

Sunny Weather

Objective

Students will track sunny days using an online weather site and graph the collected data.

Background

Solar is the Latin word for sun—a powerful source of energy that can be used to heat, cool, and light our homes and businesses. That’s because more energy from the sun falls on the earth in one hour than is used by everyone in the world in one year. Oklahoma ranks seventh in the nation for solar energy potential because we have so many sunny days. On average we have 3,089 total hours of sunshine per year.

A variety of technologies convert sunlight to usable energy for buildings. The most commonly-used solar technologies for homes and businesses are solar water heating, passive solar design for space heating and cooling, and solar photovoltaics for electricity.

Solar photovoltaics solar cells, also called photovoltaic (PV) cells, convert sunlight directly into electricity. PV gets its name from the process of converting light (photons) to electricity (voltage), which is called the PV effect. The PV effect was discovered in 1954, when scientists at Bell Telephone discovered that silicon (an element found in sand) created an electric charge when exposed to sunlight. Soon solar cells were being used to power space satellites and smaller items like calculators and watches. Today, thousands of people power their homes and businesses with individual solar PV systems. Some utility companies use PV technology for large power stations.

Solar panels use both direct and indirect sunlight to make electricity. Solar panels used to power homes and businesses are typically made from solar cells combined into modules that hold about 40 cells. A typical home will use about 10 to 20 solar panels to power the home. The panels are usually mounted at a fixed angle facing south, or they can be mounted on a tracking device that follows the sun, allowing them to capture more sunlight. Many solar panels combined together to create one system is called a solar array. For large electric utility or industrial applications, hundreds of solar arrays are interconnected to form a large utility-scale PV system. Traditional solar cells are made from silicon, are usually flat-plate, and generally are the most efficient.

Solar farms require five to seven acres of land per megawatt capacity. In Mustang, Oklahoma, Oklahoma Gas & Electric operates a farm that occupies over 16 acres of land and features 2,000 fixed and 8,000 sun-tracking solar panels. This farm generates enough electricity for over 1,000 homes.

Oklahoma Academic Standards

GRADE 3

Earth’s Systems: 2-1
Data & Probability: 1.1

GRADE 4

Physical Science: 3-2,3,4
Data & Probability: 1.1,2

GRADE 5

Earth and Human Activity:
3-1,2
Data & Probability: 1.1.2

GRADE 6

Physical Science: 3-3. Earth and
Human Activity: 3-3
Data & Probability: 1.1,2

Procedures

1. Read and discuss background and vocabulary.
2. Oklahoma ranks seventh in the nation for solar energy potential because we have so many sunny days. On average we have 3,089 total hours of sunshine per year.
 - Students will track the number of sunny days in your town for one month, using a weather tracking website like Oklahoma Mesonet: <https://www.mesonet.org/index.php/weather/local>
 - Students will choose an appropriate graph to record the data they have collected.
 - Students will find the measures of central tendency and range of the data set.
 - Students will explain and justify which measure of central tendency would provide the most descriptive information for the data set.