

	Essential Questions	Topics	Terminology	Skills	Assessment
Fall Sept/ Spring April	*What is Solar Radiation? *What factors influence the availability and intensity of solar radiation at Earth’s surface? *What is the photovoltaic effect? *What are the major PV technologies? *What are the environmental risks and benefits of PV? *How are cells, modules, and arrays related, and how is their performance quantified? *What factors influence PV system performance? *What role do other PV system components play and how are PV systems configured? *How is PV energy stored (batteries)?	*Sun/Earth Relationships *The science of the photovoltaic effect. *PV technologies. *Environmental cost/benefit *Cells, modules, arrays *Array Orientation *Effect of Shading, temperature *PV performance standard test conditions. *PV Site Selection *PV System Components *System configurations *Battery storage	*Peak sun hours *Solar declination *Solstice/equinoxes *Sun path *Solar Window *PV Effect *Semiconductors *Doping *p-n junction *Array tilt angle *Array azimuth angle *Sun tracking *Short circuit current *Open circuit voltage *Maximum power point *Renewable Resource Data Center (RReDC of NREL) *Solar pathfinder *DC vs AC *Charge controllers *Inverters *Grid tied/Net metering *Deep cycle lead acid batteries.	*Properly configure a DC PV system to successfully charge a battery or bank of batteries; use the stored energy to power a DC appliance. *Calculate zenith angle and perform air mass calculations. *Calculate array area ($A = \text{peak power}/\text{efficiency}$) *Generate a current voltage (I-V) Curve *Investigate the effect of temperature on PV performance. *Investigate the effect of irradiance on PV current and voltage. *Investigate the effect of temperature on PV performance. *Explore parallel and series connections. (cells, modules, as well as battery banks.	*Student generated newsletter. *Project reports *Student generated informational displays *Student presentations of learning. *Quiz/Exam *public presentation at Pioneer Valley Science and Sustainability Expo.