ASTRONOMY 10
THIRD HOUR SESSION "A"

ACTIVITY: Cosmic Scales

NAME

DATE

ID#

Answer the following questions about scales (the objects in the blanks will be given in class):

1. **If one edge of cube A is _____ times longer than one edge of cube B, and one edge of cube B is _____ times longer than cube C (exhibited on front desk), then how long is one edge of cube A? Would it fit in the classroom?**

2. **What is the volume of cube A? What is the volume of cube C?**

3. **What is the diameter of the marble? What is its radius? What is its volume?**

4. **About how many marbles would fit in cube C? About how many would fit in cube A? (Disregard the effects of air gaps between marbles.)**

5. **Considering the accuracy of your measurement of the diameter of your marble (that is, the number of significant digits in your measurement), what might be a more realistic number to record, for the number of marbles that could fit in cube C? In cube A?**

6. **What is the ratio of diameters between the planets _____ and _____? Suppose the marble you were given in class represented the size of the planet _____. What diameter (mm) marble would be required to represent the size of the planet_____?**

7. **Estimate how many people set end-to-end would reach from the Earth to _____ ? Do we have enough people in _____ to do this?**

8. **Rewrite your first answer from question #7 in scientific (exponential) notation.**

Open the web site http://htwins.net/scale2/scale2.swf?bordercolor=white and click "START." Notice the grey ring that is 1 meter in diameter.

9. **Slowly drag the slider near the bottom of the screen to the left until you see another circle appear. What size does this circle represent?**

10. **Drag the slider to the left, until another _____ grey rings appear; the number in the lower-right part of the screen should be _____. What objects are approximately this size?**

11. **Drag the slider to the right, until the number in the lower-right part of the screen reads _____. What is the smallest astronomical body just outside the grey ring?**

12. **Drag the slider until the number in the lower-right part of the screen reads $10^{19.4}$; you will start to see the smallest galaxies. Look for _____. How large is it in meters? This may require you to continue to move the slider to the right.**