



# Success of Solar Dynamics Observatory (SDO) Education & Public Outreach (E/PO) in Montana

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## SPOT:

### Space Public Outreach Team

SPOT offers free NASA sponsored presentations to Montana schools, youth programs, and community groups.

Presenters consist of primarily MSU (Montana State University) undergraduate students. They can do shows after receiving training on the information presented in the show and upon demonstrating proficiency in public speaking. The undergraduates get paid for training and presenting the shows. We try to have one male and female presenter at each show to provide diverse role models for the students.

Two physics graduate students run SPOT by coordinating all the travel logistics, recruiting presenters, providing training for presenters, overseeing payroll and creating the SPOT presentations.

SPOT is supervised by a faculty advisor that monitors the program's effectiveness and oversees operations.

## SPOT Statistics :

- Average cost per student for SPOT in 2012 was \$6.90
- SPOT traveled ≈30,500 miles and reached over 9.8% of all Montana K-12 students in 2012

During 2007-2012:

- 3,367 teachers participated in SPOT
- Ratio of female to male students was close to one
- Average of 86 students per presentation
- 16% of students in the last five years were from historically underrepresented communities in science
- Presenters visit an average of 100 schools each school year

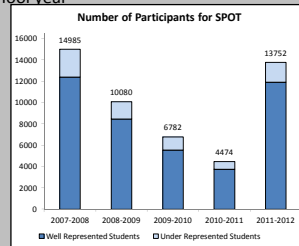


Figure indicates the amount of students well & underrepresented in science seen by SPOT each school year. Total number of participants are given above each column.

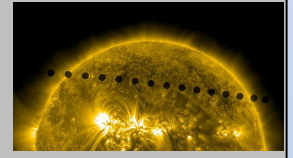
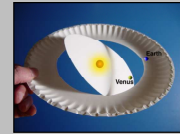
## NEAT:

### NASA Education Activity Training

Teachers in Montana can request free training on established NASA activities for students K-12. The workshops are run by two MSU graduates and the experience counts toward 2 Continuing Education Credit for teachers. This program was in operation from Fall 2011 to Fall 2012 and reached over 140 teachers. See below for a brief descriptions of the NASA activities used.

### Transit of Venus Activity:

The last transit of Venus for 105 years took place on June 5<sup>th</sup> 2012. A cleverly used paper plate allows teachers to explain this rare celestial alignment to their students. MSU also hosted a transit of Venus viewing party that was attended by over 2,000 residence.



## Present SPOT Presentations:

### THE SUN-EARTH CONNECTION



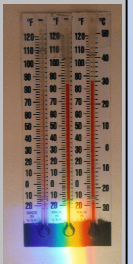
"The Sun and the Earth are intimately linked. Discover what scientists have learned about how changes on the Sun trigger events on Earth and how this impacts human exploration of space." This show focuses heavily on the breath taking images and knowledge SDO is providing scientists.



Two SPOT presenters doing the Mission to Mars show for a group of students. Picture taken from the Ravalli Republic paper in Victor, MT on 12/19/12.

## Herschel Experiment:

The hidden world of electromagnetic radiation can be observed by using a glass prism to disperse sunlight and a few alcohol thermometers with blacken bulbs to measure temperatures of each color individually. Much to William Herschel's surprise in 1800, the greatest temperature was observed beyond the red light!! This led Herschel to conclude that there must be some hidden light in the solar radiation which was later labeled infrared.



## EM Wave War & Solar Cookies:

Learning features on the sun is easy when combined with cookies.

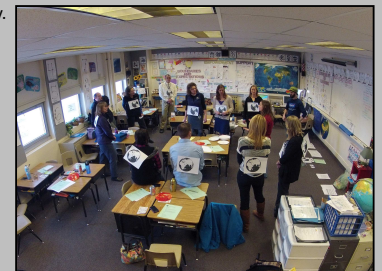


Using EM cards to play a science version of the famous card game "War" allows students to learn about the electromagnetic spectrum in a fun way.



## Kinesthetic Astronomy:

Students often have trouble understanding what causes seasonal changes on Earth. This exercise helps to explain the idea by making students replicate Earth's motion around the Sun. Shown below is a teacher workshop demonstrating this activity.



"Why is it important to visit Mars? Does Mars have water? Did life once exist on Mars and does it now? To answer these questions, NASA has sent satellites and rovers to Mars, and one day maybe people will visit!" Mission to Mars takes students on a journey which explores what it took for Curiosity to successfully land on Mars and what it's doing now to answer outstanding questions about this red planet.

## Acknowledgements

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