6.01 Formation of the Solar System Lab Report

Instructions: In this virtual lab, you will investigate the law of universal gravitation by manipulating the star's size and the planets' positions within Solar System X. Record your hypothesis and results in the lab report below. You will submit your completed report.

Name and Title:

Title of Lab	Formation of the Solar System
Student Name	
Instructor	**Mrs. Connolly & Mrs. Jeter**
Date	

SPACE COMMAND

Objective(s): To learn how a star's mass and the planets' location within the solar system affect planetary orbits.

SPACE ACADEMY

Observations Record your observation statements from Space Academy.

When the mass of the sun is larger, Earth moves around the sun at a _____ (faster, slower) pace.

When the mass of the sun is smaller, Earth moves around the sun at a _____ (faster, slower) pace.

When Earth is closer to the sun, its orbit becomes _____ (faster, slower).

When Earth is farther from the sun, its orbit becomes _____ (faster, slower).

SPACE EXPLORER

Hypothesis: Please include the if/then statements you developed during your lab activity in this section. These statements reflect your predicted outcomes for the experiment.

If the mass of the sun is 1x, at least one planet will fall into the habitable zone if I place a planet in orbits___, ____, ____, and ____, and all planets will orbit the sun successfully.

If the mass of the sun is 2x, at least one planet will fall into the habitable zone if I place a planet in orbits___, ____, ____, and ____, and all planets will orbit the sun successfully.

If the mass of the sun is 3x, at least one planet will fall into the habitable zone if I place a planet in orbits___, ____, ____, and ____, and all planets will orbit the sun successfully.

Data: For each trial, record the orbit number of each planet from the sun. After each trial, indicate the number of planets in the habitable zone. Create a different configuration of planets for each trial. An example has been supplied for you.

	Orbit Number Planet One	Orbit Number Planet Two	Orbit Number Planet Three	Orbit Number Planet Four	Number of planets in the habitable zone	Number of planets left in successful orbit
Example: sun's mass 1x	*1*	*3*	*5*	*6*	*1*	*2*
sun's mass 1x—Trial One						
sun's mass 1x—Trial Two						
sun's mass 2x—Trial One						
sun's mass 2x—Trial Two						
sun's mass 3x—Trial One						
sun's mass 3x—Trial Two						

Conclusion:

Your conclusion will include a summary of the lab results and an interpretation of the results. Please write in complete sentences.

1. Summarize what you investigated and observed in this lab using two to three sentences.

2. What are the independent variables (what you control) and dependent variable (what changes because of the independent variable) of your activity?

Independent Variable:	The mass of the sun and the initial location of each planet in relation to the sun
Dependent Variable:	The planets' final location and motion and the location of the habitable zone

3. You completed three terraforming trials. Describe how the sun's mass affects planets in a solar system. Use the data you recorded to support your conclusions.

4. In this simulation, the planets' masses were all the same. Do you think if the planets' masses were different, it would affect the results? Why or why not?

5. How does this simulation demonstrate the law of universal gravitation?

6. It is the year 2085, and the world population has grown at an alarming rate. As a space explorer, you have been sent on a terraforming mission into space. Your mission to search for a habitable planet for humans to colonize in addition to planet Earth. You found a planet you believe would be habitable, and now need to report back your findings. Describe the new planet, and why it would be perfect for maintaining human life.