ASA AMERICAN STATISTICAL ASSOCIATION

NCTM NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

# The Statistics Teacher Network

www.amstat.org/education/stn

Number 76 | The Statistics Teacher Network | ASA/NCTM Joint Committee on the Curriculum in Statistics and Probability | Fall 2010

# The Editor's Corner

Teachers of statistics, the first article of this issue is "Statistics for All—the Flip Side of Quantitative Reasoning" by J. Michael Shaughnessy, president of the National Council of Teachers of Mathematics. I do hope you take the time to read this engaging article about statistical literacy. We will likely see the importance and relevance of statistics education continue to grow rapidly in the coming years!

The next article, "Variation, Teddy Grahams, and the Law of Large Numbers" by Richard Griffiths, is perfect for the lower grade levels and makes use of tasty treats. It is sure to engage students and introduce them to a deep and rich statistical topic.

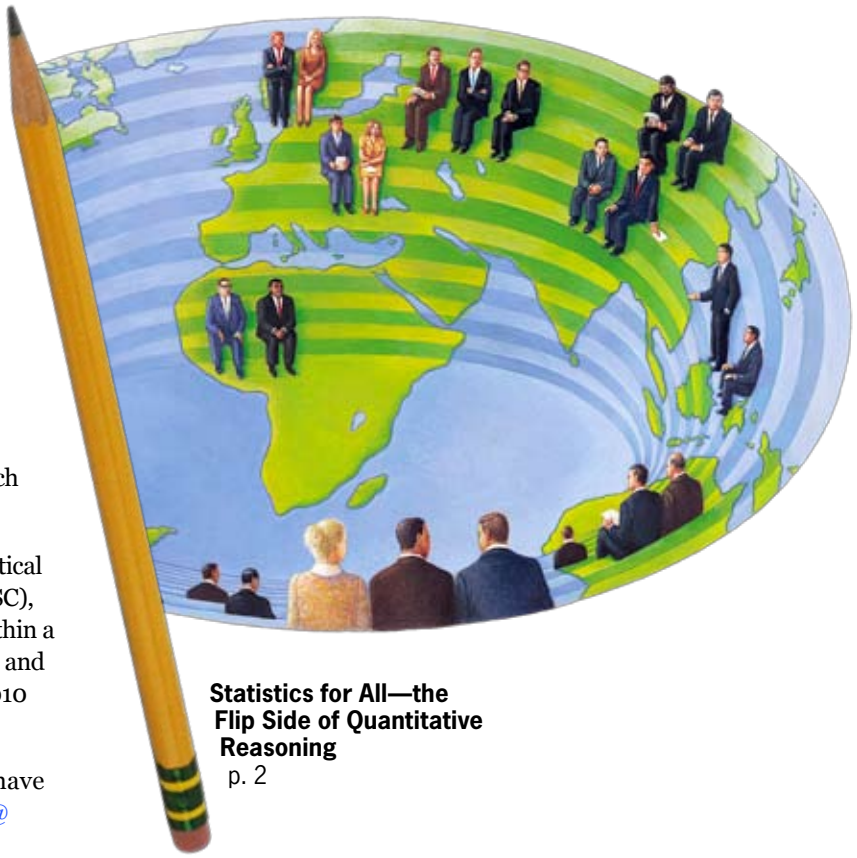
Monica Johnston and I wrote the article "Why Do Students Take Advanced Placement Statistics?" in which we look at various issues surrounding AP Statistics.

This issue also has an update from the American Statistical Association (ASA) and Statistical Society of Canada (SSC), which jointly sponsored the fourth annual Meeting Within a Meeting (MWM) Statistics Workshop for Mathematics and Science Teachers that was held August 4–5 with the 2010 Joint Statistical Meetings in Vancouver, BC.

I encourage and welcome any articles or ideas you have for publication. Please email me directly at *dwebb@bemidjistate.edu*.

Best Regards,

Derek Webb, Editor
Bemidji State University



**Statistics for All—the Flip Side of Quantitative Reasoning**
p. 2



*Also in this issue…*

## Articles

# Statistics for All—the Flip Side of Quantitative Reasoning

J. Michael Shaughnessy, NCTM President

Recently, I had the opportunity to participate in the 8th International Conference on Teaching Statistics (ICOTS). Once every four years, hundreds of teachers (elementary through tertiary levels), statisticians, and researchers gather from all over the world for a week to share the latest innovations for the teaching and learning of statistics. Over the years, I've had the opportunity to attend five ICOTS meetings and, each time, I've been increasingly impressed by how important statistical literacy has become for all of us around the globe. And statistics will only continue to become more critical in the future.

Statistical literacy has risen to the top of my advocacy list, right alongside numeracy and perhaps even ahead of "algebra for all." By statistical literacy, I mean much more than just the ability to read graphs or compute means as representatives for data sets. I mean developing the ability to reason in the presence of, or under conditions of, uncertainty. It may be that the most important quantitative reasoning ability of all is the facility to read and interpret statistical information and make informed inferences based on statistical and probabilistic information.

Mathematical arguments are based on proof and certainty. There is beauty—and perhaps even comfort—in convincing mathematical arguments such as the proof demonstrating that the amazing Pythagorean relationship holds among the sides of *every* right triangle, or that for *any* circle, the ratio of the circumference to the diameter is equal to the same number, every time, no matter the size of the circle. This is beautiful stuff, and we clearly want all our students to understand and bask in these elegant mathematical truths.

However, unlike the reasoning behind mathematics, statistical reasoning and sense making—by their very nature—occur under conditions of uncertainty. The twin sister of the "certainty" in mathematics is the "uncertainty" in statistics. We must prepare our students to deal with both types of quantitative reasoning as they grow in the mathematical sciences.

Statistical arguments are based on how likely—or unlikely—a result, sample, or measurement difference among groups is to occur with no other explanation than chance. For example, suppose 24 boys and 24 girls try out for 35 slots in a student orchestra. After the tryouts are over, it turns out that 21 girls and 14 boys were selected for the orchestra. Does that outcome seem reasonable, or might it indicate discrimination against boys in the selection process? One way to test for possible discrimination is to find out how likely it would be for that 21–14 split to occur by chance if boys and girls were randomly selected for those 35 orchestra slots.

The legal system often must make decisions similar to this, usually based solely on probabilistic information, rather than on certain information. Judges, prosecutors, and defense lawyers all have to make arguments based on reasoning under conditions of uncertainty. Citizens need to be aware of how such decisions can be defended or critiqued on the basis of quantitative reasoning using probability and statistics.

We, as citizens, are constantly deluged by statistical information—from the news media, from medical associations, and from the business and investment communities, to name just a few. Often, the information is presented in a form that can easily be misleading or confusing—sometimes even purposely so. For example, what does the pharmaceutical industry mean by "five-year survival rate?" Are you impressed or suspicious when you hear that one medical treatment showed a 20% increase in the five-year survival rate as compared to another treatment?

You should be wary, because if this information were framed in terms of absolute numbers, rather than percentages, it might mean that five patients for every 1,000 died prior to five years when given treatment A, while only four patients in 1,000 passed away prior to five years when given treatment B.

The results for treatment B are just one patient in 1,000 better, but also "20% better" than the results for treatment A. Are those data robust enough to convince you to go with treatment B, especially if treatment B also showed increased side effects or other health risks? Quantitative reasoning in the presence of uncertainty is a critical ability for all of us to develop because it will continue to have an impact on our lives and decisions.

More than 20 years ago, with the publication of *Curriculum and Evaluation Standards for School Mathematics*, NCTM took a strong stance on the importance of including statistics and probability throughout the K–12 school years. Subsequently, the council reaffirmed the importance of statistics for all students in *Principles and Standards for School Mathematics*. And the council will continue to advocate for the inclusion of statistics and the importance of statistical reasoning throughout the K–12 years as the Common Core State Standards (CCSS) are introduced, adopted, and implemented.

These standards do devote substantial attention to statistics, but only starting in grade 6. This learning trajectory differs substantially from the recommendations in NCTM's standards documents. It also differs from the statistics standards currently implemented in many other nations represented at the ICOTS meeting. For example, New Zealand and Australia have decided to include statistics throughout all grade levels in their new national curricular documents.

The CCSS position also differs from the American Statistical Association's *Guidelines for Assessment and Instruction in Statistics Education* (*GAISE*), which includes recommendations for statistics education for each of the K–4, 5–8, and 9–12 school grade bands.

As our states decide to adopt the CCSS, and as they begin to think about how to interpret and implement them in their local settings, let us not forget the importance of including and promoting statistical reasoning for all our students—at all grade levels. We have taken so many positive steps in promoting statistics education for our K–12 mathematics students that this is not the time to step backward as we reach out to help our students develop their facility for the flip side of quantitative reasoning—reasoning in the presence of uncertainty.

***Editor's Note:*** This article was originally published by the National Council of Teachers of Mathematics. It can be found online at *www.nctm.org/about/content.aspx?id=26327*.

# Free Statistics Education Webinars


Recorded webinars (web-based seminars) on K–12 statistics education topics are free to view at ***www.amstat.org/education/k12webinars*.**

This webinar series was developed as part of the follow-up activities for the ASA Meeting Within a Meeting (MWM) Workshop for K–12 Mathematics and Science Teachers (*www.amstat.org/education/mwm*), held in conjunction with the Joint Statistical Meetings. MWM and the webinars are part of the ASA's outreach activities to enhance K–12 statistics education. The Consortium for the Advancement of Undergraduate Statistics Education (CAUSE) offers free webinars on undergraduate statistics education topics at ***www.causeweb.org/webinar*.**

## Census at School Program Needs Champions

The ASA and Population Association of America (PAA) recently launched the U.S. version of Census at School (*www.amstat.org/censusatschool*), an international classroom project that engages students in grades 4–12 in statistical problemsolving. Students complete an online survey, analyze their class census results, and compare their class with random samples of students in the United States and other participating countries. The project began in the United Kingdom in 2000 and now includes Australia, Canada, New Zealand, South Africa, Ireland, and Japan.

The ASA and PAA are seeking champions to expand the U.S. Census at School program nationally. This is a wonderful opportunity for statisticians and statistics educators to perform outreach in their communities. For more information, email Martha Aliaga at *martha@amstat.org* and copy *rebecca@amstat.org*.

# **FREE** K–12 Statistics Education Resources
# *www.amstat.org/education*

## U.S. Census at School Program

The U.S. version of Census at School is a free international classroom project that engages students in grades 4 to 12 in statistical problemsolving. Students complete an online survey, analyze their class census results, and compare their class with random samples of students in the United States and other participating countries. The project began in the United Kingdom in 2000 and now includes Australia, Canada, New Zealand, South Africa, Ireland, and Japan. For more information, visit *www.amstat.org/censusatschool.*

## Poster and Project Competitions

Introduce K–12 students to statistics through annual poster and project competitions. The competitions offer opportunities for students to formulate questions and collect, analyze, and draw conclusions from data. Winners' names are published in *Amstat News* and they are recognized with plaques, cash prizes, certificates, and calculators. Posters are due every year on April 1. Projects are due every year on April 1 (Grades 4–6 and 7–9) and May 30 (Grades 10–12). For more information, including two instructional webinars, visit *www.amstat.org/education/posterprojects.*

## Statistics Education Webinars, Workshops, & Resources

The American Statistical Association offers free webinars on K–12 statistics education topics at *www.amstat.org/education/webinars*. This series was developed as part of the follow-up activities for the Meeting Within a Meeting (MWM) Statistics Workshop for Math and Science Teachers *(www.amstat.org/education/mwm*). The next MWM statistics workshop will be held in August 2011 in Miami, Florida, in conjunction with the Joint Statistical Meetings. The Consortium for the Advancement of Undergraduate Statistics Education also offers free webinars on undergraduate statistics education topics at *www.causeweb.org*. Lists of free useful websites and data resources are available at *www.amstat.org/education/usefulsitesforteachers.cfm.*

## *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report: A Pre-K–12 Curriculum Framework*

Participants in the Guidelines for the Assessment and Instruction in Statistics Education (GAISE) project created recommendations and a curriculum framework with examples for teaching statistics in the pre-K–12 years. The GAISE Pre-K–12 Report is freely available online at *www.amstat.org/education/gaise.*

## FREE Statistics Education Publications

*The Statistics Teacher Network (STN)* is a free newsletter for Grades K–12. STN is online at *www.amstat.org/education/stn.* Readers are encouraged to submit articles for publication to STN Editor Derek Webb at *mdwebb@hemidjistate.edu*.

*Making Sense of Statistical Studies (MSSS)* offers 15 hands-on investigations that provide students with valuable experience in designing and analyzing statistical studies. To download a free investigation or watch a free webinar demonstrating another investigation, visit *www.amstat.org/education/msss.*

The *Journal of Statistics Education (JSE)* is a free online journal focusing on the teaching and learning of statistics. It is available at *www.amstat.org/publications/jse/*. Other ASA publications in statistics education are available at *www.amstat.org/education/publications.cfm.*

## Statistics Education Web (STEW) in Search of Lesson Plans and Reviewers

The editor of Statistics Education Web, a free online bank of peer-reviewed lesson plans for K–12 teachers of mathematics and science, is accepting submissions of lesson plans and applications/nominations for reviewers. Lesson plans will showcase the use of statistical methods and ideas in science and mathematics based on the framework and levels in the *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report: A Pre-K–12 Curriculum Framework* (*www.amstat.org/education/gaise*). Please review your "bag of tricks" and consider submitting several of your favorite lesson plans according to the STEW template. For more information about submitting lesson plans or applying to be an associate editor/reviewer, visit *www.amstat.org/education/STEW.*

# MAKING SENSE OF STATISTICAL STUDIES


*Making Sense of Statistical Studies* consists of student and teacher modules containing 15 hands-on investigations that provide students with valuable experience in designing and analyzing statistical studies. It is written for an upper middle-school or high-school audience having some background in exploratory data analysis and basic probability.

www.amstat.org/education/msss

# Variation, Teddy Grahams, and the Law of Large Numbers

Richard Griffiths, Independent Consultant

Statistics is about variation. Echoing Richard De Veaux, Paul Velleman, and David Bock in their book, *Intro Stats*, this basic premise is taught in many first-year college statistics courses. Parts of the concept are simple enough, though, that they can be taught to elementary school children. By connecting the concept of variation to Teddy Grahams, I've taught younger children about one of the fundamental facts concerning variation—the Law of Large Numbers—and its life lessons.

For two years, I taught an after-school class in statistics and probability at Clemens Crossing Elementary School in Columbia, Maryland. The kids in the class came from grades 1–3. My intention was to use the class as a proving ground for an activity-based quantitative literacy course complementary to the school-based curriculum. (Not incidentally, it also was to entertain my elementary school–aged daughter, who participated in the class.) The idea was to expand upon the NCTM-type activities into something a little more "fun" than what the kids encountered in school, yet would start them thinking about variation and its consequences.

In Teddy Grahams, there is variation. At the simplest level, some have their arms up and some have their arms down. Teddy Grahams are actually sources of almost infinite variation, and with elementary school children, I find them a good starting place.

Using a graphical tool students are familiar with from school—the bar graph—we can look at the variation in a sample of Teddy Grahams: two bars, one for number of Teddy Grahams with their arms up and one for arms down. From this, the kids can see variation in the bars they've constructed and in the results other children have obtained. Did everyone get the same results? Anyone have more arms up than down? Why do you think that is? This is all very similar to what they learn in school.

From here, I can go on to something a little deeper. One of the fundamental facts taught to first-year college students about variation is the Law of Large Numbers: As you take more observations, the results begin to settle down. With elementary school children, we can approach the same concept. I think it's easiest with graphs.

Giving each student a small number of Teddy Grahams, I asked them to count the number of Teddy Grahams with their arms up and the number with their arms down. With five Teddy Grahams each, for instance, the relative sizes of the bars varied a lot across students. For an example, see Figure 1.

However, give each child more Teddy Grahams—say, 30 each—have them count the number of Teddy Grahams with their arms up and arms down, and then create new bar charts. Now, have them compare the two sets of charts. (See Figure 2 for an example.) The children will see that the variation in the relative sizes of the bars has become smaller.

Sometimes, as an aid to this discovery, I find it helps for them to think about the differences between the bars as steps. In Figure 1, there is a wide variation in the size of the steps—some are really big and some are really small. In Figure 2, the children can see that the size of the steps is more uniform, that the variation has been reduced.

Why is this? The answer may not come immediately to the students, but with a little help, they can understand that the more Teddy Grahams you sample, the more the picture looks like the one that would come from the whole box or the whole world of Teddy Grahams.

And the lesson for the elementary school children of this rather advanced fundamental concept in statistics: It's good to gather as much data (knowledge) about something as you can. For instance, maybe your best friend tells you she thinks all the fourth-grade teachers are mean. That's certainly some useful information, but does everybody think that? What about some of your other friends? What about some of the other kids in the school? If you poll them, you might get a different, fuller picture and, probably, a more useful one for forming your own opinion. Maybe you don't need to be so scared of graduating to fourth grade. And the variation in opinions of your friends and others is useful information, too. Not everybody thinks the same; not everybody has the same opinion; not everybody agrees. Know that and it goes a long way to making sense of the world around you.

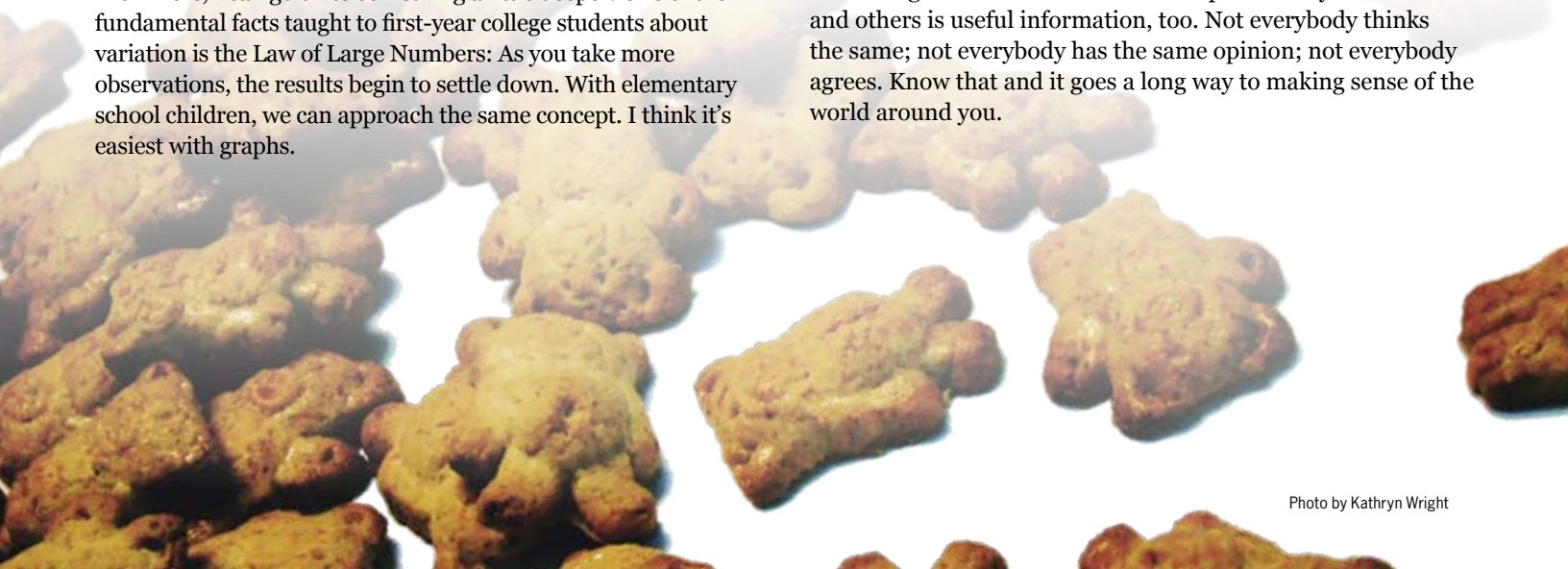


Photo by Kathryn Wright

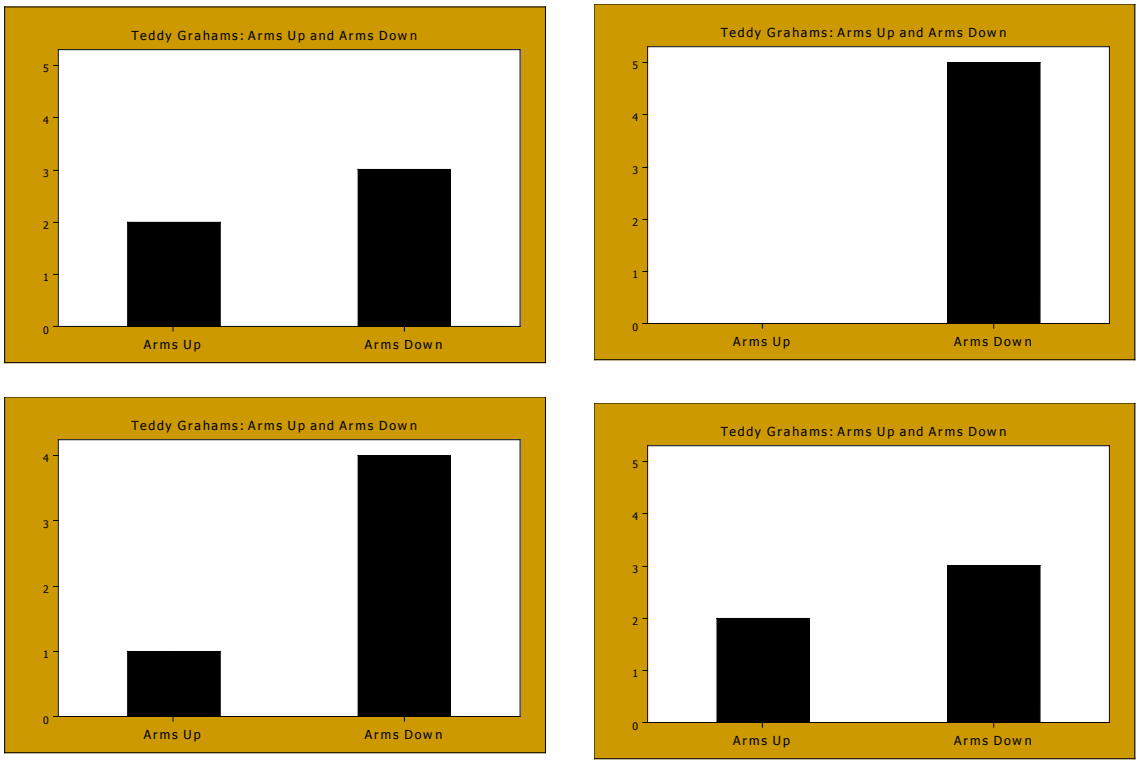



**Figure 1.** Teddy Graham bar graphs for four students: 5 observations each

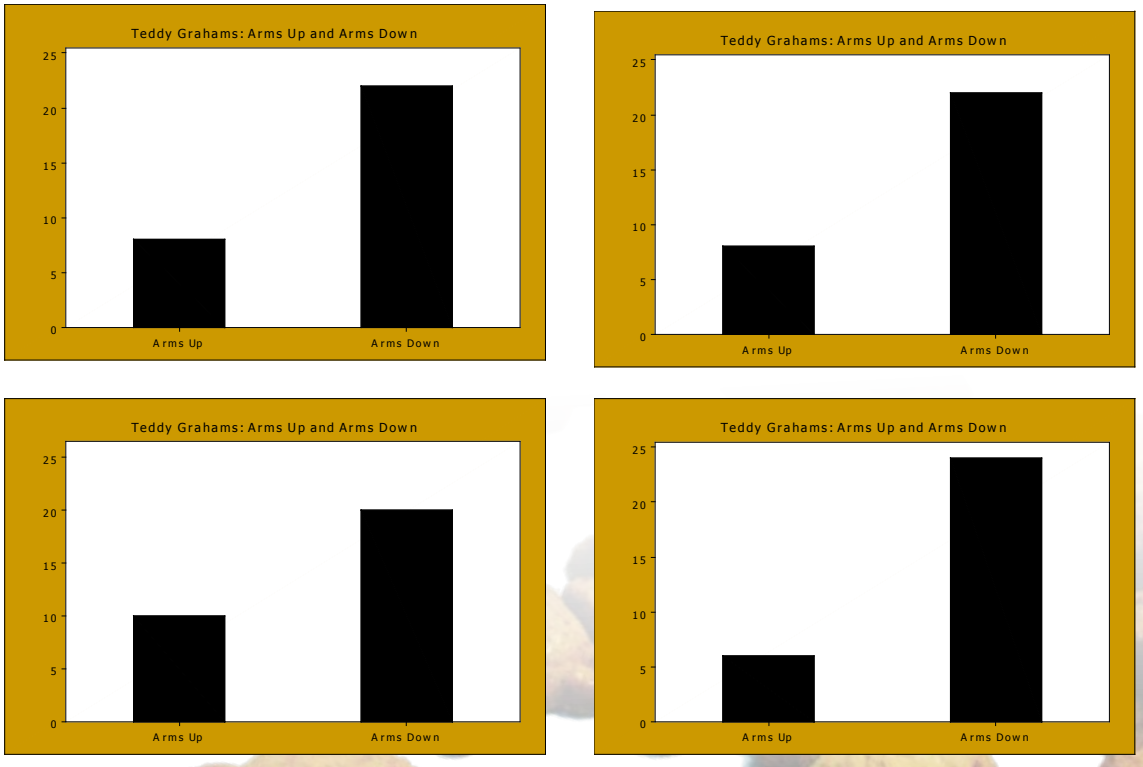



**Figure 2.** Teddy Graham bar graphs for four students: 30 observations each

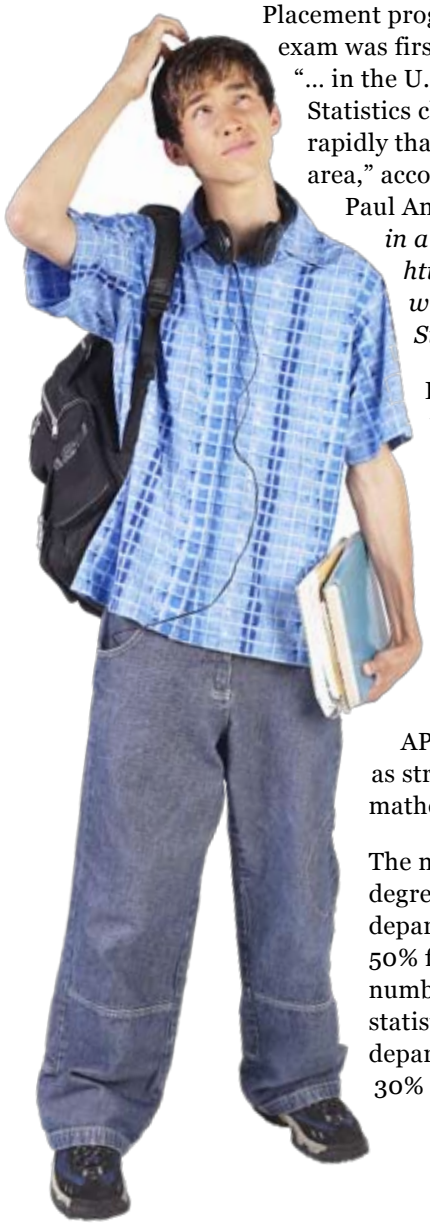
# Why Do Students Take Advanced Placement Statistics?

Monica Johnston, Independent Consultant, and Derek Webb, Senior Editor of *Statistics Teacher Network*

To provide useful information to teachers and administrators at high schools that currently offer Advanced Placement Statistics (AP Statistics), this article explores some of the reasons students take AP Statistics in high school. The ideas also should be of interest to those considering offering such a course.

## Background

The AP Statistics course is a college-level course taught in high schools through the College Board's Advanced Placement program. The AP Statistics exam was first administered in 1997, and "... in the U.S., enrollment in the AP Statistics classes is increasing more rapidly than enrollment in any other AP area," according to Sarah Boslaugh and Paul Andrew Watters in *Statistics in a Nutshell*. For details, visit *http://en.wikipedia.org/wiki/Advanced_Placement_Statistics*.



In 1997, 7,667 students took the AP Statistics exam. By 2007, 98,033 students had taken it, and 129,889 students took it in 2010. There are many reasons for this growth, including statistics becoming more widely used in so many other disciplines and successfully completing AP Statistics does not require as strong of a background in mathematics as does AP Calculus.

The number of bachelor's degrees in statistics (within math departments) was down almost 50% from 1995 to 2000. The number of bachelor's degrees in statistics awarded in 2000 from departments of statistics was down 30% from the number awarded in 1995. A study by the Mathematical Association of America showed that, while there was strong growth in statistics-related degrees from 1980–1995, there was a 39% decline from 1995–2000. But, according to the National Center for Education Statistics, the number of bachelor's degrees in statistics leveled off and then started to increase from 2001 to 2008. This coincides (given a four-year lag for completing college) with the timing of the first AP Statistics exams, given in 1997. Some students may be taking the AP Statistics course in preparation for a major in statistics, while others may not.

## Reasons for Taking AP Statistics

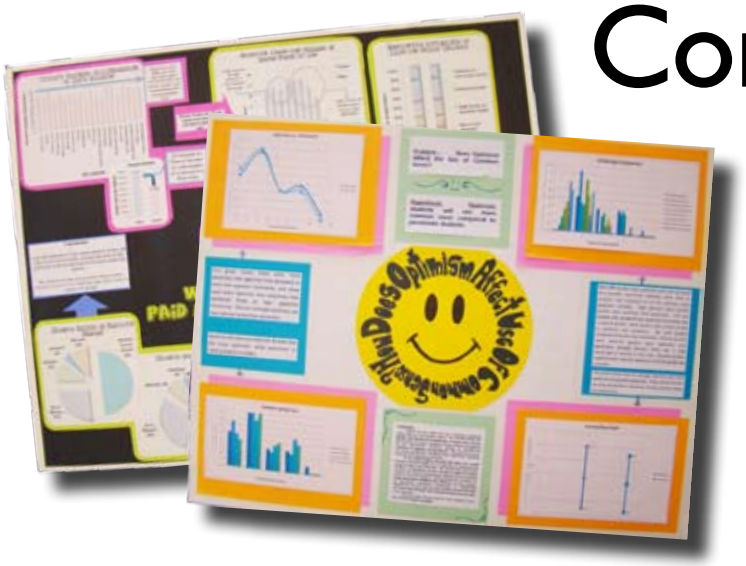
Many students think it is easy to get an A in statistics and that getting an A will boost their GPA more than if they get an A in a non-AP class. Also, they won't have to take a statistics course in college if they take AP Statistics in high school. Specifics about these reasons include the following:

### *Students Think AP Statistics Is Easier Than AP Calculus*

In the public and private high schools in Contra Costa County, college-bound high-school juniors in pre-calculus often have two mathematics classes to choose from for their senior year: AP Calculus or AP Statistics. Some students will choose AP Statistics because they've heard it is easy or easier than calculus. One student reported that her statistics teacher organized a group of seniors in his class to talk to juniors and describe their experiences taking AP Statistics. He did this to squelch the rumor that statistics is an easy course and to affect the expectations of incoming seniors and their success in the course.

This situation arises in high schools that have qualified teachers and are large enough to offer both AP Calculus and AP Statistics. When this is the case, many students develop the impression that statistics is the easier choice. This is, in part, due to most students not having had much exposure to statistics at this point in their academic careers, often just calculating summary statistics and making graphs. Students have not been exposed to statistical problems making use of inferential techniques at a deeper level, nor have they had much formal schooling in probability theory. There are many statistical topics that are as conceptually challenging as the topics students see in their first semester of calculus.

# Poster and Project Competitions



The ASA/NCTM Joint Committee on the Curriculum in Statistics and Probability and the ASA Center for Statistics Education encourage students and their advisers to participate in the free, annual Poster Competition and Project Competition.

A statistical **poster** is a display containing two or more related graphics that summarize a set of data, look at the data from different points of view, and answer specific questions about the data.

A statistical **project** is the process of answering a research question using statistical techniques and presenting the work in a written report.

Committees of distinguished statisticians and dedicated teachers of statistics meet each year to evaluate entries and award first, second, third, and honorable mention prizes to each of the K–3, 4–6, 7–9, and 10–12 grade categories.

**Winners receive cash prizes, calculators, and certificates.**

Posters are due every year on **April 1**.

Projects are due every year on **April 1** (grades 4–6 and 7–9) and **May 30** (grades 10–12).

For more information, see the K–12 link at *www.amstat.org/education*.

Another reason is that some AP Statistics teachers are not trained in teaching statistics and teach the course more like a "math" course at an Algebra I level. Teaching the course inappropriately creates the misconception that AP Statistics is easier than AP Calculus.

### *Students Demonstrate Academic Competitiveness*

Some students give thought to how college admissions offices (or even future employers) will view their high-school transcripts and they realize taking one or more AP classes is an academic advantage. This is also a strategy that high-school counselors may recommend.

Furthermore, the point structure may be different for AP classes. Typically, taking an AP class adds one grade point to the student's achieved grade. For example, students who get an A (4.0) in the AP course will receive five grade points; a B (3.0) would generate four grade points, etc. This point structure means a student can graduate with a GPA above a 4.0.

### *AP Statistics Is a Better Fit for Students' College Majors*

Students receive input from teachers, counselors, parents, tutors, and classmates when it comes to choosing their courses in high school. Students who believe it is important to take a mathematics course their senior year, but who don't believe they will major in a physical science or math in college, choose AP Statistics instead of AP Calculus because it seems like a better fit for their academic and career plans.

### *Students Reduce College Expense and Workload*

According to the College Board, taking AP courses reduces the cost of college. Students who take AP classes may enter college with a semester's worth of college credits or more, meaning they can finish college in less than four years, which reduces the cost of college. Also, students don't know what to expect in college with respect to difficulty of coursework, ability to get assistance with coursework, etc., so taking statistics under those conditions may sound more difficult than taking statistics in high school, a predictable environment for a senior.

In general, passing high-school AP Statistics in Central Contra Costa County is not as difficult as passing some introductory statistics courses in college; college courses have more homework and require more projects and reports.

There are various factors that influence whether a student takes an AP Statistics course, and none of those frequently mentioned by students relate to interest in statistics as a subject. If students begin to take AP Statistics because of an interest in statistics, we might see an increase in the number of majors in statistics and statistics-related college degree programs.

## Institutional Barriers to Taking AP Statistics

Students at many smaller schools, especially rural schools, don't have the choice between an AP Calculus and AP Statistics because neither is offered. This is sometimes a matter of funding, as the high school is not large enough to offer both AP Calculus and AP Statistics. Often, however, it is more a matter of a traditionally trained math department choosing to offer AP Calculus instead of AP Statistics or just not giving consideration to AP Statistics. This is, in large part, due to traditionally trained teachers believing the best path for their students is one that culminates in calculus, not statistics.

For schools that offer only one AP course, the choice is usually AP Calculus. However, a study at Bemidji State University from 2001–2006 concluded that 78% of all degree programs required one or more statistics courses, while only 12% of all degree programs required one or more calculus courses. It also can be argued that the better choice for students in this century is an AP Statistics course. In his *Math Horizons* article, Richard Rusczyk described the current curriculum at most high schools as a "death march to calculus" and advocated for a rethinking of mathematics curriculum in our country with a greater emphasis on statistics.

## Impact of Students' Reasons for Taking AP Statistics

Teachers often notice how students' reasons for taking AP Statistics affects the teaching of it because some students end up in their AP class even though they would have probably been better served in a different class.

### *AP Statistics Is a Better Fit for Their College Major*

Students who mention that statistics is a better fit for their college major are easier to tutor than those who take AP Statistics for academic competitiveness or other reasons. The former are easier to engage in learning the required material and more receptive to supplemental teaching efforts. For example, they express genuine interest in news articles or online links to statistics applications, especially if they relate to their intended college major.

### *Taking AP Statistics Shows Academic Competitiveness*

Students who take statistics for reasons other than an interest in it are more difficult to instruct than those who are interested. They tend to place a lower priority on doing homework and preparing for exams than they do for other courses. They are more likely to come to tutoring without their books or notes. They are less likely to have attempted problems on their own prior to coming for their tutoring session; tutors must instruct rather than review. Less effort is placed on preparing for exams than is needed, including the AP Statistics exam, prompting tutors to develop chapter review sheets.

## Recommendations

The importance of statistics to careers should be considered by teachers and administrators as they plan their math and statistics curriculum. Counselors should be similarly advised about the relevance of statistics to the degree programs that interest students so they can appropriately advise students in selecting classes.

To help students make informed decisions about taking AP Statistics and/or AP Calculus, a page of frequently asked questions (FAQs), or myth busters, could be developed. FAQs could be posted on the school district's web page or mailed to parents and students just prior to the time of selecting classes for the following academic year. Additionally, FAQs could be posted by math departments, parent-teacher associations, campus career centers, and school libraries.

Last, around the time students select classes, teachers and administrators need to generate interest in taking AP Statistics. Some avenues for generating interest include (1) having a group of seniors talk to juniors in late May or early June, (2) having a statistician as a guest speaker in sophomore and junior math classes, and (3) having a statistician participate in informational or career events held on campus.

## Further Reading


5 Steps to a 5: AP Statistics, *www.mhprofessional.com/product.php?cat=111&isbn=0071621881*

Advanced Placement Statistics, *http://en.wikipedia.org/wiki/Advanced_Placement_Statistics*.

American Mathematical Society, *www.ams.org/profession/data/cbms-survey/cbmssurvey-ch3.pdf*.

Boslaugh, Sarah, and Paul Andrew Watters. 2008. *Statistics in a nutshell*. Sebastopol, CA: O'Reilly Media, Inc.

CAUSEweb, *www.causeweb.org/uscots/uscots05/spotlight/files/C2.pdf*.

College Board, *http://professionals.collegeboard.com/testing/ap and http://apcentral.collegeboard.com/apc/public/repository/2010_Statistics_Score_Dist.pdf*.

Mathematical Association of America, *www.maa.org/CUPM/appendices.pdf*.

National Center for Education Statistics, *https://webcaspar.nsf.gov*.

Oak Park High School, *www.ophs.opusd.k12.ca.us/ap_&_honors12.htm*.

Torrence, Bruce. 2010. "A Conversation with Richard Rusczyk." *Math horizons*, February, 11–13.


# ANNOUNCEMENTS

*Statistics Teachers,*

Good News: Rep. David Loebsack (D-Iowa) introduced a bill in the U.S. House of Representatives promoting K–12 statistics education through professional development and other statistics education programs. Talking to your state representatives about this bill is a great way to share the importance of what you do and your enthusiasm for statistics education.

The ASA is asking you to meet with your representative in his/her home district office to discuss the importance of statistics education and urge that he/she cosponsor this bill. For more information, go to *www.amstat.org/outreach/statliteracy*. The ASA will prepare you with a training session on how to request meetings, conduct an effective meeting, and make a compelling case for statistics education. The session also will cover the broader context for this bill and the ASA statistical literacy grassroots campaign. If you have questions, contact the ASA's director of science policy, Steve Pierson, at *pierson@amstat.org* or K–16 education manager, Rebecca Nichols, at *rebecca@amstat.org*.

## ASA Exhibits at USA Science & Engineering Festival Expo

The The ASA participated in the two-day expo on the National Mall in Washington, DC, October 23--24 as part of the inaugural USA Science & Engineering Festival. The ASA exhibit, Discovery Through Interactive Statistics, featured hands-on activities (*www.amstat.org/outreach/hands-on.cfm*), information about careers in statistics (*www.amstat.org/careers* ), and K--12 statistics education resources (*www.amstat.org/education* ). The official festival website (*www.usasciencefestival.org*) includes a video recapping the festival, along with other information about the festival events and exhibits.

## World Statistics Day


The ASA and several other statistical organizations participated in World Statistics Day events on October 20, 2010. For more information and to download the United States' World Statistics Day poster, visit *http://unstats.un.org/unsd/wsd*.

# Statistics Workshop for Mathematics and Science Teachers Goes International

## *Fourth annual Meeting Within a Meeting held in conjunction with JSM in Vancouver, BC*

Katherine Halvorsen, MWM Program Chair, and Rebecca Nichols, ASA K–16 Education Manager

The American Statistical Association and Statistical Society of Canada (SSC) jointly sponsored the fourth annual Meeting Within a Meeting (MWM) Statistics Workshop for Mathematics and Science Teachers that was held August 4–5 concurrently with the 2010 Joint Statistical Meetings in Vancouver, BC. Canadian and U.S. middle- and high-school teachers attended workshop sessions on August 4 and received passes to attend JSM sessions on August 5. The ASA and SSC will provide follow-up activities throughout the 2010–2011 school year.

The primary goals of the MWM 2010 program were to introduce middle- and high-school teachers who teach math and science courses to the *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report: A Pre-K–12 Curriculum Framework* (*www.amstat.org/education/gaise*) and provide an opportunity for these teachers to discuss and apply the data analysis and statistical concepts embodied in the GAISE framework.

A secondary goal was to encourage cooperation between mathematics and science teachers in the teaching of statistics. The MWM program is designed to enhance educators' understanding of statistics and provide them with hands-on activities they can use in their own classrooms to strengthen the teaching of statistics in their schools. The follow-up program will include email contact with participants, new webinars, and an archive of previous webinars available at *www.amstat.org/education/webinars*.

"One of the primary missions of the American Statistical Association is to work for the improvement of statistical education at all levels," said Ron Wasserstein, the ASA's executive director. "We are pleased to reach out to the K–12 mathematics and science community through the MWM workshop and follow-up activities," he added. "MWM will not only enhance understanding and teaching of statistics concepts in the classroom, but also provide participants with a network of statisticians and educators to assist in developing the quantitative literacy of their students."

The first MWM workshop was held in Salt Lake City, Utah, in 2007 and focused on middle-school math and science teachers. Its success led Martha Aliaga, ASA director of education, to recommend expanding the Denver MWM workshop in 2008 to a two-day format that included separate strands for K–4, 5–8, and 9–12 teachers. MWM 2009 in Washington, DC, included parallel strands for K–4, 5–8, and 9–12 teachers on the first day with a field trip to the U.S. Census Bureau on the second day.

"The MWM workshops emphasize the growth of statistical literacy and thinking as teachers explore problems that require them to formulate questions; collect, organize, analyze, and draw conclusions from data; and apply basic concepts of probability," said Katherine Halvorsen, MWM program chair. "The MWM program includes examining what students can be expected to do at the most basic level of understanding and what can be expected of them as their skill develops and their experience broadens."

MWM 2010 began with SSC President Don McLeish, ASA President Sastry Pantula, Wasserstein, Halvorsen, and Aliaga welcoming the teachers. SSC past president, Bovas Abraham, and ASA president-elect-elect, Bob Rodriquez, also greeted the teachers. Kevin Keen of the University of Northern British Columbia provided an overview of the statistics standards for middle and high school prescribed by the Western and Northern Canadian Protocol Curriculum, and Patrick Hopfensperger of Homestead High School discussed the GAISE framework.

Hopfensperger also discussed planning statistics lessons and assessing student progress during a morning session, while Christine Franklin of the University of Georgia discussed univariate analysis of measurement data with a focus on understanding measures of center and spread.

The afternoon sessions were taught by Bill Finzer of KCP Technologies, Halvorsen, and Megan Mocko of the University of Florida. Finzer taught how to explore Census at School data from around the world with Fathom software and teach statistical problemsolving in the context of Canadian, U.S., and international Census at School data. Halvorsen discussed formulating statistical questions and exploring statistical questions through projects, and Mocko informed participants about the ASA Project Competition. The day ended with participants reflecting on the day's activities and filling out evaluations.

Teachers who stayed for the second day of the program used their complimentary pass to attend statistics education sessions at JSM, including "Initiatives to Create Guidelines for Statistics

Education to Prepare Future Generations to Function Effectively in a Data-Centric World: A Progress Report," organized by the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability.

All teachers attending MWM were given a certificate of participation from the ASA and SSC. Teachers also may register to receive 0.5 semester graduate credit hours through Adams State College for attending the Wednesday workshop.

MWM 2011 will take place in Miami Beach, Florida, jointly with JSM. K–12 mathematics and science teachers interested in enhancing their understanding and teaching of statistics within their curricula should register in March. Further information will be available at *www.amstat.org/education/mwm*. Questions may be directed to Rebecca Nichols, ASA K–16 education manager, at *rebecca@amstat.org* or (703) 684-1221, Ext. 1877.

***Editor's Note*:** This article was published in the October 2010 issue of *Amstat News*.



## U.S. Census at School Program Online

The ASA and Population Association of America (PAA) launched the U.S. version of Census at School (*www.amstat.org/censusatschool*), an international classroom project that engages students in grades 4–12 in statistical problemsolving. Students complete an online survey, analyze their class census results, and compare their class with random samples of students in the United States and other participating countries. The project began in the United Kingdom in 2000 and now includes Australia, Canada, New Zealand, South Africa, Ireland, and Japan. The ASA and PAA are seeking champions to expand the U.S. Census at School program nationally. This is a wonderful opportunity for statisticians and statistics educators to perform outreach in their communities. For more information on how you can get involved, email Martha Aliaga at *martha@amstat.org* and copy *rebecca@amstat.org*.

## ASA 2010 Poster and Project Winners Announced

The ASA is pleased to announce the winners of the 2010 poster and project competitions. The competitions offer opportunities for students to formulate questions and collect, analyze, and draw conclusions from data. Winners were recognized with plaques, cash prizes, certificates, and calculators and their names were published in *Amstat News*. To view the winning posters and projects and for more information, visit *www.amstat.org/education/posterprojects*.

## *Significance* Magazine Now Available in the US

The ASA and Royal Statistical Society (RSS) are collaborating on the publication of *Significance*, a quarterly magazine for anyone interested in statistics and the analysis and interpretation of data. The aim of *Significance* is to communicate and demonstrate in an entertaining and thought-provoking way the practical use of statistics in all walks of life and to show how statistics benefit society. As well as promoting the discipline and covering topics of professional relevance, *Significance* contains a mixture of statistics in the news, case studies, reviews of existing and newly developing areas of statistics, and practice and problemsolving techniques. A subscription to *Significance* will be included as a benefit of membership in either the ASA (including the ASA K–12 teacher membership) or the RSS. It also can be ordered through Wiley-Blackwell. For more information, visit *www.amstat.org/publications/significance*. K–12 teachers will receive one issue of *Significance* when they sign up for the free, three-month trial K–12 teacher membership (valid for new ASA members) at *www.amstat.org/membership/k12teachers*.

# CENSUS at SCHOOL

## FREE international classroom project to engage students in statistical problemsolving

Teach statistical concepts, statistical problemsolving, measurement, graphing, and data analysis using your students' own data and data from their peers in the United States and other countries

### Complete a brief online survey (classroom census)

13 questions common to international students, plus additional U.S. questions

15–20-minute computer session

### Analyze your class results

Use teacher password to gain immediate access to class data

Formulate questions of interest that can be answered with Census at School data, collect/select appropriate data, analyze the data—including appropriate graphs and numerical summaries for the corresponding variables of interest—interpret the results, and make appropriate conclusions in context relating to the original questions

### Compare your class census with samples from the United States and other countries

Download a random sample of Census at School data from United States students

Download a random sample of Census at School data from international students (Australia, Canada, New Zealand, South Africa, and the United Kingdom)

International lesson plans are available, along with instructional webinars and other free resources.

*www.amstat.org/censusatschool*

For more information about how you can get involved, email Martha Aliaga at *martha@amstat.org* and copy *rebecca@amstat.org*.