

# CENTER FOR THE PHYSICS OF SOLAR AND WIND POWER



**LOCATION:** Frostburg State University, Frostburg, Maryland Allegany County

**ENTERING GRADES:** 6 - 8

**TYPE:** Residential and Non-residential

**DATES OF OPERATION:**

June 21 - 27

**TUITION:** \$375 for a one-week (Sunday - Saturday) residential program; \$260 for commuters\* (Need-based scholarships available.)

Do you love science and mathematics? Do you love physics? Would you like to use what you have learned in science classes to help make our world a more beautiful and cleaner place? Come and join us for a week of study and research on wind and solar energy. The Maryland Summer Center for the Physics of Solar and Wind Power will focus on mathematical modeling of energy available from sunshine and moving air.

We will begin with electric circuit experiments for you to expand your knowledge of electricity, power, and energy. You will use "Snap Circuits" to learn basic physical principles of voltage, current, power, and energy. You will work with miniature solar panels and a model windmill to learn the fundamentals of conversion of sunlight and wind power to electricity. Then you'll set up a model house with the windmill and solar panels to study how these basic principles

are applied to the residential use of renewable energy.

You'll use the results of the measurements from your model house to make predictions about how much power can be produced by full-size solar panels and a windmill attached to a real house. You'll compare your predictions with actual data from a solar and wind equipped house on the Frostburg State University campus. The sophisticated laboratory technology to be used includes computer-assisted data collection and analysis, a 40-foot wind tunnel, and the fully instrumented WiSE hybrid solar-wind electrical system. By doing research on the economics of electric power production and solar panels and windmills, you'll finally prepare arguments in favor of or opposing the use of solar and wind power as a source of energy for typical houses.

This Summer Center emphasizes hands-on learning and research activities. The five one-day sessions include electric circuit analysis with graphing exercises using graph paper, a computer spreadsheet, and computer-assisted data collection software; experimenting with solar cells under controlled light sources and a small windmill in a wind tunnel; scaling the results from the laboratory measurements up to a residential-size solar array and wind turbine, and analyzing data from an actual residential solar and wind power installation.



All the activities will be conducted by the students, with the help of the physics/engineering professors at Frostburg State University. At the end of the week, the students will present their research results to predict the economic and environmental value of solar panels and windmills.

The program is designed for gifted and talented students in middle school (entering grade 6 through entering grade 8).

\*The students have choices of staying on the campus of Frostburg State University for five nights (Residents), or staying with their parents/guardians overnight (Commuters). The Commuters are required to participate in all the Center activities, including those in the evenings.

**Mail completed application to:**

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