Mystery Boxes

Background

No one has ever seen an atom, the smallest building block of matter. Yet we have a fairly complex model for what atoms are like. Though we will never *know* the absolute Truth about the nature of atoms, cumulative work over the centuries has given us a model that does a great job of explaining the macroscopic, observable properties of matter.

For centuries, scientists have been making observations, collecting data, and describing models of the atom. Sometimes new discoveries conflict with the model of the time. For instance, Dalton's model of the atom suggested that the atom was indivisible. Data and observations from Thomson and the Curies suggested this was not the case. When new observations and data conflict with a model, the model must be revised to account for the new observations.

Even today scientists are refining the model to account for sub sub atomic particles. The current debate is about the unequal amounts of matter vs. anti-matter in our universe.

Purpose

The goal of this activity is to model some of the thinking of real scientists engaged in investigating big questions about the nature of atoms. Your goal is to describe what you think is inside your mystery box. You will never see the inside of your box. In fact, your teachers have not seen the inside of the box. Though you might draw reasonable conclusions, you will never be able to answer with complete certainty the question "What is in the box?"

Instructions

Choose a mystery box. Do at least three different experiments to address the question, "What is inside the box?" Make observations, record your data, and draw a conclusion about what is inside that is logically supported by your observations.

Experiment 1:
Hold the box level. Gently tilt it left and right.
Data and Observations: (2 points)

Experiment 2:
Gently shake the box.
Data and Observations: (2 points)

Experiment 3:
Procedure: Write your procedure here: (1 point)

Data and Observations: (2 poitns)

Experiment 4: OPTIONAL
Procedure: Write your procedure here:

Data and Observations:

Conclusions

What do you think is inside the box? What is your evidence to support your claim? (4 points)