SNC1W – Solar System Simulator Worksheet **Name:**_____

Be sure to read all instructions from the instructions page prior to **WORKSHEET PART 1** to ensure you are ready to go. You may work with those around you throughout these questions.

Part 1

The simulator only has the first four planets of our solar system as the outer four planets are simply too far away that in order to include them to scale, we wouldn't be able to see these four planets very well.

1. What are the first four planets and what features do you they have in common?

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2. The orbits look to be circular on this simulator based on the scale of the small window. Are they actually circular? How can you tell by looking at the information provided about Earth on the right-hand side? What other shape may they be **if** they're not circular?

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3. The temperature given on the right-side menu is the average global temperature of Earth. What are the **two major factors** that contribute to the temperatures of the planets in our solar system? Do not include the size of the sun as that is consistent for all planets in our solar system.

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4. Below is a list of the average temperatures of the four rocky planets in our solar system in order from closest to the sun to furthest away. Does this confirm your thoughts from question 3? How can we explain the fact Venus is significantly hotter than Mercury? Similarly, scientists have formulas that can be used to calculate the expected surface temperature of any planet orbiting a star in our Universe. The expected temperature for Earth is -19 °C. Why is our temperature higher than that?

Mercury – 167°C Venus - 464 °C Earth – 15°C Mars – -65 °C

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Return to the Instruction sheet before part 2

Part 2

5. Make the Sun 1.1 times (10% larger) it's original size and mass. The temperature of Earth rises as you can see. What are the two key reasons that is happening? Try 1.2 times it's original size if it's not super clear yet.

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6. Other than all other rocky planets colliding into the sun and burning up, what other effect could and does happen in this simulator as planets begin to pass by very closely to (or on top of) the Sun? You may need to have the sun at 1.6 or 1.7 times it's original size.

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7. Reset the simulator and before touching either arrow try to note the distances of the Aphelion and Perihelion the furthest and closest point the Earth is to the Sun.

Aphelion (Furthest point from the sun): _____ million KM
Perihelion (Closest point to the sun): _____ million KM

Now set the sun's mass to 90% of it's original mass (Ratio of 0.9). What happens to the Earth's orbit, Aphelion, Perihelion, and temperature now? The tail on each planet is the length of it's original orbit.

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8. Keep decreasing the Sun's mass slowly watching a full orbit of the Earth each time as you go if possible. At what point does the Earth seem to go off endlessly into space? Why does this happen?

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Return to the Instruction sheet before part 3

9. What is one thing you learned about programming from reading through the code?

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