

Hi! My name is Dr. Sten Odenwald, and thank you for using this resource!

Like you, I am deeply concerned about science and math education in the United States. Believe me, it is no fun reading the infamous TIMSS survey results and seeing just how fragile the US world ranking in science and math has become. I have read various studies that show how children stop thinking of science as a career prospect around 8th or 9th grade. Not just because in some adolescent groups it is not 'cool' to be interested in science and math, but because many students feel that science is too much like math, and no one professes to like, do well in, math...not even your average parent! This expectation of failure, and boredom with the increasingly technical aspects of physical and biological science, probably helps reinforce the idea that science is only for Brainiacs and Geeks.

Can a series of math problems like the ones in this booklet make a big difference? I honestly don't know. But I think for some students it can, because as a scientist I was once deeply challenged to learn mathematics too! In the 1960's, we didn't have 'enrichment problems' or even especially interesting 'word problems' that could make the connection between sterile mathematics and the real world that I was passionately interested in as a young scientist.

So now, as a scientist who is interested in helping teachers inspire the next generation of scientists and educated citizens, I have taken on what is for me the fun task of creating math-science problems that I think can help some students better see these connections. I know that these problems work, because I keep getting emails from the teachers on my Spacemath listserve that say so. Here are a few of my favorites!

I just looked at your latest problem. It was very timely for some of my students. I have three girls working on sunspots and magnetic fields. Little things like what you provide help me get kids interested in this stuff.

Chris DeWolf, Chippewa Hills High School, Remus, MI

Your problems are great fillers as well as sources of interesting questions. I have even given one or two of your problems on a test! You certainly have made the problems a valuable resource!

Debbie Soltis, Chugiak High School, Alaska.

I love your problems, and thanks so much for offering them! I have used them for two years, and not only do I love the images, but the content and level of questioning is so appropriate for my high school students, they love it too. I have shared them with our math and science teachers, and they have told me that their students like how they apply what is being taught in their classes to real problems that professionals work on.

Beth Leavitt, Wade Hampton High School, Greenville, SC

I recently found the Weekly Math Problems website and I must tell you it is wonderful! I teach 8th grade science and this is a blessed resource for me. We do a lot of math and I love how you have taken real information and created reinforcing problems with them. I have shared the website with many of my middle and high school colleagues and we are all so excited. The skills summary allows any of us to skim the listing and know exactly what would work for our classes and what will not. I cannot thank you enough. I know that the science teachers I work with and I love the graphing and conversion questions. The "Are U Nuts" conversion worksheet was wonderful! One student told me that it took doing that activity (using the unusual units) for her to finally understand the conversion process completely. Thank you!

Lisa Tobias, St. Mary's Hall, San Antonio, TX

There is another thing you should realize about mathematics and our students. Please look at this article!

SAT Scores in Mathematics Reach a Record High

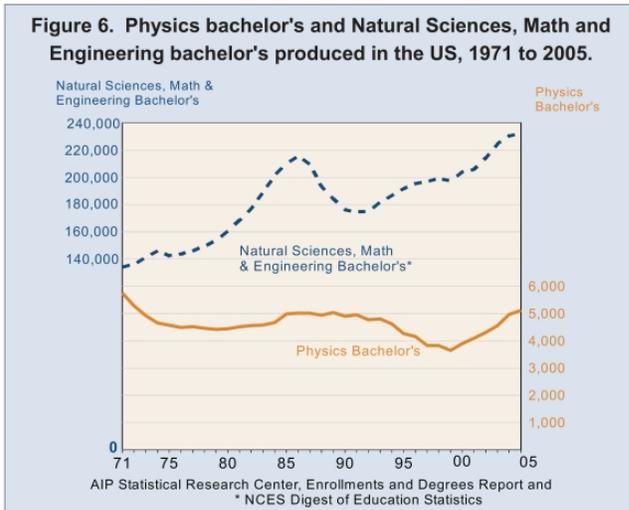
"This year's [June, 2005] graduating high-school students set a record for the highest average mathematics score on the SAT, the College Board announced in late August, with the 1.5 million students who took the test earning an average of 520, two points higher than last year."

(The Chronicle of Higher Education, September 9, 2005)

The National average SAT score for math has increased by about 25 points since 1992. But even what appears to be an insignificant annual change hides another important fact. Between 1994 and 2004, the ten-year math scores increased for nearly every population group (*Higher Education, September 23, 2004*):

American Indian, Alaskan Native	470 to 488 +18 points
Asian, Asian American, Pacific Islander	553 to 577 +24 points
African American/Black	421 to 427 + 6 points
Hispanic	464 to 465+ 1 points
Puerto Rican	442 to 452 +10 points
White	519 to 531 +12 points
All College-Bound Seniors	504 to 518 +14 points

This also supports an upward trend in bachelor's degrees in science and math, which are the gateways to more advanced degrees. (*American Institute of Physics Report, 2005*)



So, we are making a difference, and if you find these math problems helpful in keeping just a few more students engaged in science, I would be thrilled!! All we need to do is get one student per school district each year to keep their focus on their passion to learn science and math, and we can indeed make a big difference!

Enjoy!

Sten Odenwald

Useful Internet Resources

The human and technological impacts of solar storms and space weather:

<http://www.solarstorms.org>

Newspaper accounts of aurora and technology impacts from 1800-2001:

<http://www.solarstorms.org/SRefHistory.html>

Space weather and satellite failures

<http://www.solarstorms.org/Ssatellites.html>

NOAA space weather forecasting center

<http://www.noaa.sec.gov/SWN>

Space weather summaries and daily updates:

<http://www.spaceweather.com>

NASA Student Observation Network –Tracking a Solar Storm

<http://son.nasa.gov/tass/index.htm>

Archive of NASA TV programs about space weather for grades 6-10

<http://www.solarstorms.org/STV.html>

Movies and animations about space weather

<http://www.solarstorms.org/SMovies.html>

Frequently Asked Questions about space weather

<http://www.solarstorms.org/SFAQs.html>

Additional classroom activities

<http://image.gsfc.nasa.gov/poetry/activities.html>

Exploring Space Science Mathematics pre-algebra problem book

<http://image.gsfc.nasa.gov/MathDocs/spacemath.html>

Exploring Earth's Magnetic Field primer

<http://image.gsfc.nasa.gov/poetry/magnetism/magnetism.html>

IMAGE, Student's Guide to Sun-Earth Science topics

<http://image.gsfc.nasa.gov/poetry/educator/students.html>

The IMAGE, Soda Bottle Magnetometer

<http://image.gsfc.nasa.gov/poetry/workbook/magnet.html>

The Mysterious Van Allen Radiation Belts

<http://radbelts.gsfc.nasa.gov/outreach/outreach.html>