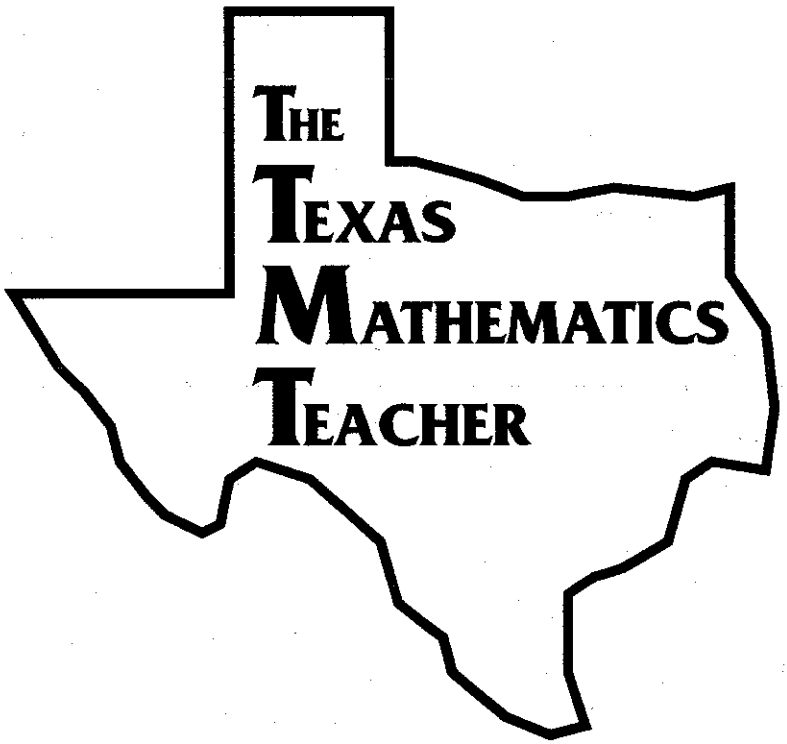

TEXAS COUNCIL OF TEACHERS OF MATHEMATICS
VOLUME XLV, NO. 1 - FALL 1997

The ***TEXAS MATHEMATICS TEACHER,*** the official journal of the Texas Council of Teachers of Mathematics, is published two times each year, in Fall, and in Spring. Authors are encouraged to submit articles that deal with the teaching and learning of mathematics at all levels. Editorial correspondence and manuscripts should be addressed to the Editor, Paul Kennedy. News bulletins for *Lone Star News* section should be sent to Associate Editor, Diane McGowan.

Potential authors should adhere to the following guidelines:

(1) Manuscripts should be word-processed, double-spaced with wide margins on $8^1/_2$ x 11 paper meeting APA guidlelines. Tables and figures should likewise be computer generated. No author identification should appear on the manuscript.

(2) Submit the original and four copies. Include a Macintosh or IBM $3^1/_2$ diskette containing the manuscript. On the disk label indicate the word processing program used.

(3) Include a cover letter containing the following information: author(s) name, address, affiliations, phone and fax numbers, email address and intended level of the article.

(4) An article for Voices From the Classroom should be relatively short, and contain a description of the activities sufficient in detail to allow readers to incorporate them into their teaching. A discussion of appropriate grade level and prerequisites for the lesson should be included.

As soon as possible after refereeing, authors will be notified of a publication decision. Originals of articles not accepted for publication will be returned to the authors. Two copies of the issue in which an author's manuscript appears will be sent to the author automatically.

We also need items for *Lone Star News*. These include reports, TCTM affiliated group announcements, and any other appropriate news postings. We would espccially like to advertise upcoming professional meetings.

SUBSCRIPTION and **MEMBERSHIP** information is on the back cover.

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TEXAS MATHEMATICS TEACHER

TEXAS COUNCIL OF TEACHERS OF MATHEMATICS

Affiliated with the National Council of Teachers of Mathematics

Fall 1997

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Computer Conferencing in Mathematics Classrooms: Distance Education – the Long and the Short of it

Charles E. Lamb and William R. Klemm
Texas A&M University

This paper is a description of a pedagogical technique that employs computer conferencing as a vehicle for delivery of mathematics instruction. Examples are given of specific activities that can be used to build confidence and interest in mathematics. The software employed is a platform that can be used in a classroom ("the short of it"), in an entire school, or at greater distances such as throughout a school district ("the long of it").

Several landmark publications have given educators a new vision for the way mathematics should be taught and learned. The National Council of Teachers of Mathematics published *Curriculum and Evaluation Standards for School Mathematics* in 1989. This document and its two companion volumes, *Professional Standards for Teaching Mathematics* (1991) and *Assessment Standards for School Mathematics* (1995) have led the way for mathematics education reform in the last several years and will continue to do so for many years to come.

One of the major goals for students in the new reform efforts is that students become more confident in their abilities. This paper suggests that computer conferencing provides a way to change classroom practice so that students will have the opportunity to work together in a self-paced way that builds self-esteem and confidence in mathematics.

Computer Conferencing

The authors propose the use of networked computers as a medium for students to work at their own pace, perhaps at different times, with software that collects, organizes, and displays the thinking and work of each student in a learning team. Each team member can edit or annotate the work of other team members. For more information on the use of computer conferencing in teaching, see Klemm, 1996 and Christal and Lamb, 1993.

Most computer software that is used for conferencing is "glorified e-mail" (Klemm and Snell, 1994). That is, students post a note and other students attach their notes to it. To get the most out of computer conferencing, students need to work on the same documents, attaching notes in context to specific places within a document – "writing in the margins," so to speak. Thus, conferencing software for mathematics teaching should use hypermedia as the organizing principle to link ideas in context. Student work is not forced into some rigid hierarchy. It is possible for students to create relationships among ideas that are most meaningful for them. In an era of television, which has conditioned students to have short attention spans, the chunking of information provided by hypermedia enables the topic to be delivered in short parcels.

The requirements for document sharing, hypermedia, and in-context annotation are satisfied by the hypermedia-based computer conferencing system, FORUM™*. FORUM allows the teacher to create logical structures of disclosure that specify what can be linked to what. This can help student groups stay focused and help to orchestrate their learning.

Benefits in the Mathematics Classroom

A computer conference can be structured so that each student must interact with peers in solving mathematics problems. Because this interaction is tangible and visible, the learning may be even more "active" than it is in non-computer cooperative learning situations. For some students, the involvement may be limited at first to asking questions of the peer group. "How did you guys draw that conclusion? Why is that the right strategy?" Note that in a conferencing environment, student questions are less embarrassing, because the only people who know are fellow group members, and perhaps the teacher. A computer conference might also make the thinking process more explicit because everybody's ideas are written down. To the extent that writing "makes the precise man," as Emerson said, the conferencing medium can help students achieve the precision necessary for good performance in mathematics. Effective use of language is critical to learning (Gallard, 1993) and a conferencing paradigm requires students to think through mathematics problems with the precision of written language.

As for giving up too soon, students in a computer conference have the chance to see that others are stumbling too and perhaps that others have helpful insights into the problem. By seeing what each member of a group does and does not know, students see explicit opportunities to help each other. Participants should be encouraged by the prospect that working together will help them succeed as individuals. Each person's thoughts are documented, making it easier for the teacher to monitor class progress and determine what help might be needed.

The computer environment provides ample time for research, reflection, and integration of mathematics concepts. This is especially true if students are allowed to work on the problems outside of class. In fact, computer conferencing creates a scenario where class never has to end!

Computer conferencing helps children to set their own pace without feeling as though they are "on the spot." If a group needs more time, they can have it. The self-pacing nature of the conference might be best used, at first, with students on an individual basis. That way children will experience success for themselves. As they begin to work in groups, they will be more confident of their abilities.

At first, it might seem strange to have students in class working together via computer rather than just talking to each other. Of course, students do not have to be networked via computers to do team (cooperative) learning. However, the authors believe that team learning in a computer environment can provide special benefits over face-to-face work (Klemm, 1995). In addition to the benefits of putting ideas on paper as mentioned above, there are also potential social advantages. In a conferencing situation, shy or reserved students have a better chance to contribute and be heard. Aggressive students have less power with which to dominate. Social stresses and personality conflicts can be lessened. Each student's work can be more efficient, because there are fewer distractions. Further, the teacher also has the opportunity to give the students the chance to remain anonymous in the computer conference setting.

Computer conferencing can be an avenue for students to experience success. The response time for questions is private and the student is not intimidated by others who are faster. This developing confidence in the ability to do mathematics will make the experiences more enjoyable rather than something to be feared.

Classroom Examples***

"Math Bingo"

"Math Bingo" is used to help students have fun while learning mathematics. Any aspect of mathematics can be taught using "Math Bingo." The students can play individually or in groups. It is up to the teacher.

Pre-Bingo

1. The students will receive 25 mathematics problems to solve. This can be done with a handout or via the computer conference. If the students are working in groups, the teacher can divide the problems among the students and have them review and comment on each others' answers when they have finished the problems.

2. After the students have answered all of the problems or questions, the game can begin. The teacher puts an electric Bingo card in the conference workspace for each student or student group.

Example Bingo Card Geometry

side-side-side postulate	exterior angle theorem	hypotenuse-leg theorem	side-side-side theorem	area cong. postulate
triangle proporionality theorem	45-45-90 theorem	side-angle-side postulate	isosceles triangle theorem	hypotenuse-angle angl3e theorem
Pythagorean theorem	side-angle-side-theorem	converse theorem	angle-angle-side side-angle theorem	angle-angle theorem
leg-angle theorem	area postulate	triangle-angle bisector theorem	min segment theorem	leg-leg theorem

Instructions

For each theorem or postulate, the student is given a set of information, which includes:

* statement of the theorem or postulate
* an example of how the theorem or postulate is applied
* a memory aid
* a question or problem to solve.

Game Procedure

The game can be played in a single session or over several sessions. The basic procedure is:

1. Numbered clues are presented in the conference. The clues are taken from the statement, application, memory aid, or question/answers of the basic instruction set.
2. For each square that matches a clue, the student will type in the clue number.
3. When the student gets Bingo (five numbered boxes vertical, horizontal, or diagonal), the student sends an e-mail to the teacher, who then verifies that the card is correct.

*If Bingo is played in a contest mode, FORUM software allows each student or student group to see the cards of other students, but a given student can write only on his/her own card.

The race is on, and students can see how their own card compares. In this case, you would not want students to display the clue numbers on the cards publicly until after the game is over.

"PUZZLE"

This game can be played with as many players as desired. Each player or group of players will have the same screen available (displaying a grid with numbered squares). Each square will correspond with a numbered problem on the bottom of the screen (underneath the grid). Some of the squares will be FREE, e.g. one square per row, randomly placed. As the students solve the problems correctly, a piece of the puzzle will be displayed. Puzzle pieces associated with the free spaces will already be displayed.

Procedure

In order to solve the puzzle, the student group will choose a problem by clicking on the problem statement, which is a hypertext link anchor to a FORUM article that acts as a workspace. To prevent guessing and to receive full credit for the problem, the workspace must show how the problem was solved. The group could then click on an options icon, which is a hypertext link anchor to a FORUM article that presents four solution options:

a. possible solution 1
b. possible solution 2
c. possible solution 3
d. possible solution 4

Clicking on an option, which is a link anchor, opens a FORUM article that tells whether the choice is correct. If the wrong answer is selected, the group can rework the problem, showing the new solution in a linked workspace, and repeat the selection of another possible solution. A correct choice leads to a graphic of the puzzle piece, which can be cut and pasted to a collage that collects all the puzzle pieces. In version 3.0 of FORUM, students can cut and paste the puzzle pieces and drag them around to try to complete the puzzle.

Scoring

Each problem will earn 5 points if solved correctly. The teacher can award fewer points for correct answers that take more than one try to achieve. No hints will be given during the game – students need to know how to work the problems. Students may want to guess what the puzzle depicts at any time for 10 bonus points; however, in order to win the game they still have to solve as many problems as possible in the time allotted to play the game (the player/team with the highest score will be the winner.

Puzzle Grid – numbered blocks are associated with a given problem number. "Free space" shows the graphic of a puzzle piece.

10	free	5	16	3	24	13	8
9	19	15	free	27	6	26	22
20	4	21	28	12	2	17	free
free	11	25	18	1	23	14	7

"TREASURE HUNT"

Treasure Hunt is a game that gives a student or group of students a mathematics problem to solve. In order for the student groups to get the correct answer, a series of related questions need to be answered correctly. The group has the opportunity to receive help and clues that might help to solve the problem.

Playing Treasure Hunt in a Computer Conference

The teacher can give a piece of the problem to the students everyday via the conference. The teacher sets up the conference in a logical structure for hypertext links that enhances the ability of the students in a group to ask each other questions, suggest strategies, and debate answers. When the group agrees on an answer, they select one of the answer choices and find out whether they are correct or not. If not, they can click on an icon that takes them to a workspace where they ask the teacher questions and seek new clues. The students would have to come up with the correct answer before they could move on to the next piece of the problem. The first group to finish the main problem wins.

Example Problem

Mrs Puddentane has been admitted to Our Pain and Misery Hospital with a very painful condition called flatus incarcerates. Dr. Zeuss is her physician. During today's rounds he ordered pain medication to be administered as follows:

Rx: Antiflatissma 50 mg/kg/d (50 milligrams per kilogram per day)

Sig.:qid (Administer 4 equal doses per day)

The medication is available in 50mg/ml concentration (50 milligrams per milliliter).

Mrs. Puddentane weighs 197 lbs.

How many teaspoons of the medication should she receive for each dose?

Answer choices: 1970 tsp (incorrect) 4.476 tsp (correct)

Conclusions

Change the routine! Use computer conferencing to put "Fun and Games" into the mathematics classroom. Teachers and students might be entertained and learn at the same time. Many children will not realize that they are learning while playing the games. In addition, groups working together can extend their learning by creating their own games.

This paper has pointed out several possibilities for the use of computer conferencing in the mathematics classroom. Teacher imagination and creativity can lead to many other interesting uses.

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*To obtain more information about FORUM, write to: Forum Enterprises, Inc., P.O. Box 5755, Bryan, TX 77805-5755 (WWW site: http://www.ForumInc.com).

***The authors wish to acknowledge the contributions of Ms. Cheri Floyd in the development of the games used in the classroom examples.

JOURNAL SUBMISSIONS MUST BE SENT TO EDITOR BY JANUARY 28, 1998.

TEKS CLARIFYING ACTIVITIES

Clarifying Activities for Algebra I are on the web! Check out "New TEKS information" on the Texas SSI website, 222-tenet.cc.utexas.edu/ssi. Clarifying Activities for other grades and courses will soon follow. Sample Clarifying Activities grades Kindergarten through Eighth.

Kindergarten

Probability and Statistics

Introduction: Throughout mathematics in Kindergarten-Grade 2 . . . students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.

12. Probability and statistics. The student constructs and uses graphs of real objects or pictures to answer questions.

The student is expected to:

A. construct graphs using real objects or pictures in order to answer questions; and

- *Clarifying Activity:* Students find the answer to the question, "What kind of shoes do students wear in our class?" by each student taking off one shoe, sorting the shoes into like groups (laces, no laces, velcro, etc.), then graphing the groups on the floor. At a later time, students cut pictures that represent their own shoes from catalogs and use the pictures to create a class graph.

B. use information from a graph of real objects or pictures in order to answer questions.

- *Clarifying Activity:* Students decide from the shoe graph what kind of shoes the store needs to have based upon the information they see . . . "The store needs to have more shoes with velcro because we had more kinds who wear velcro shoes in our class."

Grade One

Probability and Statistics

Introduction: Throughout mathematics in Kindergarten-Grade 2 . . . students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.

9. Probability and statistics. The student displays data in an organized form.

The student is expected to:

A. collect and sort data; and

- *Clarifying Activity:* Students survey other first-grade rooms to determine what kinds of books the librarian should order for the library. They use tally marks to record data, then sort the data by types of books.

B. use organized data to construct real object graphs, picture graphs, and bar-type graphs.

- *Clarifying Activity:* Students use a real, picture, or bar-type graph to display the information from the library book survey.

10. Probability and statistics. The student uses information from organized data.

The student is expected to:

A. draw conclusions and answer questions using information organized in real-object graphs, picture graphs, and bar-type graphs; and

- *Clarifying Activity:* Students determine how the information gathered and graphed, such as how many students in the class were born in each month, could be used. For example, they determine how many pencils the teacher needs for presents each month . . . "The teacher needs to buy 5 pencils in January, but none in March. The teacher will need to buy a total of 12 pencils for the months of September, October, and November.

B. identify events as certain or impossible such as drawing a red crayon from a bag of green crayons.

- *Clarifying Activity:* Students display cards marked "certain" or "impossible" when presented a series of situations, such as spinning red with a spinner that is *all* red or spinning red with a spinner that is just green and blue.

Grade Two

Probability and Statistics

Introduction: Throughout mathematics in Kindergarten-Grade 2 . . . students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.

11. Probability and statistics. The student organizes data to make it useful for interpreting information.

The student is expected to:

A. construct picture graphs and bar-type graphs;

- *Clarifying Activity:* Students use sticky notes to draw pictures of ways they came to school today (e.g. walk, bike, car, bus). Students use the concept of one picture to represent one way to come to school.

B. draw conclusions and answer questions based on picture graphs and bar-type graphs; and

- *Clarifying Activity:* Using the transportation graphs in 11A, students answer questions such as "What can we tell about today's weather by looking at the ways students came to school?"

C. use data to describe events as more likely or less likely, such as drawing a certain color crayon from a bag of seven red crayons and three green crayons.

- *Clarifying Activity:* Pairs of students draw from a bag containing 6 red beads and 3 black beads, recording the color and putting the bead back each time. They then organize their data and compare their data with other pairs of students to make predictions about the likelihood of drawing a red or a black bead. Students continue the activity to verify their predictions.

Grade Four

Probability and Statistics

Introduction: Throughout mathematics in Grades 3-5 . . . students organize data, choose an appropriate method to display the date, and interpret the data to make decisions and predictions and solve problems.

13. Probability and statistics. The student solves problems by collecting, organizing, displaying, and interpreting sets of data.

The student is expected to:

A. list all possible outcomes of a probability experiment such as tossing a coin;

- *Clarifying Activity:* Students discuss and list the possible outcomes of flipping two different coins. (Example: HH, HT, TH, TT)

B. use a pair of numbers to compare favorable outcomes to all possible outcomes such as four heads out of six tosses of a coin; and

- *Clarifying Activity:* Students perform an experiment by flipping their coins 100 times and recording the results in a table. Students then use airs of numbers to describe the data they collected about flipping two coins. For example, "12 out of 50 times in our data the result was two heads. When we put our data with another group's data, 23 out of 100 times the result was two heads."

C. interpret bar graphs

- *Clarifying Activity:* Students display their coin data in a bar graph, then generate and answer questions using information from their graph. For example, "How many ways can the coins land? Out of our total number of trials, how many times did we get two heads? At least one head?"

Grade Five

Probability and Statistics

Introduction: Throughout mathematics in Grades 3-5 . . . students organize data, choose an appropriate method to display the data, and interpret the data to make decisions and predictions and solve problems.

12. Probability and statistics. The student describes and predicts the results of a probability experiment.

The student is expected to:

A. use fractions to describe the results of an experiment; and

- *Clarifying Activity:* Students separate into 5 groups. Each group has a small box that has been secretly filled with marbles or colored gumballs (5 green, 2 blue, 2 red, 1 white). A small hole is cut in one corner of the box, large enough so that a marble can slip into it and be seen when the box is tilted, but small enough so that the marble cannot fall out of the box through the hole. Each group does 20 trials of shaking the box, tilting the box, peeking at the marble, and recording the color of the marble. Students use fractions to record the results of their 20 trials, e.g. 6/20 of the trials are green.

B. use experimental results to make predictions.

- *Clarifying Activity:* Students in each group use their group's data from their secret box to make a prediction about what marbles are in the box. Then the groups combine their data and the class uses the whole class's data to evaluate and refine their predictions. Students then open their boxes, compare the contents to the predictions they made, and discuss their findings.

13. Probability and statistics. The student solves problems by collecting, organizing, displaying, and interpreting sets of data.

The student is expected to:

A. use tables of related number pairs to make line graphs;

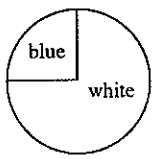
- *Clarifying Activity:* Students plant five pinto beans in identical containers of dirt at the same time. Students can put 0 teaspoons of fertilizer into the first container, 1 teaspoon into the second container, 2 teaspoons into the third container, 3 teaspoons into the fourth container, and 4 teaspoons into the fifth container. Plants should receive identical amounts of water and sunlight. Students collect the information on daily growth (continuous data) for each container, using number pairs in a table to represent the day and the height of the plant. For example:

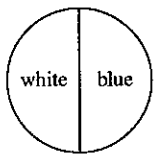
Day	Height in cm
0	0
1	0
2	1
3	3

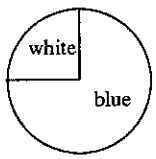
Students use the number pairs to make a line graph for each container in order to compare the effects of different amounts of fertilizer.

B. describe characteristics of data presented in tables and graphs including the shape and spread of the data and the middle number; and

- *Clarifying Activity:* Students spin 3 different spinners (see below) 12 times each and record on a class line plot the number of times they land on blue. The results are represented on the graph using a different symbol for each spinner. Students write about the shape and the spread of the data on their line plot.

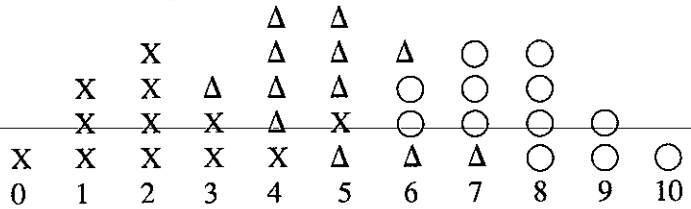






Line plot symbol: X Δ ○

Possible line plot:



Number of times spinner landed on blue

Clarifying Activity: Students collect and organize data about their resting pulse rates. Students can describe the shape of data and determine the typical (median) resting pulse rate and range for the class. Students then exercise and take their post-exercise pulse rates, organize, and display these data, finding the median and range. Students compare the exercise results with the resting pulse rates.

C. graph a given set of data using an appropriate graphical representation such as a picture or line.

- *Clarifying Activity:* Students gather data concerning classmates' favorite/least favorite food. They will construct a graph they feel will be appropriate in supporting their requests for specific foods to be served in the school cafeteria.

- *Clarifying Activity:* Students work in groups of 3 or 4 to interview other students in the class to find their favorite cereal. Students graph the results of the survey and use the results to plan a class breakfast. As students construct the cereal graph, they analyze the steps they need to take to construct it. For example, what decisions do they need to make and why? How should they organize the data? What type of graph (bar, picture, line) should they choose and why?

Grade Six

Probability and Statistics

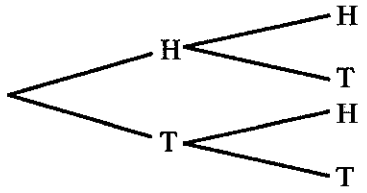
Introduction: Throughout mathematics in Grades 6-8 . . . students use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations.

9. Probability and statistics. The student uses experimental and theoretical probability to make predictions.

The student is expected to:

A. construct sample spaces using lists, tree diagrams, and combinations; and

- *Clarifying Activity:* Students use a tree diagram to show the four possible outcomes of tossing two coins:



HH, HT, TH, and TT

- *Clarifying Activity:* Students roll two dice and make an organized list of the 36 possible outcomes: (1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), etc.

B. find the probabilities of a simple event and its complement and describe the relationship between the two.	• *Clarifying Activity:* Students determine the probability of drawing a specific color of marble from a jar of marbles, the probability of not drawing the specific color, and discuss that the sum of these two probabilities is one because they are two sets of outcomes that do not overlap and include all the possible outcomes.

10. Probability and statistics. The student uses statistical representations to analyze data.

The student is expected to:

A. draw and compare different graphical representations of the same data;	• *Clarifying Activity:* Students collect and organize information about how far away from their current school they went to first grade. Students work in groups to design graphical representations of the data. Each group can be assigned a different type of graph: line plot, bar graph (made by grouping the data), line graph. Students compare and contrast each of the different graphical representations.
B. use median, mode, and range to describe that;	• *Clarifying Activity:* Students play a game with a set of 44 cards, 4 each of numbers 0 - 10. Each player is dealt 7 cards. On the first round, the player with the highest mode wins a point. On the second round, the player with the highest median wins a point. On the third round, the player with the highest mean wins a point.
C. sketch circle graphs to display data; and	• *Clarifying Activity:* Students sort themselves by the month of their birth and form a human bar graph. The last person in January joins hands with the first person in February and so on so that the students in the bars join to form a circle. The teacher stands at the center of the circle, and string or adding machine tape is used to mark the sectors of the circle from the center to the point between each of the bars designating the different months. Students estimate the fraction of the circle represented by each month.
D. solve problems by collecting, organizing, displaying, and interpreting data.	• *Clarifying Activity:* Students conduct a school-wide survey to determine the favorite foods served in the cafeteria and display the data in a frequency table. Next, students represent the data in an appropriate graph, draw conclusions from the data, and use the data to present a suggested menu for the next week.

Grade Seven

Probability and Statistics

Introduction: Throughout mathematics in Grades 6-8 . . . students use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations.

10. Probability and statistics. The student recognizes that a physical or mathematical model can be used to describe the probability of real-life events.

The student is expected to:

A. construct sample spaces for compound events (dependent and independent); and

- *Clarifying Activity:* Students list all possible outcomes for:
  - arranging three people in a row for a picture (dependent events);
  - tossing a numbered cube and spinning a spinner (independent events);
  - making a sandwich given two breads, two cheeses, and three meats (independent events);
  - drawing two names out of a bag of 5 names without replacement (dependent events).

B. find the approximate probability of a compound event through experimentation.

- *Clarifying Activity:* Students play a product game with a pair dice. Each time the dice are rolled, the product of the numbers on the dice is recorded as even or odd. Then, students use the experimental results to describe the approximate probability of obtaining an even product or an odd product.

11. Probability and statistics. The student understands that the way a set of data is displayed influences its interpretation

The student is expected to:

A. select and use an appropriate representation for presenting collected data and justify the selection; and

- *Clarifying Activity:* Students collect and organize information about the amount of time they spend on days during the week and days during the weekend in different activities, e.g. eating watching television, listening to CDs, sleeping, going to school. Students then decide an appropriate representation for the data and justify their selection. For example, "circle graphs are good because they show you the fraction of the day spent doing each activity and make it easy to compare the times spent on different activities."

B. make inferences and convincing arguments based on an analysis of given or collected data.

- *Clarifying Activity:* Students use their graphs on time spent in various activities to compare weekend days to weekdays and write a paragraph describing how this information could be used by advertisers.

12. Probability and statistics. The student uses measures of central tendency and range to describe a set of data.

The student is expected to:

A. describe a set of data using mean, median, mode, and range; and

- *Clarifying Activity:* Students work in groups of 3 or 4. Each group determines the mean, median, mode, and range of information about each student's family, such as number of siblings, number of aunts, or number of pets.

B. choose among mean, median, mode, or range to describe a set of data and justify the choice for a particular situation

- *Clarifying Activity:* Students read biased information or advertising (e.g. reporting of average salaries for professional basketball players) supported by a mean, median, mode, or range. Students determine which statistic was used, why it was used, and which one should have been used to better represent the data.

Grade Eight

Probability and Statistics

Introduction: Throughout mathematics in Grades 6-8 . . . students use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations.

11. Probability and statistics. The student applies concepts of theoretical and experimental probability to make predictions.

The student is expected to:

A. find the probabilities of compound events (dependent and independent);

- *Clarifying Activity:* Students find the probabilities of events resulting from:
  - tossing a numbered cube and spinning a spinner (independent events);
  - drawing cubes from a bag without replacement (dependent events).

B. use theoretical probabilities and experimental results to make predictions and decisions; and

- *Clarifying Activities:* Students design games, then try out the games, and decide whether they are fair or not using theoretical and experimental probabilities. Examples:

  Toss three two-color counters. You get a point if there are at least two red chips showing. Otherwise, your partner gets a point. Is the game fair? Why or why not?

  Roll two dice. If the product of the two numbers is even, you get a point. If it is odd, your partner gets a point. Is the game fair? Why or why not?

C. select and use different models to simulate an event.

- *Clarifying Activity:* Given that the probability of getting a broken CD player from Bad Company is 1/3, students select a model to simulate buying a CD, such as drawing a marble from a bag with one red marble and two blue marbles or spinning a spinner that is 1/3 red and 2/3 blue, with red representing a defective CD player.

12. Probability and statistics. The student uses statistical procedures to describe data.

The student is expected to:

A. select the appropriate measure of central tendency to describe a set of data for a particular purpose;

- *Clarifying Activity:* Students use a list of their grades and select the measure of central tendency that describes their overall grade most favorably.

B. draw conclusions and make predictions by analyzing trends in scatterplots; and

- *Clarifying Activity:* Students use a scatterplot to graph the relationship between the length of time they can hold their breath and the diameter of a balloon they can fill with one continuous breath. Students then use the trend of the data on the scatterplot to predict how long a person can hold their breath if they can fill a balloon with a diameter of 5 inches with one continuous breath.

C. construct circle graphs, bar graphs, and histograms, with and without technology.

- *Clarifying Activity:* Students collect school-wide data on topics of interest, then represent the data on a circle graph, bar graph, or histogram, with or without the use of technology.

13. Probability and statistics. The student evaluates predictions and conclusions based on statistical data.

The student is expected to:

A. evaluate methods of sampling to determine validity of an inference made from a set of data; and

- *Clarifying Activity:* Students gather consumer preferences from television commercials (e.g. 3 out of 4 people choose _____) and determine the validity of the sample population.

  Clarifying Activity: Students collect data on how many rolls it takes to roll a 1 with a regular die. Students make conclusions from the data gathered in their small group, then combine their data with other groups' data and revise their conclusions based on the patterns seen in the larger set of data.

B. recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis.

- *Clarifying Activity:* Students use graphs from sources such as *USA Today* and evaluate the conclusions made by determining the validity of the information depicted on the graph. For example, if the units on the scale are not all the same size, then the visual representation of the data is distorted.

A Cooperative Effort to Develop an Innovative Integrated Mathematics/Science Course for Preservice and Inservice Teachers

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Across the past several years a new integrated mathematics and science course has been developed at University of the Incarnate Word. It now is being offered to preservice elementary school teachers and a modification of it is also being offered to inservice peer teachers of the Urban Systemic Initiative program. The reasons for the development of the course are similar to those which exist at other institutions and it is reasonable to expect that this new response to needs of preservice and inservice teachers will be appreciated and used at other institutions.

Several factors came into play at about the same time to cause the UIW faculty to consider development of an integrated mathematics/science course. First, the prospective elementary school teachers were having to take almost 150 semester hours of course work to earn their undergraduate degree and also qualify for certification. Education faculty members requested some sort of relief for their students and one possibility was that of reducing or merging some science and mathematics courses. A second factor was that UIW had received several Eisenhower grants in both mathematics and science, and faculty members in both science and mathematics understood that university preparation of preservice teachers for elementary schools was as well as was needed. A third factor was the receipt of a major state-funded grant which placed sophisticated technology in locations that allowed interactive video communication between UIW and partner schools where UIW student teachers were involved with master teachers. One of those schools, Driscoll Middle School of Northeast ISD, used a team approach to teach certain of its classes. Using the available technology, a UIW class of preservice elementary teachers was able to join the Driscoll Middle School sixth-grade class as they were working with an integrated mathematics/science project. The experience was very worthwhile for the UIW students but it may have been more worthwhile for the UIW faculty members who were involved in the interactive video sessions. It became quite clear that UIW was not preparing its preservice teachers to teach such an integrated course and that changes needed to be made to allow for that. The time frame for these developments was the academic year 1993-94.

The next year more experimentation occurred between UIW and Driscoll Middle School, using interactive video. Also, at UIW some sections of preservice elementary school students, enrolled in Fundamental Concepts in Mathematics, were combined with sections of Scientific Inquiry, a core requirement course for liberal arts students. This allowed more experience with the integration of mathematics and science.

Finally, by the academic year 1995-96 UIW was ready to proceed with the formal development of a new course which would combine a six hour, two semester sequence in mathematics with a six hour, two semester sequence in science, resulting in a two semester sequence of four hour courses, integrating mathematics and science in the new course. The intent was to do a better job preparing preservice elementary school teachers than before and with fewer credit hours required than before.

Then, in the summer of 1996 UIW received a grant from the NSF-funded Statewide Systemic Initiative program to support the development of the curriculum for the new courses. During that summer, four pairs of teachers, one a mathematics faculty member and the other a science faculty member, worked to prepare the syllabus and daily activities in support of the curriculum. These four pairs of faculty were assisted by external consultants, one master science teacher and one master mathematics teacher from Driscoll Middle School, Dr. Ralph Cain of UT-Austin and Dr. Mary Linquist of Columbus College in Columbus, Georgia. Two internal consultants from the Education faculty also were involved. During the academic year 1996-97 the new courses were implemented by two pairs of faculty per semester. That is, the courses each were team-taught by pairs of faculty members, one from science and one from mathematics. Each two weeks the entire team of those teaching and those consulting would gather to discuss what was being accomplished. During those periods between meetings the teaching faculty and the consultants would visit the classes being taught and would write an analysis for later discussion. These were frank and some discussions that led to a significant increase in mutual faculty respect as well as improvement in the courses being offered.

By the beginning of the second semester of the academic year, other developments had occurred. A section of the new course was offered to preservice teachers who were enrolled in a new adult degree completion program

offered at UIW and this section also was taught by another team of one scientist and one mathematician. Simultaneously, the NSF-funded Urban Systemic Initiative program in San Antonio asked whether their peer teachers could have access to a somewhat similar course, but at the graduate level. Two sections of that course were offered. This fall semester of 1997, three sections are being offered USI peer teachers, two sections dealing with K-5 grades and one section with 6-8 grades.

The final report will soon be submitted to the SSI grant officials and also to other offices which will disseminate the results of these efforts. Several presentations have been made to organizations such as CAMT, CAST, consortia of universities, and to individual universities. Similar presentations will continue to be made this year as evaluation of the new courses will lead to further improvement.

Requests for summaries or for full reports concerning the new courses may be submitted to any one of the authors.

A Week of Measurement – A Week of Fun

Novella Mutz
Hillcrest Elementary
Del Valle, Texas

As I took my shoe off and placed it on the table at the front of the classroom, my students' attention began to peak and all eyes glared at what craziness I was doing this time. Next, I asked that each of them remove their left shoe and position it directly in front of them. They obeyed willingly and my measurement lesson was off the ground! We began to arrange the shoes in different ways: smallest to largest, largest to smallest, widest to thinnest... Each time, we did not measure, we just estimated. After the first arrangement, I began to argue and then rearrange the shoes in an incorrect way. "I think John's shoe is longer than David's. You guys need to look more carefully. I think Lindsey's shoe is definitely wider than Cortney's. Don't you agree?..." The students soon began shouting for measurement to find out who was right or wrong! The lesson was off and running as I allowed my students to take over.

My students quickly had a discussion explaining to me how to measure correctly and the importance of using the proper method to get a correct measurement. I listened intently and added insight when needed.

This was a perfect lead into a week of fun – a weak of measurement! The following lesson plans combine problem solving involved in the conversion of measurement as well as the basic math operations, estimation, and real-life measureing activities.

Day One and Two:

Objectives: The children will work with partners to measure different parts of their bodies, carefully estimating before each measurement is actually taken.

Directions:

1. As an anticipatory set, complete the activity described earlier to grab students' attention. You could measure heads, measure hands or measure feet. Any part of the body could be used to get your class involved and excited.
2. Each child should measure his or her foot and then group the children with a partner who has approximately the same foot size. This pair of children need to be given a tape measure and worksheet 1A. If a tape measure is not available, a yard stick and a piece of string will work by measuring with the string and placing it end to end on the yard stick to find the actual length.
3. Allow each student to estimate the length of certain body parts and then, with the help of their partner, actually measure. The estimations and the actual lengths should be recorded on worksheet 1A.
4. As the whole class begins to finish, each child should fill in personal and partner measurements on a graph to compare sizes and lengths. The teacher should complete a class graph on overhead or on poster size graph so each child can compare themselves to other students.

5. Students should now be broken up into cooperative groups: Feet group, Hand group, Head group, Leg group, and Arm group. They should be given large enough paper so that each child can draw the lengths of the five largest, or smallest, feet, hands, heads, legs, and arms in the class. This will be a good visual and will get the student actually synthesizing different measurements.

Extensions

1. Create different kinds of graphs: picture, line, circle...
2. Measure parents or siblings feet, hands, etc. and graph to find tallest or shortest.

Day Three:

Objective: The children will problem solve to convert time and measurement.

Directions:

1. Discuss with students that we can measure in inches, yards, feet, hours . . . but sometimes we must change or convert lengths, distances, or time. Discuss the different conversions.
2. Read the book *Jim and the Beanstalk.* Discuss measurement as you read. Ask questions such as, "How tall do you think the beanstalk Jim climbed actually is? How tall do you think Jim is? What about the giant?..."
3. Allow students to work individually, with a partner or in a cooperative group on the conversion activity. Jim and the Beanstalk

Extensions and modifications:

1. The numbers in bold print may be changed to smaller or larger number depending on the level of your students.
2. Students may work the problems with paper and pencil, or with a calculator.

Day Four and Five:

Objective: The children will work in cooperative groups to estimate and measure different locations on the giant's head.

Directions:

1. Students will need poster board, rulers or yardstick, pencils, crayons and worksheet 1C
2. Allow students to work in groups to measure and draw the actual size of the giant's head according to the dimensions given. The students should be allowed to use imagination and problem solving if parts of the head will not fit on the paper.
3. Students should color and display.

Extensions:

1. Use the metric system instead of standard measurements. Have the students measure to find the size of different parts on the Giant's head in metric.

Literature:

Briggs, Raymond. *Jim and the Beanstalk.* New York:Coward-McCann, Inc., 1970

MEASURING MY BODY

Body Part	Estimate	Actual	Difference
Circumference of head			
Length between eyes			
Length of nose			
Length of arm			
Length of hand			
Length of thumb			
Length of leg			
Length of foot			

Jim and the Beanstalk
Written by Raymond Briggs

1. If the beanstalk Jim climbed up was **12,000 inches,** how many **feet** did Jim climb to reach the Giant?

2. If the windows on the castle at the top of the beanstalk are **2,600 feet** long and **1,785 feet** wide, what is the **perimeter** of the window?

3. What is the **area** of the window?

4. If the Giant's drink can hold **400 ounces**, how many **cups** is that? (8 ounces=1 cup.)

5. If the oculist worked on the Giant's glasses for **480 minutes**, how many **hours** did it take the oculist to make the Giant's glasses?

6. If the gold coin weighed **2 tons**, how many **pounds** did it weigh? (2,000 pounds = 1 ton.)

7. If The Baby Giant's Bumper Fun Book was **200 pages** and the Giant has read **96 pages**, how many more **pages** does the Giant need to read before he finishes?

8. If the dentist took **120 hours** to make the Giant's teeth, how many **days** did it take him?

9. If it took the wig-maker **26 days** to make the wig for the Giant, how many **weeks and days** did it take?

10. If Jim decided to climb back up the beanstalk to ask the Giant for **6** more **gold coins**, how much money would Jim have when he went home? (1 gold coin =$2,000.)

Bonus: If the Giant's drink was **1,600 ounces** and a child needs **one cup** to quench his thirst, how many **kids** could gulp from the Giant's drink?

Jim and the Beanstalk
Written by Raymond Briggs

1. From the center of the left eye to the center of the right eye is exactly one foot.

2. The diameter of each eye is 5 inches.

3. From the top of each eye to the tip of the Giant's head is one foot.

4. From the top of the Giant's head to the tip of his chin is three and a half feet.

5. His smile is one foot and three and a half inches from end to end.

6. You can see his teeth when he smiles. Draw them.

7. How long are the Giant's teeth?_____

8. How wide are the Giant's teeth?_____

9. From the Giant's left ear to the Giant's right ear is three feet.

10. The Giant's neck is 7 inches long.

11. Draw glasses on the Giant.

12. What is the diameter of one lens of the Giant's glasses?_____

13. The Giant's hair should meet the middle of his neck. Draw his red hair.

14. How long is the Giant's hair from the middle of the top of his head to the end?_____

15. The diameter of the gold coin is 12 inches. Draw the gold coin at the bottom of your picture.

Worksheet

Anyone Can Make It Happen in Their Classroom

Data Collection and Analysis

Participants at an Austin ISD Algebra Institute enjoyed a week of interesting activities presented by Eva Gates. At the beginning of morning and after lunch break. Eva had the participants work on collecting and analyzing data from an experiment. As a culminating activity she asked groups of four teachers to write an experiment to share with the group. The experiments are presented on the following pages. They may be used by teachers at most grade levels.

Ted Blackwell, a teacher at Crockett High School in Austin, wrote a song which the Algebra Institute group sang while he played guitar on the last day of the institute. The tune was also original and cannot be included in the journal, but singers can improvise.

The Algebra Institute

Algebra for Everyone
Algebra do it just for fun
Algebraevery day
Algebra in every way

Chorus:

At the Algebra Institute
Algebra Institute
Solve the mysteries of math
Learn while you have a blast!

Algebra an aerobics dance
Make your body do equations if you get the chance
Just stand up straight It's easy to do
Turn your body into Y = X + 2

Chorus

Algebra can make you shine
Just connect the dots and form a line
If you're Linear That means you're straight
You can find Y When X is 8.

Chorus

Algebra is nonlinear too
The fun is figuring out what to do
You find the difference in the series chain
If it isn't constant Then do it again.

And before too long At the Algebra Institute
you discover the key
And solve it easily Math is a Blast for you ... and Me!

Words and Music by Ted Blackwell, © 1997

Announcing The 1998 Texas Essential Knowledge and Skills Competition in Workplace and Community Applications of Mathematics and Science

The Charles A. Dana Center's Texas Statewide Systemic Initiative (SSI) for a contemporary, intellectually-rigorous education in mathematics, science and technology for all students announces a competition for projects or activities to improve student learning in middle and high school mathematics and science education through using workplace and community contexts. Specifically, the competition seeks workplace and community contextual learning activities aligned with the new Texas Essential Knowledge and Skills (TEKS). All Texas mathematics and science teachers, and their workplace or community partners, are welcome to apply. The deadline for competition applications is Friday, May 15, 1998.

For further information, please contact: Dr. Bob Glover
Center for the Study of Human Resources
The University of Texas at Austin
107 West 27th St.
Austin, TX 78712
Tel.: (512) 471-2194; Fax: (512) 471-0585
bglover@uts.cc.utexas.edu (Robert W. Glover)

Balancing Act

Materials:

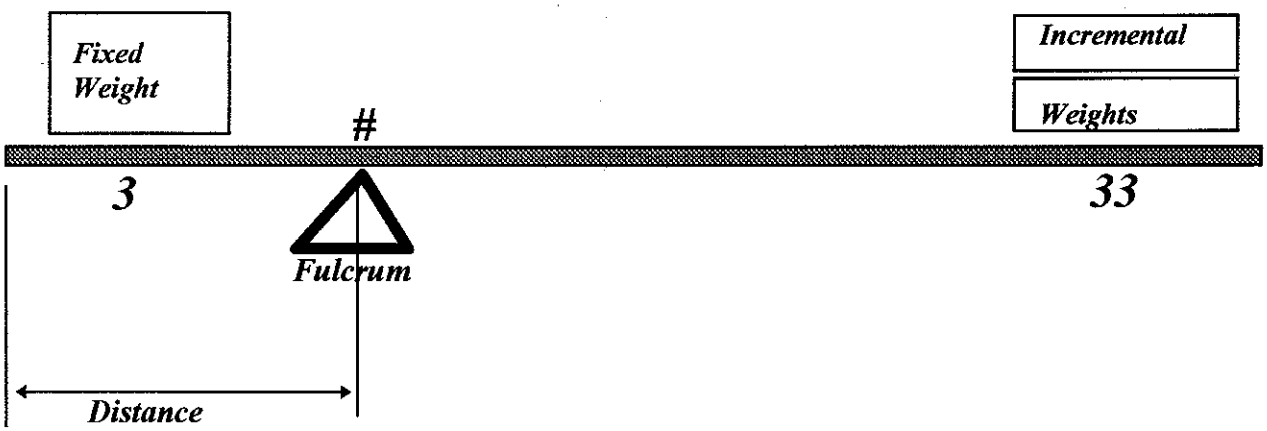
One three-foot board (1 by 4) paper cups, weights of uniform size (Science departments have these weights.) or large marbles, wooden wedge (fulcrum)

Procedure:

1. Place a cup at each end of the board.
2. Place a fixed weight or number of marbles 3" from the left end of the board.
3. Drop weights , one at a time, into a cup 3" from the right end
4. Slide the board to the left until it begins to rise, then back to the right so that it is steady.
5. Record the number of weights and the number of inches from the scale above the Fulcrum.

SETUP:

SETUP:



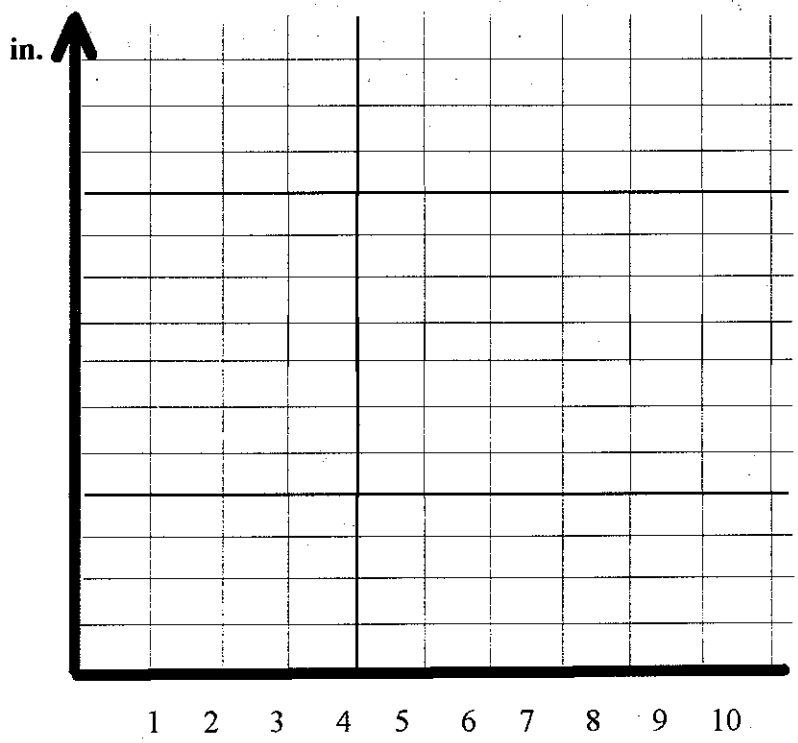
Predict where will the Fulcrum lie

(to the left, center, or right of center) when ...

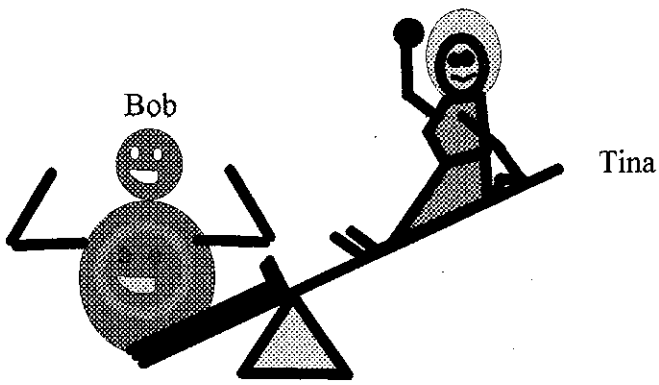
- the weight on the right side is less than the weight on the left side
- when the weights are the same
- when the weight on the right side is greater than the fixed weight on the left

Make a table of your results: Plot your results on the Graph below.
What will be the independent variable?
Is the graph linear or nonlinear?

Weight #	Fulcrum Distance (inches)



Which way do we move the Fulcrum so that Bob and Tina are both sigging level on the see-saw



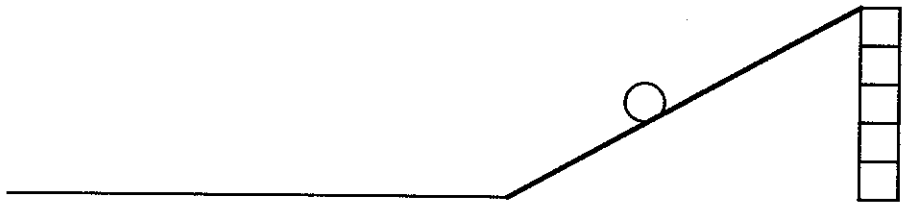
Balancing Act :

Ted Blackwell, Crockett High School, Austin ; Lisa Brown, Dobie Middle School, Austin; Donald Davis, Crockett High School, Austin; Dottie Hutchins, Crockett High School, Austin ; Lupita Garza, Murchison Middle School, Austin, Texas.

THE ROLLING WEIGHT DEBATE

This experiment will provide you with an opportunity to gather, analyze, display, and interpret data.

SET UP:



MATERIALS NEEDED:

8 - balls of different weight with the same diameter
Potpourri balls may be purchased from a craft store.
These are clear plastic balls with a
plastic tab that needs to be removed.
Fill the balls with some small objects such as rice, beans, birdseed, pellets, or foam peanuts. Use tape or cellophane on the inside of the balls to cover any holes and prevent the filling from falling out of the balls. You may also use playdough or modeling clay to fill the balls. You could vary the weight by suspending different items in the clay. You should probably glue the balls together before using.
Ramp - made from plywood, 2 by 4's or 1 by 4's.
Wooden Blocks - 4X4X2 size (You will need 4 or five of them.)
Stopwatch
Measuring tape
Inch grid paper or graphing calculator

GROUP SIZE: 2 to 4 People

PROCEDURE:

1. Roll a ball down the ramp from the height of 5 block
2. Release the ball from the top edge of the ramp.
3. Measure the distance that the ball rolls.
4. Record the time, starting with the release of the ball, until it stops.
5. Make two different graphs:
6. Weight vs. Distance
7. Weight vs. Time.
8. Describe the graphs and any relationships you observe.

EXTENSION IDEAS FOR THE ROLLING WEIGHT DEBATE

1. Divide the class into groups and give each group a different height at which to set the ramp. When coming back to whole group, compare the graphs.

2. Provide a scale from the science department and have the students weigh the balls before the experiment , record data, and generate two additional graphs.

3. Give each group a ball to take home and fill-up with what they choose.

4. Roll the ball from a ramp onto different surfaces; carpet, tile, grass, sand, packed dirt, gym floor, etc. How do these different surfaces effect the distance the ball travels? the curve?

5. Try the experiment with different size balls that weigh the same.

The Rolling Weight Debate:
Louis Gonzales, St Louis School, Austin; Nasin Mombaini, Kealing Junior High School, Austin; Andy McNeilly, Elgin Middle School, Elgin; Nancy Pietsch, Carmin-Round Top High School, Carmine; Michelle Williamson, Smithville High School.

Wheely-Games

Focus: Civilization depends on circular motion to reduce the work of moving objects both large and small. How far we can go depends not on the size of our machines , but on the size of the wheels that they use. How can we predict how far a given wheel well get us? We will explore that question in the following experiments.

Materials:

Three cylinders of various diameters with one end marked to indicate a point on the circumference
Metric measuring tape
Masking tape
Graphing calculator

Setup:

Groups of 4: recorder, roller, two measurers

Procedure:

1. Use masking tape to tape the measuring tape to a long table or on the floor.
2. With the cylinder on its side, align the mark with the "0" on the measuring tape
3. Roll the cylinder along the masking tape one revolution until the mark on the cylinder is aligned with a point on the measuring tape.
4. Record this distance in centimeters in the table.
5. Repeat the procedure for two, three and four revolutions.
6. Determine which value is the dependent variable and which is the independent variable.
7. The recorder should enter the data into a graphing calculator and link with the other members of the group to share the data..
8. Make a scatter plot for the cylinder and determine if the graph is linear or non linear.
9. Use the graphing calculator to determine a curve-of -best-fit for the data.
10. Predict the distance for 60 revolutions for your cylinder . Describe how you came to this conclusion.
11. How many revolutions would it take one of your cylinders to travel 1 kilometer? Explain your conclusion.
12. Repeat the experiment and analysis for the other two cylinders.

Number of Revolutions				
Distance Rolled in CM				

Your analysis of the data:

Extension:

Procedure:

1. Use a measuring tape to measure the diameter , the distance through the center from edge to edge.
2. Record the diameter and the distance the cylinder travels for one revolution in a table.
3. Enter the data into the graphics calculator.
4. Graph the data.
5. Describe your graph.
6. Determine how many revolutions each cylinder must make to travel 100 centimeters.
7. Determine a formula that relates the diameter of the object to the number of revolutions it takes to roll 100 centimeters.

Diameter in cm				
Distance in cm for one revolution				

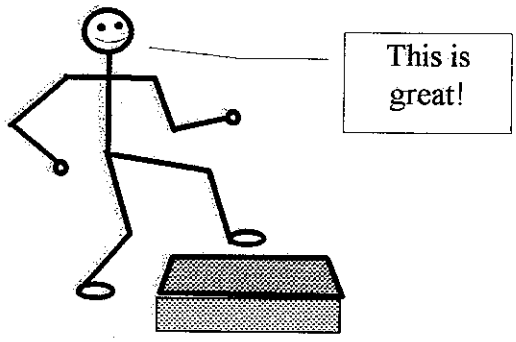
This experiment is a combination of experiments presented by two groups:

Judy Ketchum, Covington Middle School, Austin: Karla Holmlund, Schulenburg Highs School; Schulenberg; Mathew Mahlmann, Elgin High School, Elgin; Glenn Tamura, Travis High School, Austin

Nan Carnagey, Connally High School, Pflugerville: Clayton Cormack, Webb Middle School, Austin; Elaine Fowler, Lamer Middle School, Austin; Anthony Thompson, Johnston High School, Austin.

"Aerobic Workout"

Materials: Stair Stepper, stopwatch, weights, music (optional)
Set-up: Group of 4: Test subject, spotter, timer, recorder



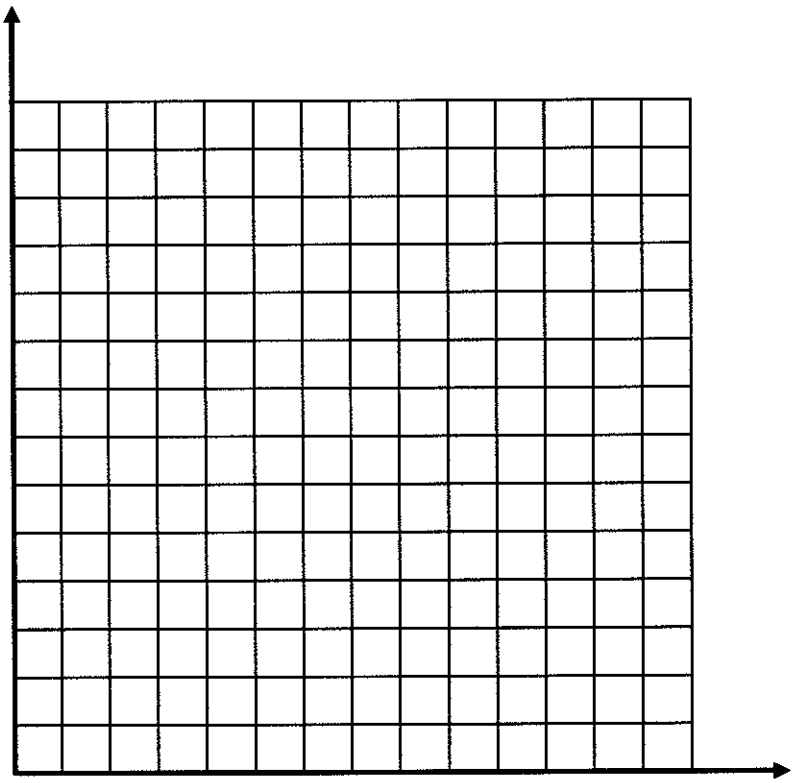
Procedure:

- The test subject will use the stair stepper with no weights while the timer times the subject for 30 seconds. The spotter stands near by while the subject is exercising to ensure safety and balance.

1. Find an open area to locate the stair stepper.
2. Record the test subject's heart rate per minute. (At rest heart rate).
   Locate the pulse of the test subject by placing the first two fingers of one hand on the neck at the carotid artery (big vein).
   Count the pulse for 10 seconds.
   Multiply the count by 6. This is the test subject's heart rate per minute.
3. Start the music. At the first step by the subject the timing begins. The subject steps up and down the stairs with no weights for 30 seconds.
4. Immediately record the test subject's heart rate per minute following the procedure in step 1.
5. Record the data in the table on the next page.

6. The test subject will use the stair stepper with a 1 pound weight while the timer times the subject for 30 seconds. The spotter stands near by while the subject is exercising to ensure safety and balance.
7. Once again record the test subject's heart rate per minute.
8. Continue this process for 7 more times adding 1 pound with each iteration.
9. Graph the data . Describe the graph.
10. Repeat the experiment for other members of the group.

Number of Weights	0	1	2	3	4	5	6	7	8
Heart Rate per Minute									



Aerobic Workout: Gary Adam, Anderson High School, Austin, Jesse Barrientes, Bowie High School, Austin; Thelma Briseno, Porter Middle School, Austin; Elizabeth Flanagan, Giddings ISD, Giddings.

Expanding Balloons

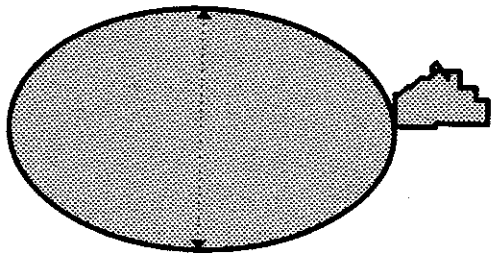
Materials:

- One round balloon for each group
- One piece of strip long enough to wrap around the center of the balloon when inflated to its largest volume
- Measuring tape or ruler

Setup: Groups of four

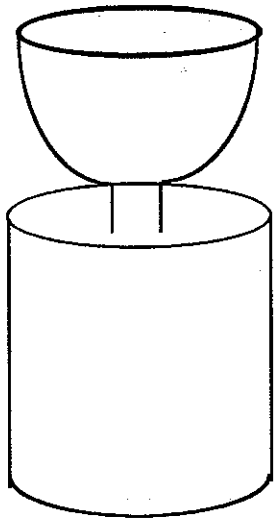
Procedure:

- One student will fill the balloon one breath at a time. (It is more important that breaths blown into the balloon are moderate and consistent, to provide more data points. Large balloons will provide more information.)
- After each breath, another student will wrap a piece of strip around the balloon to measure the circumference. He will use the measuring tape to determine the length
- The third student will record the data in the table on the next page.
- The fourth student will graph the data on the graph grid or on a graphing calculator.
- The group will analyze the graph and write an analysis of the graph.



Group: Ed Owens, Bailey Middle School, Austin;Guadalupe Garza, Travis High School, Austin: Robert Rasmus, Covington Middle School, Austin.

SLITHERING SOLIDS



MATERIALS:

clear cylinder
funnel or funnel made by cutting the top from a plastic bottle
stop watch
centimeter ruler
dry ingredients
salt, rock salt, rice, beans
4 ounce cups
paper plate or paper towels
heavy cardboard or ruler to cover funnel

Note: Salt is easier to use with a regular funnel or with a funnel made from the top is from a 1 liter or smaller soda bottle. A 3 liter bottle must be used for pinto beans. Smaller beans and rice work well with either larger or smaller bottle funnel.

Group members will need to be assigned to each of the following jobs:
Measurer, Funnel holder, Time keeper, Recorder

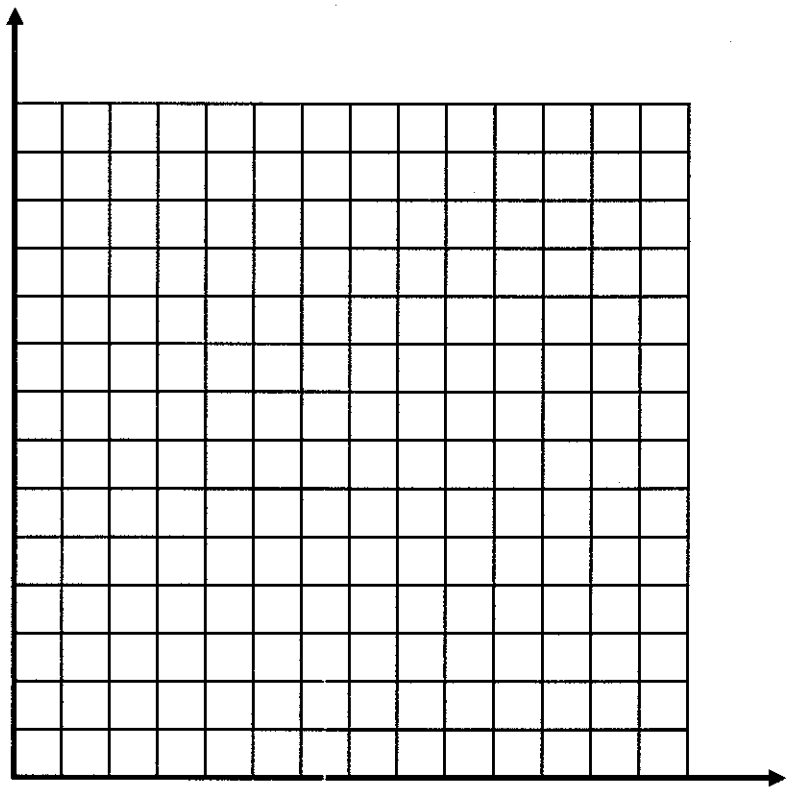
PROCEDURE:

1. Place the funnel over the cylinder with your finger, cardboard, or a ruler under the spout.
2. Measure 1 cup of the dry ingredient and pour into the funnel.
3. Slip your finger or cardboard off the spout. Time the number of seconds from the time you release your finger until the funnel is emptied.
4. Shake the cylinder to level the dry ingredients in the cylinder. Measure the height of the cylinder from the table to the top of the dry ingredient.
5. Record the data in the table on the next page.
6. Empty the cylinder by pouring the dry ingredient into another container. You may use it again for the next measurement.
7. Repeat the steps 1-6 for the other measurements shown in the table.
8. Graph the set of ordered pairs (time, number of cups)
   You may use the graph grid on the next page or use the graphing calculator.
9. Describe the relationship between these numbers. What is the rate at which the dry ingredient is being emptied from the funnel?
10. Graph the set of ordered pairs (number of cups, height)
11. Analyze the graph.
12. Graph the set of ordered pairs (time, height).
13. Describe the relationship between these numbers. What is the rate at which the height is changing?

14. Write a paragraph to describe the results of your experiment

NUMBER OF CUPS	TIME TO NEAREST HUNDREDTH OF A SECOND	HEIGHT TO NEAREST TENTH OF CENTIMETER
1		
2		
3		
4		
5		
6		
7		
8		
9		

Label each of your graphs.



Group: Ray Beverly, Lanier High School; Janice Hensley, McCallum High School; Scot Hodges, Lanier High School; Diane McGowan, Bowie High School

FOLLOW THE BOUNCING BALL

In this experiment the relationship between the height the a basketball is dropped and the average time that it takes the ball to stop bouncing will be determined.

Materials

- Basketball
- Measuring tape in centimeters or inches
- Masking take to mark heights
- Stop watch to mark time
- Graphing paper
- Graphing calculator

Procedure

1. Use masking tape to mark off 6 heights 1 foot apart, ensuring that tapes are directly under each other.
2. Hold basketball at one foot level and drop.
3. Record the time it takes the ball to stop bouncing.
4. Repeat this procedure a second time
5. Record the average of the two times.
6. Repeat this procedure for each height.
7. Make a table of values to show the relationship between the height the ball was dropped and the average time it took to stop bouncing.
8. Graph the set of points.
9. What type of curve best fits the data?
10. What do you predict the average time would be if you dropped the ball from 10 feet?

Group: Glen Bacak, Austin High School, Austin; Jimmie Hines Pearce Middle School, Austin; Pablo Ozuna, San Marcos High School, San Marcos; Charles V. Parr, Webb Middle School; Austin.

Flight of the Balloon

A Data Analysis Activity

Materials:

- String or fishing Line
- Balloons
- Tape
- Yard stick or measuring tape
- Stop watch

Group Roles:

The following roles should be assigned to the members of your group:

- Inflater: blow up the balloon
- Set-up#1 : tape the balloon to the straw and run the experiment.
- Timer: time the flight of the balloon
- Measurer: measure the flight of the balloon
- Data Recorder: record the data from the experiment.

Procedure:

- Cut a straw 4-5 cm in length. Run the string through the straw. Tape the balloon and the straw. This setup creates a track that the balloon will travel, making it easier to determine the distance of the flight. The set up will look similar to this diagram:

- Inflate the balloon and count the number of breaths. Record this number in the table.
- Measure and record the circumference and diameter of the balloon.
- Attach the balloon to the straw using the tape. Release the balloon and measure the flight time with a stop watch.
- Measure the distance the balloon traveled.
- Repeat the experiment at least five or six times.

Number of Breaths						
Circumference						
Diameter						
Time						
Distance						

Possible Discussion Questions:

Using the data, what relationship could you investigate? In each investigation, what would be the independent variable and the dependent variable? Give justification for each.

Diameter vs. Circumference
Create a graph from the circumference and diameter data. Describe the graph.

Distance vs. Time
Create a graph using the distance and flight time data. What does the graph look like?
What do you think causes a balloon to go fast or slow? Explain.

Breath vs. .....

- Create different graphs showing the relationships between the number of breaths and the different variables, including diameter, distance, and flight time.
- Describe the different graphs.
- Which graphs are similar?
- Which graphs are different?
- For the graphs which are linear, what does the slope of the graph represent? Explain.
- Find the power regression for the graph of the number of breaths vs. the diameter.
- The formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$. In what sense is the volume of the balloon measured by the number of breaths?

Break Down

- How precisely were you able to make your measurements?
- What possible reasons could there be for error in the measurements or data?
- Discuss different ways to make the experiment more precise.

Group: Kendra Kahn, Dripping Springs Middle School, Dripping Springs ; Eric Moyer, Kealing Junior High School, Austin; Diane Wagner, Dripping Springs Middle School, Dripping Springs ; Ann Walsh, Dripping Springs Middle School, Dripping Springs ; Sylvia Villejo, Juvenile Justice Alternative School, Austin.

A Calculus Bundt Cake Project

Norma Jost, Mathematics Specialist K-12, Austin Independent School District

My favorite class presentation is teaching Calculus students how to find the volume of a three-dimensional solid. I am always watching for new ways to make this a fun and hands-on lesson. We begin the investigation of three dimensional volume by connecting with the traditional volumes found in Geometry. I have student groups model some traditional shapes with playdough and poster board and then model volumes of solids with known cross sections. We next model solids with the shell and disc method. As they model these shapes with playdough, the students must record the mathematics for finding each volume on a poster board. The students make amazing connections to their previous math courses and advertise those connections to their peers as hundreds of playdough models fill my classroom. I also use food to teach this important Calculus concept. In my first year of teaching (1990 -1991), I tried an National Council of Teachers of Mathematics article on calculating the volume of a bundt cake by approximating a displaced parabolic shape rotated around the y-axis. Every year since then, this teaching tool has evolved into a hands-on volume experiment. I make 2 bundt cakes which we eat, taking care to graph one piece of cake on a x-y coordinate plane that is on a transparency on the overhead projector. The students measure the radius of the center of each cake, the x-axis intercepts, and the vertex of each piece of cake. Their team project is to:

a. Find the equation of the parabolas that approximate curves of my cake,
b. Find the volume of my cake using calculus,
c. Make a CREATIVE box that approximates the volume of my cake,
d. Make their own cake that requires some calculus to get its volume.

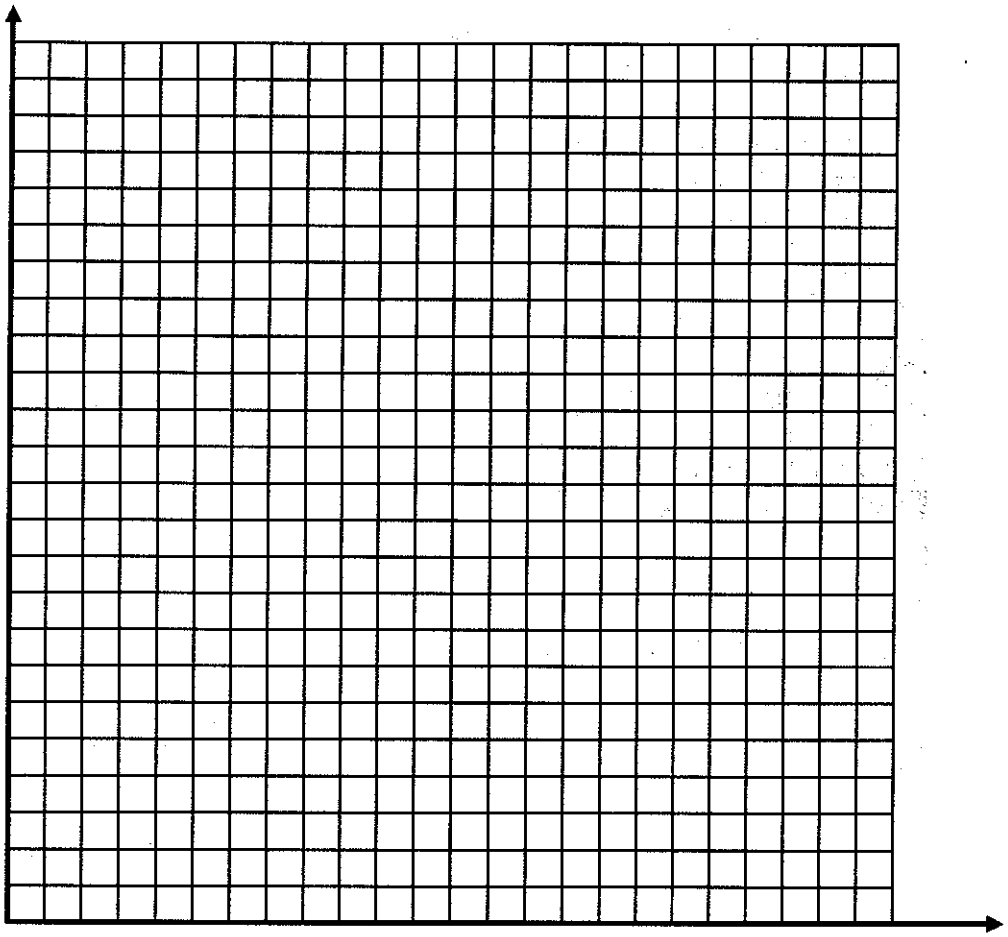
There is extra credit for the most creative cake, the most unique box, and the best tasting cake, so I recruit professional cake judges to help with those tasks. I bring my bundt cake pan (and birdseed) and we measure each box to see which one most closely approximates the volume of my cake. The students turn in a report of all of the mathematics involved in the volume of my cake, their cake, their box and details of their efforts in this group project. I take pictures, the school newspaper takes pictures and writes an article, and I take the playdough models, boxes, reports, and pictures to our display windows at the library. I announce the winners (creative cake, best tasting cake, unique box) to the school and I advertise the wonders of mathematics. My last year teaching calculus, I added other food items like donuts, apples, and an angel food cake. All students deserve to experience the wonders of mathematics from many perspectives.

Volume—It's a Piece of Cake

Diane McGowan, Bowie High School, Austin

Norma Jost inspired me to try the cake activity in my calculus class. In previous years we have found the volume of a donut by approximating curves to fit the donut. However, the graphics calculator regression capabilities allow the students to collect data and find curves to fit the data. The students cut a thin slice of cake, lay it on waxed paper, cut out the shape, lay the shape on the coordinate grid, and record the points. They enter the data into their calculators and fit curves to the data. The directions are for a TI 82.

VOLUME OF THE CAKE

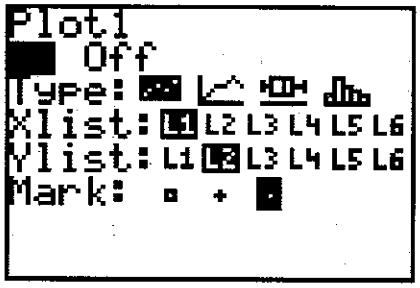


1. Position the replica of the slice of cake on the grid above.

2. Make a table to record the data points for each curve.

3. Enter the data points you chose into the calculator.
Press STAT
Choose EDIT
Clear the lists if they contain data.
Using L_1 and L_2 for the first curve and L_3 and L_4 for the second curve.

4. Graph the data points on your calculator.
Choose STAT PLOT
Turn off all plots
Choose 1
Select as shown below.



Choose ZOOM 9 to set a window to fit the data and draw a graph.

To graph the second set of data choose STAT PLOT number 2 with
x list L_3 and ylist L_4

4. Use the calculator to find regression equations to best fit the data for each curve.

Press STAT
Choose CALC
Choose the regression equation which best fits the data. Try a quadratic regression first.
The equation data will appear on the home screen Do not press enter
Find the 2nd function keys for L_1 (above 1) and L_2 (above 2)
QuadReg L_1 , L_2 ENTER
The quadratic equation to fit the data will appear on the screen.
Press y=
Press VARS 5:Statistics EQ 7:RegEQ

Write your equation _____
Graph on the calculator.

Use the same process to find the equation for the second set of data and graph the equation.
Write your second equation _____
Graph on the calculator.

5. Set up the integrals to find the volume of the cake.

6. Compute the volume using the Math 9: fnInt(

"PROBLEM SOLVERS, UNLIMITED"

Diane Butler, St Stephen's Episcopal School, Austin

In late June, I sent out letters to all the new students that would be attending our school in the fall inviting them to join "Problem Solvers, Unlimited." I explained that the purpose of the group would be to get an introduction to problem solving strategies, writing complete solutions to problems, and just having some fun working some cool math problems. Included in the letter was PSU #1: "THE COLORFUL ROBOTS PROBLEM" and my e-mail address for students to use if they had access to a computer.

WOW! Within a week, more than 20 students responded by e-mail and another six sent me responses by snail mail. It kept me busy, but it was such fun writing back comments and compliments. Frequently, we also chatted about their summer activities and things they liked to do. I told them I was learning to use the graphing calculator and that I was going to a "math teachers' camp" called CAMT.

The second PSU problem sent was entitled "I LOVE MATH." After a few responses from a student, I was able to individualize the selection of problems for that child based on my first impressions of their problem solving and communication skills. It was also fun to "personalize" the problems by making each of them the character in the problems! It was especially challenging, however, to give a geometry problem that required the student to write out directions for me to draw some geometric shape as part of their solution. Some students solved more than ten problems over the summer! I asked each of them to save their favorite problem solving piece, and I promised them some "bonus points" when school started.

Several parents sent me private responses thanking me for helping their children feel like they already knew a teacher at school, giving me information about their child's math background, and asking questions about our math program. It was fun to meet all of my problem solvers and their parents in person at registration. Even though I may not have the opportunity to actually teach all of these students this year, when I see them in the halls, they know they are still my "PSU kids." Next year I think we'll get T-shirts!

"Problem Solvers, Unlimited" started out to just be an interesting way to get acquainted with my new math students. Now I think that using e-mail might be a great way to individualize problem solving for all kinds of students—students with learning disabilities, students who lack confidence in their mathematical ability, students who need more guided practice, and high achievers and mathematically gifted students who want extra challenges.

Would you like to share favorite problems? debutler@tenet.edu

Maybe we should form PSTU —-"Problem Solving Teachers Unlimited!"

I found "The Orange Problem" while sorting through a huge box marked "Important Miscellaneous." The box was filled with dynamite handouts from workshops, creative lesson plan ideas borrowed from other teachers, and magazine articles paper-clipped and saved to "do something with" that I had collected for several years. (Can anyone identify?!) I e-mailed my version of "The Orange Experiment" to several rising 7th graders that I knew had already had some experiences finding circumference and area of a circle. They were asked to e-mail me their solution for each part of their experiment before continuing. It took a while to work through some of the parts, but the results were delightfully delicious – and I didn't have orange juice all over my classroom desks!

"The Orange Experiment"

Part 1. Find the diameter of a nice, round orange WITHOUT cutting it. Explain your "math thinking" process!
Part 2. Use a compass to draw 6 circles with the same radii as your orange.
Part 3. Carefully peel your orange. Cover as many circles as you can with the pieces of your orange peel.
Part 4. Describe a relationship between the surface area of your round, spherical orange and the number of circles covered by the peel.
Part 5. Write your own formula for the surface area of a sphere.
Part 6. Now eat your manipulative!

On the first day of school I asked Margaret if she remembered what the surface area of a sphere was. She confidently replied, "It takes four circles to cover an orange."

Date_____ Name_____

Discovering the Derivative of Sine and Cosine — Lab 6

To find the derivative of a function, its slope at each point must be found. Use the TI 83's numerical derivative to find the slope and then plot the slope versus the x-value. The result should yield a graph which is the derivative.

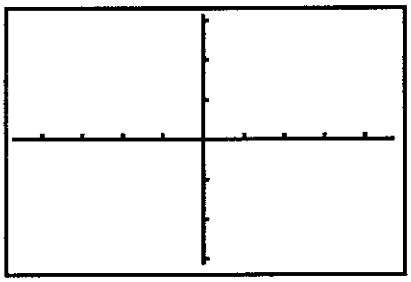
1. Enter the function $F(x) = \sin(x)$ as Y_1=sin(x)
2. Graph the function by pressing **ZOOM 7:Trig**
3. Press **2nd TRACE [CALC]** and select **6:dy/dx**. Enter **-7π/4** and press **ENTER**. Record the derivative (or the slope) to the nearest hundredth in the table. Repeat until the table is complete.

x-value	slope
-7π/4	
-3π/2	
-5π/4	
-π	
-3π/4	

x-value	slope
-π/2	
-π/4	
0	
π/4	
π/2	

x-value	slope
3π/4	
π	
5π/4	
3π/2	
7π/4	

4. Press **STAT** and select **1:EDIT** to enter the data above. Type the x-values in L_1 and the slopes in L_2.
5. Press **2nd Y= [STAT PLOT]** and select **1:Plot 1...** Highlight On and press **ENTER**. Select the scater icon for the Type; L_1 for the Xlist; L_2 for the Ylist; and the big dot for the Mark.
6. Press **GRAPH** to display the scatter plot of the derivative. Sketch the graph on the axis provided.
7. What function would model the data in the plot? Test your guess by entering the function in Y_2 and graphing.
   Based upon your findings, if $F(x) = \sin(x)$, then $F'(x) =$ _____

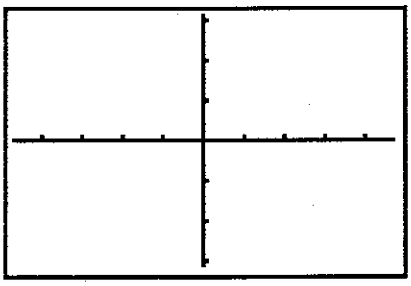


8. Repeat for $F(x) = \cos(x)$.

x-value	slope
-7π/4	
-3π/2	
-5π/4	
-π	
-3π/4	

x-value	slope
-π/2	
-π/4	
0	
π/4	
π/2	

x-value	slope
3π/4	
π	
5π/4	
3π/2	
7π/4	



$F'(x) =$ _____

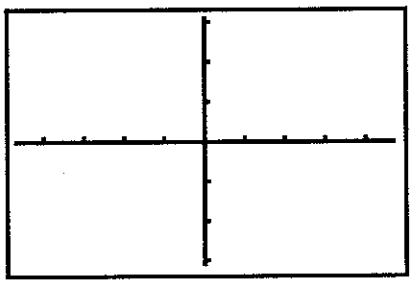
11. Repeat the activity for each function given.
    a. $F(x) = \sin(2x)$

Date_____ Name_____

x-value	slope
$-7\pi/4$	
$-3\pi/2$	
$-5\pi/4$	
$-\pi$	
$-3\pi/4$	

x-value	slope
$-\pi/2$	
$-\pi/4$	
0	
$\pi/4$	
$\pi/2$	

x-value	slope
$3\pi/4$	
π	
$5\pi/4$	
$3\pi/2$	
$7\pi/4$	



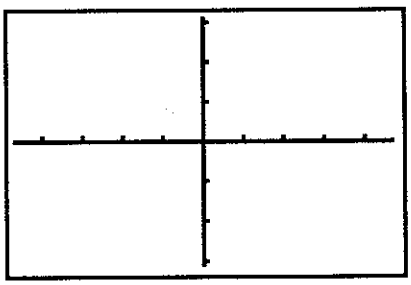
$F'(x) =$ _____

b. $F(x) = \sin(3x)$

x-value	slope
$-7\pi/4$	
$-3\pi/2$	
$-5\pi/4$	
$-\pi$	
$-3\pi/4$	

x-value	slope
$-\pi/2$	
$-\pi/4$	
0	
$\pi/4$	
$\pi/2$	

x-value	slope
$3\pi/4$	
π	
$5\pi/4$	
$3\pi/2$	
$7\pi/4$	



$F'(x) =$ _____

12. From the two problems in #11, can you generalize the derivative of $F(x) = \sin(nx)$?

13. Try your hypothesis by entering other equations in the form $F(x) = \sin(nx)$ in $\mathbf{Y_1}$ and **nDeriv(Y_1, X, X)** in $\mathbf{Y_2}$ and graphing the two together. Turn the stat plot off by pressing **2nd Y= [STAT PLOT]** selecting **4:Plotsoff** and pressing **ENTER**.

14. What do you think the derivative of $F(x) = \cos(nx)$ might be? Test your hypothesis as you did in question 13.

This is one of the many labs from *Work Smarter not Harder* by Sam Gough, Debbie Crawford, Mary Ann Gore and Jill Gough. These labs are designed to help students discover and explore calculus concepts.

Sam Gough – The Kiski School, Saltsburg, PA – sam.gough@kiski.org

1997 Prentice Hall and TCTM Scholarships

The Texas Council of Teachers of Mathematics and Prentice Hall is proud to announce this year's recipients of the Mathematics Specilaist Scholarships. TCTM is again deeply appreciative of Prentice Hall's generous donation to our scholarship fund. Their contribution allows our organization the opportunity to provide scholarhips to 1997 high school graduates planning to attend college and become secondary mathematics teachers.

The quality and potential of this year's candidates was very impressive, and the scholarhip committee had a difficult task in selecting only two of the applicants. After carefully reviewing all applications, the committee selected four scholarship recipients. The names of these recipients were announced on August 1, 1997 at the Texas Council of Teachers of Mathematics annual meeting in Houston, Texas. The scholarship winners are listed below:

- David C. Villalobos, Memorial High School, San Antonio, Texas plans to attend the Univeristy of Texas at Austin.
- Sarah M. Burleson, Denison High School, Denison, Texas plans to attend Stanford University.
- Jessica D. Freerksen, Waxahachie High School, Waxahachie, Texas will attend Texas Women's University.
- Sarah E. McCreight, Tarkington High School, Cleveland, Texas will attend Stephin F. Austin State University.

TEXAS SSI

Phil Swann
Communications Coordinator
Texas Statewide Systemic Initiative

The overarching theory of the Texas SSI is that the strategic coordination of policy development, site- and community-based capacity building, and educational infrastructure development-all focused on the implementation of a standards-based curriculum in every classroom, for every child-will yield a system that is high performing and equitable.Furthermore, the development of this high-performing, equitable system requires first a knowledgeable citizenry committed to public education and its ideals. Second, it requires a catalytic agency with sufficient resources to keep critical constituencies focused on the right goals, to respond creatively to countertrends and opportunities, and to modify its strategic goals based on evidence. The SSI is this catalyst. Now in its 4th year of Phase I operation, the SSI has firmly established its leadership role in implementing such a system of mathematics and science education in Texas. The Initiative is at the center of a large and growing complex of partnerships and broad-based leadership groups working under the SSI aegis on critical components of reform. The SSI has built a strong core staff and Advisory Board and has established close working relationships with the Texas Education Agency (TEA), the Governor's Office, the Texas Business Education Coalition (TBEC), and the major professional organizations of administrators and of mathematics and science teachers. The SSI has also developed partnerships with the principal state and regional agencies that constitute the heart of the Texas educational system and policy-making apparatus.

These relationships are reflected in the SSI's leadership and governance structures. Philip Uri Treisman, professor of mathematics and director of the Charles A. Dana Center at The University of Texas at Austin serves as the SSI's Principal Investigator and executive director. Michael Moses, the Commissioner of Education serves as the SSI's co-PI. Norman Hackerman, distinguished chemist and President Emeritus of The University of Texas and of Rice University, serves as chair of the SSI Advisory Board; John Stevens, Executive Director of the Texas Business and Education Coalition serves as the Advisory Board's vice-chair. The details of these relationships and partnerships have been summarized in our Performance Effectiveness Review dated December 3, 1996 and in our various progress reports to the National Science Foundation.

Organization and History

Since the Texas SSI operates as a component of the Charles A. Dana Center, an organized research unit in the College of Natural Sciences of The University of Texas at Austin, and since the SSI was the first major initiative of the Dana Center (which has been designated by TEA as the formal state Center for Educator Development for both mathematics and science), the two entities are closely connected in the mind of the Texas public.

continued on page 48

In October 1995 the Dana Center/SSI, with two partners (the Intercultural Development and Research Association of San Antonio and RMC, Inc.), won the contract to operate the STAR (Support for Texas Academic Renewal) Center, the U.S. Department of Education's Comprehensive Assistance Center for Elementary and Secondary Education Act Programs in Texas. In November 1995 the Dana Center/SSI became the home of the Texas Education Network (TENET), which provides more than 60,000 Texas educators with Internet access and educational resources-the largest such system in the world. In July 1996, in collaboration with the Texas Commission on Volunteerism and Community Service and the University of North Texas, the Dana Center/SSI became the home of TxServe, which develops and provides standards-based resources to the thousands of community-based administrators and civic leaders who mobilize volunteers for schools and other educational agencies and endeavors. The Texas SSI, TENET, the STAR Center, and TxServe each address critical aspects of systemic reform and were developed by, or were transferred to, the Dana Center for that reason. The four initiatives operate as an integrated unit and together constitute the SSI's superstructure. The convergence of these resources at the Dana Center and the Center's position with the state government and the formal education establishment have special power. In her 1996 doctoral dissertation for the University of Colorado at Denver, Mary Apodaca studied the Texas SSI and commented on this strength of its position:

> . . in Texas a third-party agency [the SSI] succeeded in bringing together many fragmented reform efforts under a state-level umbrella. . . . If school reform is to "scale"-become pervasive rather than exceptional-it needs all the help it can get. The success in Texas should alert states to a largely untapped resource, the third-party agency. In Texas, the SSI sometimes filled a void when something else had already driven administration out of the arena: state policy in one instance, politics in another. Its third-party status gave the Texas SSI the opportunity to try new things while maintaining close relations with the state bureaucracies and with the Foundation.

The power of this "outside" positioning has also been demonstrated by the successes experienced by the Connecticut and Puerto Rico SSIs, which like the Texas SSI operate by playing a complex brokering role that empowers advocates of equity and mathematics and science education and enables them to shape their state's education system. We believe that in these success stories there are lessons for many other states. To learn more about the Texas SSI, feel free to write us at:

The Texas Statewide Systemic Initiative
2901 N. IH-35, Ste. 2.200
Austin, TX 78722
Or visit on the World Wide Web at:
http://www-tenet.cc.utexas.edu/ssi

Texas Leadership Awards

Two TCTM members were honored for their contributions to the mathematics education in Texas.

Dr. Pam Chandler was presented with the E. Glenadine Gibb Achievement Award at the opening session of CAMT in August in Houston.

The E. Glenadine Gibb Achievement Award is presented to someone nominated by TCTM member to be honored for his/her contribution to the improvement of mathematics education at the state and/or national level. Pam has 25 years as high school mathematics teacher Dallas ISD and Fort Bend ISD; 9 years mathematics department Head at Clements High School ; and 5 years as Mathematics Coordinator at Fort Bend ISD

She is co-founder Fort Bend Council of Teachers of Mathematics; she served as Vice-president and President FBCTM, Chairman Planned Meal Functions - Regional NCTM - Houston; Exhibits Chair CAMT 1997, 1998, 1999 ; and Southern Regional Director- National Council of Supervisors of Mathematics

She has writing experience as co-author Texas Staff Development Modules #28, #29, #30; writing/development team for T-cubed modules for Algebra, Calculus, and Statistics; and serves as a T-cubed Instructor

Diane McGowan was honored with the TCTM Leadership Award. The TCTM Leadership Award is presented to a TCTM member who is nominated by a TCTM-Affiliated Group. This person is to be honored for his/her contributions to the improvement of mathematics education at the local and state level. He/she has designed innovative staff development, and has promoted the local TCTM-Affiliated mathematics council.

Diane has 30 years teaching experience in Austin ISD. She has served as President, vice-president, treasurer and newsletter editor of Austin Area Council of Teachers of Mathematics. She is a past president, vice-president, and regional director of TCTM. She currently serves as director of publications.

She has written Guerrilla Algebra manuals and is co author of Holt Algebra One Interactions . She has worked on the Pre-Algebra module and is currently on the team writing an institute for grades 6 through 8.

1997 CAMTERSHIPS

Each year TCTM offers scholarships to teachers who are finishing their first year of teaching. These $100 awards are presented at CAMT at the TCTM breakfast. Winners also donate their time by working in the NCTM booth .

Aaron W. Wernet works at West Middle School in West, Texas. He teaches two sixth grade and four eighth grade classes. He is also the yearbook staff advisor, and teaches extended-year classes through summer school.

Holly McGowan is a bilingual fourth grade teacher at Meyer Elementary in the Spring school district. She taught prekindergarten and fourth graders in her first year of teaching.

The CAMTership application is included in this copy of the journal. First year teachers should apply by completing the application. Six winners names will be drawn from the applicants. The winners will be informed by March 1, 1998.

CAMTERSHIP APPLICATION

Six $100 "CAMT"erships will be awarded to first year teachers who are members of TCTM. The money is intended to help cover expenses associated with attending CAMT, and to encourage new teachers to attend CAMT. Two camterships each will be awarded to teachers in grades K - 4, 5 - 8, and 9 - 12. Winners will be determined by random drawing of names, and will be notified by March 1, 1998. Winners will be asked to work for two hours at registration or NCTM material sales will be TCTM's guest at our breakfast, where the checks will be presented. GOOD LUCK!!!

Name_____ Phone _____

Home Address_____ City, zip_____

School_____ Grade(s) taught _____

School Address_____ School Phone _____

Principal's Name _____ Are you a member of TCTM ? _____

Note: If you are not a member of TCTM, you may enclose $8 with this application to apply for membership.

Are you completing your first full year of teaching?_____

What are your teaching responsibilities? _____

_____

Send your completed application by **February 15** to
Basia Hall, 12306 Piping Rock, Houston, TX 77067

TEXTEAM Update

There are several new institutes on the TEXTEAM horizon. Training of trainers for each of the following institutes is currently scheduled for Spring/Summer 1998:

New Grades 6-8 Institute
Project Director: Eva Gates
Algebra II/Precalculus Institute
Project Director: Susan Williams, University of Houston
Mathematical Modeling with Algebra and Geometry
Geometry For All Institute (a three-day institute which will serve as a lead in to the Geometry Institute)

Applications for the training of trainers will be sent out to all current TEXTEAM trainers, TASM members, education service centers and math coordinators in the 22 largest school districts sometime in early 1998. If you are not on one of these mailing lists and would like to receive an application, please email your name and address to Jackie Jimenez, TEXTEAM Coordinator, at jjimenez@mail.utexas.edu or call 512-471-5223. Make sure you indicate which institute(s) you are interested in.

The new TEXTEAM Guidebook is now available. It lists descriptions of all current modules and institutes with suggestions on what your professional development priorities should be, as well as a list of trainers across the state. If you would like a copy of the guidebook, send your request to dhross@mail.utexas.edu or call Dana Ross at 512-232-2253. We also have TEXTEAM brochures that you can order in bulk.

Coming Resources for the new Mathematical Models with Applications

The Texas SSI is working to provide resources for the new high school mathematics course, Mathematical Models with Applications. The TEKS for this course make it a very different course from Mathematics of Money. Implementation is set for 1998-99 (as it is for all the TEKS), and textbooks will be adopted during 2001-2002. Given all these factors, the Texas SSI will provide additional attention to resources to support your local preparation to implement this course. Prior to the completion of the TEXTEAM Mathematical Modeling with Algebra and Geometry Institute, the Texas SSI will provide clarifying activities and a list of applicable resources for the Mathematical Models course. These pieces will be part of the Mathematics Toolkit being developed by the Texas SSI and are intended to assist educators with building this course.

If your district or Education Service Center is in the process of developing your local curriculum for Mathematical Models with Applications or if you have questions about the additional resources being developed by the Texas SSI for this course, please call Chuck Powell at 512-475-8797 or e-mail: capowell@mail.utexas.edu.

Calendar

October 21	Austin Area Council of Teachers of Mathematics, Fall meeting, St Stephens, School, Austin, 5:30 p.m. Promote your math program through family events.
November 11	Fort Bend Council of Teachers of Mathematics General Meeting Contact: Judith Maldonado, Alief Middle School
January 20, 1998	Texas South Plains Council of Teachers of Mathematics Meeting, Region 17 Education Service Center Contact: Katheryne Aufill, 5510 86th, Lubbock , TX 79254
February 2, 1998	Fort Bend Council of Teachers of Mathematics General Meeting Contact: Judith Maldonado, Alief Middle School
February 12-14,1998	NCTM Regional, Dallas
March 7, 1998	Austin Area Council of Teachers of Mathematics, Mini Conference
April 2-4, 1998	NCTM National Conference Washington D.C.
July 22-24, 1998	CAMT, San Antonio, Henry B. Gonzales Convention Center

Send dates and activities to Diane McGowan by January 20, 1998 for publication in the spring journal.

Affiliated Group News

Austin Area Council of Teachers of Mathematics
Contact: President ,Norma Jost, 5014 Shoal Creek Blvd., Austin, TX 78756

Past Events

The organization held three meetings in 1996-97 school year. The spring meeting was held at Holt Rinehart, & Winston with dinner provided. Three of our members were also recognized for their outstanding contributions to mathematics education: Dixie Ross of Taylor ISD was awarded a $10,000 Toyota Time math grant, Norma Jost, and Merlinda Rodriguez were presidential award nominees for 1996. The focus of this meeting was presentations by those who attended the NCTM conference in Minneapolis, discussion of TEIMS report, Connected Math Project, PBS "Math Line" videos, and officer elections.

Our Spring conference was attended by over 100 teachers with Cathy Seeley as keynote speaker, a Math Mall complete with NCTM materials, sessions of interest for teachers K-12, and parts of the TEXTEAM modules.

Future Events

The fall meeting will feature formats for a family math event. Sessions will be presented on math camp, vertical team activities, and family math nights. The spring conference is planned for March 7, 1998.

Greater Dallas Council of Teachers of Mathematics

Past Events

For the twentieth year, the GDTCM conducted its mathematics contests. Begun in 1977 and later renamed in memory of the late W.K. McNabb, these events are modeled after other contests such as the American High School Mathematics Examination and the American Junior High School Mathematics examination. The contest committee responsible for conducting this twice-yearly competition is headed by Tom Butts of UT-Dallas, with the assistance from Montie Monzingo of Southern Methodist University, Tom Hall of Duncanville High School, and Mark Mrozek and Tommy Whilock, both of the Episcopal School of Dallas. The contests are given in November and May for students in grades 7-12. The examinations are regarded as challenging and interesting by the participants and their coaches. The McNabb competition winners were honored at an awards dinner held on May 15. Montie Monzingo presented the awards and Michael Keyton of the St. Mark's School of Texas spoke on "Dynamic Geometric Investigations".

Future Events

The GDCTM is acting as host of the NCTM regional conference to be held in Dallas in February, 1998. Many members have volunteered their service on various committees.

A major effort this school year is revitalizing the organization with focus on both the recruitment of new members and the infusion of incumbent members into positions of leadership.

Alamo District Council of Teachers of Mathematics
Contact: President, Norma Torres Martinez, 110 Tuleta, San Antonio, TX, 78212

Past Events

Last year the council hosted three Middle School U.I.L. events. Working with the help of the Texas Math Science Coaches Association we hosted two local meets and one Regional meet. All funds raised from the events are placed into scholarship funds for the first place winners to claim upon graduation. Another event that we hosted this year was a mini CAMT/CAST. With the help of a STAT scholarship, the group hosted a two day conference for 400 teachers. With the help of the San Antonio Urban Systemic Initiative both math and science workshops were presented. At the conference local teachers were given Exemplary Teaching Awards in many categories. Newsletters were published to keep teachers in the San Antonio area informed of the upcoming state , local, and national math events.

Upcoming Events

Six hundred teachers are expected to attend the mini-CAMT/CAST will be help in late February.

Middles school meets in San Antonio and surrounding areas will be sponsored. Four newsletters will be published to update the teachers in the area on mathematics issues. A math mall event is planned for the spring. With this event the organization hopes to involve parents and children in talking about and learning mathematics.

1960 Area Council of Teachers of Mathematics
Contact: Susan Hemphill
email: shemp@math.rice.edu

The council plans a mini-conference for November 8 at Aldine school.

Texas South Plains Council of Teachers of Mathematics

Contact: Katheryne Aufill, 5510 86th, Lubbock, Texas 79424

Past Events

The council held four meeting in 1996-1997 school year. The meeting topics included Multimedia, Multi-learning presented by Andy Pearce; Effective Teaching Practices with Dr. Donal Maas; Exploring the Internet presented by Bill Armstrong, and Utilizing learning Style with Peggy Young.

The Panhandle Area Math and Science Conference was held at Canyon, Texas in September, 1996.

Future Events

The first fall meeting will be October 7 at Region 17 Service Center with Brenda Lee, a national representative from Cuisenaire on using manipulatives from grades kindergarten through twelve.

Reports on council's activities are published when they are sent to Lone Star News Editor, Diane McGowan. If your council has no report, take responsibility and see that information is presented by January 20, 1998 for publication in the spring journal.

RENEW YOUR MEMBERSHIP

Check your membership expiration date on the mailing label.

Journals are mailed only to current members.

Renew your membership. Copy the membership form and share the it a friend.

TEXAS COUNCIL OF TEACHERS OF MATHEMATICS

MATHEMATICS SPECIALIST SCHOLARSHIP

Amount: $1000 or $500

Application Deadline: **March 15, 1998**

Eligibility: Any student who will graduate in 1997 from a Texas High School - public or private - and who plans to enroll in college in the Fall of 1997 to pursue a career in mathematics teaching either as a mathematics specialist in elementary school or as a secondary school teacher with certification in mathematics.

Return all materials in one envelope to:

Basia Rinesmith Hall
12306 Piping Rock
Houston, TX 77077-5916

NAME: _____
Last First Middle

Address: _____
Number and Street Apt. Number

_____
City Zip Code

Phone Number: (_____)-_____

Birth date: _____

Social Security Number:_____

High School(s) Attended:

What college or university do you plan to attend? If you are awarded this scholarship, TCTM's treasurer will send a check directly to the business office of the college. We need the college's complete address.

To apply, enclose the completed application with each of the following in the same envelope and mail to Diane McGowan at the address listed above. **YOU MUST INCLUDE 3 COPIES OF ALL REQUIRED MATERIALS.**

1. List High School Activities including any leadership positions on a separate sheet,
2. Official High School Transcript,
3. Letter of recommendation from a TCTM member,
4. An essay describing your early experiences learning mathematics and any experiences explaining mathematics to your classmates or friends. This essay must be no more than two pages, double spaced.
5. An essay telling why you want to be a mathematics specialist in elementary school or a mathematics teacher in middle or high school. This essay must be no more than one page, double spaced.

Glenadine Gibb Achievement Award
APPLICATION

The E. Glenadine Gibb Achievement Award is presented to someone nominated by TCTM member to be honored for his/her contribution to the improvement of mathematics education at the state and/or national level.

Information about the TCTM member nominating a candidate:

Name _____

Home Address_____

Home phone_____Business phone_____E-mail _____

Are you a member of TCTM?_____ NCTM?_____

Information about the nominee:

Name _____

Home Address_____

Home phone_____Business phone_____E-mail _____

Is the nominee a member of TCTM?_____NCTM?_____Retired _____

Applications should include 3 pages:

- Completed application form
- One-page, one-sided, typed biographical sheet including:
  - Name of nominee
  - Professional activities
  - National offices or committees
  - State TCTM offices held
  - Local TCTM-Affiliated Group offices held
  - Staff Development
  - Honors/awards
- One-page, one-sided essay indicating why the nominee should be honored for his/her contribution to the improvement of mathematics education at the state/national level.

Send the completed application, biographical sketch and essay to

Basia Rinesmith Hall
12306 Piping Rock Drive
Houston, TX 77077-5916

Deadline: February 15, 1998

TCTM LEADERSHIP AWARD
APPLICATION

The TCTM Leadership Award is presented to a TCTM member who is nominated by a TCTM-Affiliated Group. This person is to be honored for his/her contributions to the improvement of mathematics education at the local and state level. He/she has designed innovative staff development, and has promoted the local TCTM-Affiliated mathematics council.

Information about the of Affiliated group nominating a candidate:

Name of Affiliated Group _____

President of the Affiliated Group _____

Home Address_____

Home phone_____Business phone_____E-mail _____

Are you a member of TCTM?_____ NCTM?_____

Information about the person being nominated:

Name _____

Home Address_____

Home phone_____Business phone_____E-mail _____

Is the nominee a member of TCTM?_____NCTM_____Retired _____

Applications should include 3 pages:

- Completed application form
- One-page, one-sided, typed biographical sheet including:
  - Name of nominee
  - Professional activities
  - State/local offices or committees
  - Activities encouraging involvement/improvement of math education
  - Staff Development
  - Honors/awards
- One-page, one-sided essay indicating why the nominee should be honored for his/her contribution to the improvement of mathematics education at the state/national level.

Send the completed application, biographical sketch and essay to

Basia Rinesmith Hall
12306 Piping Rock Drive
Houston, TX 77077-5916

Deadline: February 15, 1998

TEXAS COUNCIL OF TEACHERS OF MATHEMATICS
INDIVIDUAL MEMBERSHIP APPLICATION

Name: _____

Home Mailing Address: _____

City _____ State _____ Zip _____

email address _____

Circle area(s) of interest :K-2 3-5 6-8 9-12 College

Check one:
Renewal _____ New Member _____ Change of Address _____

Individual Membership Dues $10.00

PROFESSIONAL MEMBERSHIP FORM

To enroll school, institution, or affiliated group :

School District or University: _____ Campus: _____

School Mailing Address: _____

City _____ State _____ Zip _____

New _____ Renewal _____

Professional Membership Dues: $30.00
Total Amount due TCTM: $ _____

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS MEMBERSHIP

_____New _____ One Journal (regular) $57.00

____Renewal _____ Two Journals (regular) $75.00

_____ Three Journals (regular) $99.00

_____ Institutional Membership for Campus $50.00 (Please indicate the one (1) journal you wish to receive) ($18 for each additional journal)

___Teaching Children Mathematics
___ Mathematics Teacher
___Mathematics Teaching in the Middle School
___Journal for Research in Mathematics Education

Amount due NCTM: $ _____

Make check payable to TCTM and mail to:
TCTM Treasurer
38 Bradford Circle
Sugar Land, TX 77479

Total Amount due : _____

TEXAS COUNCIL OF TEACHERS OF MATHEMATICS

Affiliated with the
National Council of Teachers of Mathematics
1997-1998

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Cut out your membership card.
Note the expiration date on your mailing label.
Renew your membership before that date.
Use the form on the last page.

Texas Council

of Teachers of Mathematics

Member 1997-1998

NAME _____

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