California Online Mathematics Education Times (COMET)
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COMET Archives (2000-2015): http://comet.cmpso.org
California Mathematics Project: http://www.cmpso.org

California Online Mathematics Education Times (COMET) is an electronic news bulletin providing STEM-related news from California and across the nation, as well as information about professional events and opportunities, current educational issues, and online resources.

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Warmest wishes for a joyful, reflective, and rejuvenating holiday season! ~ Carol

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ARTICLES & ANNOUNCEMENTS (CALIFORNIA FOCUS)

(1) Conference on California's Emerging Teacher Shortage: New Evidence and Policy Responses

Contact: Policy Affairs for California Education
URL: http://edpolicyinca.org/events/californias-emerging-teacher-shortage-new-evidence-and-policy-responses

On 19 January 2016 from 9:30 a.m.-2:30 p.m., a free conference will be held at the Sacramento Public Library to discuss California's growing shortage of teachers in mathematics and other areas. Cosponsored by the Learning Policy Institute (LPI), Policy Analysis for California Education (PACE), and Education Policy Center at AIR, the conference includes the following keynote speakers:
- Se**nator Carol Liu**, Chair, Senate Standing Committee on Education
- Linda Darling-Hammond, Learning Policy Institute and Stanford University

The conference will present new evidence on the **scale of the emerging teacher shortage**, with a particular focus on already **critical shortages of teachers in specific fields and regions.** It will feature presentations on **new approaches to teacher recruitment, preparation, and retention** that could help ameliorate the worst impacts of this shortage on California's students. Presenters and panelists will include policy leaders, senior researchers, and local practitioners.

Lunch will be provided. To **register**, please visit the website above.

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(2) TEACH Grants Provide Significant Financial Support for Eligible Prospective K-12 Mathematics and Science Teachers

Every December, the California Department of Education (CDE) must submit a letter to the U.S. Department of Education (ED) documenting identified teacher shortage areas. The benefits of doing so are listed in a letter from ED located at http://www2.ed.gov/about/offices/list/ope/pol/csso-letter.html and include cancellation of student loan debt and grants for those preparing to teach in identified shortage areas.

As usual, CDE's letter to ED this year **included Science and Mathematics/Computer Science in its list of teacher shortage areas** (see https://assets.documentcloud.org/documents/2650565/CDE-Teacher-Shortage-Letter-Nov-2015.pdf). For the first time, CDE also included teachers in self-contained classes in its letter because of **the state's documented shortage of elementary school teachers**. (For a **complete listing** of areas of teacher shortage by state for the last 25 years, please visit https://www2.ed.gov/about/offices/list/ope/pol/tsa.pdf)
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The California State University (CSU) Chancellor's Office strongly encourages qualified undergraduates and credential students in identified shortage areas to apply for a **TEACH (Teacher Education Assistance for College and Higher Education) Grant,** which **provides up to $4000 per year (up to a total of $16,000)** for students who are preparing to teach full-time in one of the many identified high-need (shortage) areas. TEACH Grant recipients are **required to teach in one of these areas at a low-income school for at least 4 years within an 8-year period**. There are over 8,000 schools in California identified as low-income for fulfilling the requirement, so finding one is not difficult. The CSU System's goal is to at least double the number of TEACH Grant recipients using last year's figure (400) as a baseline.

Please direct potentially interested preservice teachers to their campus's financial aid office as well as the following websites: https://studentaid.ed.gov/sa/types/grants-scholarships/teach and www.calstate.edu/teachered/scholarships/teach-grant.shtml

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(3) Making Statistical Connections in Middle School: Facilitator Training
Source: California Mathematics Project
URL: http://commoncore.tcoe.org/docs/default-source/Math-docs/stats-training_fresno.pdf?sfvrsn=0

The most recent California Mathematics Content Standards have incorporated **statistics and probability standards in grades 6-8.** The California Mathematics Project (CMP), in partnership with the California Mathematics Council (CMC) and the California Association of Mathematics Teacher Educators (CAMTE), has developed a series of modules for middle school teachers to support the teaching and learning of statistics and probability. This facilitator training will take a close look at the modules, instructional guides for facilitators, and the materials available for use with teachers, focusing specifically on grades 6-8.

The training will be held on **February 29-March 1, 2016 in Fresno**. Participants will receive access to the statistics modules in iBook or PDF format, as well as Facilitator Notes and Teacher Resources. To register online, go to http://ucla.in/1Qwgjiu

For more information, visit https://sites.google.com/a/cmpso.org/statistics/ Contact Ann Park with any questions: apark@gseis.ucla.edu

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ARTICLES & ANNOUNCEMENTS (NATIONAL FOCUS)

(1) President Obama Signs the Every Student Succeeds Act
URL (video): http://tinyurl.com/President-Signs-ESSA

On 10 December 2015, **President Obama signed the Every Student Succeeds Act (ESSA),** which reauthorizes the Elementary and Secondary Education Act (ESEA) of 1965 and replaces the most recent ESEA update—the No Child Left Behind Act of 2001 (NCLB). After thanking 8th-grader and prospective engineer Antonio Martin for his
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introduction, the president declared, "This is an early Christmas present….a Christmas miracle--a bipartisan bill signing right here!"

In his speech, the president stated that the goals of NCLB (high standards, accountability, and closing the achievement gap) were "the right ones," but he also said that "in practice, it often fell short. [NCLB] didn't always consider the specific needs of each community. It led to too much testing during classroom time. It often forced schools and school districts into cookie-cutter reforms that didn't always produce the kinds of results that we wanted to see… We're going to have to have our young people master not just the basics but also become critical thinkers and creative problem solvers."

The president summarized some key elements of the Act: "First, this law focuses on a national goal of ensuring that all of our students graduate prepared for college and future careers... Second, this bill makes long-overdue fixes to the last education law, replacing the one-size-fits-all approach to reform with a commitment to provide every student with a well-rounded education. It creates real partnerships between the states, which will have new flexibility to tailor their improvement plans, and the federal government, which will have the oversight to make sure that the plans are sound.

"It helps states and districts reduce unnecessary standardized tests -- something we talked about a couple of months ago, because what we want to do is to get rid of unnecessary standardized tests so that more teachers can spend time engaging in student learning while, at the same time, making sure that parents and teachers have clear information on their children's academic performance.

"Number three, we know that the early years can make a huge difference in a child's life, so this law lays the foundation to expand access to high-quality preschools, and it creates incentives for innovative approaches to learning and for supporting great teachers.

"And finally, this bill upholds the core value that animated the original Elementary and Secondary Education Act signed by President Lyndon Johnson -- the value that says education, the key to economic opportunity, is a civil right. With this bill, we reaffirm that fundamental American ideal that every child, regardless of race, income, background, the zip code where they live, deserves the chance to make out of their lives what they will…"

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The **enrolled version of the Every Student Succeeds Act** (S.1177) is available at https://www.gpo.gov/fdsys/pkg/BILLS-114s1177enr/pdf/BILLS-114s1177enr.pdf
COMET readers may enjoy conducting **searches of terms** such as STEM (with a space in front to avoid "system"s), mathematics, science, computer science, engineering, and technology for specifics on the bill's support for STEM programs for students and STEM professional learning and leadership (e.g., the STEM Master Teacher Corps) for teachers.

The U.S. Department of Education's ESSA website serves as a **resource center** for information on this bill: www.ed.gov/essa Questions on ESSA can be submitted, and those interested in receiving **news and updates about ESSA** can register on this webpage.

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Related Article:

(1.1) "**ESSA: Implications for California and Equity—Live Video Conversation**"

EdSource and Partners for Each and Every Child (http://tinyurl.com/partnersforeachchild) will co-sponsor a **live video conference** via GoToWebinar to **examine the implications of the new Every Student Succeeds Act in California on 12 January 2016, 11 a.m.-12:30 p.m. PT.**

After more than a decade of "No Child Left Behind," the reauthorization of the federal Elementary and Secondary Education Act promises to significantly alter the federal government's role and direction in education policy.

States will play an important role under the new law in ensuring educational equity, and ensuring that schools are supported to respond to the needs of underserved, underrepresented, and/or high-needs students.

California, with continued implementation of the Local Control Funding Formula (LCFF) and redesign of an accountability system with multiple measures, is poised to have a major impact on the evolution of national discourse and practice.

Still, many questions remain unanswered:
- What does this mean for California's school districts?
- How could the new law impact California's reforms, particularly the new accountability system the state is currently developing?
- What must educators and policymakers do to ensure that all children have an equal opportunity to succeed in California's schools?

Join a discussion moderated by EdSource executive director Louis Freedberg with Christopher Edley, chair, Partners for Each and Every Child, and other prominent California educators and experts to examine some of these questions. More details will be available in January.

To register for this free 90-minute webinar, go to http://tinyurl.com/ESSA-Videoconference To view the **guidance letter issued by the U.S. Department of Education,** please visit http://tinyurl.com/ED-guidance-letter-ESSA

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(2) **"Apple's Tim Cook: Computer Science and Coding Education Crucial to Training Workforce of Tomorrow"** by Bree Fowler (AP)
Source: *The Winnepeg Free Press* – 9 December 2015

URL: www.winnipegfreepress.com/business/apples-cook-computer-science-and-coding-education-crucial-to-training-workforce-of-tomorrow-361316541.html

Teaching kids to code is just as important as teaching them any other language. And the younger they start learning it, the better, Apple CEO Tim Cook said [on 9 December 2015].

Cook spoke to a group of New York third graders who visited a Manhattan Apple store for an "Hour of Code" class. In an interview afterward, he said that schools aren't putting enough emphasis on computer-science education, but he has "great hope" that will change and coding will ultimately become a required class for all kids.

"From an economic standpoint the job segment itself today is huge, but it's going to become even larger," Cook said.

And if the concepts are introduced at a young age, in a fun way, it's more likely that kids will find them cool and stay interested as they grow older, hopefully resulting in a larger and more diverse tech workforce down the road, he said.

Cook added that even if kids don't grow up to get a lucrative job in the tech industry, they'll discover a new way to be creative and pick up important problem-solving skills along the way.

The kids at Wednesday's event played with a Star Wars-themed game created by the non-profit group Code.org in partnership with Disney. [See https://code.org/starwars] On iPad Minis, they used basic drag-and-drop commands to program their droid to do things like pick up scrap metal and evade Stormtroopers.

Their teacher, Joann Khan, said Wednesday's introduction to coding was probably a first for most of her students, noting that her school, located in Manhattan's East Harlem neighborhood, no longer has a computer lab. She said the lessons taught through the game bring to life some of the math skills the kids are learning in her classroom, something she planned to point out to them when they returned to school.

The "Hour of Code" workshop was one of many held by Apple Inc. and a slew of other technology companies around the world [during Computer Science Education Week, December 7-13] as part of a Code.org push to introduce as many kids as possible to computer science through a one-hour class.

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Related Article:

(2.1) "University of California Pressured to Count Computer Science toward High School Math Requirement" by Katy Murphy and Sharon Noguchi
Source: *San Jose Mercury News* – 14 December 2015
URL: www.mercurynews.com/california/ci_29245938/

… A powerful coalition of technology leaders, state politicians and high school teachers has taken aim at the university's influential set of high school courses required for admission, pressuring UC to count computer science as advanced math, alongside calculus and statistics.

They say elevating computer science would encourage more California high schools to offer it -- and more students to sign up, preparing them to enter fields with few women and minorities…

UC stresses that it is possible for computer science to meet the rigorous standards for a math course, but only 11 of the more than 1,500 classes offered this year in California high schools made the grade, according to information provided by the UC Office of the President.

Last week, Lt. Governor Gavin Newsom urged UC to reconsider its position in a letter signed by a long list of student leaders and top executives at LinkedIn, Facebook, Microsoft and other major companies…

[Visit the website above to read the entire article.]

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(3) Webinar: Programming Video Games With Algebra
Source: MSPnet, National Science Foundation

Emmanuel Schanzer is the founder and developer of **Bootstrap**, a **curricular module for students ages 12-16 that teaches algebraic and geometric concepts through computer programming.** He first designed the curriculum for his own students (middle and high school mathematics students) in the Boston Public Schools.

Earlier this month, Schanzer was invited by MSPnet to give a talk addressing the question, **"Can computer programming help kids learn algebra?"** To view this informative talk, go to http://hub.mspnet.org/index.cfm/28979 and click on **"Webinar Recording."** PPT slides can be viewed at http://hub.mspnet.org/media/data/bootstrap.pdf?media_000000008436.pdf

Session summary:

Many people naively assume that "Programming is like Math," and expect magically higher grades from students who've taken a class in Java, Scratch or Python. Unfortunately, this assumption is far from accurate. In a world of high-stakes testing, we can no longer pretend the word "function" means the same thing to algebra teachers and programmers. If we truly wish to help students in algebra, we need to re-think the foundations of what programming we teach. In this talk, Schanzer will explore the literature and current research in the field of algebra education and programming, while discussing the highly-popular Bootstrap program now in use in schools across the country. Bootstrap teaches students to program their own video games using purely algebraic and geometric concepts, and is closely aligned with the Common Core Standards for Mathematics. Find out how teachers, college students and professionals

are getting involved with Bootstrap to bring functional programming to middle and high school students around the country.

Related articles:

(3.1) Bootstrap: Programming Games with Algebra, for *Every* Student
Source: Bootstrap
URL: www.bootstrapworld.org

(3.2) "7 Ways to Get Kids Interested in Computer Science" by Neil Plotnick
Source: *Education Week* - 7 December 2015
URL: www.edweek.org/tm/articles/2015/12/07/7-ways-to-get-students-interested-in.html?cmp=eml-enl-tu-news1

(3.3) Digital Media + Family Engagement = Gains in Early Math Learning
URL: www.wested.org/rd_alert_online/digital-media-family-engagement-gains-in-early-math-learning

(3.4) "'Star Wars' Tech: 8 Sci-Fi Inventions and Their Real-Life Counterparts" by Edd Gent
Source: LifeScience – 16 December 2015
URL: www.livescience.com/53114-real-life-star-wars-technology.html

(3.5) "New Minecraft Tutorial Teaches Kids Coding" by Laura Davaney
URL: www.eschoolnews.com/2015/11/18/minecraft-tutorial-059/

COMET readers may enjoy watching a short video of the creator of Minecraft (https://minecraft.net/), followed by hands-on experience with this popular programming game.

...Designed for ages 6 and up, the Minecraft tutorial introduces players to basic coding skills, encouraging them to navigate, mine, craft and explore in a 2D Minecraft world by plugging together blocks to complete all actions and generate computer code. Players are offered a set of 14 challenges, including free play time, to explore coding concepts they've learned through the tutorial.

"'Minecraft' is a special game that girls and boys alike often can't be pried away from," said Code.org CEO and Co-founder Hadi Partovi. "Microsoft continues to be Code.org's most generous donor and one of the largest supporters of the worldwide movement to give every student the opportunity to learn computer science. This year's Minecraft tutorial will empower millions of learners around the world to explore how a game they love actually works and will inspire them to impact the world by creating their own technology or apps"…

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(4) "Positive Mindset May Prime Students' Brains for Math" by Sarah D. Sparks
Source: *Education Week* – 8 December 2015

URL: www.edweek.org/ew/articles/2015/12/09/biological-evidence-found-for-mindset-theory.html

…In an ongoing series of experiments at Stanford University, neuroscientists have found more efficient brain activity during math thinking in students with a positive mindset about math.

It's part of a growing effort to map the biological underpinnings of what educators call a positive or growth mindset, in which a student believes intelligence or other skills can be improved with training and practice, rather than being fixed and inherent traits.

"Our findings provide strong evidence that a positive mindset contributes to children's math competence," said Lang Chen, a Stanford University postdoctoral fellow in cognitive psychology and neuroscience. "Beyond the emotional or even motivational story of 'positive mindset,' there may be cognitive functions supporting the story"…

Chen and colleagues tested 243 children ages 7 to 9 for intelligence, numerical problem-solving and math reasoning in word problems, reading ability, working memory, and math-anxiety levels. Chen also gave the students a survey designed to identify positive-mindset levels in math, such as questions about how much they enjoyed solving challenging problems and how competent they felt in learning math…

Of the children in the study, 47 were asked to either stare at a fixed point or identify whether a series of addition problems were correct while being scanned using functional magnetic resonance imaging, or fMRI, a noninvasive method of identifying brain activity by measuring changes in blood flow in the brain.

Chen and his colleagues found that students with higher positive-mindset levels in math were more accurate at identifying correct and incorrect math problems, even after controlling for differences in IQ, age, working memory, reading ability, and math anxiety. A lower positive-mindset level was likewise associated with lower math performance.

"This is very, very exciting," said Carol Dweck, the Stanford psychologist who first coined the terms "growth" and "fixed" mindsets, but who was not involved with Chen's study. "We've typically asked how does [mindset] affect students' willingness to take on challenges and their ability to stick to that challenge when they hit setbacks. This opens up a whole new area, which is getting ready to solve a problem…

Students with high positive-mindset levels had generally greater brain activity in a number of areas of the brain associated with math problem-solving: the hippocampus, the left dorsomedial prefrontal cortex, the left supplementary motor area, the right lingual gyrus, and the dorsal cerebellum. In particular, the researchers found faster, smoother connections, called "upregulation" between the hippocampus—an area often associated with the ability to quickly remember math

facts and processes—and the other brain areas associated with math problem-solving…

[Visit the website above to learn more about Chen's findings as well as information on related studies.]

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(5) "Math Anxiety Doesn't Equal Poor Math Performance"
Source: Association for Psychological Science News– 4 November 2015
URL: www.psychologicalscience.org/index.php/news/releases/math-anxiety-doesnt-equal-poor-math-performance.html
URL (Psychological Science Abstract):
http://pss.sagepub.com/content/early/2015/10/30/0956797615602471.abstract

Experiencing math anxiety -- nervousness and discomfort in relation to math -- impairs math performance for some students, but new research shows that it's linked with improved performance for others, at least to a degree…

In two studies, researchers Zhe Wang of Virginia Polytechnic Institute and State University, Stephen Petrill of The Ohio State University, and colleagues found that a moderate level of math anxiety was associated with high math performance among students who reported high math motivation -- that is, among students who reported that they valued math and embraced math challenges. For those who are low in this kind of math motivation, however, high math anxiety appears to be linked with low math performance.

"Our findings show that the negative association between math anxiety and math learning is not universal," say Wang and Petrill. "Math motivation can be an important buffer to the negative influence of math anxiety."

While some children might be anxious about math because it is extremely difficult for them and they feel threatened by it, others might be anxious about math because they want to perform well. The researchers hypothesized that different underlying motivations for these two groups may have different consequences for math learning behaviors and performance.

For the first study, the researchers looked at data from 262 pairs of same-sex twins. The children, about 12 years old on average, completed measures of math anxiety and math motivation. They also completed six tasks aimed at measuring math performance, tapping skills like representing numerical quantities nonverbally and spatially, calculating with fluency, and using quantitative reasoning in problem solving.

The results indicated that there were no differences in math anxiety and math motivation according to age, but they did show that girls tended to have higher math anxiety than boys.

When the researchers investigated math anxiety and math motivation together, a complex pattern of results emerged. For children who reported low levels of math

motivation, increases in math anxiety were associated with poorer performance. For children who reported high math motivation, the relationship between math anxiety and performance resembled an inverted U shape: Performance increased with anxiety, reaching peak levels with moderate anxiety. As anxiety increased beyond this midpoint, math performance decreased.

To ensure that these results were robust, the researchers conducted a second study with 237 college students. Again, they found that math anxiety was related to poor math performance among students who reported low math motivation, while students who reported high motivation showed the inverted-U relationship between anxiety and performance.

"These findings suggest that efforts that simply aim to decrease math-anxiety level may not prove effective for all students," says Petrill. "Although math anxiety is detrimental to some children in their math learning, motivation may help overcome the detrimental effects of math anxiety. In particular, for children highly motivated to better learn math moderate level of math anxiety or challenge may actually prove efficacious."

According to Wang and Petrill, the next step in this line of research will be to examine the real-time physiological changes that underlie the complex relationship between math anxiety and math achievement.

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(6) New SAT Rolls out in March 2016

January 2016 will be the **last opportunity for high school students to take the current version of the SAT.** The **redesigned version**, which will **first be offered on 5 March 2016**, strives to "provide to higher education a more comprehensive and informative picture of student readiness for college level work while sustaining, and ideally improving, the ability of the test to predict college success." It will not require an essay (a 50-minute essay is optional), does not penalized guessing, includes sub-scores for each test, provides 4 response choices rather than 5, and reduces testing time by 45 minutes to a 3-hour timeframe.

The College Board website offers charts containing features of the current SAT (maximum composite score of 2400) and new SAT (maximum composite score of 1600). **The side-by-side summaries provide a useful at-a-glance comparison** of the exam versions:
https://collegereadiness.collegeboard.org/sat/inside-the-test/compare-current-new-specifications (Also see
www.mytutor.com/sites/default/files/imce/SATACTChart.pdf for a chart that includes features of the ACT.)

According to *The Redesigned SAT*, published by the College Board, the new assessment places a greater emphasis on assessing "meaningful, engaging, rigorous" high school coursework than the current test. In the mathematics section, the revised test requires students to "show command of a focused but powerful set of knowledge, skills, and understandings in math and apply that ability to solve problems situated in science,

social studies, and career-related contexts," as well as "demonstrate skill in analyzing data, including data represented in tables, graphs, and charts in reading, writing, and math contexts" (p. 2).

For more information, read ***The Redesigned SAT*** at https://collegereadiness.collegeboard.org/pdf/test-specifications-redesigned-sat.pdf or visit https://collegereadiness.collegeboard.org/sat

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(7) Journal Invites Manuscripts on Preparing Teachers for the Common Core State Standards and Next Generation Science Standards
Source: http://edprepmatters.net/2015/12/call-for-jte-manuscripts-special-issue-on-teaching-to-changing-standards/

The editors of the *Journal of Teacher Education* (JTE) **invite manuscripts for a special issue on teacher preparation for changing standards** (e.g., Common Core, Next Generation Science Standards). Manuscripts are due **February 15**.

JTE Coeditor Gail Richmond writes the following:

For this special issue, we invite manuscripts that address questions related to how teacher education is changing and should respond to these new standards for K-12 student learning. We are particularly interested in papers that incorporate research-based evidence. Questions that might be addressed include the following:

- What approaches in teaching methods courses assist teachers in adopting instructional practices effective in teaching to new standards?
- What aspects of teachers' content knowledge must be strengthened to meet the demands of new standards?
- What have been the successes and limitations of national networks aimed at aligning teacher preparation with new standards?
- How have changes in the education policy context (e.g., new student assessments) affected teacher preparation programs?
- What are effective approaches for helping those responsible for clinical instruction adapt to new standards?

In addition to submissions for this special issue, **manuscripts for open-topic issues are also welcomed.** For detailed submission guidelines and other information about the journal, visit http://jte.sagepub.com.

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(8) True Loves Will Get A Bargain This Year; PNC Christmas Price Index Up A Mere 0.6 Percent
Source: PNC Wealth Management
URL: http://pnc.mediaroom.com/2015-11-30-True-Loves-Will-Get-A-Bargain-This-Year-PNC-Christmas-Price-Index-Up-A-Mere-0-6-Percent

Reflecting a steep decline in energy costs, lower inflation and slow-but-steady economic growth, the 2015 PNC Christmas Price Index (PNC CPI) experienced its lowest growth rate in six years at 0.6 percent in the whimsical economic analysis by PNC Wealth Management.

According to the 32nd annual report that measures the cost of the gifts in "The Twelve Days of Christmas," the price tag for the PNC CPI is $34,130.99 in 2015, a mere $198 more than last year's cost and in line with the government's Consumer Price Index, which has increased 0.2 percent over the past 12 months.

"While the economy continues to chug along on a sustainable path, low commodity prices are keeping consumer costs down," said Jim Dunigan, chief investment officer, PNC Asset Management Group. "With only a few items in our index increasing in cost this year, True Loves should be thrilled that they can have their goose and better afford the gas to roast it, too."

Information about the Christmas Price Index is available at www.pncchristmaspriceindex.com/#explore-index Gift prices can be found at www.pncchristmaspriceindex.com/cpi/#giftprices Students can calculate the total number of presents given by the True Love from December 25 to January 5, as well as the "True Cost of Christmas" (the total cost of the items gifted by a True Love who repeats all of the song's verses), which is considerable!

Additional activities can be found at https://www.pncchristmaspriceindex.com/cpi/#educators/activities (Some educators enjoy using the related Stock Market Game, available online at www.stockmarketgame.org/)

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See you next year!