

SCOPE

NEWSLETTER
OF THE
NAGC
CURRICULUM
STUDIES
NETWORK

SEPTEMBER 2008
VOL. 3, ISSUE 3

*Sharing Curricular Options that
Promote Excellence*



From the Editors

For many of us in education, September means a return from a break in our teaching schedules. For others, summer is spent in a different kind of classroom setting. Enrichment camps, short courses, and gifted programs can be found throughout our country during the summer months. In this issue, we will highlight the many perspectives of summer academic programs for gifted students, including what students learn inside and outside of the classroom. Through summer programs like the Center for Talented Youth (CTY) and the Saturday Enrichment Program (SEP), students learn in novel ways and many teachers benefit from an invigorating and refreshing classroom experience. Both students and teachers often leave these programs feeling inspired and challenged. Two teachers in such gifted programs will share their experiences in curriculum, teaching unsolved math problems and other topics geared especially to gifted students. A resident assistant shares his perspective on the residential life and social benefits of a summer program for gifted students, while SEP coordinators give an overview of their unique program. We hope you will enjoy this unique look at curriculum through the eyes of these teachers.

-Jennifer Beasley & Leighann Pennington, editors

Inside SCOPE

From the Editors	1
Network Chairs' Letter	2
A Day in the Life of CTY	2
Summer Enrichment Program	3
Considering Unsolved Problems	4, 5
From Data and Chance To Barbie Bungee	6

NAGC Curriculum Network

2008

Network Leadership

Current Chair: Christine Briggs

Incoming Chair: Carol Ann Williams

Secretary: Diane Heacox

Newsletter Editors: Jennifer Beasley & Leighann Pennington

Curriculum Awards: Carol Ann Williams & Eric Mann

From the Network Chair

Welcome to our fall edition of SCOPE and my last letter as Network chair. As of September 1st, I passed the gavel to Carol Ann Williams. For the past two years she served as Network Co-chair and for the past five years as co-chair for the Curriculum Studies Awards Competition. As chair of Curriculum Studies Network, Carol will be your touch point when and if questions arise about the network concerns and will keep you informed as NAGC proceeds with reorganization. I will take on the role of Co-chair for the Curriculum Division Competition. If you are interested in working with the awards process please contact me at cbriggs@louisiana.edu. If you would like to submit a curriculum for the 2009 competition, check the NAGC website around January/February for updates on submission requirements and procedures.

This edition of SCOPE shares specific information on curriculum offerings at two unique programs. First, the University of Virginia Summer Enrichment Program serves academically talented middle and high school students and guides students in active learning while on this college campus. The primary goal is to support the development of the students' strengths and interests.

The second program is the Center for Talented Youth offered at John Hopkins University in Baltimore as well as CTY programs at universities across the globe. Two articles shared highlight specific learning experiences with one focusing on a statistics and probability course and the second describing "Math Mysteries." Both articles provide examples of problems and activities to support active learning processes in mathematics.

I hope to see many of you at the NAGC conference in Tampa, Florida. If not, have a wonderful school year.

--Christine Briggs, Network Chair

A Day in the Life at CTY: Social Life and Learning in the Residential Program by Matt Anderson



Saturday Night at CTY

It is Saturday night at John Hopkins's summer camp and no campfires can be found. The marshmallows are still nestled in their packages, untouched by flames. An outsider might not even realize they are at a summer camp. No kids are hiking, fishing, or swimming. Rather, the kids are in the park watching a performance of Shakespeare's comedy "As You Like It". Children's laughter fills the outside theatre and overpowers the rest of the audience. You definitely get the feeling that this is not a normal summer camp. Then again, these aren't normal children.

Who Are the Students?

Students at Johns Hopkins' Center for Talented Youth have traded in the marshmallows for calculators; they've replaced classic campfire stories with classic literature. These are the brightest students in the world and they've come to summer camp with a purpose. For the next three weeks, they will take high school level classes, studying everything from forensics to creative writing. All the students placed in the highest percentiles on the SAT or SCAT and many have traveled from Asia or Europe to attend this program.

Most teachers drool at the thought of teaching a class full of brilliant students, students eager to learn and participate. So what happens when you bring the smartest children in the world together in a three week summer camp? Well, it's pretty much like every other camp but smarter.

Social Life: What does a Resident Assistant Do?

As a residential assistant, I deal with the social aspect when the students aren't in class. There are daily dodge ball games and scavenger hunts, Friday night dances and intense games of ultimate Frisbee. Although these kids may have mastered Algebra by the fifth grade, they are not immune to homesickness. The first week is filled with tear-choked phone calls home. While many students excel academically, not all of them have developed their social skills to the point that they can share a room peacefully. Conflicts arise over drawer space and shower time.

Nerd Camp? Think Again: Kids who will Change the World

Many people write off camps like John's Hopkins as "nerd camps." To do so is a grave error. Johns Hopkins is the beginning of a generation where intelligence is valued, where nerd is chic. A new kind of child is emerging; one who is not only smart, but who is athletic and socially aware. CTY is full of students whose most impressive feats are what they can do outside of the classroom, whether it's the 11 year old who has mastered Chopin's *Fantasia Imromptu* or the kids who beat their RAs in basketball.

CTY has taken the traditional summer camp and flipped it upside down by mixing adventure with an invigorating education. These students know that campfires alone won't give them the tools to change the world.



UNIVERSITY OF VIRGINIA SUMMER ENRICHMENT PROGRAM

Amy Germundson

SEP Academic Coordinator & Ph.D. Student

Deanna Vogt

SEP Coordinator & Ph.D. Student

Each summer, the University of Virginia is home to over 900 hundred academically talented middle and high school students. These students differ in their respective hometowns, educational experiences, interests, talents, and passions in life. Yet, the Summer Enrichment Program (SEP) in coordination with the Curry School of Education unifies this diversity into an unforgettable camp experience. Let's take a look at what makes this camp unique!

During the week, SEP campers spend the mornings and afternoons in classes focused on active learning. Held at nearby St. Anne's Belfield School, these classes function as catalysts to developing individual talents and strengths. Ranging from Cryptography to Political Science to Forensic Chemistry, students become novice participants in these differing fields and disciplines. They are challenged with questions such as: *How do experts think in this discipline? What are the problems and issues of this field? How does this field impact communities? Who am I in this discipline and how can I contribute to its knowledge base?* Many of the topics explored in SEP either extend beyond traditional classroom content or allow students to study a familiar topic of interest in greater depth and complexity. On a walk through St. Anne's Belfield any given morning, you'll see students creating pictures using the authentic strokes of Chinese Brush Painting, designing a water chemistry protocol by synthesizing the work of experts around the nation, producing and editing an original digital story, or heading out into the local community to participate in a service learning project. Despite these varied learning experiences, an overarching mission of SEP is to help these young scholars learn to approach issues with multiple perspectives, to construct logical arguments, and to think critically and creatively.

On the residential side of SEP, students make connections and relationships within a community of peers. College-age counselors work together to create an atmosphere comfortable for gifted campers to socialize and have fun. While at camp, students live on university grounds in a dorm suite with seven other same-aged peers and one or two counselors. Together the counselors and the students create a home away from home as they bond during mealtimes and evening activities. This is a great opportunity for students to take responsibility for their personal living space while sharing with others. Many of the counselors have attended SEP as campers and work to preserve camp traditions from years past. Dustin Fleetwood, head SEP counselor, shares that "It's a unique experience for both campers and counselors alike--year after year, the counselors are continually surprised at the things they learn from their campers. It's a rewarding experience to know that you've had a positive impact on a child's educational upbringing, and that maybe you've contributed to a lifelong positive attitude towards learning."

Each year, campers look forward to the showcase of activities on the residential side of SEP! Some students display their unique abilities at the dance or talent show, while others look forward to competition during recreation activities. Field day brings smiles to many campers' faces as it gives students the opportunity to demonstrate team spirit and sportsmanship through a plethora of activities. Throughout the week students have the opportunity to participate in a variety of counselor led seminars. Each seminar is designed by individual counselors to teach a unique skill or talent to a small group of campers. When the academic week comes to a close, the students and the counselors look forward to the weekend. Weekend activities include, but are not limited to, going to the movies, mental challenges, having lunch at local restaurants, and shopping at the university bookstore. Students benefit from this time to interact with the local culture and walk in the footprints of college students.

The entire team of staff at SEP is dedicated to serving this population on both the academic and residential side with enthusiasm and appreciation for the talents and abilities these campers bring. Celebrating our 30th year in operation next summer, we look forward to touching young lives for many years to come. For program information, please visit us online at <http://curry.edschool.virginia.edu/sep> or email the program office at curry-sep@virginia.edu.

NOTES FROM THE DIRECTOR

This winter, students from the Virginia Commonwealth and beyond will focus their attention on applying for the 2009 Summer Enrichment Program. Spots at SEP are difficult to obtain but plenty of kids apply each year. The reason? This camp offers things these students really want: to learn and to have a ton of fun with other kids who share their interests and talents. Each of three sessions has over 300 students in grades (rising) 5-11. Counselors, many of whom were campers in their day, preside over groups of eight campers and lead them through eleven glorious days of classes, seminars, challenges and games both brainy and zany. Teachers guide them through curricula expertly calibrated to their level and the quality of all offerings are carefully monitored by faculty and graduate students at the UVA Curry School of Education. UVA staff and UVA resources combine to offer everything that the camp needs to keep the children safe, clean, fed and engaged. We are now looking forward to the 30th summer! - Julie Baird, SEP Director



SEP 2K8 CLASSROOM SPOTLIGHT

One class at the Summer Enrichment Program in Charlottesville, Virginia was developed in collaboration with the Environmental Sciences Department at the University of Virginia and explores the science surrounding the atmosphere and weather. Campers in this course entitled "Ask a Meteorologist Weather or Not" work with Luke Sitka, a graduate student who focuses his research upon atmospheric science. Within the framework of this class, students learn theories used in meteorology and see the atmosphere as an integrated system. As novice meteorologists, students learn how to use basic instruments, data collection methods, and develop analytical connections within the field. One week into the course, students launch a weather balloon funded by and loaned from the Environmental Sciences Department. The specialized equipment aboard provide real-time measurements of temperature, humidity and pressure to the students on the ground as the weather balloon ascends. From such, students are able to assess the current state of the atmosphere and make predictions of weather to come. Sitka hopes that real-life experiences such as this not only excite young students about the atmospheric sciences but to also forge connections between the atmosphere and their daily lives.

"I hope that the students will become scientific thinkers able to both comprehend and connect science to their lives. My goal for them is not blindly to believe what they read, but to question and understand current scientific issues."

-Luke Sitka



Hey!

If you are a graduate student and you are joining us for the NAGC convention in October, join other graduate students in the Graduate Student Community Room, hosted by the Graduate Student Committee. Meet us in Convention Center Room 39 anytime during the conference.



? $X + Y = ?$ $10\% > ?$ $7X .35 = ?$ $56N = ?$ $VIII = ?$ $XY = Y?$

Considering Unsolved Problems in Mathematics to Promote Engagement in a Math Lesson.

by David C. Nofer

A mystery grabs and holds attention, just as a loud crackle with a shower of yellow sparks in a summer sky does! Many mysteries, in the form of problems that haven't yet been solved, are found in mathematics. You can use some of these mysteries to engage elementary- and middle-school students in math lessons. For the past several summers, I have used these mysteries to engage gifted students in 5th and 6th grade at the Center for Talented Youth (CTY) in an intense inductive/deductive reasoning course.

Why Teach a "Math Mystery?"

Educators have suggested the use of mysteries to drive engagement in a variety of subjects, including math (Lee & Miller, 2001; Rapp Buxton, 2007), science ("Exploring the Earth's Great Mysteries," 1978), history (Fischer, 2001), and English/writing (Turner, 1980). The mystery may be a

story, or unsolved issue taken directly from the field. Mysteries of the latter kind promote learning by (a) sparking attention and (b) inviting consideration from many angles. Because there's no established answer, the consideration of a mystery provides a relaxed forum, one in which students may share and discuss ideas with one another. In addition, students learning about a mystery can experience the inspirational feeling associated with, *There's an answer out there somewhere . . . but nobody has found it yet.* Student-initiated learning is likely to follow a great experience with mysteries in a particular area.

Finding the Unknown Problems

The unknowns in mathematics are numerous. Some descriptions are found on Wikipedia (search for "unsolved problems in mathematics"); other sources include Guy (2004) and Klee and Wagon (1991). In terms of the background required for understanding the problems, there is wide variation. Knowledge of arithmetic or simple geometry is sufficient for some

of them. Some unsolved problems are suitable for math lessons in elementary school and middle school.

Who Benefits?

Mathematically precocious students may particularly benefit from the engagement with such mysteries, but students who are struggling with math or just getting by should also profit. The responsiveness to a good mystery is a near-universal trait.

Below, read about several unsolved mysteries in math that you could incorporate into your classroom.

Math Mystery 101: The Collatz Conjecture

What's known as the "Collatz conjecture" provides one enjoyable mystery.

Try it out:

- Choose a whole number.
- Then follow these rules: For any even number, divide it by 2; for any odd number, triple it and add 1.

continued on page 5

continued from page 4

- Apply the appropriate rule to the result and repeat this procedure.
- It's speculated that, if you follow this procedure, you'll always at some point reach 1.
- If I started with 4, for example, I'd first halve that, then halve the result, and thus easily reach 1.
- It's known that this conjecture works for starting values well into at least the trillions.

Then what happens?

Despite the mathematical conjecture, whether you'll ultimately obtain 1 for any positive whole number is a mystery. Put on the spot, a truthful mathematician would look downward and concede the possibility that the conjecture might fail somewhere in the region of *tremendous*-sized numbers. Start with some huge number and you might enter a 'repeating cycle' of results preventing 1 from occurring, or the results after some point might increase without bound, preventing the possibility of reaching 1. **This mystery reflects our uncertainty about "what goes" in the foreign land of *tremendous*-sized numbers.**

The Unicorn of Math: The "Perfect Cuboid"

Another mystery relates to figures. Mathematicians have thought up a figure called a 'perfect cuboid.' Shaped like a box, the perfect cuboid satisfies rigorous criteria: The edges of the figure, the face diagonals, and the space diagonal must be whole numbers (for a more detailed discussion, see Klee & Wagon, 1991). Nobody has shown that a perfect cuboid can exist outside someone's imagination. It may be a stretch, but the 'perfect cuboid' is a sort of unicorn of math! Discussing the perfect cuboid (a) provides an opportunity to teaching geometric terminology (e.g., 'face diagonal')

(b) demonstrates the sort of *open-endedness* that may be involved in mathematic questions, and (c) encourages students to visualize and think abstractly.

Friendly Numbers

My favorite mystery is found in connection to whether a number is classified as 'friendly' or as 'solitary.' Here is the deal.

- For any given number, you can add up all the numbers that divide that number evenly. You can express that sum as a fraction of the original number. Let's call that fraction 'F.'
- Any number whose 'F value' is identical to the F value for at least one other number is called 'friendly.'
- A number not sharing its F value is called 'solitary' (all of the prime numbers, for example, are known to be solitary).
- For a slew of numbers, the **friendly versus solitary classification is unknown.**
- **For example:** Ten is an example. Ten's divisors added together, 18, divided by 10 is equal to 9/5. If there's another number with that F value, *no one knows what it is.*

I find this mystery and the background on friendly/solitary numbers appealing and instructive for a number of reasons.

- First, the mystery is engaging because it involves a number as small and as familiar as 10.
- Second, the coverage of friendly/solitary numbers encourages a student to realize that numbers may relate to one another in non-obvious ways.
- Third, a student can practice fractions by finding F values.
- Fourth, there's the cute anthropomorphization suggested by the term 'friendly number.' The latter opens up the possibility for some fun activities; as an accessory to teaching about friendly num-

bers, I distribute copies of a mock social networking profile that I made up for the friendly number 476 (which is friendly with 103), then ask students to draw a profile for the number 10.

Bridging the Known and Unknown

Today's mathematicians benefit from thousands of years of accumulated knowledge and unprecedented computing power. Even so, an abundance of mysteries that keep mathematicians intrigued still exist. As teachers, we should put those mysteries that don't require extensive mathematical training to work—to engage the minds of young students. In closing, what is unknown (as well as what is known) may be used to engage students in math lessons!

Sources

Exploring the earth's great mysteries! (1978). *Instructor*, 88(3), 81-88.

Fischer, M. W. (2001). *Mysteries of Antiquity: Lessons to engage middle school students in ancient/medieval history*. Boulder, CO: Social Science Education Consortium.

Guy, R. K. (2004). *Unsolved problems in number theory* (3rd ed.). New York: Springer-Verlag New York, LLC. (checked)

Lee, M., & Miller, M. (2001). *40 fabulous math mysteries kids can't resist: Fun-filled reproducible mystery stories that build essential math problem-solving skills*. New York: Scholastic Professional Books.

Klee, V., & Wagon, S. (1991). *Old and new unsolved problems in plane geometry and number theory*. Washington, DC: The Mathematical Association of America (Incorporated).

Rapp Buxton, M. L. (2007). *Math logic mysteries: Mathematical problem solving with deductive reasoning*. Waco, TX: Prufrock Press Inc.

Turner, T. N. (1980). The CenterSpot: I love a mystery! *Teacher*, 97(8), 18-22, 25.

Unsolved problems in mathematics. (2008, July 26). In *Wikipedia, The Free Encyclopedia*. Retrieved August 8, 2008, from http://en.wikipedia.org/wiki/Unsolved_problems_in_mathematics

From Data and Chance to Barbie Bungee: CTY from an Instructor's Perspective

By Crystal Vesperman

Imagine sitting in a classroom while the children are working in groups. You glance up at the clock and realize it's almost time for lunch. You announce to the class that it's time to stop and the whining begins immediately. "Do we have to go NOW?" "Can't we just skip lunch?" Welcome. You are an instructor for CTY.

CTY – The Center for Talented Youth – is a program run by Johns Hopkins University in Baltimore. It is a program for 2nd through 12th graders who are identified as gifted and talented on the basis of standardized test results. In other words, these are kids who want to learn. It all began in 1972, when Dr. Julian Stanley, a psychology professor at The Johns Hopkins University, introduced the first talent search designed to identify, challenge, and reward gifted and talented young people. It has since expanded to include several types of programs, from summer residential camps to online classes. Classes include a variety of topics, from Robotics to Inductive and Deductive Reasoning to Model United Nations and Advanced Geography.

I first heard about CTY through my husband, who has been teaching at CTY since the summer of 2001. I am from the Midwest, so a job on the West Coast was intriguing. There are CTY sites on the East and West Coasts, as well as Hawaii and even other countries. I found out the pay was great and they take care of room and board. A job with only gifted children? It all sounded too good to be true. From my point of view, this program is not only a summer job – teaching these kids actually refreshes me for the fall. I am energized to reach students after spending six weeks with highly motivated, gifted young people who have a desire to do well in life.

During summer 2008, I was an instructor for Data and Chance – a statistics and probability course. I was at the Stanford University site in Palo Alto, which is for younger students, those who have just finished 5th or 6th grade. They are typically 11- or 12-years-old with the occasional 10- or 13-year-old. All classrooms have an instructor and a TA; most classes at this age level include between 12-14 students.

I enjoyed teaching this course for a variety of reasons. First of all, probability and statistics are topics that often fall at the end of the year as time is running out. CTY allows me three weeks of day-long classes to really dive into the material. Secondly, we get to play games! I teach the

students how to tell if a game is "fair" by actually having them play the games! Finally, we collect data in fun and interesting ways – for example, dropping Barbie dolls off the side of a building.

All About Barbie Bungee:

Barbie Bungee is a favorite Data and Chance activity.

1. Students use rubber bands to determine a linear relationship between the number of rubber bands and the distance Barbie will fall.
2. They begin by using 1, 2, 3, 4, 5, and 6 rubber bands and record the data.
3. Using linear regressions, the students develop an equation to use later in the activity.
4. The final step is to drop Barbie off of a building.
5. Students predict the number of rubber bands it will take based on the height and the earlier data collected.
6. **GOAL:** get Barbie as close to the ground as possible without hitting the ground.

You can probably imagine how excited young 12-year-old boys get as they wait to see if any of the dolls will smash headfirst into the ground.



There are many sites to choose from for the summer CTY programs. Here are some of the sites for the Summer 2008:

Baltimore, Maryland – Johns Hopkins University
Bethlehem, Pennsylvania – Moravian College
Carlisle, Pennsylvania – Dickinson College
Chestertown, Maryland – Washington College
Kaneohe, Hawaii – Hawaii Pacific University
Lancaster, Pennsylvania – Franklin & Marshall College
Los Angeles, California – Loyola Marymount University
Loudonville, New York – Siena College
Madrid, Spain – Universidad Europea de Madrid
Monterrey, Mexico – Tecnológico de Monterrey

Nanjing, China – Hopkins-Nanjing Center
Palo Alto, California – Stanford University
Puebla, Mexico – Universidad de las Americas
South Hadley, Massachusetts – Mount Holyoke College
Thousand Oaks, California – California Lutheran University

I strongly encourage anyone looking for a summer job to take a look at this program. It not only provides a great experience, but also truly refreshes my husband and me as we prepare for another school year back in Wisconsin.

For more information, please visit: <http://cty.jhu.edu>.



The things we have to learn before we do them, we learn by doing them.
- Aristotle

Article Contributors

Matt Anderson has worked for the Center for Talented Youth (CTY) for one summer previously as a Resident Assistant. He attends the University of Illinois at Urbana-Champaign as a business major. Matt may be contacted at An3derson@yahoo.com.

Amy Germundon is graduate research assistant and doctoral student at the University of Virginia where she is pursuing a degree in Curriculum and Instruction with a shared concentration in Mathematics and Science. Her interests and current work with school districts both nationally and internationally focuses on curriculum mapping, implementing concept-based learning, developing performance assessments, and differentiating instruction for diverse learners in secondary mathematics and science. She may be reached at ajg5w@virginia.edu.

David C. Nofer teaches for Johns Hopkins University's Center for Talented Youth (CTY), where he's taught courses in Inductive and Deductive Reasoning, Data and Chance, and Biology of the Senses. He graduated from Fordham University with a PhD in statistical methods. He's currently working as a researcher and consultant in the area of educational testing. He's particularly interested in statistics, number theory, cognitive science, and mathematics education, and may be reached at DCNofer@Yahoo.com.

Crystal Marie Vesperman currently teaches 8th grade math at Oak Creek West Middle School in Oak Creek, WI. She graduated from Carthage College with a B.A. in Mathematics and will graduate in December from Cardinal Stritch University with a Master of Education. She has worked at Johns Hopkins University's Center for Talented Youth (CTY) for the past three summers both as a TA and an instructor for Math Sequence and Data and Chance.

Deanna Vogt is currently pursuing a doctorate in Educational Psychology with an emphasis on Learning and Development. Her past experience encompasses teaching multiple subject areas in both seventh and eighth grades. Deanna master's degree in special education, with a specialization in learning disabilities, allowed her the opportunity to work in mainstream and special education classroom. She may be reached at dvc6e@virginia.edu.



CURRICULUM STUDIES NETWORK
1707 L STREET NW - SUITE 550
WASHINGTON, DC 20036

SCOPE

NAGC Curriculum Studies
Network Member

