Laarman Lesson Plan

Class: Earth Science Unit: Space Standards: ESS1-1, ESS1-2, ESS1-3

Topic: Modeling the Universe in Space and Time Date: 9/12/16

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| **Materials, Prep** | Universe Time Scale Worksheet |
| **Objective** | Students will be amazed as they grasp the time periods associated with the universe. |
| **Anticipatory Set**  **-connection, motivation, relevance** | Recall Friday: How long is a trillion seconds?  What does it mean to make a map or model to scale? Are there other types of models we can make to scale? |
| **Procedure** | 1. Introduce assignment: models, scale, [ratios](http://www.mathsisfun.com/numbers/ratio.html), and reading carefully 2. Student partnerships complete worksheet, which guides them in creating a time-scale model of the Universe. |

Topic: Dark Energy Date: 9/13/16

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| **Objective** | Students will consider the evidence for the existence of dark energy. |
| **Anticipatory Set**  **-connection, motivation, relevance** | * If the universe started with a “Big Bang,” what should happen to the rate of expansion of the universe? |
| **Procedure** | 1. Watch bookmarked segment of video (“Runaway Universe” from Safari ES playlist) 2. Check for understanding: student partners summarize why scientists believe there must be some sort of “dark energy” 3. Watch QA video on the size of the universe (from Safari ES playlist) |

Topic: Stars and Nucleosynthesis Date: 9/14/16

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| **Materials, Prep** | Stars Multimedia |
| **Objective** | Students will explain how stars create elements. |
| **Anticipatory Set**  **-connection, motivation, relevance** | Why is the Sun (and other stars) so hot? |
| **Procedure** | 1. Stars Multimedia for student notes (Start with galaxies section) 2. Black holes video (Safari playlist) 3. Stars Multimedia: making elements |
| **Closure** | Small group discussion: What elements are most prevalent in the Earth? What elements are most prevalent in the human body? How are they produced? We are star stuff! |

Topic: The Size of the Solar System Date: 9/15/16

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| **Materials, Prep** | Model Solar System Sun and planet representations |
| **Objective** | Students will be amazed as they grasp the size and distances of objects in the solar system. |
| **Anticipatory Set**  **-connection, motivation, relevance** | We use models all the time in science. Do we have any models representing the solar system in here? Are they to scale?   * Discussion of scale |
| **Procedure** | Class conducts the “Thousand-Meter Solar System” lab |

Topic: The Sun Date: 9/16/16

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| **Procedure** | Video: The Empire of the Sun; students take notes on a note sheet to turn in. |