

Name \_\_\_\_\_

Period \_\_\_\_\_

Biology

Date \_\_\_\_\_

## GENERATING HYPOTHESES & EXPERIMENTAL DESIGN 2

### 1. General Idea

**Example:** *I think that the amount of fertilizer has an effect on the growth rate of plants*

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### 2. Hypothesis Development

a. Factors that you think have a relationship:

**Example:** *fertilizer & growth rate of plants*

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b. Describe the type of relationship (**positive**, **negative**, **neutral**):

**Example:** *I think fertilizer will increase plant growth, so "positive"* \_\_\_\_\_

c. Prediction of how a **change** in one factor affects the **change** in the other.

**Example:** *more fertilizer will increase the growth rate of plants*

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d. If that relationship is accurate, then predict the actual changes that you will be able to *measure* during the experiment.

**Example:** *When I increase the amount of fertilizer given to my bean plants then my bean plants will grow taller.*

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e. Restate as a hypothesis: specific, includes a prediction & is testable (try to put it in an "if..., then..." format):

**Example:** *If there is a positive relationship between fertilizer and plant growth, then when I increase the amount of fertilizer applied to my bean plants, my bean plants will grow taller.*

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**3. Experimental Design**

- a. Which is your *measured (dependent)* variable? \_\_\_\_\_

**Example:** *height of plants (because I didn't know how that was going to change therefore I had to measure how its change was dependent on the amount of fertilizer).*

- b. Which is your *manipulated (independent)* variable? \_\_\_\_\_

**Example:** *amount of fertilizer (because I manipulated how much fertilizer was given; it changed only how I chose it to change and was not dependent on any other factor in the experiment)*

- c. List three **confounding variables** that you would have to control to isolate your tested variable.

(*Confounding* means *confusing*, so confounding variables would be other factors that could affect the results and therefore confuse your interpretation of the results)

**Example:** *amount of water, type of soil, temperature, amount of light, age of plants...*

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- d. Describe the experimental groups for your experiment.

**Example:** *each group of 10 plants is treated with a different amount of fertilizer: 0 tsp/gallon, 1/4 tsp/gall, 1/2 tsp/gall, 1 tsp/gall (recommended), 2 tsp/gall, 4 tsp/gall*

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- e. Describe the control group(s) for your experiment.

**Example:** *the group receiving only water ("standard" or no treatment condition)*

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- f. Suggest a **sample size** for your test groups in this experiment. \_\_\_\_\_

**Example:** *just NOT one plant; consider at least 10 or more per group*

- g. What result would cause you to conclude that your hypothesis is **supported**?

**Example:** *the plants that are given more fertilizer grow taller than the ones given less.*

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- h. What result would cause you to **reject** your hypothesis?

**Example:** *the plants that are given more fertilizer do NOT grow taller than the ones given less*

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