THE SCIENTIFIC METHOD: In Your Daily Life

Your Example:

Scientific Method & Experimental Design

EXPERIMENTAL DESIGN: Examples

Independent Variable (IV) Example:

Dependent Variable (DV) Example:

Hypothesis (H) Example:

Constants Example:

Control Example:

Replicates Example:

SCIENTIFIC METHOD

1. Identify the problem
2. Make observations
3. State the hypothesis
4. Test the hypothesis, in other words: *set up an* experiment: Materials, Procedure, & Experiment
5. Collect data
6. Analyze the data
7. Form conclusions
8. Write and present your research.

EXPERIMENTAL DESIGN

Variable – *vari-* means *"different"* … *-able* means *"capable of"* … SO, a **variable** is capable of being different

*__Independent Variable (IV)__ – the variable that is being **tested** – what is changed by the **scientist**; sometimes called the *manipulated* variable

*__Dependent Variable (DV)__ – the **measured** response to the independent variable; **the DATA** being collected; sometimes called the *responding* variable

1. **Quantitative Data** – the data collected is **N**umeric
2. **Qualitative Date** – the data collect is **L**anguage based, in words

*__Hypothesis (H) –__ a statement you can prove true or false that shows the relationship between the independent variable and the dependent variable

Equation for writing a Hypothesis:
H = IV + DV (the + is a verb)

*__Constants –__ all other *possible variables* that are **kept the SAME,** so that only the independent variable is being tested, measured to keep them the same; sometimes called the *controlled* variables

*__Control__ – a set-up of the experiment that does NOT get the independent variable; NO IV OR "normal"

*__Replicates__ – to increase the statistical significance of the experiment, it is **repeated** at least 5 (or more) times; *more than one set of data!*

**__Uncontrolled variable__ – sometimes called confounding variables, an outside force such as nature, size, or the inability to change the object/situation physically; this inability to be controlled can skew the data.

OTHER NOTES

Type Here

ENRICHMENT:
TYPES OF EXPERIMENTAL ERROR

To complete these definitions, See:
http://writeonline.ca/media/documents/LabReport_TypesOfExperimentalErrors.pdf

Systematic Error –

Four Types of Systematic Errors:

1. **Instrumental** -
2. **Observational** -
3. **Environmental** -
4. **Theoretical** -

Random Error –

Two Types of Random Errors:

1. **Observational** -
2. **Environmental** -

Blunders –

Resources:
* Cothron, J., Glese, R., and Rezbe, R. (1993). Students and research: Practical strategies for science classrooms and competitions, second edition. Dubuque, IA: Kendall/Hunt Publishing Co.
** Snead, C. (August 25, 2015). What is an uncontrolled variable? From: https://www.quora.com/What-is-an-uncontrolled-variable