

TOTALITY2017

Educational Outreach Strategies in Anticipation of the 2017 U.S. Total Solar Eclipse

SEC 2014

Cloudcroft, New Mexico

27 October 2014

Charles Fulco

Planetarium Director; Coordinator of
Space & Environmental Sciences
Port Chester (NY) Public Schools

A Real Answer...

The date JFK
was assassinated.

...to a Real Question

What historical event
happened on July 20, 1969?

A Real Answer...

Dora.

...to a Real Question

Name another explorer
other than Columbus?

A Real Answer...

The Sun's shadow hits
the Earth when the Sun
comes between the
Moon and the Earth

...to a Real Question

How does a solar
eclipse occur?

A Real Answer...

Lance Armstrong.

...to a Real Question

Who was the first person
to set foot on the Moon?

- (Maybe he'll be the first person to bike on the Moon?)

Introducing Totality2017

An initiative...

- to engage and involve the educational community and the general public via FB, Twitter and webpage
- to push in to classrooms
- to dispense and promote awareness, knowledge, and safety
- to use the Internet to dispel myths and hoaxes (remember Mars in 2003?)

Why TOTALITY2017?

- Test scores show SCIENCE LITERACY in U.S. is DECREASING despite technology and virtually instantaneous access to information
- STEM and COMMON CORE both implemented to increase scores and literacy
 - Not meeting objectives—why?
 - Much resistance from teachers, parents, even politicians—why?

How am I using
The 2017 U.S. Eclipse
to address these
educational issues?

First, you take a
sabbatical!



Teaching Teachers to Incorporate TSE 2017 into Common Core Curricula

TSE2017 → MATH (some examples)

- Researching and computing the Saros and other eclipse cycles to predict future eclipses
- Calculating the sizes of Sun, Moon and Earth and how these ratios affect durations of eclipses
- Regression of nodes, gamma ratio, etc.
(*higher level students*)

Some Obstacles I'm Encountering

- Even after having TSE 2017 explained to them, many school districts surveyed indicate they would *still* keep students and staff indoors, based on misguided safety and legal reasons
- Many districts say there is “no time to teach science when we have to worry about the math and ELA exams”

It's 1970 All Over Again

- After recent conversations with school districts, it appears that not much has changed since 1970!
- School administrators are worried about safety and legal issues of having students outdoors during an eclipse
- Less-knowledgeable instructors (esp. those at the elementary level) simply follow their administrations' directives without question

Problems Are Not Only In Classrooms

Many working parents of these same students will remain indoors during the eclipse, ignorant (or afraid) of the spectacle going on outside at lunch time (*will the workers in St. L, KC, North Platte and Nashville, etc., be watching it on their desktops?*)

Socio-Economic Problems?

- Potential for many lower-income district students to not have adequate eye protection, or to use it incorrectly
- Many of these districts also are “forgotten” when it comes to being included in public outreach and other support
- BUT—large potential for grants and visits from organizations (NASA, county agencies)

Dispelling Misinformation and Myths via Education & Public Outreach

- Education must be directed toward both adults and younger learners
- Must encompass all relevant age levels (K - Adult)
- Target scouting groups, high school and middle school science clubs; private schools may be less tied to common core restrictions and other community organizations and therefore very eager to participate (*e.g., The Berkshire School*)
- Find a way to use social media to educate adults and kids in ways to which they can relate

Dispelling Misinformation and Myths via Education & Public Outreach

- Contact CHAMBERS OF COMMERCE, VISITORS & CONVENTION BUREAUS, MEDICAL CENTERS, etc. with sufficient lead time to allow preparation
- Alert MEDIA OUTLETS, especially those along the path of totality, so they can dispense factual information—not perpetuate myths and misinformation (*establish these relationships NOW*)
- Provide websites of companies who sell/donate solar/eclipse shades, telescope filters, etc.

Some Educational Myths to Dispel

- From my interviews with schools, the most common misconceptions/myths about solar eclipses are:
 - The Sun produces <<special rays>> during eclipses that will blind anyone (esp. students!) (even when not looking directly at the Sun!) (More dangerous on school grounds for some reason)
 - All students will stare directly at the Sun for long periods until sufficiently blinded and then angry parents and lawyers will knock on principal's door
 - ANY eye protection (including aluminized Mylar) is NOT safe to view the Sun

More Educational Myths to Dispel

- Watching on television in classroom is the safest way to view a solar eclipse (well, it actually is, but are you REALLY looking at the ACTUAL eclipse that way? Of course not!)
- All blinds and shades must be securely drawn to prevent students from even stealing peeks at landscape objects like trees and shrubs
- Even lunar eclipses may be dangerous to view! (And besides, kids should be inside doing their homework during that time anyway)

Some Positives of My Sabbatical So Far

(but don't worry, it's early on, things can change)

- A few, progressive schools in my recent travels, like Westchester Science Magnet School System in L.A. already have forward-thinking, “hands-on” policies in place for just such natural events
- Some science departments, such as that at U Missouri, are already involved with coordination and implementation of TSE observing events (still very rare, though)

- Many locations are already being scouted, and reservations made at hotels, lodges, etc., along path of totality, raising awareness in those local communities
- Chambers of Commerce and Visitor Information Centers are also being alerted by motivated and concerned individuals and groups such as ours
- Interest will be high for commemorative items (*posters, DVDs, license plates, pins, t-shirts, etc.*)
- Still a long way to go, inside AND outside the classroom

- Was asked to contribute to Time For Kids
- Possibly writing book with former national weatherman
- Convince skeptical girlfriend that I have time to do all this

The Technology Paradox

- Current society is “wired-in” to information possibly to the point of over-saturation (how much info can our brains actually process and retain, after all?)
- This term recognizes the fact that although we have a 24-hour stream of information at our fingertips, we seem to know less about the natural world than our predecessors did (compare 1900 students vs. 2014 students)

The Technology Paradox

- Analyzing solar eclipse articles from the 19th and early 20th century (i.e., New York Times, science magazines, literary works) clearly shows a high-level understanding by the public and journalists
- Judging from the reports, there also appeared to be a high level of public participation in eclipse observing

Educating Outside the Classroom

- Creating the website [TSE 2017.org](http://TSE2017.org); create your own!
(there are many free web hosting sites available)
- Created FB page: [Totality2017](https://www.facebook.com/Totality2017) *(more likes every week!)*
- Created Twitter account: [@totality2017](https://twitter.com/totality2017), with many tweets to other relevant accounts
- Enlisting my celebrity cousin to help contact famous folks associated with space (*Tom Hanks, Gary Sinese, etc.*) to get on board with PSAs and/or other publicity-generating ads

Educating Outside the Classroom

- Currently working with S. Carolina DMV to create commemorative 2017 TSE license plate (ready made design with crescent moon and palmetto)
- Other states' DMVs not as easy (some require legislative approval for special plates)
- No DMV I contacted was aware of forthcoming eclipse but a few showed actual interest

Examples of Web Hosting Sites

- GreatAmericanEclipse.org
- Eclipse2017.org
- Totality2017.org (*under construction*)
- KySolarEclipse.com
- ShadowAndSubstance.com/2017/2017e.html
- aas.org/education/outreach/eclipse-2017
- home.cc.umanitoba.ca/~jander/tot2017/tse17intro.htm

Incorporating TSE 2017 into Common Core Curricula

SCIENCE → SOC STUDIES (example)

Secondary: construct eclipse viewing devices; form eclipse observation groups; instruct others to dispel misinformation and myths; hands-on eclipse-themed science labs and lesson plans

Incorporating TSE 2017 into Common Core Curricula

TSE2017 → ART

- construct eclipse viewing devices (*shoeboxes, oatmeal containers, etc.*)
- create sundials (*colored sidewalk chalk works great!*)
- design and sketch posters for cities along path of totality, incorporating landmarks

My Educational Timeline for TSE 2017

2015+

- Get celebs that students admire on board
- Continue aggressive FB friending, website and blogging activity and age-appropriate outreach
- Think about a group or organization that might want to travel with you (i.e., scouts, school, community group) and discuss logistics with group leader(s); inquire about travel prospects (air/bus/rail/car
- Continue sabbatical

Educational Timeline for TSE 2017

- Alert local authorities if planning to hold a group observing session on public property
- Arrange to speak in schools and with other interested groups to be a “myth-buster” and teacher
- Write children’s book and for Time For Kids
- Remind local media about your role in outreach and education--you may get the chance to get the word out!
- Keep continuing sabbatical

Educational Timeline for TSE 2017

- As E-Day Approaches
- Be the educational, informational and safety “go-to” person for your educational community
- Distribute “eclipse shades” and other items, making sure to test all filters for damage and “leaks”
- Remind everyone on FB, my website/blog, and in the media about the eclipse and how to view it safely
- Enjoy TSE 2017 knowing you’ve done all you could do to educate the public!

A Day in the Life of a
Middle School Teacher
Trying to Teach Science
in Spite of Common
Core, Administrators and
other Obstacles...























