

# Data Table Design and Practice

## Integrated Science 1

8/07

**Redwood High School**

**Name:** \_\_\_\_\_

**Period:** \_\_\_\_\_

In the previous handout, we used the *Design Outline* to organize and identify the components of a scientific experiment. In this handout, we will look at some standard methods for collecting and recording data.

### ■ Data Collection Guidelines

- Information collected during an experiment is called **data**. Always be careful, thorough, consistent and accurate when you are collecting data.
- Always complete *as many* repeated trials as is reasonably possible.
- Clearly identify the category of the independent variable.
  - **Continuous**: levels of the I.V. that are measurements based on a continuous metric or English scale
  - **Discontinuous**: levels of the I.V. that are distinct, discrete categories
- Clearly identify the category of data collected for the dependent variable.
  - **Quantitative measurement**: continuous data collected using measurements based on standard scale of metric or English units.
  - **Qualitative measurement**: discontinuous data that is classified into discrete categories.

### ■ Data Table Design

To design and make a proper data table, you must first fully understand the data you will be collecting. Begin by identifying the following:

- a. Independent Variable and levels of the Independent Variable
- b. Dependent Variable(s)
- c. The number of trials for each level of the I.V.
- d. All calculations used to analyze the data

Now you are ready to construct your data table! Always sketch a rough draft of your data table first. Include all appropriate units.

1. Make a table containing vertical columns for (1) the independent variable, (2) dependent variable and (3) statistical calculations (i.e. mean). Use a ruler. *\* are the cells of your table large enough?*
2. Subdivide the column for the dependent variable to reflect the number of trials.
3. Under the I.V. column, list the levels (treatments) of the independent variable in rows – preferably from the smallest to the largest.
4. Title the data table (“The Effect of I.V. on. D.V.”)
5. Record all data values and calculations in the appropriate locations!

### ■ Sample Data Table – The Effect of Compost Age on Plant Height

Age of Compost (months)	Height of Plants at 30 Days (cm)					Mean Plant Height (cm)
	<i>Trials</i>					
	1	2	3	4	etc.	
0 months (control)						
3 months						
6 months						

## Data Table Practice

### Directions:

1. Consider the following scenarios below. For each scenario, identify the aspects of the Design Outlines (previously completed) that are needed to construct appropriate data tables.
2. Using a ruler, neatly construct a blank data table for each scenario.

### Scenario 1: Mashed Potato Color

Gloria wanted to find out if the color of food would affect whether kindergarten children would select it for lunch. She put food coloring into 4 identical bowls of mashed potatoes. The colors were red, green, yellow and blue. Each child chose a scoop of potatoes of the color of their choice. Gloria did this experiment using 100 students. She recorded the number of students that chose each color. Gloria also observed, and recorded, their body language while the students ate the mashed potatoes. Gloria made sure that only kindergarten age children participated, she also made sure that each child received the same amount of potato in the same size and color bowl.

#### Important Aspects of Design Outline:

**Independent Variable:** \_\_\_\_\_

**Levels (treatments) of I.V.:** \_\_\_\_\_

**Number of trials for each level (treatment):** \_\_\_\_\_

**Dependent Variable:** \_\_\_\_\_

Scenario 1 Data Table - Title \_\_\_\_\_:

### Scenario 2: *Aloe vera* and Planaria

Jackie read that *Aloe vera* promoted healing of burned tissue. She decided to investigate the effect of varying amounts of *Aloe vera* on the regeneration of the worm planaria. Using a sterile scalpel she cut the planaria in half to obtain 10 parts (5 heads and 5 tails) for each experimental group. She applied 15 milliliters of *Aloe vera* for each of the following concentration: 0%, 10%, 20%, and 30% to each group. All planaria were maintained in a growth chamber with identical food, temperature, and humidity. On Days 5, 10, and 15, Jackie observed the regeneration of the planaria parts and categorized development as full (5), partial (3) or none (0). The overall healthiness each worm part was described in paragraph form.

#### Important Aspects of Design Outline:

**Independent Variable:** \_\_\_\_\_

**Levels (treatments) of I.V.:** \_\_\_\_\_

**Number of trials for each level (treatment):** \_\_\_\_\_

**Dependent Variable:** \_\_\_\_\_

Scenario 2 Data Table - Title \_\_\_\_\_:

### Scenario 3: Metals and Rusting Iron

In chemistry class, Allen determined the effectiveness of various metals in releasing hydrogen gas from hydrochloric acid. Several weeks later, Allen read that a utilities company was burying lead next to iron pipes to prevent rusting. Allen hypothesized that less rusting would occur with the more active metals. He placed the following into separate beakers of water: a) 1 iron nail; b) 1 iron nail wrapped with an aluminum strip; c) 1 iron nail wrapped with a magnesium strip; d) 1 iron nail wrapped with a lead strip. He used the same amount of water, equal amounts (mass) of the metals, and the same type of iron nails. At the end of 5 days, he weighed the rust generated from each nail. He also recorded the color of the water for each level of the independent variable.

#### Important Aspects of Design Outline:

**Independent Variable:** \_\_\_\_\_

**Levels (treatments) of I.V.:** \_\_\_\_\_

**Number of trials for each level (treatment):** \_\_\_\_\_

**Dependent Variable:** \_\_\_\_\_

#### Scenario 3 Data Table:

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### Scenario 4: Perfumes and Bee Behavior

Joanna read that certain perfume esters would agitate bees. Because perfume formulas are secret, she decided to determine whether the unknown Ester X was present in three different perfumes by observing the bees' behavior. She began by testing a perfume known to have Ester X. She then proceeded to test the remaining three perfumes. Each perfume was tested individually by placing a saucer three meters from the beehive. She then recorded the time required for the first five bees to emerge from the hive and hover around the saucer. She also made observations on bee behavior. After a 30 minute recovery period, she tested the second, third and fourth perfumes. All experiments were conducted on the same day when the weather conditions were similar; that is, air, temperature, and wind.

#### Important Aspects of Design Outline:

**Independent Variable:** \_\_\_\_\_

**Levels (treatments) of I.V.:** \_\_\_\_\_

**Number of trials for each level (treatment):** \_\_\_\_\_

**Dependent Variable:** \_\_\_\_\_

#### Scenario 4 Data Table:

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