**GRASPS Assessment for Grade 6**

**SUMMATIVE ASSESSMENT TASK: 3-D Model on a Solar System**

**Goal**: Understand the scale and structure of the solar system by modeling its building blocks in precise proportions.

**Role**: As an astronomer and educator, you must create a model that accurately represents the size and proportions of the solar system

**Audience:** Your model will be introduced to teachers and students in middle school science classes.

**Situation**: Understanding the size of the solar system and the ratios between its components is critical to explaining the complexity of the solar system to students. You have to build a model with the correct proportions, including each planet, sun, asteroid, and Kuiper belt. This model will help students visually understand the scale of the solar system.

**Product**: You create a proportional model of the solar system, and it should include:

Construct a **3D model** that shows the exact proportions of the size of each planet and the sun. For example, the Sun is about 109 times the size of Earth, and the distances between the planets need to be adjusted proportionally.

* Annotate the model. The manual should include a description of the size, distance, and characteristics of each planet. For example, specify the distance between the Sun and the Earth (about 1 AU), the composition of each planet's atmosphere, the number of satellites, etc.
* Analyze the scientific relationship to the structure of the solar system based on models and manuals. With this, you should explain how you can help students understand the size of the solar system and the relationships between its components.

**Objective A: Knowing and understanding (Strands i, ii)**

* Explain scientific knowledge about the solar system
* Apply mathematical understanding to create accurate proportions

**Objective B: Inquiring and designing (Strands i, iii)**

* Design an appropriate method to represent the scale
* Outline how to manipulate variables (size and distance ratios)
* **Criterion A**: Knowing and Understanding (8 marks)

**Standards**:

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| **Achievement Level** | **Descriptor** |
| 7-8 | Student demonstrates excellent understanding of scale and proportion; provides comprehensive and accurate calculations; explains planetary relationships with precise scientific knowledge |
| 5-6 | Student demonstrates substantial understanding of scale and proportion; provides accurate calculations with minor errors; explains planetary relationships with mostly accurate scientific knowledge |
| 3-4 | Student demonstrates adequate understanding of scale and proportion; provides basic calculations; explains planetary relationships with some scientific knowledge |
| 1-2 | Student demonstrates limited understanding of scale and proportion; provides incomplete calculations; explains planetary relationships with minimal scientific knowledge |

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* **Criterion B**: Inquiring and Designing (8 marks)

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| **Achievement Level** | **Descriptor** |
| 7-8 | Develops innovative and effective scale model design; demonstrates excellent mathematical reasoning; includes comprehensive documentation of process |
| 5-6 | Develops effective scale model design; demonstrates substantial mathematical reasoning; includes detailed documentation of process |
| 3-4 | Develops basic scale model design; demonstrates adequate mathematical reasoning; includes basic documentation of process |
| 1-2 | Develops limited scale model design; demonstrates minimal mathematical reasoning; includes incomplete documentation of process |

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