



Watts On Your Mind?

Solar energy educational activities for schools

Activity Overview

Grade Level: Varies
Activity: WOS-4

Description

Students will use a computer with a spreadsheet application to analyze the data from other schools in the Watts On Schools program and compare performance among schools.

Learning Outcome

Students will learn about other school's solar electric system performance and infer what may cause differences in performance.

Subjects

Computer science, geography

Process Skills Used

Discussion, application, research, and computer literacy, communicating, group interaction

Duration

2 class periods

Key Vocabulary

Fields, equivalent kilowatt-hours, download

Curriculum Standards

Texas (TEKS): 112.42.c.6,
112.48.b.3

Louisiana (LSCS): PS-H-F1

Arkansas (ASCF): 3.1.34,
4.1.28

National (AAAS Project
2061):

The Designed World – 12th

The Physical World – 12th

Comparison of Schools

Materials

- Computer with internet access or connected to solar electric system
- Computer spreadsheet application
- Worksheet included in activity

Method

Divide the class into groups according to the number of computers available (preferably 19). Assign each group to a participating school in the Watts On Schools program and ask them to download the data file for the current year. Follow directions on the worksheet and analyze data for the previous month. Compare and discuss any differences in performance between the schools.

Background

Eighteen other schools, such as yours, also have solar electric systems generating electricity for their building. These schools are located throughout Texas, Arkansas and Louisiana. Because the schools span a wide geographic area, each solar electric system may perform slightly differently than yours. Factors that may influence a system's performance include climate and topography. Figure 1 shows the location of all 19 schools in "Watts On Schools."

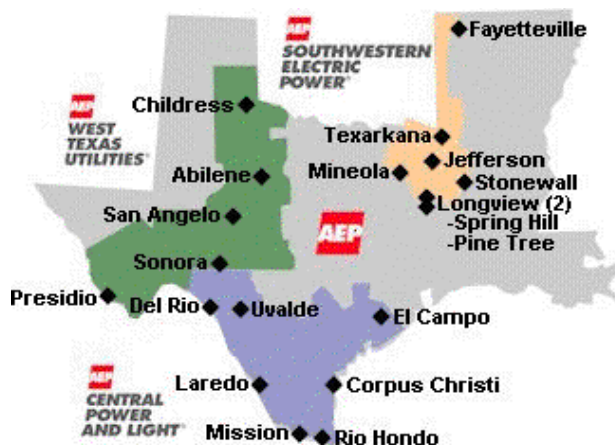


Figure 1. Location of Watts On Schools Solar Electric Systems



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Following is a list of all the schools participating in “Watts On Schools”:

- Abilene, Texas - Abilene Independent School District Planetarium
- Childress, Texas - Childress High School
- Corpus Christi, Texas - Calallen High School
- Del Rio, Texas - Del Rio High School
- El Campo, Texas - El Campo Middle School
- Fayetteville, Arkansas - Fayetteville High School
- Jefferson, Texas - Jefferson Middle School
- Laredo, Texas - Martin High School Health Sciences Magnet School
- Longview, Texas - Pine Tree Junior High School
- Longview, Texas - Spring Hill Junior High School
- Mineola, Texas - Mineola High School
- Mission, Texas - Mission High School
- Presidio, Texas - Presidio High School
- Rio Hondo, Texas - Rio Hondo High School
- San Angelo, Texas - Central High School
- Sonora, Texas - Sonora High School
- Stonewall, Louisiana - North DeSoto Middle School
- Texarkana, Arkansas - Trice Elementary School
- Uvalde, Texas - Uvalde Junior High School



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Worksheet

Part A – Calculations/Observations

Calculate/identify the following values for your assigned school:

VARIABLE	VALUE
School:	
Month:	
Year:	
Total kilowatt hours for the month:	
Average daily kilowatt hours:	
Peak kilowatts:	Date: _____
Peak wind speed:	Date: _____
Average high temperature:	
Average peak daily solar irradiance (for the month):	

Part B - Graph

1. Make weekly graphs of the following:
 - Kilowatts
 - Solar irradiance
 - Temperature
 - Wind

(*Advanced: Plot 2 variables on the same graph)

2. Describe the system's performance for your assigned school during the month:

Part C – School Comparison



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1. Ask a representative from each group to summarize the statistics calculated in Part A and summarize the PV system's performance for the month.
2. Make a chart on the chalkboard, overhead or other common area to compare each school's performance. Use the following chart as guidance:

VARIABLE	(School 1)	(School 2)	(School 3)	Etc.
Total kilowatt hours for the month:				
Average daily kilowatt hours:				
Peak kilowatts:				
Peak wind speed:				
Average high temperature:				
Average peak solar irradiance (for the month):				

Discussion

1. Which school produced the most kilowatt-hours for the month? Which school produced the least?
2. What are some of the major differences between each school's performance?
3. What are some possible explanations for differences in power production between the schools?

Further

Research climatic and topographic characteristics of each school's region to determine major differences that may affect the performance of their PV system.