NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **7**

Systems & System Models

DATE \_\_\_\_\_\_\_\_\_\_\_ PER \_\_\_\_\_\_

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| SYSTEM RULES… | EXAMPLES |
| 1. A SYSYTEM is anything made of components (parts) that work together to form a whole. |  |
| 2. Each component of a system can itself be described as its own system. |  |
| 3. A system is very different from its components. |  |
| 4. All components are connected to other components. |  |
| 5. Systems have FLOW (input & output) |  |



**ANSWER THE FOLLOWING QUESTIONS USING THE PICTURE ABOVE.**

1. Why is this picture an example of a SYSTEM? Evidence!

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1. What are some of the components (parts) of this Eco-system?

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1. List & explain how components (parts) of the Eco- system are connected/depend on each other.

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1. List a part of the Eco-system and explain how it is its own smaller system.

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1. What are the input and or outputs in this system? Label the arrows on the picture.

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**SYSTEM MODELS**

* **A system model is typically a 3-D structure that scientist and engineers build to help them better \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ what something looks like and how it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Solar System Scale Model Activity Questions**

1. List 2 things you learned about the solar system from constructing and studying this system model.

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2. What does the length of the string in the model represent?

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3. How can you move the string to represent the actual orbit of the planets? Explain

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4. What is accurate about this system model?

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5. What are the limits of this model?

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6. List & Explain 3 Science & Engineering Practices that you used in this activity.

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GROUP # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CLASS PERIOD \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Solar System Scale Model Activity**

**Purpose:** Construct a scale solar system model using beads and string.

**Materials per Group:**

5 meters of string 10 beads meter stick marker calculator

**Background Information:**

Astronomers refer to the distance from the sun to the Earth as one **“astronomical unit” or AU**. This will provide an easy way to calculate the distances of the other planets from the sun and build a scale model with the correct relative distances.

1 Astronomical Unit (AU) = Approximately 150 million kilometers or 93 million miles.

**THE SCALE-FACTOR FOR THIS MODEL IS 10 CENTIMETERS PER 1 AU**

**Procedures:**

1. Complete the distance chart by multiplying each AU distance by the scale-factor of 10 cm per 1 AU.
2. Start your scale model by cutting 5 meters of string.
3. Tie the first or largest bead to one end of the string using a double knot.
4. Using the calculated distances in centimeters, measure the distance from the sun on the string to the first planet (Mercury). Mark this distance on the string with a marker.
5. Tie a colored bead in place for the first planet (Mercury).
6. Repeat steps 4 & 5 for the rest of the planets.
7. Answer the analysis questions on packet paper #7!

**Data Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Object** | **AU** | **Scale Value**  **(Centimeters)** | **Bead Color** |
| Sun | 0.0 AU |  |  |
| Mercury | 0.4 AU |  |  |
| Venus | 0.7 AU |  |  |
| Earth | 1.0 AU |  |  |
| Mars | 1.5 AU |  |  |
| Jupiter | 5.2 AU |  |  |
| Saturn | 9.6 AU |  |  |
| Uranus | 19.2 AU |  |  |
| Neptune | 30.0 AU |  |  |
| Pluto | 39.5 AU |  |  |