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| Unit Title: | Solar Photovoltaics |  | Grade: | 8-12 |

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| Learning Styles: | All students have different learning styles, and we are using a mixture, based on seven recognized learning styles: Visual, Aural, Verbal, Physical, Logical, Social and Solitary. We believe this module incorporates different learning styles and that vicarious learning on the part of a student is critical for growth. Learning styles in this module include:  •Visual: Pictures and images used  •Verbal: Words to help convey meaning  •Social: Students should discuss |
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| Unit Description: | This unit will explain basic principles of Photovoltaics. Additionally, it will demonstrate how to effectively incorporate PV systems into stand-alone or interconnected electrical systems. This module will introduce and apply key terms to system operations. |
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| Instructional Objectives: | The curriculum is designed to achieve the following objectives for each individual area.  Radiation  1. Solar photovoltaics  2. Irradiance  3. Insolation  4. Declination  5. Solar window  6. Sun hours  Off grid vs Connected  1. Stand alone or connected  2. Electrical grid  3. Electrical loads  4. Autonomy  Cells, Modules, Arrays  1. Solar Cells  2. Semiconductor  3. P/N junction  4. Sizing  5. Configurations  Inverters  1. AC and DC voltage  2. Sine waves  3. Types of inverters  Racking  1. Racking systems  2. Mechanical considerations  3. Roof mounting  4. Ground mounting |
| Estimated Time: | 10-14 hours depending on students |
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| Teaching Strategies: | Lecture: Present materials in a structured manner.  Active Learning: Promote active learning and critical thinking in discussion. Seek from students in discussion real-life applicability for the use of renewable energy resources and the concepts provided. |
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| Assessments: | At the end of each power point have the students answer questions based on the power point. At the end of the module create an assessment combining the five power points which the student can demonstrate basic knowledge of the subject. The assessment should be based upon discussions and power points. |
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| Instructional Outcomes: | The outcomes for this unit include:  1. The student will identify residential systems.  2. The student will discuss the relationships between the sun and earth.  3. The student will explain key terms in PV.  4. The student will compare off-gird and on-grid applications.  5. The student will recognize different collectors.  6. The student will compare different collectors and efficiency.  7. The student will identify different controls.  8. The student will apply the appropriate electrical terminology.  9. The student will explain the electrical grid.  10. The student will understand the schematic of a PV layout. |

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