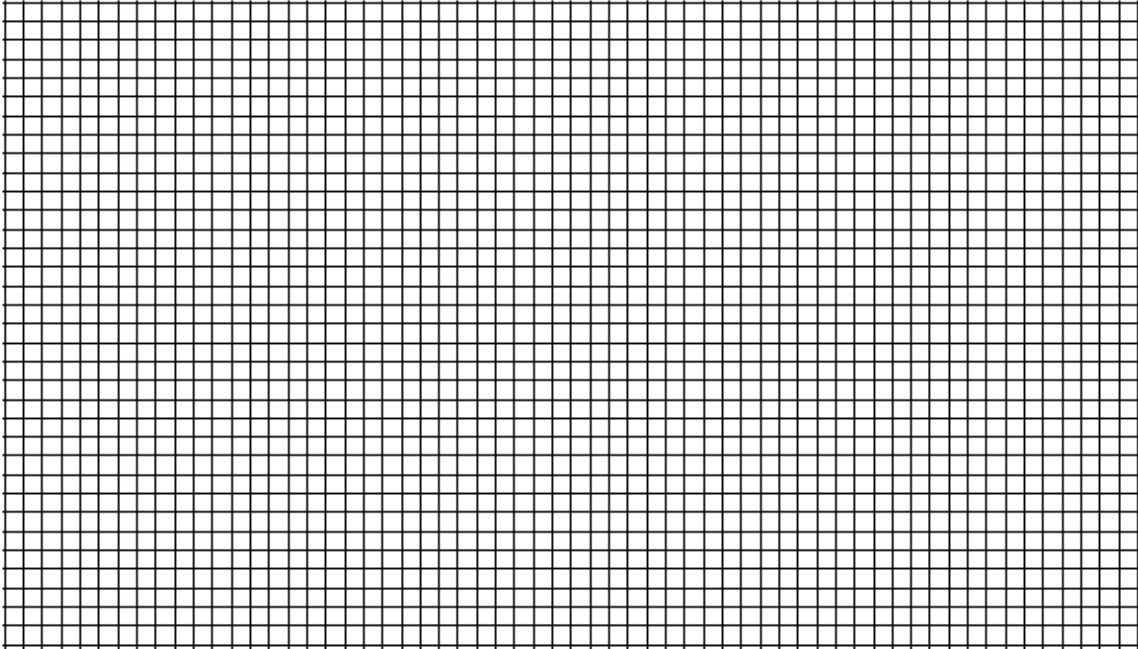
Dependent Variable

Controls

Control Group

Experimental Group(s)

**Results/Data (Graph):**



**Conclusions:**