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| **Lesson Plan Template** |
| **Teacher:** | Brian Hardison |
| **Grade/Subject:** | 7th/8th |
| **Course Unit:** | Math |
| **Lesson Title:** | Solar Cars and Angles |

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| **LESSON OVERVIEW** | Summary of the task, challenge, investigation, career-related scenario, problem, or community link |
|  .-Students will become more familiar with solar panels and how they  are a clean, renewable alternative to nonrewable resources. They will also be introduced to the idea that there is a coorelation  between latitude and the geometric angle of the solar panel. The panel must be adjusted accordingly for maximum efficiency.   |

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| **STANDARDS** | Identify what you want to teach. Reference State, Common Core, ACT College Readiness Standards and/or State Competencies. |
|  Math- 7.NS.A.3 -7.EE.B.3 Science- 0707.T/E.2 - 0707.7.7 -0707.7.5 \*\*\*The integration of science standards is a way of “teaching across the curriculum” to grasp deeper understanding. |

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| **OBJECTIVE** | Clear, Specific, and Measurable – NOT ACTIVITIESStudent-friendly |
|  .- students will learn the basics of the earth’s tilt and how it plays a  very important role in our seasons. They will be introduced to solar panels and the pros and cons of using this technology. Through fixed math formulas, the students will determine the angle at which the solar panel must be placed. |

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| **INTRODUCTION** | Should Include: Any prior knowledge that the students need to complete the lesson, approximately how long the lesson is predicted to take (Ex. 1 Day or 2 Days), and a short summary of the entire lesson plan. |
|  -Students will view the solar panel youtube video to become more  familiar with solar panels and how they work. - Lesson will take 2-3 days |

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| **MATERIALS LIST** | A bullet list of materials.The materials need to be specific and include quantities |
|  -solar car kits -paper/pencil -world map -protractor -smart board/digital camera -black electrical tape  |

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| **RESOURCES** | Should Include: A bullet list of any links to videos, names of worksheets, names of projects, names of PowerPoints, links to online articles, links to interactive websites, names of reading materials, etc (All worksheets, PowerPoints, projects, and reading materials should be attached to the back of the lesson plan). Specify whether they will be used before, during, or after the lesson. |
|  -<https://www.youtube.com/watch?v=xKxrkht7CpY>  -<http://www.solarpaneltilt.com/> (adjustable solar panel formulas to challenge advanced students) |

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| **ACTIVATING STRATEGY** | Motivator / HookAn Essential Question encourages students to put forth more effort when faced with complex, open-ended, challenging, meaningful and authentic questions. |
|  - <https://www.youtube.com/watch?v=NDZzAIcCQLQ> (shown a beginning of lesson to peak their interest) |

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| **INSTRUCTION** | Step-By-Step Procedures – SequenceDiscover / Explain – Direct InstructionModeling Expectations – “I Do”Questioning / Encourages Higher Order ThinkingGrouping StrategiesDifferentiated Instructional Strategies to Provide Intervention & Extension |
|  -Have discussion about latitude and it’s coorelation with angle of  the sun and how solar panels must be adjusted accordingly. -show video at beginning of class to introduce these concepts -show students a solar panel via the digital camera-displayed on  smart board -construct solar car on second day of instruction for students to observe   |

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| **GUIDED & INDEPENDENT PRACTICE** | “We Do” – “ You Do”Encourage Higher Order Thinking & Problem SolvingRelevanceDifferentiated Strategies for Practice to Provide Intervention & Extension |
|  -Guide students through first calculation……”If your latitude is  below 25 degrees, multiply the latititude times .87”. This will be the angle at which you will adjust your solar panel to. “If your latitude is between 25 and 50 degrees, multiply the latitude times .76, then add 3.1 -students will be given 10 random locations on a map to solve the  angle of the solar panel. \*\*\*more advanced students …..teacher can review adjustable  formulas at <http://www.solarpaneltilt.com/> -Day 2, construct solar cars. (teacher should model this before handing out to students) -Day 3, apply what has been learned and compete in solar car  races.  |

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| **CLOSURE** | Reflection / Wrap-UpSummarizing, Reminding, Reflecting, Restating, Connecting |
|  - Last 5 minutes of class, students will be given a sticky note and  write one thing……..they learned, or one thing that peaked their  interest and want to know more, or one thing they didn’t quite grasp and need more guidance.  |

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| **CROSS-CURRICULAR CONNECTIONS** |
|  -Science…..standards listed above |

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| **ASSESSMENT /** **EVALUATION** | Students show evidence of proficiency through a variety of assessments. Aligned with the Lesson ObjectiveFormative / SummativePerformance-Based / RubricFormal / Informal |
|  Students will be assessed via quiz/exam at end of chapter or unit |

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| **CITATIONS** | Any websites that were used to gather information. |
|  <http://www.solarpaneltilt.com/>  - <https://www.youtube.com/watch?v=NDZzAIcCQLQ> |

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| **NOTES:** | Purchasing information for non-typical itemsTips & Tricks that may help |
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