Practice Identifying Parts of the Scientific Method NAME_____

Directions: The following are experimental scenarios. Read the experiments, complete a graph, and then identify the components of the scientific method.

Experimental Scenario #1

A student investigated whether ants dig more tunnels in the light or in the dark. She thought that ants might need the light to see, and therefore would dig more tunnels during the daytime. (Of course she realized that the light would have to filter through the upper layers of earth) 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 millimeters using a string and a ruler. Average lengths for the tunnels were then calculated. The averages are listed in the following chart.

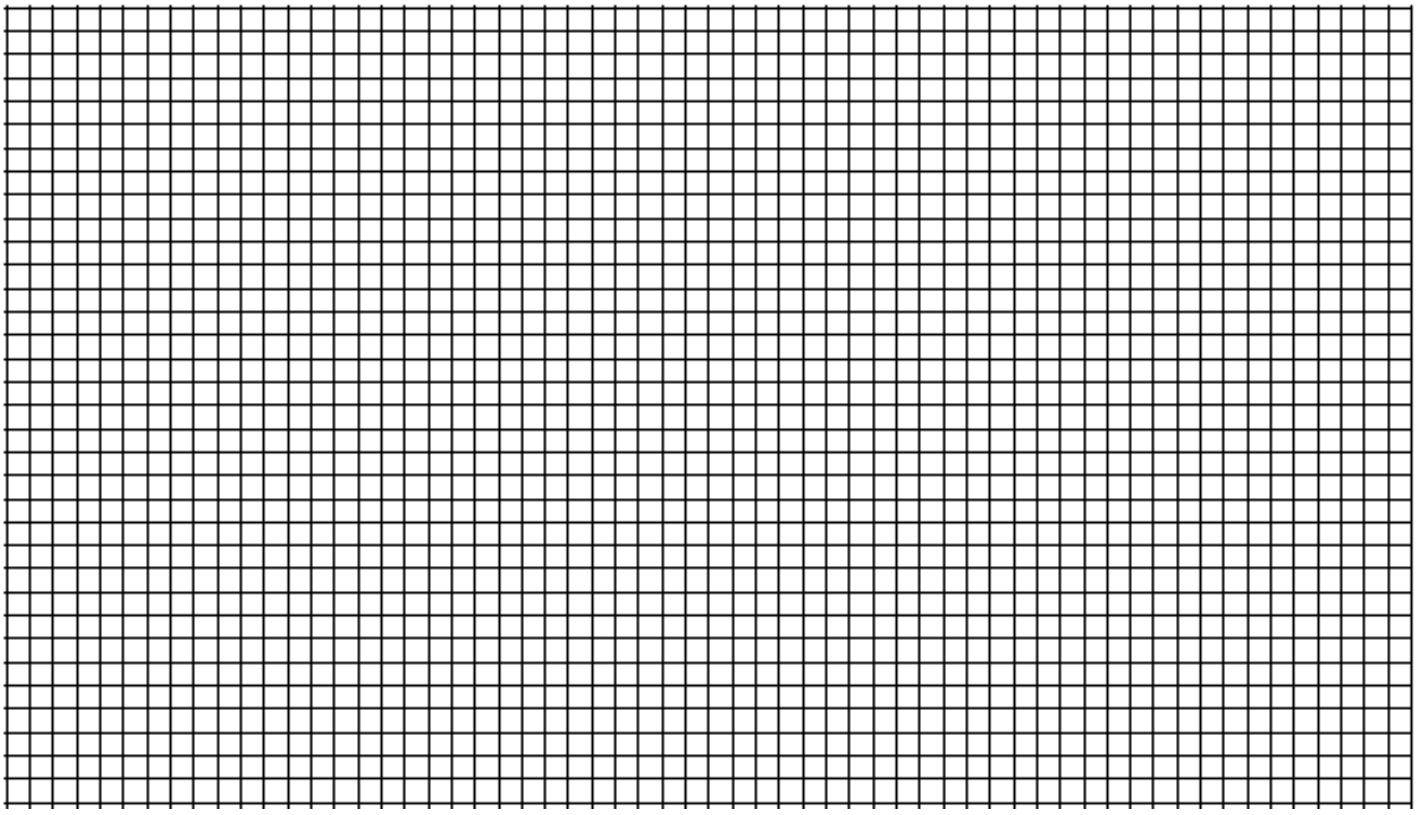
Length of Tunnels (mm) Constructed by Ants in Different Light Conditions

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

Analysis of Experimental Scenarios

SCIENTIFIC QUESTION:
HYPOTHESIS:
EXPERIMENT: *don't write anything here*
Independent Variable
Dependent Variable
Controlled Variables
Control Group
Experimental Group(s)
CONCLUSION:

Results/Data (Graph):



Experimental Scenario #2

A student investigated the effect of ultra-violet (UV) radiation on the germination of bean seeds. Using his background knowledge that UV light is damaging to human skin, he thought that exposure to UV radiation would also be damaging to a seed and therefore limit its ability to germinate (sprout). Three hundred seeds were randomly divided into three groups. One group was placed under a UV light for three hours. Another group was placed under a UV light for six hours. The last group was not placed under a UV light. 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 in each group was recorded.

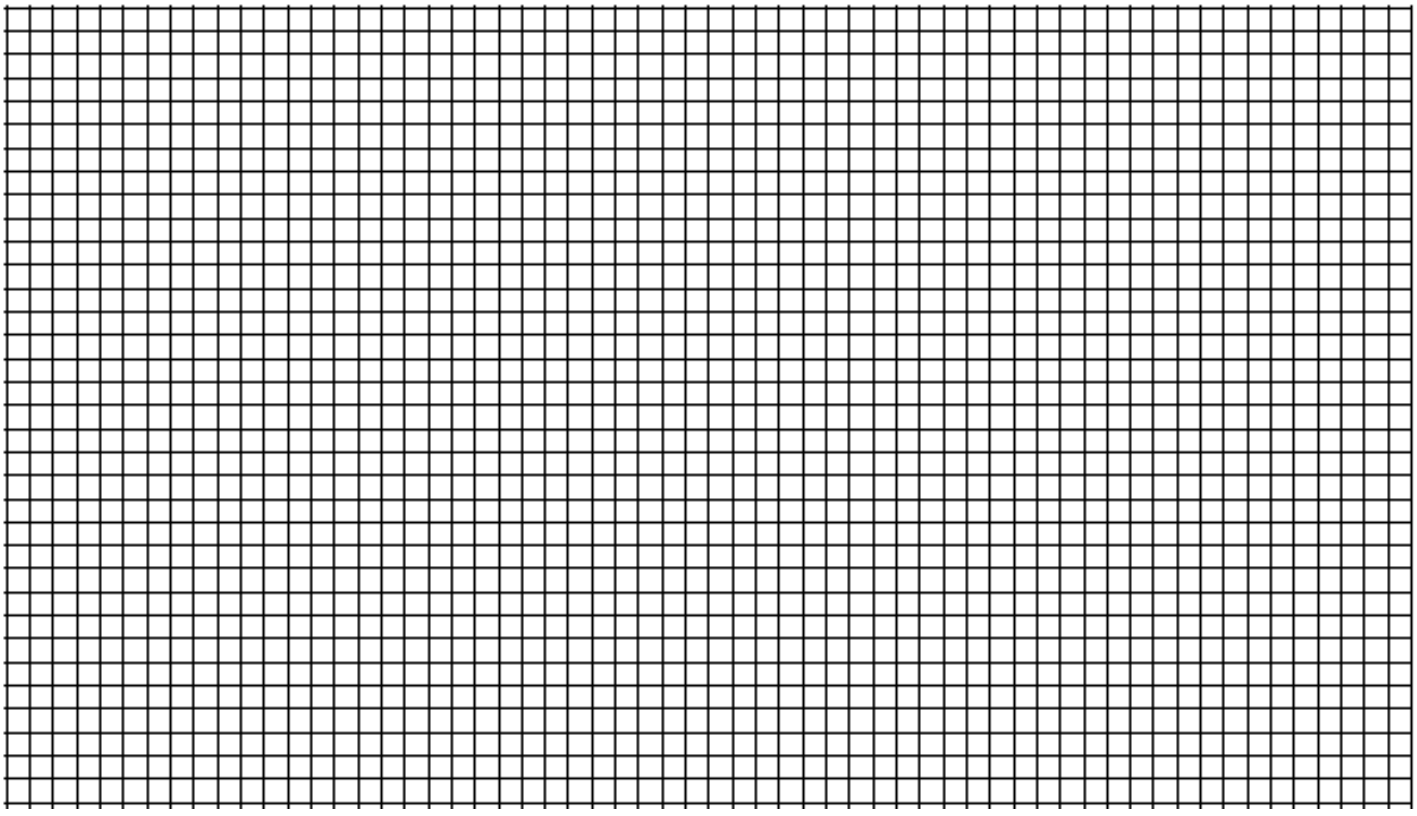
Total Number of Bean Seeds Germinated after UV Light

Three hours of UV Radiation	Six hours of UV Radiation	No UV Radiation
54	26	88

Analysis of Experimental Scenarios

SCIENTIFIC QUESTION:
HYPOTHESIS:
EXPERIMENT: *don't write anything here*
Independent Variable
Dependent Variable
Controlled Variables
Control Group
Experimental Group(s)
CONCLUSION:

Results/Data (Graph):



Experimental Scenario #3

A student investigated the effect of aged compost (fertilizer made from decaying plant material) on the growth of bean plants. She's pretty sure the compost would provide extra nutrients and make plants grow faster, but not sure if "fresh + new" compost works better or "older + more rotted." 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.

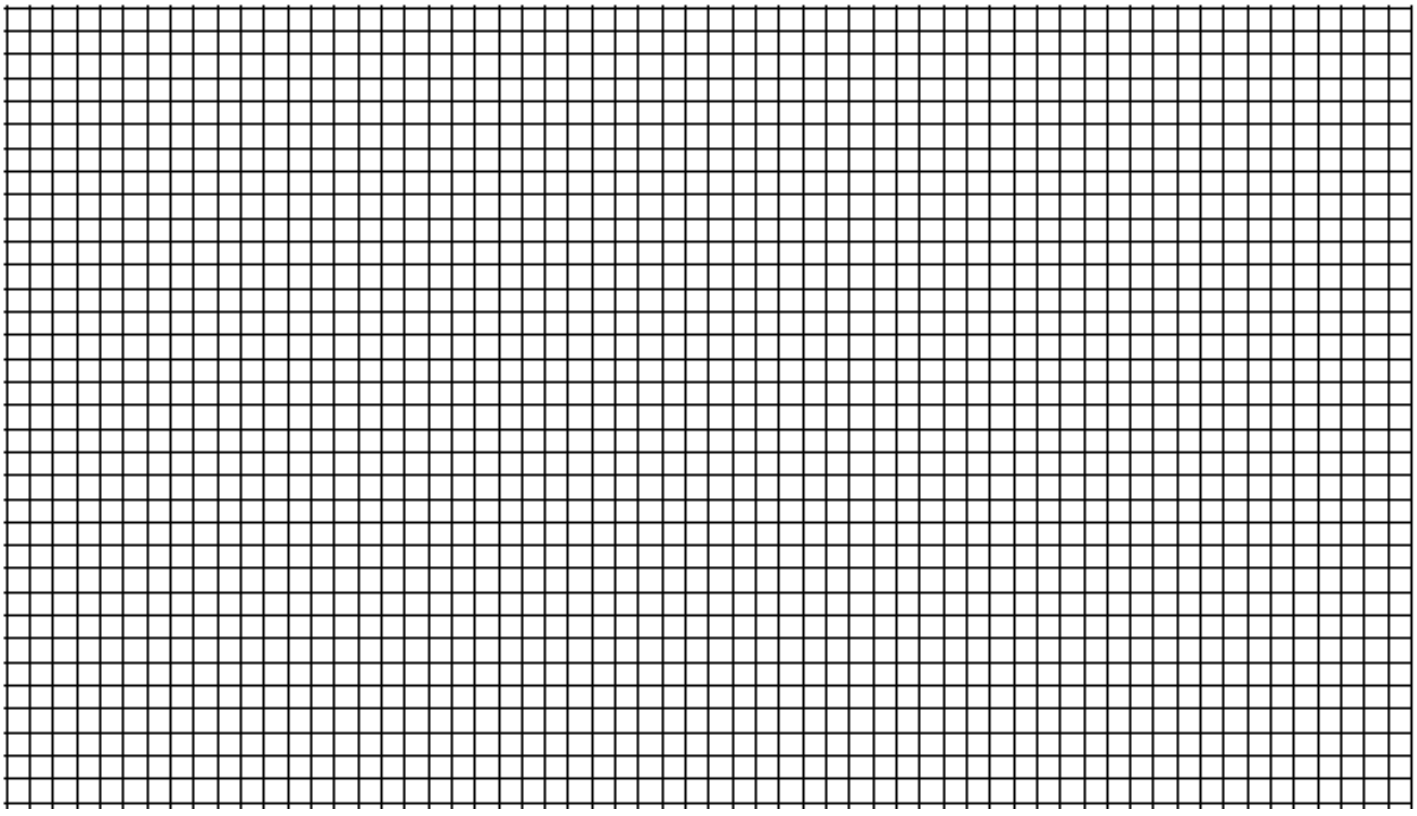
Final Heights of Bean Plants

	3-month old Compost	6-month old Compost	No Compost
	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
Average Height	**8.45**	**11.6**	**8.43**

Analysis of Experimental Scenarios

SCIENTIFIC QUESTION:
HYPOTHESIS:
EXPERIMENT: *don't write anything here*
Independent Variable
Dependent Variable
Controlled Variables
Control Group
Experimental Group(s)
CONCLUSION:

Results/Data (Graph):



Experimental Scenario #4

A student wants to investigate the effect of acid precipitation on the hatching of frog eggs. He knows that natural rain is slightly acidic (pH of 5.0 - 5.5, because carbon dioxide mixes with water in the air and forms carbonic acid). Frogs can hatch out of eggs just fine with this pH level. But, he thinks that exposure to ***high*** amounts of acid (pH less than 5.0) might interfere with frogs being able to hatch out of their eggs. He purchases two hundred frog eggs and two acid solutions, one with a pH of 5.5 and the other with a pH of 4.0. How do you think he should set up the experiment?

Analysis of Experimental Scenarios

SCIENTIFIC QUESTION:
HYPOTHESIS:
PROCEDURE:
EXPERIMENT:
Independent Variable
Dependent Variable
Controlled Variables
Control Group
Experimental Group(s)