

LESSON PLAN

- 1) If possible, do the Minecraft lesson on the SIZE of the planets first.
 - 2) Introduce the topic of how far away the planets are from each other. Assess the students' basic knowledge. First, ask students to name all of the bodies within the solar system. Then, ask them to put them in order from closest to furthest. Finally, ask the students specifically about how far specific planets are to the sun. (Note: it is very difficult to conceive of these distances).
 - 3) Show this video. It highlights some of the problems and misconceptions of scaled models of the solar system. <https://www.youtube.com/watch?v=zR3lqc3Rhfg>
 - 4) Tell students that they will be exploring a Minecraft Edu model of the solar system to help them understand the relative distances of the sun and planets. Tell students that they will be able to SEE the relative distances of the planets and the sun in the Minecraft world. PLEASE INFORM STUDENTS of the following caveats: a) this model does not account for the sizes of planets (that is addressed in another Minecraft Edu world); and b) this model does not account for things like orbital inclination (the tilt of orbital pathways). Tell students that in this world, 1 block is equal to 10 million kilometers. Tell students that there are NPCs (non player characters) in this world they should INTERACT or TALK with them to learn interesting facts about each of the bodies.
 - 5) Print and pass out the Note-taking sheet (Page 2 and 3 of this lesson plan). Students should try to collect as much information on the Note-taking sheet as possible. They will have a limited time (perhaps 45 minutes) to collect that information. Tell students that they will have to take an assessment afterwards, based on the information that they collect on their Note-taking sheets.
- *Note: for students who have difficulty reading or writing, it may be a good idea to partner them with students who are proficient readers/writers, so that all students can benefit from the written information in the world.
- 6) Activate the world. Please make sure that it is set to "Minecraft Edu" mode, and that students CANNOT build, but they CAN ALWAYS FLY (it may be necessary to fly to access some parts of the map).
 - 7) At the end of the time session, FREEZE the players, and have them disconnect.
 - 8) To assess student understanding, teachers may have students play a Kahoot (for basic understanding) or a Socrative (for more detailed understanding). Alternatively, teachers may give other forms of assessment, like a written reflection, or having them create a physical scaled model of some sort, or having them recreate the scaled model in another Minecraft world (not included in this lesson).
 - 9) To supplement or deepen understanding of this topic, students could read books or visit sites on planetary sizes. I would also recommend the site, "The Scale of the Universe 2" (<http://htwins.net/scale2/>), and have a scavenger hunt to find the different planets, and list down objects that are all relatively the same size as specific planets.

NAME _____

DATE _____

PLANETARY DISTANCES NOTE-TAKING SHEET

Draw a picture of each Object below.	Distance from Sun:	How long is a year?	Interesting Facts
MERCURY	Average: Aphelion: Perihelion:		
VENUS	Average: Aphelion: Perihelion:		
EARTH	Average: Aphelion: Perihelion:		
MARS	Average: Aphelion: Perihelion:		
JUPITER	Average: Aphelion: Perihelion:		

SATURN	Average: Aphelion: Perihelion:		
URANUS	Average: Aphelion: Perihelion:		
NEPTUNE	Average: Aphelion: Perihelion:		
PLUTO	Average: Aphelion: Perihelion:		