**What is This Pile of Stuff?**

Purpose: Explore the relationship between mass

and moles

Setup: Harman was looking out her window and

saw moles digging up her back yard. She ran outside and yelled and chased them away. When they were gone, she discovered the stuff they had dug up and it was NOT dirt. It looked very valuable.

With her super chemistry vision, she determined that all of this stuff had to be pure substances, thus elements. Using her mole meter she bagged and labeled the amount of each sample. She gathered up samples and brought them to you for determination.

Your samples of Harman’s stuff are in bags at the lab station. In 30 minutes I need a whiteboard report of what each bag of stuff contains.

On the back of this sheet you need to provide a procedure that you used to determine the identity of the stuff and any data and calculations that back up your claim.

**Scoring:**

Points are assigned based on correctly identifying the “stuff” each group had, the process they used to determine the identity, and the math involved.

5 points: 2 each for process and math, 1 for the correct metal.

**Reflection/Teaching Tips:**

**Purpose for the assessment:**

This is designed to have students make the connection between mass and moles and to help them with their experimental design. We wanted to see if the students could apply the concept of molar mass.

**Possible ways to use the assessment:**

It is actually used this in two ways last year. Last year in general, we used it as the first day activity after winter break. The students had been exposed to molar mass as a conversion factor and were basically just let loose with this. In honors, I used it as a group formative quiz after the first few days of moles and molar mass to actually put it into context. We also created a short video that accompanied the activity. This assessment can give several kinds of everyday experiences such as, identification of an unknown substance, problem-solving, team work, communication.

**Additional advice for using the assessment:**

Please see the teacher notes with the masses of material we put in each baggie. Also a few students might need a jump-start in thinking about what data they could collect. And make sure to measure the masses carefully so the mole amounts on the bags can allow them to get a reasonable molar mass or identification can be difficult.

**Student understanding:**

Many students were confused at first because they thought they would need more materials. I was fine with this, however, because of how I was using this to stretch their thinking. Students know the definition of molar mass and how to take measurements. They do not realize that using molar mass can be a two-way street. They were very comfortable using it as a conversion factor, but to go “backwards” to use it to identify something was more difficult.

**What Is This Stuff? (Teacher Notes)**

