

High School Mathematics Workshop Series Spring 2003

During the Spring semester 2003, we held four workshops for high school students. The topics of the workshops were Elasticity Theory, Rate of Change and Functions, Graph Theory, and Cryptography.

The Elasticity Theory workshop took place on March 10th from 10am until 2pm. The students were from Douglas High School in Douglas, Arizona. The teacher contact was Denise Kroll. The graduate student who organized the workshop was Tyler McMillen and the other graduate students involved were Sarah Frey, Ben Levitt, Jen Lowe, Jeff Selden, Patrick Shipman, and Katrina Piatek-Jimenez.

The Elasticity Theory topics covered during the workshop were:

Introduction (Tyler)

Paper Buckling (Sarah)

Shells and Cacti (Patrick)

Activity Stations (Water waves, Wheel, Slinky, Vibrating String) (Ben, Jen, Katrina, Jeff, Tyler)

Calculation of Shock Waves (Tyler)

Whips (Tyler)

The Rate of Change and Functions workshop was a short one-hour activity held for a group of about 40 students in the Freshman House at Desert View High School. They came to the U of A on March 28th and spent from 11am until noon in a workshop run by this program. The teacher contact was Helen Remington. The graduate student who organized this workshop was Sarah Frey and the other graduate students involved were Ben Levitt and Katrina Piatek-Jimenez.

During this workshop we did a rate of change activity with the students which looks at the rate of change of the circumference of a lollipop with respect to time. It turns out that this describes a linear function. The original idea of this project comes from the book “A Watched Cup Never Cools” written by Ellen Kamischke and published by Key Curriculum Press.

The Graph Theory workshop took place on Friday, April 11th from 9am until 2pm. The students were from Rincon High School and the teacher contact was Brian Rhatigan. The graduate student who organized this workshop was Katrina Piatek-Jimenez and the other graduate students involved were Frederick Leitner, Patrick Shipman, Justin Miller, and post-doc Russel Carlson. We also had undergraduate Jaime Balicanta come and speak with the students about life as an undergraduate student at the U of A.

The Graph Theory topics covered during the workshop were:

Intro/Spanning Trees and Best Edge Algorithm (Frederick)

4-color Map Theorem (Patrick)

Instant Insanity (Russel)

Finally, the Cryptography workshop was held on April 30th from 10am until 2pm. The students were from Catalina High School and the teacher contact was Caroline Torres. The graduate student who organized this workshop was Erin McNicholas and the other graduate students involved were Dustin Ditchen, Ben Levitt, and Fredrick Leitner. Once again, we had undergraduate Jaime Balicanta speak with the students about college life.

The Cryptography topics covered at this workshop were:

Intro and History (Erin)

One Time Pad Ciphers (Ben)

Playfair and ADFGVX Ciphers (Dustin)