Laarman Lesson Plan

Class: Earth Science Unit: Space Standards: ESS2-1, ESS2-2, ESS1.B

Topic: The Sun Date: 9/19/16

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| **Materials, Prep** | Laptop cart |
| **Procedure** | 1. Complete video: The Empire of the Sun  * Students complete video quiz while watching  1. Students enjoy the “Eyes on the Solar System” simulation at nasa.gov |

Topic: The Planets Date: 9/20/16

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| **Materials, Prep** | Laptop Cart, planets quiz |
| **Procedure** | Students are divided into groups of four. Each student researches one of the terrestrial planets and shares the information with the group. Repeat with the gas giants. Students fill out the planets quiz while they learn from their partners. |

Topic: The Moon Date: 9/21/16

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| **Materials, Prep** | Moon Multimedia, textbooks |
| **Procedure** | 1. Student partnerships respond to discussion questions on the Moon by first guessing at the answer and then discovering it in the book 2. Moon multimedia through rise and set times |

Topic: Moon Phases Date: 9/22/16

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| **Objective** | Students work together to construct a model to answer questions. |
| **Procedure** | Student groups create a model to illustrate the cause of the phases of the moon and solar eclipses. |

Topic: Orbits in Space Date: 9/23/16

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| **Anticipatory Set**  **-connection, motivation, relevance** | Why do astronauts “float” in space? |
| **Procedure** | 1. Lecture/discussion  * What is weight? (the amount of force an object exerts) * If you were on a scale in an elevator what would happen to your weight when the elevator accelerates upward? Accelerates downward? The cable breaks? * Any time you’ve jumped off something you’ve been in freefall and have been weightless * Now say you were on a giant tower and jumped off. Where would you land? What if you had a running start? What if you ran so fast you never reached Earth’s surface? (you’d be in orbit) * Interactive: <http://media.pearsoncmg.com/aw/aw_0media_astro/if/if.html?escape_v_earth> * Conclusion: astronauts in space are weightless because they are in constant freefall * Do space stations or satellites need to be continually propelled to stay in orbit?   + No: Newton’s 1st Law states that an object moves at a constant velocity if no force acts upon it * What forces could act on objects in space?   + Gravity from other objects * What determines if gravity is going to have an effect?   + Newton’s Law of Gravitation: Fg=G(M1M2)/d2 where Fg is the force of gravitational attractions, G is the gravitational constant, M is the masses of the objects, and d is the distance between them  1. Law of Universal Gravitation video (Safari Playlist) |