

Mathematics and Science Connections through Online Activities
NCTM 2012 Philadelphia, Saturday, April 28, 2012 8:30 a.m. – 10:00 a.m., Session 641
Dr. Deborah A. McAllister
The University of Tennessee at Chattanooga

Session Description: Examine connections between mathematics and science while studying the solar system, using activities available online. Explore activities that meet standards for mathematics and science inquiry in kindergarten through grade 5. Make connections to relevant mathematics contained in children's literature.

Funding: National Space Grant Foundation/Aerospace Education Services Project (AESP)
Implementation Mini-grant: \$15,000 for 2009, \$15,000 for 2010. The AESP multimedia toolkit materials were used.

Activities Selected for 2009 and 2010 NSGF/AESP Workshops at UTC:

- <http://web2.utc.edu/~fbp972/nsgf09.html>
- <http://web2.utc.edu/~fbp972/nsgf10.html>

(Some toolkit links have expired. Search by activity title.)

Activities for Session:

- Reaction Time: Quick as a Wink - <http://www.challenger.org/lessons/89.pdf>
- Touchdown - http://www.nasa.gov/pdf/308966main_On_the_Moon.pdf
- Two Astronomy Games: "Small and Large" "Near and Far" - <http://www.space-science.org/education/downloads/Two%20Astronomy%20Games%20%201%20-%20Optimized%20with%20web%20site.ppt>
- Where Are We Going? - <http://pluto.jhuapl.edu/education/GrowthChartActivities/WhereAreWeGoing/whereGoing.php>

Standards Links:

- Tennessee Curriculum Standards (correlations listed below) - <http://www.tn.gov/education/curriculum.shtml>
- National Council of Teachers of Mathematics – Math Standards and Expectations - <http://www.nctm.org/standards/content.aspx?id=4294967312>
- Common Core State Standards for Mathematics - http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf
- National Science Education Standards – <http://www.nap.edu/readingroom/books/nses/>
- A Framework for K-12 Science Education - http://www7.nationalacademies.org/bose/Standards_Framework_Homepage.html
- Next Generation Science Standards - <http://www.nextgenscience.org/>

Contact Information:

Dr. Deborah A. McAllister, UC Foundation Professor
The University of Tennessee at Chattanooga
Email: Deborah-McAllister@utc.edu
Web page: <http://web2.utc.edu/~fbp972/>

Correlation to Tennessee Curriculum Standards:

Reaction Time: Quick as a Wink

Grade	Grade Level Expectations	Checks for Understanding	State Performance Indicators
K - 000		MP 6.1.1, NO 6.2.4	NA
1 - 010	NO 6.2.3, DPS 6.5.1	NO 6.2.9, DPS 6.5.4	NA
2 - 020	NO 6.2.3, DPS 6.5.1	NO 6.2.10, 6.2.11, DPS 6.5.1	NA
3 - 030	NO 6.2.4, A 6.3.4, DPS 6.5.1	NO 6.2.4, A 6.3.6, DPS 6.5.1	NO 6.2.11, A 6.3.3, DPS 6.5.1
4 - 040	NO 6.2.4, DPS 6.5.1	NO 6.2.2, DPS 6.5.2	NO 6.2.9, DPS 6.5.1
5 - 050	NO 6.2.5, DPS 6.5.1	NO 6.2.3, DPS 6.5.3, 6.5.4	NO 6.2.5, DPS 6.5.1

Touchdown

Grade	Grade Level Expectations	Checks for Understanding	State Performance Indicators
K - 000	A 6.3.3; GM 6.4.2, 6.4.3; DPS 6.5.1, 6.5.2; SI 7.2	A 6.3.5; GM 6.4.5, 6.4.6; DPS 6.5.3; SI 7.2, 7.4	NA
1 - 010	GM 6.4.2, 6.4.3, 6.4.5, 6.4.6, 6.4.7; SI 7.2, 7.3	GM 6.4.5, 6.4.6; DPS 6.5.4; SI 7.2, 7.4	NA
2 - 020	GM 6.4.2; DPS 6.5.1, 6.5.2; SI 7.1	GM 6.4.4, 6.4.5, DPS 6.5.3; 6.5.4; SI 7.1	NA
3 - 030	DPS 6.5.1; SI 7.2	GM 6.4.5, 6.4.10, 6.4.13; DPS 6.5.1, 6.5.3; SI 7.2	GM 6.4.5, 6.4.6; DPS 6.5.3
4 - 040	GM 6.4.3; DPS 6.5.2; SI 7.1	GM 6.4.11, 6.4.12; DPS 6.5.6; SI 7.2	DPS 6.5.2, 6.5.4; SI 7.1
5 - 050	GM 6.4.4; DPS 6.5.12; SI 7.2	GM 6.4.7, 6.4.9, 6.4.10, 6.4.11, 6.4.12; DPS 6.5.3; SI 7.2	GM 6.4.6; DPS 6.5.2; SI 7.1

Two Astronomy Games: “Small and Large” “Near and Far”

Grade	Grade Level Expectations	Checks for Understanding	State Performance Indicators
K - 000	MP 6.1.2; GM 6.4.2, 6.4.3; SI 7.1	A 6.3.4; GM 6.4.6, 6.4.7; SI 7.3	NA
1 - 010	MP 6.1.2; DPS 6.5.1; SI 7.1	GM 6.4.6, 6.4.7; SI 7.3	NA
2 - 020	MP 6.1.2; DPS 6.5.1; SI 7.1	GM 6.4.3; DPS 6.5.1; SI 7.3	NA
3 - 030	MP 6.1.2; DPS 6.5.1; SI 7.1	DPS 6.5.2; SI 7.4	DPS 6.5.2; SI 7.1
4 - 040	MP 6.1.2; GM 6.4.3; SI 7.1	GM 6.4.12, 6.4.13; SI 7.4	GM 6.4.7; DPS 6.5.2; SI 7.1
5 - 050	MP 6.1.2; GM 6.4.4; SI 7.1	GM 6.4.11; DPS 6.5.4; SI 7.4	DPS 6.5.2; SI 7.1

Where Are We Going?

Grade	Grade Level Expectations	Checks for Understanding	State Performance Indicators
K - 000	MP 6.1.1, 6.1.2, 6.1.4, 6.1.5, 6.1.7, 6.1.8; NO 6.2.4, 6.2.5; SI 7.2, 7.3	MP 6.1.1, 6.1.2; NO 6.2.14, 6.2.15, 6.2.16; SI 7.2, 7.3, 7.4	NA
1 - 010	MP 6.1.1, 6.1.2, 6.1.3, 6.1.4, 6.1.5, 6.1.6; NO 6.2.1, 6.2.4; A 6.3.1, 6.3.2, 6.3.3; SI 7.2, 7.3	MP 6.1.8, 6.1.10; NO 6.2.7, 6.2.8, 6.2.10, 6.2.11, 6.2.12, 6.2.13, 6.2.17; A 6.3.1, 6.3.5, 6.3.7; SI 7.2, 7.3, 7.4	NA
2 - 020	MP 6.1.1, 6.1.2, 6.1.6; SI 7.2, 7.3	NO 6.2.3, 6.2.4, 6.2.6, 6.2.8; A 6.3.1, 6.3.3; SI 7.2, 7.3, 7.4	NA
3 - 030	MP 6.1.1, 6.1.2, 6.1.5, 6.1.6; SI 7.3, 7.4, 7.5	MP 6.1.5; NO 6.2.1, 6.2.2, 6.2.5, 6.2.10; A 6.3.6; SI 7.4	A 6.3.2; SI 7.1
4 - 040	MP 6.1.1, 6.1.2, 6.1.4, 6.1.5, 6.1.6; NO 6.2.2, 6.2.4; A 6.3.1, 6.3.3; SI 7.3, 7.4, 7.5	MP 6.1.1, 6.1.9; NO 6.2.8, 6.2.13; SI 7.4	MP 6.1.1; NO 6.2.10; SI 7.1
5 - 050	MP 6.1.1, 6.1.2; SI 7.3, 7.4, 7.5	MP 6.1.6; DPS 6.5.1; SI 7.4	DPS 6.5.1, 6.5.2

Children's Literature Correlation – Toolkit for 2010

A Family Guide to the Sun

- Scale Model of the Sun, Earth and Moon - *My Full Moon is a Square*
- Layers of the Sun – *Q is for Quark*
- Discover Why the Sun Appears to Rise and Set - *G is for Galaxy*
- Listen to a song about the sun – *Math Curse, Science Verse, Math Appeal*

Earth & Mars Poster

- Mars Calendar Project – *Pepper's Journal*
- Solar System Bead Distance - *G is for Googol, The Warlord's Beads*
- Good Vibrations – *It's Probably Penny, The Great Graph Contest, Probably Pistachio*
- De-coding Starlight: From Pixels to Images – *Mapping Penny's World, Treasure Map*
- ESA Science & Technology: Wavelength – *Can You Count to a Googol?*

Designing a Crew Exploration Vehicle – *The Greedy Triangle, Let's Fly a Kite*

Solar System Memory Game – *A Pair of Socks*

New Horizons Mission Guide

- Where Are We Going? – *If You Hopped Like a Frog, How Much is a Million?*
- Growing Up With A Mission – *Tiger Math, Chimp Math*
- Last Year on Pluto – *Measuring Penny*

Making a Sun Clock – *It's About Time*

Two Astronomy Games “Small and Large” “Near and Far” – *The Best Bug Parade*

A View of Home from the Front Door and from Space – *Bug Dance*

ESA Science & Technology - Hubble: 15 Years of Discovery – *A Million Dots*

What is a planet? – *Dave's Down-to-Earth Rock Shop*

Solar System Lithograph Set – *Rabbit's Pajama Party* (sequencing)

On the Moon - Touchdown – *Polly's Pen Pal* (Metrics)

An Earth-based Tour of the Moon – *My Full Moon is a Square*

Destination: Mars – Getting There! Navigation and Trajectory – *What's Your Angle, Pythagoras?*

Pinhole Camera – Touch the Sun – *The Librarian Who Measured the Earth*

Egg Drop Sample Return Capsule – *Safari Park* (finding unknowns)

Build a Solar System – *Hamster Champs* (angles)

Cylindrical Galactic Coordinates: A 3D Model – *The Fly on the Ceiling*

Fit Explorer Challenge/Train Like and Astronaut! – *The Great Graph Contest, Pepper's Journal*

Education Highlights

- Making Time Fly - *Get Up and Go!*
- Sled Kite - *Let's Fly a Kite*
- Air Engines – *Equal Shmequal*
- Reflection of Light With a Plane (Flat) Mirror - Trace a Star – *The Quiltmaker's Gift, The Quiltmaker's Journey*
- Get a Leg Up – *Super Sand Castle Saturday* (measuring)

Children's Literature Correlation – Toolkit for 2009

- What supplies will you take to the Moon, and how will you pack them in the cargo bay? – *Tangram Magician*
- What metals and minerals are best suited for the construction of the lunar station? – *Tally O'Malley, Dave's Down-To-Earth Rock Shop*
- Which area of the chosen landing site is best for mining?
- Investigate Craters
- Plane Math – *Room for Ripley, Follow the Money!*
- Apollo 11 Cryptograph – *Math Appeal*
- Build and Astronaut Base
- Lunar Telephone – *The Grapes of Math, Polly's Pen Pal*
- M&M Moon Mining
- Reaction Time: Quick as a Wink – *Missing Mittens*
- Saturn V Coordinates
- Shuttle Coordinates - *The Fly on the Ceiling*
- Fit Explorer Challenge Activities – *The Great Graph Contest, Pepper's Journal*
- Making Time Fly – *Get Up and Go!*
- Sled Kite – *Let's Fly a Kite*
- Right Flight
- Air Engines
- Reflection of Light with Two Plane Mirrors – *The Quilt Maker's Gift, The Quilt Maker's Journey*
- Color Spinners
- Reflection of Light with a Flat Mirror
- Hidden Messages – *A Million Dots*
- Distance to the Moon – *If You Hopped Like a Frog, Can You Count to a Googol?*
- What's Hidden Inside
- Get a Leg Up
- Diameter of the Moon – *The Librarian Who Measured the Earth, Beanstalk: The Measure of a Giant*
- Lunar Cryptograms
- Oreo Moon Phases
- Addition Blast Off – *Every Buddy Counts, The Warlord's Beads*
- Launch It
- Touchdown
- Hot Wheels Lab
- Moon Count