

## Practice Problem

You want to determine the effect of a certain fertilizer on the growth of orchids grown in a greenhouse. Materials that are available to you include: greenhouse, 100 orchid plants, water, fertilizer, and soil. You want to know if the orchids will grow best with a weak concentration of fertilizer, a medium concentration of fertilizer, or a high concentration of fertilizer. How will you design an experiment to test different concentrations of this fertilizer?

A. State your hypothesis: \_\_\_\_\_

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B. How will you set up a controlled experiment? \_\_\_\_\_

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C. What is the control group in this experiment? \_\_\_\_\_

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D. What is the experimental group in this experiment? \_\_\_\_\_

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E. What variables must be kept constant in this experiment? \_\_\_\_\_

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F. What variable is being changed in this experiment? \_\_\_\_\_

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G. After one month of measuring the orchids, the following data is obtained:

Group 1 (Control Group): Grew to an average height of 15 cm.

Group 2 (Weak concentration): Grew to an average height of 35 cm.

Group 3 (Medium concentration): Grew to an average height of 28 cm.

Group 4 (High concentration): Grew to an average height of 10 cm.

Is your hypothesis supported or not supported by these results? \_\_\_\_\_

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What is your conclusion based on these results? \_\_\_\_\_

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## V. Analysis Questions:

A. Why is it important to have a large sample size in any experiment? \_\_\_\_\_

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B. Why is it important to repeat the experiment many times? \_\_\_\_\_

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C. What is the importance of the control? \_\_\_\_\_

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D. How is a theory different than a hypothesis? \_\_\_\_\_

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E. Why is it so important that a scientist accurately describes the procedure used in the experiment?

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F. What is the difference between the independent and the dependent variables in an experiment?

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G. In a “controlled experiment”, why must all of the variables, except one, be kept constant throughout the experiment? \_\_\_\_\_

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