Size and Scale of the Universe (Student Worksheet)

As we move from one realm of the Universe to the next, look at the materials in front of you and pick the one that best represents the size of the previous (smaller) realm when the current (larger) realm is represented by the classroom.

Throughout this activity, make your guesses as if you're in a large classroom (10 x 10 meters – or 10 meters in diameter):

1. Sun and Earth: Imagine that the Sun is the size of the classroom…

   a) Which object best represents how large would **Earth** be at the same scale?

   Guess: **Actual** (given by the teacher)**:**

I.   Show your math to see if you get a similar answer:

$$\frac{\text{Room's diameter (10 m)}}{\text{Sun's diameter (1,390,000 km)}} = \frac{\textcolor{red}{\textbf{Answer (in meters)}}}{\text{Earth's diameter (12,700 km)}}$$

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2. Solar System: Now imagine that the Solar System out to the boundary between the Solar Wind and interstellar space (200 AU diameter) is the size of the classroom.

   a) Compared to the size of the room, how large would the **Sun** be? Which object best represents this?

   Guess: **Actual:**

b) Which object is closest in size and shape to **Earth's orbit** compared to the size of the room?

   Guess: **Actual:**

c) What object best represents **Earth** on this scale?

   Guess: **Actual:**

II. What is an AU?

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3. Solar Neighborhood: Zoom out to make the Sun's Neighborhood (40 light-year diameter) the size of the classroom.

a) Which object best represents the **Solar System** at this scale?

   Guess: **Actual:**

III. What is a light-year?

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4. Galaxy: Zoom out to make the Milky Way Galaxy (100,000 light-years diameter) the size of the classroom.

a) Which object best represents the **Solar Neighborhood** at this scale?

   Guess: **Actual:**

5. Local Group: Zoom out to make the Local Group of galaxies (6.5 Million light-years diameter) the size of the classroom.

    a) Which object best represents the **Milky Way Galaxy** at this scale?

        Guess: **Actual:**

IV. Show your math to see if you get a similar answer:

Hint: The Milky Way Galaxy is 100,000 light-years across.

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6. Local Supercluster: Zoom out to make the Local Supercluster of galaxies (130 Million light-years diameter) the size of the classroom. How large is the Local Group? How big is the Milky Way?

    a) Which object best represents the **Local Group** at this scale?

        Guess: **Actual:**

    b) What object best represents the size of the **Milky Way** at this scale?

        Guess: **Actual:**

7. Universe: Zoom out to make the entire observable Universe (91 Billion light-years diameter) the size of the classroom. How big is the Local Supercluster? How big is the Local Group?

    a) Which object best represents the **Local Supercluster** at this scale?

        Guess: **Actual:**

b) Which object would best represent the **Local Group** at this scale?

Guess: **Actual:**

V. Write one paragraph describing how your <u>perspective</u> and <u>understanding</u> of the Universe have changed after participating in this activity:

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