



PROJECT PLANS

- At the summer 2000 retreat of the NCMATYC Board, the concept was born
- A committee of four was formed to guide the direction of the project
- The AMATYC Traveling Workshop was contacted to research potential workshop topics

PARTICIPANT REQUIREMENTS

- Complete the preliminary reading and participate in the workshop at the NCMATYC conference
- Write six lessons per pair of participants (or three each) that utilize the *Crossroads Standards* and that follow the provided format

PARTICIPANT REQUIREMENTS

- Submit the final lessons one month prior to the NCMATYC Conference in March
- Conduct a presentation at the NCMATYC Conference related to the lessons written

STUDENT SHEET FORMAT:

- Topic
- Introduction to the lesson
- Materials needed
- Student procedure
- Extension/Report
- Handouts

SOLUTION SHEET FORMAT:

- Solutions to all student work in the same format as the student sheets

PROJECT OUTCOMES

- A booklet of the project lessons presented to each participant at the NCMATYC business meeting
- Professional growth for each participant
- Friendships developed among community college teachers

NENA BABB CATAWBA VALLEY C.C.

LESSON TITLES

- How Much Does It Hold?
- Modeling Quality Control
- Redecorating Your Room

MATH TOPICS

- Volumes of 3-dimensional figures
- Probability, estimation, percentages, mean, fractions
- Estimation, applying formulas, area, perimeter, scale drawing

JAN MAYS
GUILFORD TECHNICAL C.C.

LESSON TITLES

- That's the Way the Ball Bounces
- Building Boxes
- Circles, Midpoints, and Distance Jigsaw

MATH TOPICS

- Linear functions, slope, and data collection
- Graphing polynomial functions, maximums and minimums
- Circle equation, midpoint and distance formula, and cooperative learning

MICHAEL MILLER
WAKE TECHNICAL C.C.

LESSON TITLES

- Polynomial Curve Fitting
- Path of a Space Shuttle
- Generating Exponential Functions by Pattern Recognition

MATH TOPICS

- Using matrices to find polynomials and calculating residuals to determine best model
- Generating data and modeling data with a trig function
- Generating tables of values and recognizing patterns to write exponential models

LINDA SIGMON
CATAWBA VALLEY C.C.

LESSON TITLES

- Graphical Investigation of the Sine Function
- Graphing Table: Guess and Test
- Biorhythms

MATH TOPICS

- Graphing sine and cosine using the 5 main points to analyze transformations
- Analysis of the effects of different coefficients A, B, C, and D on trig functions
- Periodic behavior, Modeling with trig functions, and predicting outcomes

PEGGY WOMBLE WAYNE COMMUNITY C.

LESSON TITLES

- Modeling Population from Census Data
- Conic Sections throughout Nature
- Exploring Functions through Parametric Equations

MATH TOPICS

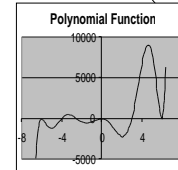
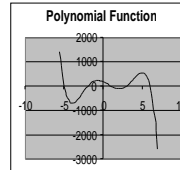
- Scatter plots and modeling with polynomial regression
- Conic sections, research, and report writing
- Parametric equations and projectile motion

Polynomial Jigsaw Activity

Student Procedure: You will be assigned to a base group of 3 students. One person from the based group will be given a worksheet on cubic polynomials. A second person from the based group will be given a worksheet on quartic polynomials. The third person from the based group will be given a worksheet on quintic polynomials. You will leave your base group and complete the worksheet you are given with another person from another group that has the same worksheet as you do. After each pair has completed their worksheet, then everyone will return to their base group, where each person will share their findings with the other members of their base group.

Polynomial Jigsaw Activity

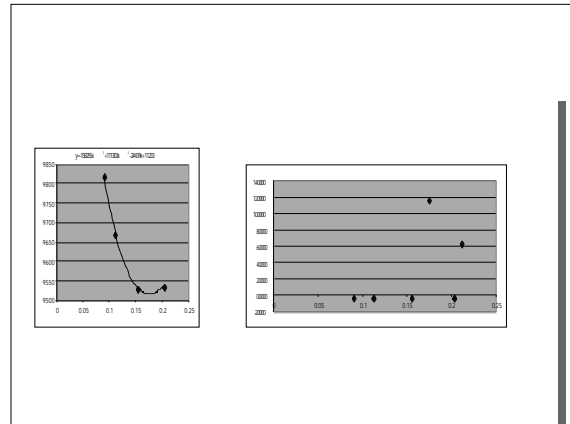
Group Activity 3: Given each polynomial graph below, determine a) the least degree polynomial it could be, b) the sign of the leading coefficient, and c) the constant a_0 .



Generating Exponential Functions

Problem 3. We all have bacteria on our skin and they multiply quite rapidly. Suppose there are 800 bacteria left on your skin after you shower at 5 P.M. on Saturday. This colony of bacteria doubles every 4 hours. When will 1 billion bacteria be present?

Problem 4. Carbon-14 has a radioactive half-life of 5730 years. An archaeological object is found to have 0.12 grams of C-14 currently and it is known that the object initially had 6 grams of C-14 present. How old is the object? Why is C-14 used to date fossils? Can you describe a situation in which C-14 is *not* a good indicator of age?



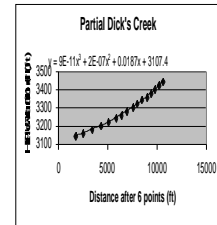
Earning and Saving Money

An employee has decided to have \$50 deposited into an interest bearing account each month that earns 6% compounded monthly. The employee wishes to accumulate an investment worth at least \$5,000. How long is required to accomplish this goal?

Numerical Approach: Create a table of values on your calculator using the TABLE feature that continues the table shown above. Generate the formula for the individual deposit value and enter it into y1. Use the calculator command *sum seq(y1, x, 1, x, 1)* entered into y2, which will sum the terms generated by y1 from the first term to the xth term. Use the table to determine how long is required for the investment to total \$5,000.

Modeling Rivers from Topo Maps

Create a data set of approximately twelve points that correspond horizontal distances and elevations for Dick's Creek, from Dicks Creek Dam to Junaluska Gap. Produce a scatter plot and find a polynomial model (or build a piece-wise polynomial model function) that fits the scatter plot. Graph the polynomial model with the scatter plot to determine the goodness of fit. Graph the difference quotient to obtain the rate of fall for Dick's Creek. Use this graph to determine the steepest incline or rate and where it occurs from Dick's Creek Dam.



Path of a Space Shuttle

- 1) Working in groups of four, use the string to represent the orbit around the globe and use the tape to secure the string. The path should form a great circle around the globe. Send the shuttle off in a northeast or southeast direction.
- 2) Using the attached data collection sheet, record data points that describe your shuttle's path. The more data points you collect, the better your graph and model will be, but you should collect at least 30.
- 3) Plot these data points on your world map.
- 4) Write a sine or cosine model that describes your shuttle's path (i.e., find a, b, c, and d for one of the following). x represents longitude and f(x) represents latitude measure.
- 5) Describe how each parameter (a, b, c, and d) relate to the shuttle's path.

PARTICIPANT COMMENTS

What was the reason you registered for the *Crossroads to Classroom* Project?

- I am always looking for ways to reach more of my students.
- I wanted to work with another instructor on developing activities.
- I want to support a project that would share good creative classroom activities.

PARTICIPANT COMMENTS

What was the reason you registered for the *Crossroads to Classroom* Project?

- Anything to help my classes improve is appreciated.
- A wide available database of activities would be a tremendous benefit to NC instructors.
- It seemed liked an excellent idea that was going begging for participants.

PARTICIPANT COMMENTS

Are you in favor of *NCMATYC* sponsoring a similar project in the future? Why?

- Yes. It is important for good teachers to share good ideas.
- Yes. I believe that is could be a way to get instructors to implement what they see at sessions.
- Yes. It was refreshing to see concrete examples of what the STANDARDS mean.

PARTICIPANT COMMENTS

Are you in favor of *NCMATYC* sponsoring a similar project in the future? Why?

- Yes. Anything that opens communication and the exchange of ideas and techniques is good for us.
- Yes. But more time is needed during the workshop for teams to focus on ideas for activities.

PARTICIPANT COMMENTS

- Seeing the results of others work presented at the conference was a positive outcome of the project.
- A second meeting of all participants as a working session to share ideas prior to the lessons deadline would have been helpful.