



Nebraska Solar Schools is a program of the nonprofit Nebraskans for Solar (NFS). The purpose of our Solar Energy Education & Development Program is to provide resources for K-12 teachers to facilitate integration of renewable energy education into their classrooms or after-school programs. Resources are also provided for those who want to install a photovoltaic (PV) system at their schools.

### **Solar Energy Kits for K-12 Nebraska Schools**

Nebraska Solar Schools has launched a new project made possible through a grant from the Nebraska Environmental Trust: 100 Solar Energy Kits for K-12 Nebraska Schools. The kits are available at no cost to teachers and principals.

### **NEED Solar Energy Kits**



The National Energy Education Development (NEED) Project partners with numerous local, state, and national energy outreach programs, including Nebraska Solar Schools and similar renewable energy education and development programs. NEED, which began in 1980, relies on an extensive nationwide Teacher Advisory Board to ensure that all curriculum materials are objective, up-to-date, scientifically accurate, and meet the requirements of national and state science standards.

### **Benefits of the NEED Solar Energy Kits**

- NEED Solar Energy Kits' cross-discipline lesson plans, projects, and activities support Nebraska Science Standards.

- The four grade-level kits contain all the materials needed for completing each unit, providing an easier and less time-consuming way for teachers to integrate renewable energy education into their curriculum planning.
- Almost all the materials in the kits are reusable, making them cost-effective. Replacement kits with new student guides and consumables are a fraction of the cost of the main kits.
- Most NEED modules are inquiry-based, helping students to develop and access critical thinking and problem-solving skills. Activities that are not inquiry-based are engaging and interactive.
- NEED materials provide evaluation strategies, including pre- and post-assessments, rubrics, and project-based tasks, enabling teachers to track their students' knowledge gain

## **Brief Descriptions of the Kits**

### **The Sun and Its Energy: Grades K-2**

Primary students are introduced to solar energy with a read-aloud book and classroom-based activities. Students will learn that the sun's energy produces light, transforms to heat, powers the water cycle, produces wind, and that solar cells convert radiant energy into electricity. The kit includes an all-encompassing teacher and student guides and the materials necessary to conduct the activities. Activities include: UV Beads, Solar Oven & S'Mores, Sun Prints, Solar Balloon, Solar House, Solar Energy's Uses, Games & Puzzles.

### **Wonders of the Sun: Grades 3-5**

Elementary students develop a basic understanding of solar energy through background reading and classroom activities. Hands-on activities demonstrate solar energy transformations into kinetic energy, thermal energy, chemical energy, and electricity. The kit includes a Teacher Guide, a class set of 30 Student Guides, and the materials necessary to conduct the activities. Activities include Nature Prints, Solar Energy to Heat and Motion, Latitude and Sunlight Intensity, Radiometer, Cooking With Solar Energy, Transforming Solar Energy Into Electricity, PV Systems on Schools, Solar Energy Bingo, Solar House Kits, links to Games, Puzzles and More Activities.

### **Energy from the Sun: Grades 6-8**

Intermediate students learn about solar energy through investigations that explore radiant energy transforming into thermal energy, kinetic energy, chemical energy, and electricity. The kit includes the following materials: Teacher Guide, class set of 30 Student Guides, and all the materials needed to conduct the activities. Activities include: Introduction to Solar Energy, Radiation Cans – Converting Radiant Energy to Heat, Solar Collection with a Solar Distiller, Photovoltaic Cells (PV Cells), Temperature and UV Beads, Solar Balloon, Solar Oven Challenge, Designing a Solar House, Photovoltaic Arrays on Schools, Solar Energy Bingo, Solar Energy in the Round Game, links to Awesome Extras.

## **Exploring Photovoltaics: Grades 9-12**

Secondary students learn how solar energy is used to generate electricity. Students are introduced to photovoltaic systems, concentrated solar power, and developing solar technologies. Activities explore how photovoltaic cells work and what variables affect their electrical output. The kit includes a Teacher Guide, a class set of 30 Student Guides, and all the materials necessary to conduct the activities. Activities include: Introduction to Solar Energy, Investigating PV Cells (Parts 1-3), Solar Energy in the Round Game, PV Ping Pong Simulation, Digital Multimeter, Series Circuits, Parallel Circuits, Calculation of Power, Basic Measurement Values in Electronics, Solar Array Wiring, Solar Space Heating, Solar Energy Bingo.

### **Additional NEED Resource for Schools With Solar Systems**

*Schools Going Solar*: Free PDF Download

This 56-page guide provides lessons and activities to support and incorporate installed photovoltaic systems into the classroom-learning environment.

Grade Levels: Intermediate and Secondary

Subject Areas: Science, Math, Technology, Social Studies, and Language Arts.

**All Nebraska K-12 schools** are encouraged to participate in the Solar Energy Education & Development Program and to submit a request form for a NEED Solar Energy Kit. If sufficient interest is demonstrated to warrant expanding this pilot project, Nebraska Solar Schools will seek additional funding.

### **Terms of Agreement for Schools Awarded a NEED Solar Kit**

- Each teacher who uses the NEED Solar Kit is asked to complete a minimum of two projects or activities from the kit.
- Each teacher who uses the kit is also required to complete a one-page project evaluation by May 15, 2020. The evaluation form will be emailed to the person who requests the kit. He or she is asked to make copies of the evaluation form and distribute them to all participating teachers and after-school program leaders.
- When both of the above requirements are completed, teachers and their students who participated in this pilot project will be awarded a Nebraska Solar Schools Certificate, which will also include the Nebraska Environmental Trust seal, to display in their classrooms.

To request a kit, download and complete the [NEED Solar Kit Request Form](#) and email it to Nebraska Solar Schools Facilitator: [HelenDeffenbacher@NebraskaSolarSchools.Org](mailto:HelenDeffenbacher@NebraskaSolarSchools.Org). The kits are shipped to schools via UPS, addressed to the person whose name is on the Request Form.