



# GLOBE Science Fairs

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Matt Silberglitt

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18 July 2016



Implemented by:  UCAR



- Overview of the US Regional Science Fair – Pacific Region
- Discussion of the 2016 International Virtual Science Fair
- Planning for the 2017 International Virtual Science Fair





# GLOBE Regional Science Fairs – Focus on Pacific

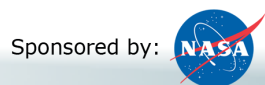
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July 18, 2016



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# Purpose

- To give students the opportunity to come together and share the results of their field investigations using the GLOBE protocols.
- Competition was broken up into grades 5-8, and 9-12.
- 6 US Regions:
  - \* Northeast & Mid-Atlantic
  - \* Southeast
  - \* Northwest
  - \* Pacific
  - \* Midwest
  - \* Southwest

Region	Location	City/State	Partners
Northeast & Mid-Atlantic	NASA Goddard Space Flight Center	Greenbelt, MD	Jessica Taylor, Michael Jabot, Todd Ensign, Rick Sharpe, Jaime Ford, Todd Toth
Pacific Region	Jet Propulsion Lab	Pasadena, CA	Erin Fender, Peggy Foletta, Svetlana Darche, Tracy Ostrom
Southeast Region	Museum of Natural Science	Jackson, MS	Lynne Hehr, Sherry Herron
Midwest Region	University of Toledo	Toledo, OH	Steven Smith, Kevin Czajkowski, David Bydlowski
Northwest Region	World Forestry Center	Portland, OR	Elena Sparrow, Paul Ruscher, Georgia Cobbs
Southwest Region	University of Texas – Tyler	Houston, TX	Janelle Johnson, Michael Odell, Teresa Kennedy

Region	Number of Projects	Number of Students
Northeast & Mid-Atlantic	12	30
Pacific Region	7	15
Southeast Region	6	27
Midwest Region	24	40
Northwest Region	7	20
Southwest Region	11	35

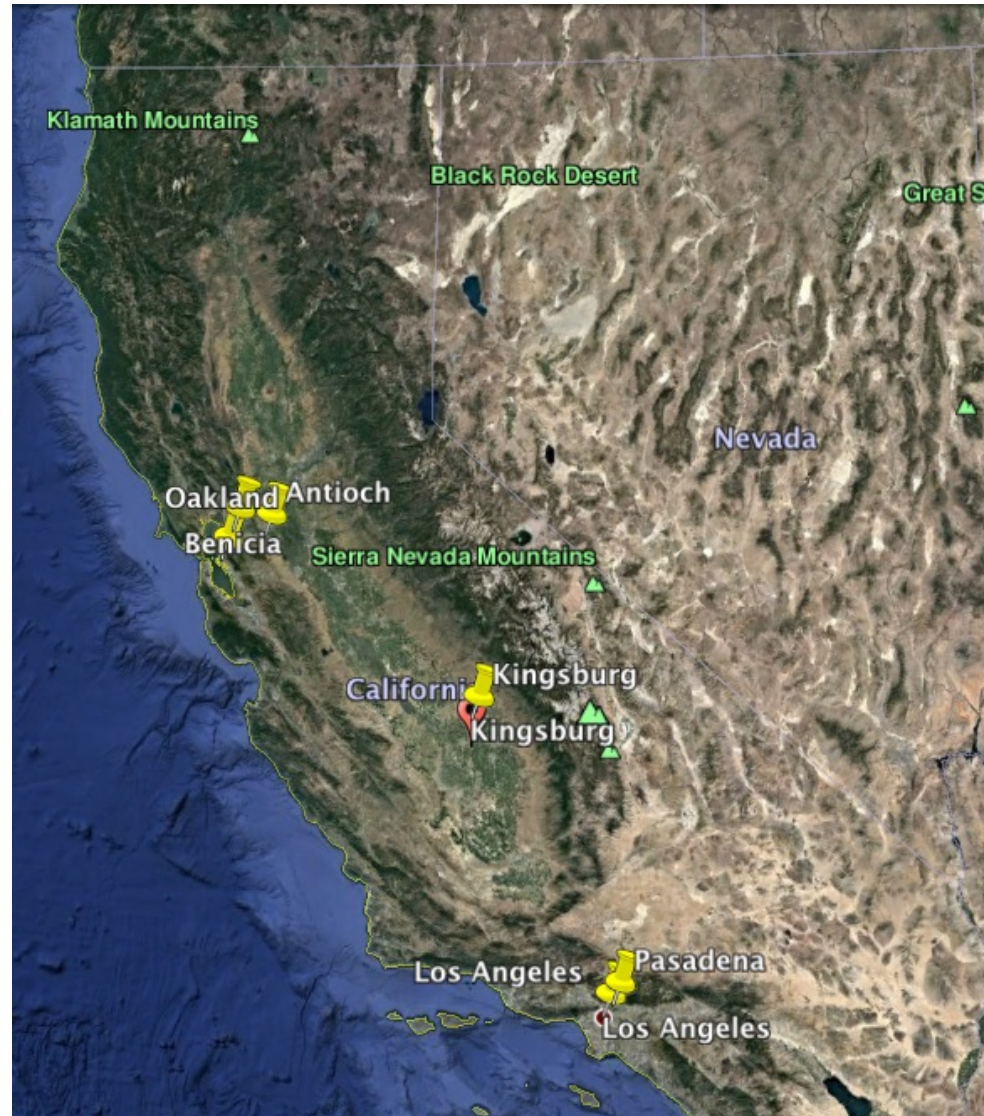


# Special Acknowledgements (Pacific Region)

- Tracy Ostrom, University of California Berkeley
- Jen Bourgeault, GLOBE Country Coordinator
- Svetlana Darche, WestEd
- Henry Ortiz, LAUSD, and Annie Richardson, JPL
- Dr. Bill Patzert, Dr. Mike Deflorio and Dr. Naiara Pinto
- Jim Rounds, JPL Videographer
- Peggy Folleta, GLOBE Master Trainer

# Pacific Region—Participants

- **Schools:** We had 7 schools represented, 5 high schools & 2 middle schools.
- **Research Projects:** Focused on many aspects of GLOBE including topics on tropospheric ozone, SMAP data comparison and biodiversity.
- **Areas Represented:**
  - Northern California: Oakland, Benicia and Antioch high schools.
  - Central California: Kingsburg high school.
  - Southern California: Pasadena and Los Angeles



# Lessons Learned

- Encourage an early start, so that students have more time to collect GLOBE data.
- Let teachers know about the webinars early in the school year, and provide them with the poster template well in advance.
- Encourage teachers to be intentional in teaching students about the development of good research questions, in addition to analytical skills and drawing sound conclusions.



# Lessons Learned cont.

- Introduce the assessment rubric early in the school year and use it as a teaching tool
- Allow for “engineering solutions” projects in addition to science research. Use GLOBE data and leverage work with NASA
- Move to a criteria based symposium. Much like science peer review publications/research. Students need to understand criticism is part of doing science, and science is process of gradual improvement (not a contest).

# Lessons Learned cont.

- “***Math is the language of science***”. Students have clear quantitative hypotheses in the introduction, but we do not ask them to use quantitative tools in the Methods.
- Students understood scale and spatial variability when making comparisons between remote sensing and field data. GLOBE should consider adding a tutorial on scaling and common Cal/Val issues.
- Have teachers and classmates reproduce the research and report out during the presentation. This will teach students about the importance of reproducibility in science.



**Play Video**



Thanks  
Go GLOBE!





# GLOBE International Virtual Science Fairs

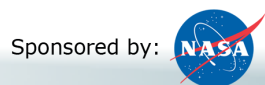
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# International Virtual Science Fair 2016

Region	Number of Entries
Africa	0
Asia and Pacific	22
Europe and Eurasia	10
Latin America and Caribbean	7
Near East and North Africa	44
North America	22
<b>Total</b>	<b>105</b>

# International Virtual Science Fair 2016

Region	Number of Judges
Africa	3
Asia and Pacific	4
Europe and Eurasia	5
Latin America and Caribbean	2
Near East and North Africa	1
North America	9
<b>Total</b>	<b>28</b>

Region	Number of Mentors
Africa	6
Asia and Pacific	6
Europe and Eurasia	8
Latin America and Caribbean	4
Near East and North Africa	5
North America	8
<b>Total</b>	<b>37</b>

Each judge was sent an appreciation certificate after scoring was complete.

# International Virtual Science Fair 2016

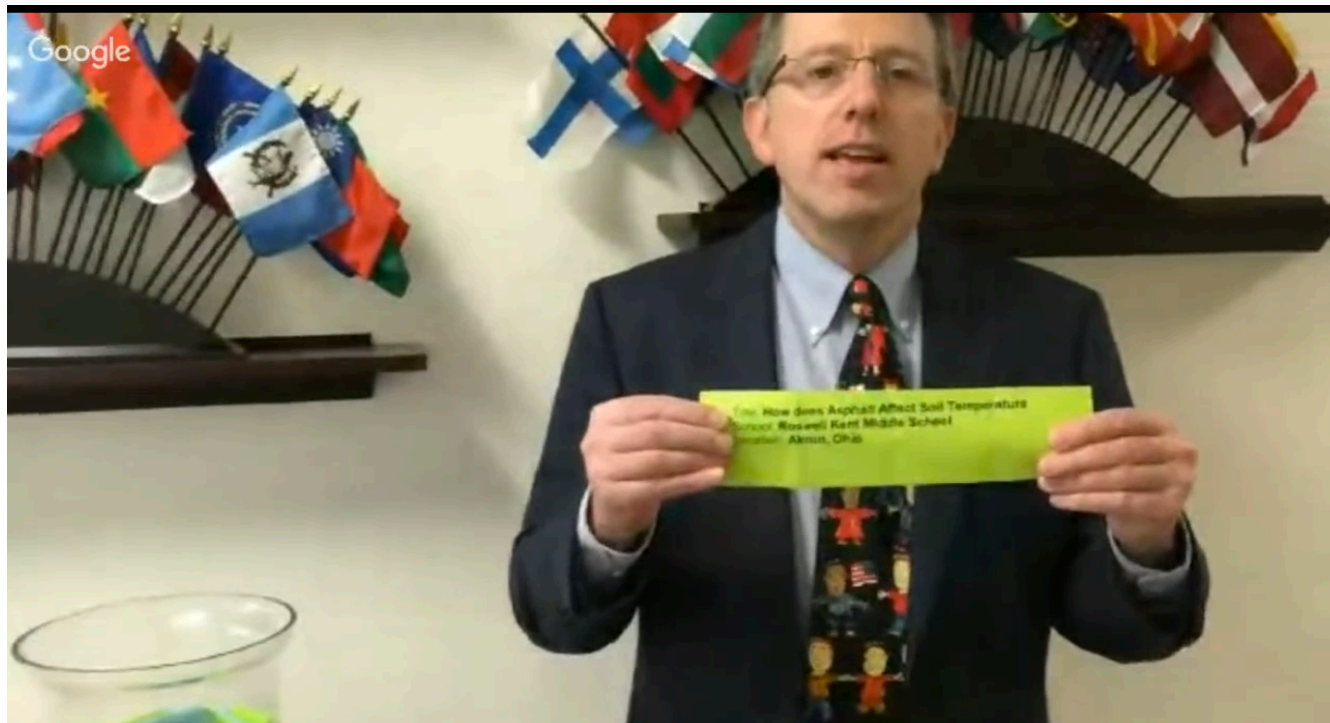
- Each student team was emailed a detailed score sheet with feedback from judges (4/22)
- Virtual badges were assigned and placed on each school's profile (4/21)
- All students earned a "Student Research Badge" and selected optional badges





# International Virtual Science Fair 2016

**Drawing for stipend held on 4/22 during GLOBE Google Hangout**



# International Virtual Science Fair 2016

## U.S. -

Title: [The Effect of Land Use on Water Quality](#)

School: St. Francis Xavier Catholic School

Location: Gettysburg, Pennsylvania

Teacher: Amy Woods

Title: [How does Asphalt Affect Soil Temperature](#)

School: Roswell Kent Middle School

Location: Akron, Ohio

Teacher: Steve Frantz

## International -

Title: [Seasons and Climatic Factors Affecting Dengue Cases in Muang Nakhon Si Thammarat, Thailand](#)

School: Princess Chulabhorn Nakornsrihammarat

Location: Nakhon, Srithammarat, Thailand

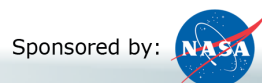
Teacher: Kanokrat Singnui

Title: [Determining the Presence of heavy metals in the air by using GLOBE protocols for aerosols, conductivity and pH](#)

School: Prirodoslovna i graficka skola

Location: Rijeka, Croatia

Teachers: Marina Pavlić and Irena Sabo



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# International Virtual Science Fair 2017

<http://globe.gov/science-fair>

- Due date: 03 April 2017
- Scores and Badges Announced: 15 May 2017



## Project elements for 6–8 and HS (bold=required)

1. Abstract or Summary
2. **Research Question(s)**
3. Hypothesis
4. Student-led Investigation Plan
5. **Research Methods (including GLOBE protocols)**
6. **GLOBE data and data entry**
7. **Data summary – tables and/or graphics**
8. Data analysis
9. **Conclusions**
10. Discussion of limitations
11. Bibliography/Citations
12. Responses to judges' comments

## Project elements for K-2 and 3-5 (bold=required)

1. Abstract or Summary
- 2. Research Question(s)**
3. Student-led Investigation Plan
- 4. Research Methods (including GLOBE protocols)**
- 5. GLOBE data and data entry**
- 6. Data summary – tables and/or graphics**
- 7. Conclusion**
8. Bibliography
9. Responses to judges' comments

# Helpful Reminders

- Use GLOBE data
- Look for reasons to collaborate
- Don't forget to match the research question to the research
- Use feedback from scientists to revise your project
- Recognize the limitations of your project and be up front about them

# Suggestions for 2017

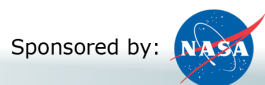
- Add undergraduate category (same rubric as HS)
- Judges attend rubric calibration training
- Judges who sign up commit
- .....



# Thank you!

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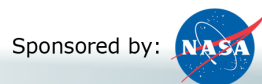
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# The Effect of Land Use On Water Quality

...

Madison Sieg



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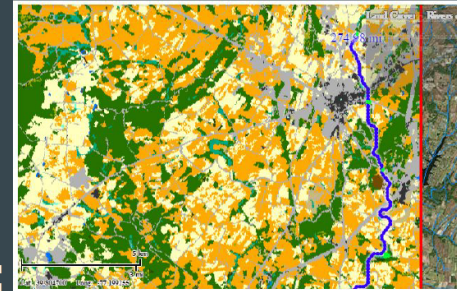
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# Research Question

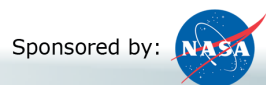
This experiment focuses on the question:  
How does land usage affect the water quality of Rock Creek?



This study was prompted by questioning the water quality of the local streams and whether or not they were contributing harmful water to the Chesapeake Bay. Land use was also evaluated to determine if questionable water quality levels were the result of runoff and/or industry pollution. It is important for all streams within the Chesapeake Bay watershed to be monitored and work towards contributing clean water to the Bay to help save the Bay and all its resources.

# About the Experiment

This experiment is designed to test the effect of land usage on the health of the stream/creek. The independent variable tested is the location along the stream being tested. The dependent variables that will be measured are the levels of dissolved oxygen, nitrates, pH, water temperature, conductivity, and water transparency. Dissolved oxygen will be measured in mg/L. Nitrates will be measured in mg/L. pH will be measured in the logarithmic scale from 0-14. Water temperature will be measured in degrees Celsius. Conductivity will be measured in microsiemens/cm. Water transparency will be measured in centimeters. The controls for this experiment are the day all the testing will take place, the time the tests are completed, and how samples are collected and tested.



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# Determining the presence of heavy metals in the air by using GLOBE protocols for aerosols, conductivity and pH

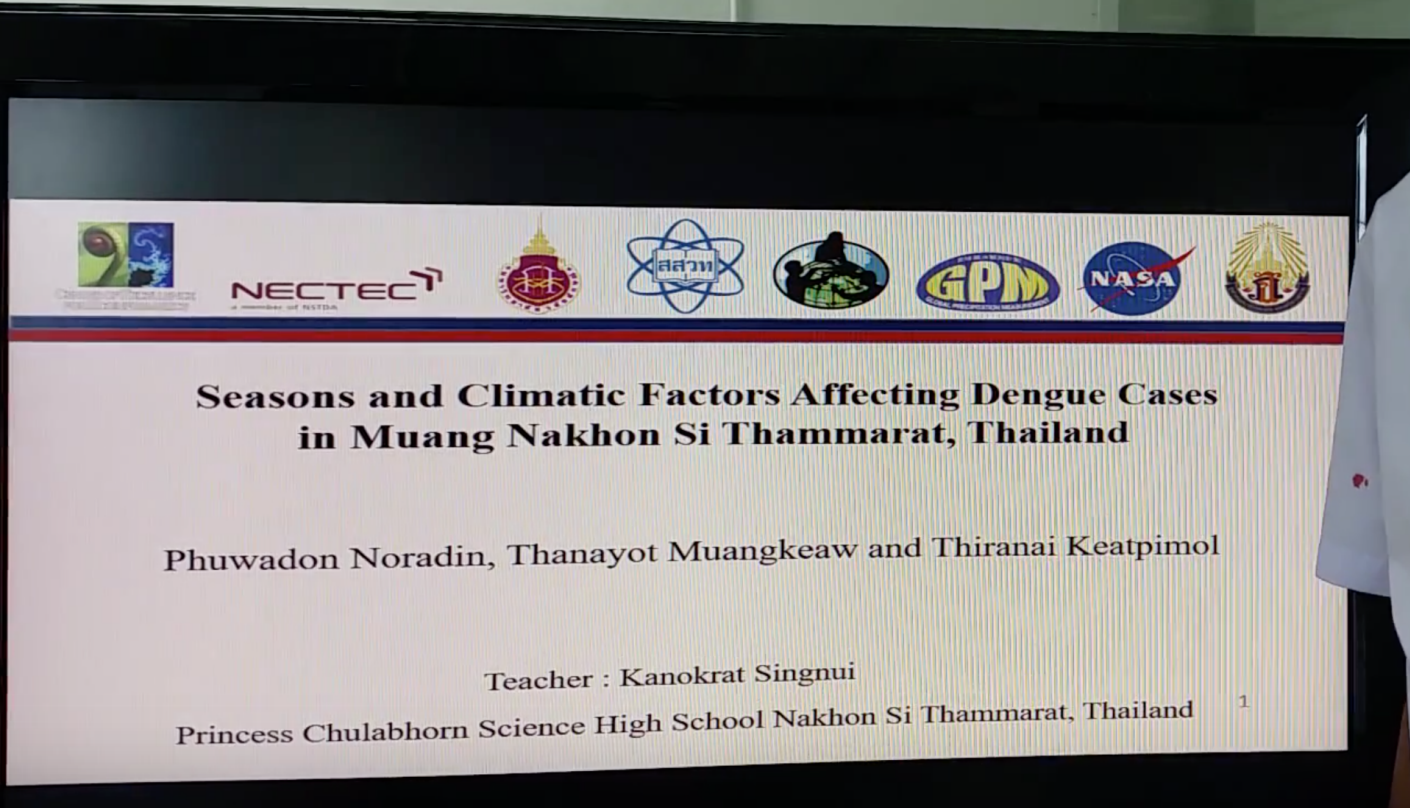
**Students: Dino Bešić , Sarah Butigan**  
**Mentor: Marina Pavlić**



## Who inspired us?

- The citizens of Bakar invited us to see the big black blot in the middle of The Bakar Bay and the black particles in their homes
- we determined that the pollution was coming from the air.
- While researching we found new ways to use GLOBE protocols





**Seasons and Climatic Factors Affecting Dengue Cases  
in Muang Nakhon Si Thammarat, Thailand**

Phuwadon Noradin, Thanayot Muangkeaw and Thiranai Keatpimol

Teacher : Kanokrat Singnui

Princess Chulabhorn Science High School Nakhon Si Thammarat, Thailand

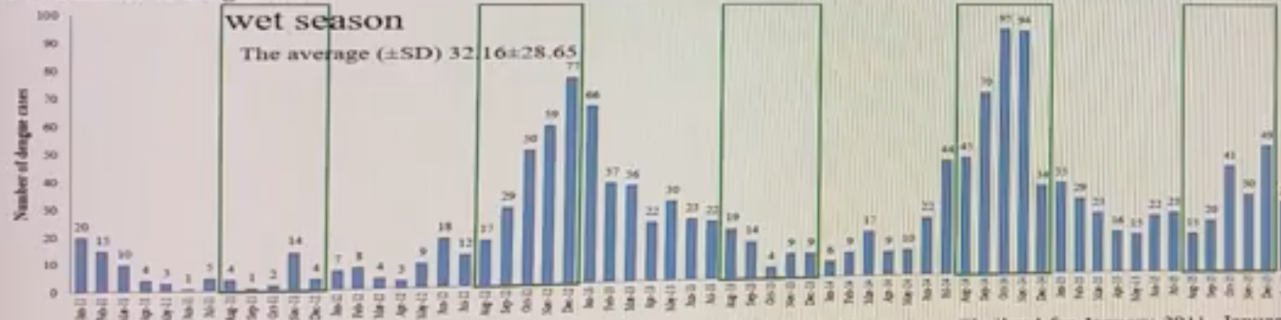
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## Results: Monthly dengue cases from 2011-2016 in wet/dry seasons

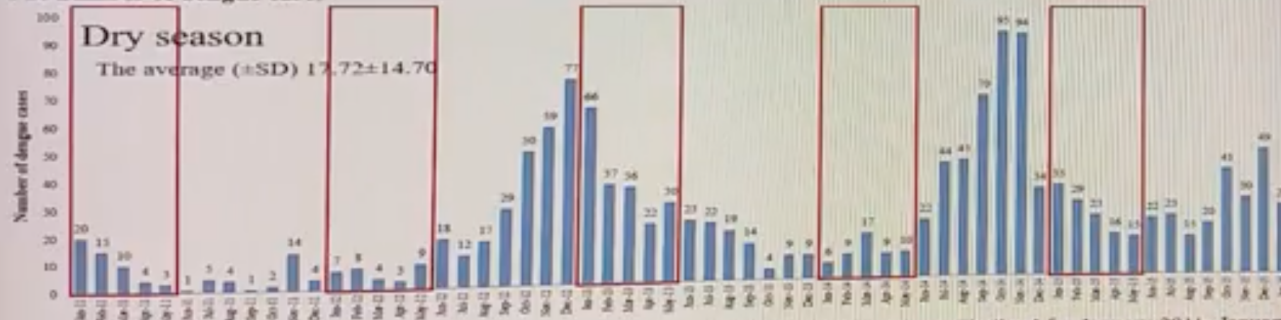
The number of dengue cases



**Figure 3.** Monthly dengue cases in wet and dry seasons at Muang Nakhon Si Thammarat, Thailand for January 2011- January 2016. The average ( $\pm$ SD) dengue cases in wet and dry seasons were 32.16 $\pm$ 28.65 and 17.72 $\pm$ 14.70. Dengue cases in Muang Nakhon Si Thammarat in the wet season were higher than in the dry season ( $t_{35,823}=2.242$ ,  $P<0.05$ )

## Results: Monthly dengue cases from 2011-2016 in wet/dry seasons

The number of dengue cases



**Figure 3.** Monthly dengue cases in wet and dry seasons at Muang Nakhon Si Thammarat, Thailand for January 2011- January 2016. The average ( $\pm$ SD) dengue cases in wet and dry seasons were 32.16 $\pm$ 28.65 and 17.72 $\pm$ 14.70. Dengue cases in Muang Nakhon Si Thammarat in the wet season were higher than in the dry season ( $t_{35.823}=2.242$ ,  $P<0.05$ )



## How Does Asphalt Affect Soil Temperature

Suzanna Vang

Roswell Kent Middle School  
1445 Hammel St. Akron, Ohio 44306  
Mr. Frantz

### Abstract

The purpose of this project was to find out if a surface with low albedo (the amount of light energy that is reflected) such as asphalt, affected surrounding short-grass soil temperature. The hypothesis was the closer the soil is to asphalt the warmer short-grass soil temperature will be. The GLOBE Program protocol for collecting soil temperature was followed using a Taylor 2" Bithermal Dial soil thermometer, spike, and Garmin eTrex Venture GPS. Four data collection points were identified at the site, which was the teacher's parking lot, the edge of the asphalt, five meters and ten meters away from the asphalt into the short-grass. The data was also collected at a depth of 5 centimeters and 10 centimeters into the short-grass soil, at each site. The data supported the hypothesis twelve out of twelve days data was collected. From the asphalt the average soil temperature was 8.5°C at zero meters, 7.3°C at 5 meters and of 6.5°C at 10 meters. The data was collected for 12 non-consecutive days during the month of November. Several factors during the twelve days affecting the data were snow, ice, and rain. The data, however, showed there was minimal affect snow, ice, or rain had overall. Other relevant research can be done in the future such as extending planting seasons in close proximity to asphalt, further understanding the transfer of heat from asphalt to surrounding short-grass, or coloring asphalt a lighter color in an attempt to minimize this phenomenon.



### Materials

