

Effective Thinking Through Mathematics

Modern Mathematics: Plan II (M310P), Spring 2019

Instructor: Professor Michael Starbird, RLM 11.122, 512-471-5156, starbird@mail.utexas.edu

Office hours: MWF 10:00-11:00.

Teaching Assistant: Hannah Turner

Office hours:

Texts: *The Heart of Mathematics: An invitation to effective thinking, 4th edition*
by Edward B. Burger and Michael Starbird, Wiley & Sons, 2012.

The 5 Elements of Effective Thinking, by Edward B. Burger and Michael Starbird,
Princeton University Press, 2012.

Homework Exercises:

Homework will be due regularly, usually each Wednesday. Work will be submitted via Canvas. Clarity of exposition is extremely important. Thus, you should strive for well-written, polished answers. Collaboration on these assignments with others from *this class* is encouraged after you have worked on all the questions on your own. Submitted work must be individually written up and all collaborators should be acknowledged.

Workshop Sessions:

Once every two weeks you will meet with Hannah with a small group of about five students to discuss the mathematics. You will sign up for these sessions during the first couple weeks of class. Sessions will be held for 30 minutes each. Your performance in the workshop sessions will be partially measured by your presentation and discussion of selected homework challenges with your peers and Hannah.

Examinations:

Two mid-term tests will be given, one on February 15 and the other in early April. The date of the April test will be announced at least a week before the test. There will be a comprehensive final examination on Thursday, May 16, 9:00 a.m.-12:00 p.m..

Stories of Creation/Math as Metaphor:

On several occasions during the semester, you will be asked to take a mathematical concept and create a story illustrating how that idea could have been conceived and developed. As a final project, choose an issue that you care about outside mathematics. Then produce a similar story that illustrates how you created a new insight or product in that other field by using the elements of effective thinking that we discuss during the semester. These projects will be described more fully during the semester.

Thinking Through Mathematics

Michael Seilmaier



Thinking Through Mathematics:

Creative Thinking Through Mathematics Mika Munakata, Eliza Leszczynski, 2026-04-30 This book engages students in interactive explorations that encourage creative thinking in their approaches to mathematics Organized around five themes the fifteen quests invite students to notice wonder and draw upon their mathematical reasoning as they connect mathematics to other disciplines and everyday situations The quests foster students creativity by posing open ended questions encouraging reflection inviting playfulness and curiosity and connecting to research based traits of creativity The authors broaden the notion of what it means to be a mathematical thinker provide access to mathematics through creative thinking and celebrate the idea that everyone has the capacity to explore mathematics Each chapter concludes with a project idea that encourages students to personalize their learning around the chapter s theme Accompanying worksheets and other resources are also available online This book is written for undergraduate students including preservice teachers and is suitable as a textbook for general education mathematics courses It can also be used within teacher professional learning communities and professional development programs as a supplement for more specialized mathematics education courses or anywhere there is interest in approaching mathematics creatively [Thinking Through Mathematics](#) Edward A. Silver, Jeremy Kilpatrick, Beth Schlesinger, Dennie Wolf, 1990 This document focuses on how mathematics teaching and learning can be improved by developing more powerful approaches to connect thinking and mathematics It proposes changing perspectives on what it means to learn and do mathematics and explores how these perspectives can be incorporated into the teaching of secondary school mathematics Chapter 1 offers a view of mathematics as emerging largely from individual and social activity rather than from textbooks worksheets and tradition The learner is depicted as someone who actively constructs meaning instead of passively receiving it Chapter 2 considers how a greater emphasis on communication discussion debate recording and writing stimulates and uncovers students learning and thinking and leads to a deeper understanding by both teachers and students Chapter 3 explores how teachers might encourage greater inquiry and communication in a secondary school class by making minor but thought provoking changes in ordinary problems and situations Finally chapter 4 gives some practical advice on transforming the mathematics classroom into a place where students are expected not only to absorb and consume mathematics but also to produce and think about it Contains 17 references and 17 figures MKR

Well Played Linda Schulman Dacey, Karen Gartland, Jayne Bamford Lynch, 2015 Well Played Building Mathematical Thinking Through Number Games and Puzzles Grades 3 5 This is a book full of thoughtful and well chosen games and puzzles but it is also a book that offers a lens into how we might include this kind of play in our own classrooms in ways that are deeply meaningful and engaging for our students It is a book truly rooted in the realities and possibilities of the classroom which is what makes it such a valuable resource for teachers Kassia Omohundro Wedekind from the foreword Students love math games and puzzles but how much are they really learning from the experience Too often

math games are thought of as just a fun activity or enrichment opportunity Well Played shows you how to make games and puzzles an integral learning component that provides teachers with unique access to student thinking The twenty five games and puzzles in Well Played which have all been field tested in diverse classrooms contain explanations of the mathematical importance of each game or puzzle and how it supports student learning variations for each game or puzzle to address a range of learning levels and styles clear step by step directions and classroom vignettes that model how best to introduce the featured game or puzzle The book also includes a separate chapter with suggestions for how to effectively manage games and puzzles in diverse classrooms reproducibles that provide directions game boards game cards and puzzles assessment ideas and suggestions for online games puzzles and apps Well Played will help you tap the power of games and puzzles to engage students in sustained and productive mathematical thinking

Creative Thinking Through Mathematics Mika Munakata, Eliza Leszczynski, 2026-04-29 This book engages students in interactive explorations that promote creative thinking in mathematics Fifteen quests invite students to notice wonder and connect math to other disciplines and situations Written for undergrads and pre service teachers the quests foster creativity through open ended questions reflection and playfulness

Well Played Linda Schulman Dacey, Karen Gartland, Jayne Bamford Lynch, 2016 Students love math games and puzzles but how much are they really learning from the experience Too often math games are thought of as just a fun activity or enrichment opportunity Well Played shows you how to make games and puzzles an integral learning component that provides teachers with unique access to student thinking This third book in the series helps you engage students in grades 6 8 in discussions of mathematical ideas and deepen their conceptual understanding It also helps you develop students fluency with number systems ratio and proportional relationships expressions and equations statistics and probability and patterns graphs and functions The twenty five games and puzzles in Well Played which have all been field tested in diverse classrooms contain explanations of the mathematical importance of each game or puzzle and how it supports student learning variations for each game or puzzle to address a range of learning levels and styles clear step by step directions and classroom vignettes that model how best to introduce the featured game or puzzle The book also includes a separate chapter with suggestions for how to effectively manage games and puzzles in diverse classrooms reproducibles that provide directions game boards game cards and puzzles assessment ideas and suggestions for online games puzzles and apps Well Played will help you tap the power of games and puzzles to engage students in sustained and productive mathematical thinking

Fostering and Sustaining Mathematics Thinking Through Problem Solving John Mason, Joy Davis, 1991 Prepared for courses ECT405 ECT705 offered by the Faculty of Education in Deakin University s Open Campus Program

Thinking through Mathematics - Book 3, 2010 Provides practical ideas and contexts for developing the process of a mathematical inquiry Inquiry based learning in mathematics immerses students in solving authentic complex problems Students are challenged to build on their own contextual knowledge and experiences to engage with a problem

devise and implement a plan and justify and communicate their investigation and solution Publisher Thinking Through Math Word Problems Art Whimbey,2013-04-03 This innovative text teaches elementary school students the techniques of critical thinking and problem solving and applies those methods to mathematical word problems It supplements traditional fourth fifth and sixth grade textbooks and increases students thinking and problem solving abilities Students are taught the fundamentals of these processes by applying them both to simple and multi step problems which are provided These problems many written by elementary school pupils gradually increase in difficulty making learning both fun and stimulating Special attention is given to typical errors and sources of conceptual difficulty **Well Played, Grades 3-5** Linda Dacey,Karen Gartland,Jayne Bamford Lynch,2015-06-20 Students love math games and puzzles but how much are they really learning from the experience Too often math games are thought of as just a fun activity or enrichment opportunity Well Played Grades 3 5 Building Mathematical Thinking Through Number Games and Puzzles shows you how to make games and puzzles an integral and engaging part of the math classroom Now in its second edition Well Played Grades 3 5 offers twenty five engaging games and puzzles which have all been field tested in diverse classrooms Additionally the materials for each game and puzzle have been streamlined making preparing for and managing game and puzzle play even easier Each game or puzzle contains Short explanations of the mathematical importance of each game or puzzle and how it supports student learning Variations for each game or puzzle to address a range of learning levels Classroom vignettes and tips that model how to introduce the featured game or puzzle Exit card choices and student work examples that make real time assessment a meaningful part of teaching with games and puzzles New full sized appendices of all game boards puzzles and other materials make preparing for play an easy task A built in study guide at the end of each chapter makes this book an ideal choice for book studies and collaborative teacher learning Well Played Grades 3 5 will help you tap the power of games and puzzles to engage students in sustained and productive mathematical thinking *Well Played* Linda Schulman Dacey,Karen Gartland,Jayne Bamford Lynch,2015-11-23 Students love math games and puzzles but how much are they really learning from the experience Too often math games are thought of as just a fun activity or enrichment opportunity Well Played shows you how to make games and puzzles an integral learning component that provides teachers with unique access to student thinking The twenty five games and puzzles in Well Played which have all been field tested in diverse classrooms contain explanations of the mathematical importance of each game or puzzle and how it supports student learning variations for each game or puzzle to address a range of learning levels and styles clear step by step directions and classroom vignettes that model how best to introduce the featured game or puzzle The book also includes a separate chapter with suggestions for how to effectively manage games and puzzles in diverse classrooms reproducibles that provide directions game boards game cards and puzzles assessment ideas and suggestions for online games puzzles and apps Well Played will help you tap the power of games and puzzles to engage students in sustained and productive mathematical thinking Yearbook of the

National Society for the Study of Education National Society for the Study of Education,1912 *Thinking through Mathematics - Book 2* ,2010 Provides practical ideas and contexts for developing the process of a mathematical inquiry Inquiry based learning in mathematics immerses students in solving authentic complex problems Students are challenged to build on their own contextual knowledge and experiences to engage with a problem devise and implement a plan and justify and communicate their investigation and solution Publisher Year-book of the National Herbart Society for the Scientific Study of Teaching ,1914 Bulletin of the American Mathematical Society American Mathematical Society,1908 **Some Aspects of High-school Instruction and Administration** National Society for the Study of Education,1914 The Yearbook of the National Society for the Study of Education ,1913 *The Mathematics Teacher* ,1911 *Maths Revolution* Julia Smith,2026-03-26 Grade 4 GCSE Maths Success is an essential guide giving you powerful tools to break through where traditional methods have failed transforming resistant maths learners into confident achievers Some Aspects of High-school Instruction and Administration ,1924 **Vassar Quarterly** ,1919

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