**Scientific Method Review - Identifying Variables Practice**

**Date: Excellent Experimenter (Name):**

Read each experiment and try to define all the variables used by the scientist in the experiment.

1. You water three sunflower plants with salt water. Each plant receives a different concentration of salt solutions. A fourth plant receives pure water. After a two-week period, the height is measured.

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| **Experimental Group** (the group that you are testing – receives the independent variable)The 3 plants that get salt water | **Control Group** (the group used to compare against – does NOT receive the independent variable)The fourth plant that gets pure water |
| **Independent Variable** (what you are interested in testing, the m*anipulated* variable, the CAUSE)Salt concentration |  |
| **Dependent Variable** (your data that you are collecting by measurement or observation, the *responding* variable, the EFFECT)Plant height |
| List some **controls** (constants) that should be used to make this a fair, **controlled** experiment.Same amount of sunlight, amount of soil, type of soil, amount of water, humidity, pot size, sunflower type, growing location, pH of water, etc.  |
| What is this scientist studying? This scientist is studying the effect of salt concentration on plant height (Independent variable) (Dependent variable) |

1. Pea plant clones are given different amounts of water for three-week period. The first pea plant receives 400 milliliters a day. The second pea plant receives 200 milliliters a day. The third pea plant receives 100 milliliters a day. The fourth pea plant does not receive any extra water: the plant only receives natural ways of receiving water. The heights of the pea plants are recorded daily.

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| **Experimental Group** (the group that you are testing – receives the independent variable)Pea plants that receive extra water – first, second, and third plants. | **Control Group** (the group used to compare against – does NOT receive the independent variable)Plant that receives only natural ways of receiving water |
| **Independent Variable** (what you are interested in testing, the m*anipulated* variable, the CAUSE)amount of water received |  |
| **Dependent Variable** (your data that you are collecting by measurement or observation, the *responding* variable, the EFFECT)heights of the pea plants |
| List some **controls** (constants) that should be used to make this a fair, **controlled** experiment.The pea plants are all clones (identical to each other). Same amount of sunlight, amount of soil, type of soil, humidity, pot size, growing location, pH of water, etc.  |
| What is this scientist studying? This scientist is studying the effect of amount of water received on pea plant height (Independent variable) (Dependent variable) |

1. One tank of gold fish is fed the normal amount of food once a day. A second tank is fed twice a day. A third tank is fed four times a day during a six week study. The fish’s weight is recorded daily.

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| **Experimental Group** Fish in second and third tank receiving more food | **Control Group** Fish in the first tank receiving normal amount of food |
| **Independent Variable**amount of food fed to the fish in a day |  |
| **Dependent Variable** fish’s weight |
| List some **controls** (constants) that should be used to make this a fair, **controlled** experiment.All gold fish, same temperature of water, size of tank, number of fish in each tank, pH of water, amount of food per serving, etc.  |
| What is this scientist studying? This scientist is studying the effect of amount of food fed to the fish in a day on fish weight (Independent variable) (Dependent variable) |

1. Three oak trees are kept at different humidity levels inside a greenhouse for 12 weeks. One tree is left outside in normal conditions. The heights of the trees are measured once a week.

**EG** Three oak trees inside greenhouse **CG** tree left outside in normal conditions

**IV** humidity level

 **DV** heights of the trees

**Controls** Same amount of sunlight, amount of soil, type of soil, amount of water, pot size, tree type, growing location, pH of water, etc.

 **What is this scientist studying?**

This scientist is studying the effect of humidity level on tree height

 (Independent variable) (Dependent variable)

1. You decide to clean the bathroom. You notice that the shower is covered in a strange green slime. You try to get rid of this slime by adding lemonade juice. You spray half of the shower with lemonade juice and spray the other half of the shower with water. After 3 days of spraying equal amounts 3 times a day, there is no change in the appearance of the green slime on either side of the shower.

**EG** the half of shower that receives lemonade  **CG** the half of shower that receives water

**IV** lemonade juice

**DV** appearance of the green slime

**Controls** same amount of spraying, same type of green slime, amount of green slime on both halves of curtain, etc.

**What is this scientist studying?** This scientist is studying the effect of lemonade juice on green slime

 (Independent variable) (Dependent variable)

1. Four groups of rats are first massed and then fed identical diets except for the amount of vitamin A they receive. Each group gets a different amount. After 3 weeks on the diet, the rats’ masses are measured again to see if there has been a decrease.

IV amount of vitamin A DV masses are measured Controls identical diet, same type of rat, amount of exercise, amount of sleep, time, etc.

1. A study was done to find if different tire treads affect the braking distance of a car.

IV tire treads DV braking distance Controls same car or car type, speed, conditions, etc.

1. The height of bean plants depends on the amount of water they receive.

IV amount of water DV height of bean plants Controls same plant type, sunlight, soil, etc.

1. An investigation found that more bushels of potatoes were produced when the soil was fertilized more.

IV amount of fertilizer DV amount of bushels of potatoes Controls all other growing conditions would have to be the same between different potato plants

1. The amount of pollution produced by cars was measured for cars using gasoline containing different amounts of lead.

IV amounts of lead DV amount of pollution Controls same type of cars, driving conditions, etc.