



Name _____



Experimental Design

Background Information: One way to investigate an answer to a question is by doing an **EXPERIMENT**. A true experiment involves **VARIABLES**.

In an experiment, scientists ask a question [called a **RESEARCH QUESTION**] about how one variable [called the **INDEPENDENT / MANIPULATED VARIABLE**] will affect another variable [called the **DEPENDENT / RESPONDING VARIABLE**.]

Some variables are held **CONSTANT** – they do not change during the experiment because the scientist controls them. These are called **CONTROLLED VARIABLES**.

Usually a **HYPOTHESIS** is made; this is an educated guess about how the independent variable will affect the dependent variable.

Then a **PROCEDURE** is developed to test the hypothesis.

The experiment must be **REPEATED SEVERAL TIMES** to be confident in the accuracy of the results.

The results [called **DATA**] of the experiment are recorded. A **TABLE** is used to collect the quantitative or numerical data.

Given this research question: How does the amount of salt mixed with water affect the density of the water?

Design an experimental investigation to help you answer the question. Use the graphic organizer to help plan what you are going to do.

Remember to:

Identify all of your variables:

Independent / manipulated

Dependent / responding

Controlled / constants

Steps (What needs to be done)	Details (Materials, how much, how often, when, time, temperature)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Creating a way to collect data:

Data gathered during an experimental investigation must be collected in some organized manner. A **DATA TABLE** or **DATA CHART** is usually used. The data table is frequently designed as part of the experimental design. **Charts** are lists of information; they may also be diagrams or pictures. **Tables** are numerical displays in columns and rows.

Quality tables and charts have a title. The title describes exactly what the data in the table or chart refers to.

Tables and charts include the variables and units of measurement. The units of measurement are put in parenthesis. They are always metric units.

The data table includes the **REDUCED DATA** – averages, percents, frequencies, range or other **MEASURES OF CENTRAL TENDENCY**. The reduced is data is frequently **GRAPHED** so that **PATTERNS**, **TRENDS**, and **RELATIONSHIPS** can be seen.

Design a data table to record your observations.