KEY

Earth Science End of Year Cornerstone Assessment: Part A. Scientific Investigation

Directions: Read the paragraph below and then respond to the questions.

Your grandma loves fresh tomatoes. She asked you to investigate which type of soil will produce the tallest tomato plants in her garden. Her best friend recommended sandy loam but your grandma thinks that topsoil will work the best. The soil in her garden is primarily clay so you decide to test that as well.

1a. Identify the **independent variable in the above scenario**? Type of Soil

1b. Why is this considered the independent variable?

This is the variable that is being manipulated or changed by the experimenter.

2a. Identify the **dependent variable in the above scenario**? Height of Tomato Plant
2b. Why is this considered the dependent variable?

This is the variable that responds to the changes or the variable that is measureable.

3a. What is your **hypothesis**?

This can have various responses but should include the independent variable and dependent variable and/or written as an if/then statement.

3b. Why did you choose this answer?

This can have various responses but should link prior knowledge/experience and the current topic.

Available Materials:

Fan	Topsoil	Water	Ruler
Pots	Tomato Plant seeds	Sandy Loam	Stirring Rod
Clay	Sunlight	Thermometer	Q-tips

4. Identify the **materials** you would use in your experiment.

Pots, Clay, Topsoil, Tomato plant seeds, water, sandy loam, sunlight ruler.

5a. List the variables you need to hold **constant** in your experiment? location, amount of light, amount of water, pot, number of seeds (other possibilities exist)

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5b. Explain why they should be held **constant.**

This can have various responses but should mention that accuracy comes with changing only one variable (validity).

6. List the **steps** you would take to conduct your experiment.

1. Fill a pot to the top with clay. Repeat with sandy loam and topsoil in a different pot.

2. Place seeds in the soil at the same depth for each container.

3. Give each pot the same amount of water and sunlight.

4 . Measure each plant's height at a set interval.

7. Set up a data table for this experiment. Include labels for each row and column (you do not need to include data).

		Height of Tomato Plant (in centimeters)			
		2 weeks	4 weeks	6 weeks	8 weeks
Type of Soil	Topsoil				
	Sandy Loam				
	Clay				

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Earth Science Mid-term Cornerstone Assessment: Part B. Data Analysis and Interpretation and Scientific Reasoning

Directions: Read the paragraph below and review the data table. Then, answer the questions that follow.

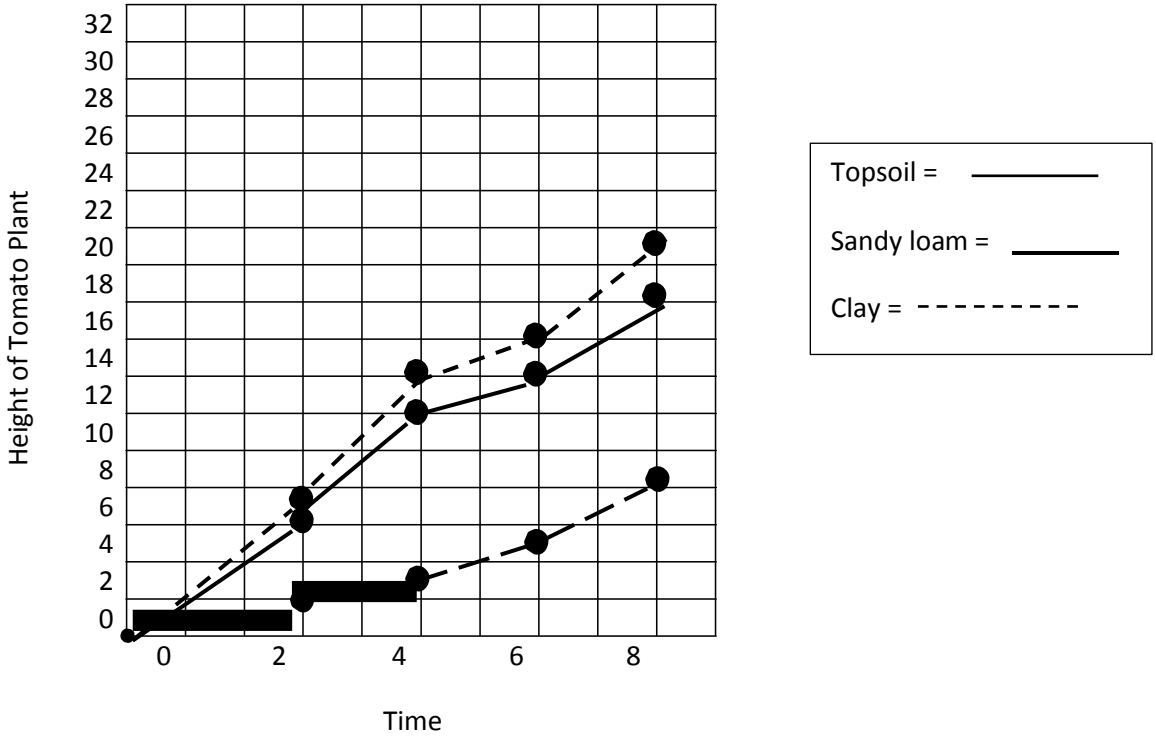
You planted your tomato seeds in the different types of soil and measured the height every two weeks. Here is the data you collected.

	Height of Tomato Plants (in centimeters)				
	Initial Height	2 weeks	4 weeks	6 weeks	8 weeks
Topsoil	0	6	12	14	18
Sandy Loam	0	7	14	16	21
Clay	0	2	3	5	8

1. Based on the data, predict the height of each plant after 10 weeks.

	10 weeks
Topsoil	22.5 $\pm$1
Sandy Loam	26.25 $\pm$1
Clay	10 $\pm$1

2. Create a graph to display the data provided for this experiment.



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3. Which soil promoted the greatest rate of tomato plant growth? Sandy Loam

4. For the soil that showed the greatest rate of growth, what is the difference in growth between week 2 and 4 and week 6 and 8? There is a difference of 2

5. Based on your experimental data, write a conclusion about the type of soil and the rate of growth in tomato plants?

   Based on the data, sandy loam produces the tallest tomato plants.

   Students may write a variation of the above answer but should include basic findings about the type of soil.

   *The difference between practitioner and expert is that a practitioner will give you the above statement but an expert will provide evidence that supports their answer (porosity and water retention).

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