Scientific Method (Mystery Box Experiment)

Procedure

Your job for this lab is to use the scientific method to determine the contents of the mystery box. Each lab group will be given a closed box with mystery items. Your instructor will provide you with a list of items that may be present in your box. Each group will also be provided with the following: a balance, an empty box of the same type as the sealed black box, and access to each of the items that may be present in the sealed box.

Using the available tools and your observations (sounds and the masses of objects), generate and test hypotheses concerning the contents of your mystery box. Keep in mind that good experiments should only test one variable at a time, so you will need to conduct several experiments in order to come up with a complete list of the box's contents. Record your hypotheses, experimental design, data, and conclusions on the worksheet provided.

Check with your instructor to see if you are correct about you mystery box's contents. If you were not correct, what may have led to your erroneous conclusions? How could you have conducted the experiments differently to come up with the correct conclusions?

Example

Shake/tilt (gently), listen, feel the box, etc.

Observation: An object rolls as you tilt the box from side to side.

Hypothesis: There is a glass test tube in the black box.

Prediction: If there is a glass test tube in the black box, then I will hear the same rolling sound if I place a glass test tube in the empty box and tilt it.

Experiment: Place a glass test tube in the empty box. Tilt both the empty box with the test tube and the sealed black box and listen.

Experimental Data: Similar rolling sounds are heard in both boxes.

Conclusion: The hypothesis is supported.

**Think about whether you should test this same hypothesis again. Are you confident in one experiment? How else might you test this hypothesis?