**Name: Date: Period:**

**Worlds in**

**Comparison**

***Approximately 99% of the mass of the solar system is found in the Sun. That leaves only 1% for the rest of the solar system! In other words, for the models to be an accurate representation in terms of mass, 99 grams of clay would be needed to represent the Sun, and only 1 gram could be used for all of the planets, 160+ moons, and thousands of asteroids. That’s hard to believe, isn’t it?***

**Question: Can I make a model that compares the relative sizes of the planets in our solar system?**

**Background: List 3 facts about the planets that relate to their size or composition.**

**1)**

**2)**

**3)**

**Materials:**

* 3 lbs of play dough per group
* Plastic knife
* Tape
* Toothpick
* Wax paper/butcher paper for cutting play dough
* Ruler
* Solar System object name cards

**Procedure:**

1. **Arrange the solar system object cards side by side in order.**
2. **Tape the paper to the tables (wax side up).**
3. **Divide the entire ball of play dough into 10 equal parts**. (You may find it easiest to start by rolling the ball into one big hot dog shape)
   1. Combine 6 parts together, roll them into a ball and put the ball on the **Jupiter** card.
   2. Combine 3 parts and put them on the **Saturn** card.
4. **Cut the remaining part into 10 equal parts.**
   1. Take 5 parts and combine them with the ball on the **Saturn** card.
   2. Combine 2 parts and put on the **Neptune** card.
   3. Put 2 parts on the Uranus card.
5. **Cut the remaining part into 4 equal parts.**
   1. Take 3 parts and combine them with the ball on the **Saturn** card.
6. **Cut the remaining part into 10 equal parts.**
   1. Put 2 parts on the **Earth** card.
   2. Put 2 parts on the **Venus** card.
   3. Take 4 parts and combine them with the ball on the **Uranus** card.
7. **Combine the remaining 2 parts and cut into 10 equal parts.**
   1. Put 1 part on the **Mars** card.
   2. Take 4 parts and combine them with the ball on the **Neptune** card.
   3. Take 4 parts and combine them with the ball on the **Uranus** card.
8. **Cut the remaining part into 10 equal parts.**
   1. Put 7 parts on the **Mercury** card.
   2. Take 2 parts and combine them with the ball on the **Uranus** card.
9. **Cut the remaining part into 10 equal parts**.
   1. Take 9 parts and combine them with the ball on the **Uranus** card.
   2. Put 1 part on the **Pluto** card.
10. **Now that you have divided the play-dough to represent the planets by volume, roll the pieces in each planet’s box into balls to best represent the shapes of the planets.**

**Data: Sketch each planet’s (even Pluto) relative size in the space below. Measure the diameter of each planet in centimeters and record in the data table.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Planet Name: Mercury**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_**  **“Planet” Name: Pluto**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_** | **Planet Name: Venus**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_** | **Planet Name: Earth**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_** | **Planet Name: Mars**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Planet Name: Jupiter**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_** | **Planet Name: Saturn**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_** | **Planet Name: Neptune**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_** | **Planet Name: Uranus**  **Diameter:\_\_\_\_\_\_\_\_\_\_\_\_** |

**Conclusion Questions:** Answer the following questions on a separate sheet of paper in complete sentences.

1. **Make at least three observations about the planet sizes by looking at the planet models and/or your data table?**
2. **Taking into consideration what you have learned about the planets in our solar system, why do you think each is the size it is? (Hint: Think about the formation of the S.S.)**
3. **Why didn’t you make a model that shows the size of the sun?**
4. **Discuss the pros and cons of this model.**
5. **In general, why do scientists use models?**

**EXTRA CREDIT**

**If we were to make a model of the sun using the scale for this activity, how much clay would we need? Explain how you got your answer.**

**EXTRA CREDIT ANSWER:**

**Copy the following question and answer it on a separate sheet of paper.**

**QUESTION:**

**If we were to make a model of the sun using the scale for this activity, how much clay would we need? Explain how you got your answer.**

*Our model of the planets in the solar system used 3 lbs of clay. If the planets represent approximately 1% of the solar system, then we need a sun that is made of 99 three-pound containers of clay or 297 pounds of clay.*

*\*Students could argue that we need a bit less than this since we did not represent any moons or asteroids in the calculations.*