Regional Math and Science Center Grand Valley State University 328 Henry Hall 1 Campus Drive Allendale MI 49401

Mathematics in Action

"Data Analysis Throughout the Mathematics Curriculum"

a conference for K-12 mathematics educators



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Thursday, February 26, 2004





The Eberhard Center The Robert C. Pew Campus in downtown Grand Rapids Grand Valley State University Thursday, February 26, 2004 8:30 am - 3:00 pm





www.gvsu.edu/math/MathInAction

Math in Action is funded in part by: GVSU Pew Faculty Teaching and Learning Center, GVSU Division of Science and Mathematics, MCTM, GVSU Mathematics Department, and the Regional Math & Science Center (GVSU).

| | Session A: 8: | :40 |) - 9:40 am | | | | | |
|-----|--|------|--|--|--|--|--|--|
| A1 | What Can We Learn from Pioneers? Math, Beauty, and Perseverance in Children's Literature Victoria Swenson, Cornerstone University Math Strands in 2-D geometry, mapping, and patterns will be addressed with activities based on books about varied kinds of "pioneers" who show the quality of Perseverance. Winter-related art activities and handouts. Grades K-6 | A5 | Helping Middle School Students Make Sense of the Statistical Investigation Process (Part 1 of a 2 part session) Christine Browning, Western Michigan University Amy Bessen, Western Michigan University Diane Rogers, Kalamazoo Public Schools The statistical investigation process involves posing questions, collecting data, analyzing data, and interpreting results. Tasks/activities that help students make sense of this process, including activities incorporating the | | | | | |
| A2 | The Power of Trash Jo Anna Berry, North Muskegon Public Schools This session will provide an excellent example of how to integrate data collection in your classroom. The power of trash is a project that you can take back to your school and get kids involved in, not only recycling and reusing, but also in data collection. Grades 4-7 | A6 | use of graphing calculators and data-collection devices, are presented. PARTICIPANTS MUST SIGN UP FOR BOTH A5 AND B5. B5 is not a repeat, it is a continuation. <i>Grades 6-8</i> Integrated Middle School Data Analysis Projects* <i>Kim Duhamel, West Michigan Academy of Arts & Academics</i> <i>Jeff Bretz, West Michigan Academy of Arts & Academics</i> How can chewing gum, student lunches, and temperature offer students content integrated opportunities to gather and analyze data?. Evenlose actual middle achead projects that integrate correct | | | | | |
| A3 | Spinners - What Can They Teach Us?* <i>Tara Maynard, Creekside Middle School</i> Spinners are good for more than just games! We will see how spinners can be used for graphing, understanding fractions, data collection, probability, and more. <i>Grades 5-8</i> | A7 | data? Explore actual middle school projects that integrate across the four content areas. <i>Grades</i> 7-8 Do Dogs Know Calculus?* <i>Tim Pennings, Hope College</i> <i>Elvis Bogaart Wales Pennings, Welsh Corgi</i> When I play "fetch" with my Welsh Corgi, Elvis, at the beach does he choose the quickest path (involving running and swimming) to | | | | | |
| A4 | Probability in Action! (Part 1 of a 2 part session) Christy Schultz, Valleywood Middle School Cindy Schoonbeck, Crestwood Middle School This session will entail a variety of middle school probability activities involving technology and manipulatives. Our resources include some traditional texts, CMP, M3RP activities, technology, and our own personal teaching experiences. PARTICIPANTS MUST SIGN UP FOR BOTH A4 AND B4. B4 is not a repeat, it is a continuation. Grades 6-8 | A8 | the ball? We will tell what we found when we tested this hypothesis. <i>Grades 11-12</i> School Improvement Project* <i>Gail Sutton, Forest Hills Central High School</i> Students set a school improvement goal, gather baseline data, determine strategies and implement them, then gather follow-up data. These steps will be shared along with specific projects and grading rubrics. These can be used in coordination with NCA school improvement goals! <i>Grades 9-12</i> | | | | | |
| | Session B: 9 | 2:5 | 0 - 10:50 am | | | | | |
| B1 | Collecting and Analyzing Data Found in Children's Literature Charlene Beckmann, GVSU Mathematics Nancy Patterson, GVSU School of Education We naturally tell stories and learn through them. Illustrating mathematical concepts through stories helps students build on their intuitive understanding. Collecting and analyzing data through several books will be shared. Grades 4 - 8 The Lise of Statistics in Analyzing the Space Shuttle | B4 | Probability in Action! (Part 2 of a 2 part session) Christy Schultz, Valleywood Middle School Cindy Schoonbeck, Crestwood Middle School This session is a continuation of A4. PARTICIPANTS MUST SIGN UP FOR BOTH A4 AND B4. Grades 6-8 Helping Middle School Students Make Sense of the Statistical Investigation Process (Part 2 of a 2 part session) Christine Browning, Western Michigan University Amy Bessen, Western Michigan University | | | | | |
| | Challenger Data <i>Terri Faitel, Trenton Public Schools</i> Participants will watch clips of the Challenger Investigation and engage in statistical analysis of the 23 launches using graphing techniques and the TI-83 graphing calculator. <i>Grades 6 - 12</i> | B6 | Diane Rogers, Kalamazoo Public Schools This session is a continuation of A5. PARTICIPANTS MUST SIGN UP FOR BOTH A5 AND B5. Grades 6-8 Spinners - What Can They Teach US?* Tara Maynard, Creekside Middle School This session reports A3. Grades 5.8 | | | | | |
| 83 | Melissa Cragg, Park City Mathematics Institute (GLIMers) Participants will make a piece of a tetrahedron kite to take home. We will then collect data on perimeter, surface area, and volume. Awesome activity to start the year with! Grades 7 - 12 | В7 | Do Dogs Know Calculus?* <i>Tim Pennings, Hope College</i> <i>Elvis Bogarrt Wales Pennings, Welsh Corgi</i> This session repeats A7. <i>Grades 11-12</i> | | | | | |
| | General Sessions and Lu | nc | h: 11:00 am - 12:40 pm | | | | | |
| Pro | ofessor Deborah Ball, University of Michigan | _ /1 | | | | | | |
| G1 | Ipants will attend one of the general sessions and eat lunch during the other session. Making Mathematics Reasonable (<i>Grades: Elementary, Middle, and Higher</i>) 11:00 - 11:45 am Mathematical reasoning is central to proficiency with mathematics. This session will engage participants in the work of helping tudents learn to reason about mathematics, to give and expect mathematical explanations, to justify claims, and to compare and analyze lternative solutions and arguments. What are the key elements of mathematical reasoning and how can they be developed in school lassrooms? What are the challenges and how can these be mediated? Teaching and Learning Mathematical Definitions (<i>Grades: Middle and Higher</i>) 11:55 am - 12:40 pm Mathematicians agree that precise use of terms is a cornerstone of mathematical practice, and yet helping students develop such ensibility and skill is not always successful. This session will engage participants in investigating the role of definitions in learning and eaching mathematics. Participants will examine the role of precise language in the development of students' mathematical proficiency nd how this might be fostered in classrooms. We will also consider ways to balance encouraging students to express their ideas while lso developing the value of precision. | | | | | | | |

| Session C: 12:50 - 1:50 pm | | | | | | | | |
|--|---|--|--|--|--|--|--|--|
| C1 Cookies and Coke? A Balanced Statistical Meal | C2 Developing the Probability Strand Using Performance | | | | | | | |
| John Gabrosek, GVSU Statistics | Tasks* | | | | | | | |
| Phyllis Curtiss, GVSU Statistics | Donna Davis, Glencoe/McGraw-Hill | | | | | | | |
| Two hands-on activities using cookies and coke that illustrate | Introduce probability. Compare experimental and theoretical | | | | | | | |
| experimental design, numerical summaries of data, probability, and | probabilities. Apply data collection skills and analysis by sampling. | | | | | | | |
| hypothesis testing concepts. Participants are encouraged to bring | Explore fairness and improve chances of winning. Test predictions | | | | | | | |
| TI calculators. Grades 3 - 6 | about outcomes. Analyze combinations of events. Grades 6 - 9 | | | | | | | |

| Session C (continued): 12:50 - 1:50 pm | | | | | | | | | | | | |
|--|--|--|---|----------|---------|--------------------------|-----------|--|--|--|--|--|
| C3 Pros and Cons of Block Scheduling <i>Rhonda Pardue, Black River Public School</i> This is a combination talk and discussion of the pros and comblock scheduling. Problems and successes of three different hof blocks will be mentioned. <i>Grades 6 - 12</i> | ns of kinds | C6 Integrated Middle School Data Analysis Projects* Kim Duhamel, West Michigan Academy of Arts & Academics Jeff Bretz, West Michigan Academy of Arts & Academics This session repeats A6. Grades 7-8 C7 The Price is Picet | | | | | | | | | | |
| C4 Can You Fathom It? Shanna Greer, West Ottawa High School Fathom is an innovative software recently introduced mathematics. Students can discover the world of probabilit manipulating data, moving and creating outliers, adjusting 1 and median, etc. Grades 7 - 12 | into ty by mean | Mary Richardson, GVSU Statistics Diann Reischman, GVSU Statistics The speakers will guide participants through an activity that is used to illustrate simple linear regression and correlation. Data consist of guessed prices and actual prices of various items. | | | | | | | | | | |
| C5 What if One Standard Function Isn't Enough? <i>Reva Kasman, GVSU Mathematics</i> Practical data cannot always be represented by a single polyno exponential, or other standard function. This session will focu defining and graphing piecewise functions to model data. <i>Grades 9 - 12</i> | omial, us on | | | | | | | | | | | |
| Session D: 2:00 - 3:00 pm | | | | | | | | | | | | |
| D1 Logical Reasoning Louise Honea, WGVU-PBS Television Fun is the order of the day as students put pictures of Hacker his pals in the correct sequence in terms of time. Learning obje is for students to use and explain their reasoning to solve a v logic puzzle. Using logic to determine a sequence. Grades 3 D2 How Long Until We "Pig Out"? Mary Richardson, GVSU Statistics | r and ective visual | D5 School Improvement Project* Gail Sutton, Forest Hills Central High School This session repeats A8. Grades 9-12 D6 Developing the Probability Strand Using Peformance Tasks* Donna Davis, Glencoe/McGraw-Hill This session repeats C2. Grades 6 - 9 D7 Taking Changed | | | | | | | | | | |
| David Coffey, GVSU Mathematics Using the 'dice' game Pass the Pigs, participants will exp experimentally and theoretically how many tosses it takes bef player rolls a "pig out". Grades 6 - 12 | plore fore a | <i>Mike Meyers, Calvin College</i> Participants will perform simple and fun probability experiments and analyze the results. <i>Grades 3-6</i> | | | | | | | | | | |
| D3 Solving Complex Probability Problems in Four Sin Steps - Applying the Monte Carlo Procedure Gina Garza-Kling, Western Michigan University The Monte Carlo Procedure is a simple, four-step proces estimating solutions to complex probability problems. Learn to apply this powerful problem-solving technique to intere real-world situations. Grades 6 - 12+ | nple as for how esting | D8 From Misconception to Classroom Lesson Karen Meyers, Regional Math and Science Center, GVSU Follow the evolution of a lesson on the use of variables — from analyzing student work that reveals a misconception, designing a lesson based on the new GRPS mathematics instructional model, experiencing the lesson, and discussing modifications for improving the lesson. Grades 5-8 | | | | | | | | | | |
| D4 Movie Money Making - An Exponential Explosion John Golden, GVSU Mathematics Looking at real movie money histories, we will make and c predictions, seeking to understand the patterns and the marke Grades 9 - 12 | check eting. | \sim | | | | | | | | | | |
| Mathematics in A (One registration per formduplicate as needed - th | Action | n Registra n is also <u>avai</u> | tion Form ilable at www.gv | su.edu/i | math/M | ⊿ lat <u>h</u> | InAction) | | | | | |
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| You will NOT receive a confirmation! NOTE: Sessions offered more than once are marked | an *. Enclose your registration fee of \$22.00 per teacher/educator | | | | | | | | | | | |
| (Place appropriate session code in the blanks. Please indicate s Session A: I need a receipt. Sessi 1 st Choice | ion C: | Choices.) | ecks payable to GVSU) completed registration form by February 13 , 2004 to: | | | | | | | | | |
| Session G: | 2 nd | Choice | Regional Math/Science Center - MIA | | | | | | | | | |
| Session B:2 nd Choice Session | on D: | | 328 Henry Hall | | | | | | | | | |
| 1 st Choice | 1 st (| Choice | 1 Campus Drive Allendale, MI 49401 | | | | | | | | | |
| 2 nd Choice | 2 nd | Choice | For information regarding registration contact Mary Watters | | | | | | | | | |
| Ask your school if professional development funds are ava | at | at (616) 331-2273 or wattersm@gvsu.edu. | | | | | | | | | | |



From US-131 Northbound: US-131 Northbound - Exit at Pearl Street (#85B). Turn left onto Pearl Street and stay in left lane. Proceed West underneath U.S. 131 and Mt. Vernon Avenue is immediately after the highway. Turn left onto Mt. Vernon Avenue and continue South to Fulton Street. Turn left onto Fulton Street and the complimentary Conference Guest parking lot will be on the right.

From US-131 Southbound: US-131 Southbound - Exit at Pearl Street (#85B). Proceed through the light and go one block South to Fulton Street. Turn left onto Fulton Street and the complimentary Conference Guest lot will be on the right.

From I-196 East/West: Exit at Ottawa Street (#77). Proceed through the light and continue South on Ottawa Street to Fulton Street. Turn right onto Fulton Street and proceed one block West over the Grand River and the complimentary Conference Guest parking lot will be on the left.

Overflow parking is available in the Watson Lot noted on the map above.

January 3, 2004

Dear Educator,

The Department of Mathematics at Grand Valley State University is pleased to announce its annual Math In Action Conference. This year the conference will be held on Thursday, February 26, 2004 in the Eberhard Center on GVSU's Robert C. Pew Campus in downtown Grand Rapids and will run from 8:30 am to 3:00 pm. The topic for this year is "Data Analysis throughout the Mathematics Curriculum".

There will be four sets of concurrent sessions addressing this theme. They will offer teachers the opportunity to experience a variety of interactive projects and activities that other educators have found successful. Each session will offer possibilities from across the K-12 curriculum on a host of topics; please examine the session descriptions in this program with titles and abstracts for further information.

This year we are pleased to have Professor Deborah Ball from the University of Michigan giving our plenary addresses. Professor Ball is a world renowned mathematics educator who conducts research on mathematics instruction and on the processes of learning to teach. She is a former elementary teacher who now chairs several national panels and study committees including the Glenn Commission on Improving Mathematics Education for the 21st Century and the National Research Council study panel that produced Adding It Up.

As the attendees for Math In Action have diverse backgrounds in the K-12 curriculum, Professor Ball will give two differently focused addresses. One will focus on encouraging mathematical explanations in the elementary, middle and high school grades. The other address will focus on the role of definitions in the learning and teaching of mathematics at the middle and high school grades. Both addresses will be motivating to K-12 educators and dynamically presented in a multi-media format.

This year's conference will be an exciting time of learning and idea-sharing filled with innovative and practical teaching methods centered on the mathematics classroom. We look forward to you joining us.

Sincerely,

William Dickinson Co-chair, Math in Action

Marge A Frier

Marge Friar Co-chair, Math in Action