**Gravity & Orbits**

**I. Introduction**

The Solar System is full many objects that are bound by the universal force of gravity. The balance that exists with gravity is based on object masses and distances between objects. If an objects mass increases, the gravitational pull of the object increases. If the distance between two objects increases, then the gravitational pull is weakened. Any change in the gravitational balance of the Solar System can produce drastic, devastating effects.

In this activity, you will explore the effects of gravity on objects in the Solar System.

**II. Procedure**

1. Go to the following website :

<https://phet.colorado.edu/en/simulation/gravity-and-orbits> .

2. Choose the application labeled **Gravity & Orbits**.

3. Click on “Run Now!”. Then open the JNLP file.

4. Click on the buttons for Sun & Earth, Gravity Force, Path, and Grid (you

should be on cartoon, not “to scale”).

5. Describe the path of Earth around the Sun.

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6. How many days does it take to complete one revolution around the Sun?

\_\_\_\_\_\_\_\_\_\_\_ days

7. Reset, and increase the mass of the Sun and describe what happens to the Earth.

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8. Reset, and decrease the mass of the Sun and describe what happens to the Earth.

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9. Click on the buttons for Sun & Earth, & Moon, Gravity Force, Path, and Grid

(you should be on cartoon, not “to scale”).

10. Describe the path of Moon around Earth.

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11. Reset, and increase the mass of Earth and describe what happens to the Moon.

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12. Reset, and decrease the mass of Earth and describe what happens to the Moon.

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13. Click on the buttons for Earth & Satellite, Gravity Force, Path, and Grid

(you should be on cartoon, not “to scale”).

14. Describe the path of Satellite around Earth.

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15. Reset, and increase the mass of Satellite and describe what happens to the Satellite.

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16. Reset, and decrease the mass of Satellite and describe what happens to the Satellite.

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**III. Analysis & Conclusions**

**1. In what direction is the gravitational force of the orbiting object?**

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**2. In what direction is the velocity of the orbiting object**

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**3. If you turn gravity off, what happens?  Why does this happen?**

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**4. Why would the loss of the Moon have devastating consequences for life on Earth?**

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**5. Why is it important that the Earth formed around a mid-sized star the size of Earth?**

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**6. Explain the relationship between the Earth, Moon, and Sun using Newton’s Law of**

**Universal Gravitation.**

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