



Thinking Strategies for Mastering Math®

Offering Professional Development Math Workshops for K - 4th Grade Teachers, Title and Special Education Teachers, Teacher Assistants, and Paraprofessionals

Thinking Strategies for Mastering Math® Workshops:

- Are affordable for any sized school or school district.
- Can be presented at your school or center anytime throughout the year including in-service days.
- Offer professionally written classroom ready materials edited by doctorates of mathematics.
- Offer graduate credit and CEU's.

ON-SITE PROFESSIONAL DEVELOPMENT WORKSHOP OPTIONS FOR K - 4TH GRADE EDUCATORS

ONE OR TWO HOUR WORKSHOP AFTER SCHOOL, HALF-DAY OR ONE-DAY WORKSHOPS:

I Developing Number and Operation Sense using Dot Cards, Five- and Ten-frames (page two)

II Place Value, the Trading Process for Whole Numbers, Algorithms (page two)

ONE-DAY OR TWO-DAY WORKSHOPS:

III Mastering the Basic Facts of Addition and Subtraction by Mental Computation; Place Value and Trade for the Basic Facts (page three)

IV Mastering the Basic Facts of Multiplication and Division by Mental Computation; Place Value and Trade for the Basic Facts (page three)

V Number and Operations, Algebra, Geometry, Measurement, Data (page four)

VI Geometry for the 3rd and 4th Grade Student (page four)

VII Kindergarten Workshop: See class syllabus on web: www.masteringmath.org

FAMILY MATH NIGHT: Presenters offer a free Game Night for parents for each workshop.

Course Foundations: Common Core State Standards for Mathematics

Principles and Standards for School Mathematics, 2000

Studies by Ashcraft, Barnard, Broody, Carpenter, and others. See research.

Graduate Credit: Minot State University, Minot, North Dakota

- 15 contact hours: optional one semester hour of graduate credit, Math 500, \$50; CEU's, \$20.
- Fee for graduate credit and CEU's are not a part of the workshop fee.
- Any two, one-day workshops will qualify for graduate credit or CEU's.

Location and Date: Workshops can be held at your school or center anytime throughout the year including in-service days, weekends, and summers months. A two-day workshop can be presented on two consecutive days or two days months apart.

Workshop fee: 1 or 2 Hour Workshop after School or Half-day Workshop: \$500

One-day workshop: \$1,100

Two-day workshop: \$1,300

Plus travel expenses to include mileage, meals, and motel for two consultants.

Optional Materials: Materials used at each workshop are optional purchases. See workshop descriptions.

To schedule a workshop please contact Jean Valer:

Thinking Strategies for Mastering Math E-Mail: jean@masteringmath.org

P.O. Box 747

Phone: 701-426-3802

Bismarck, ND 58501

Fax: 701-221-0760

References and Research: www.masteringmath.org

WORKSHOP I: DEVELOPING NUMBER & OPERATION SENSE USING DOT CARDS, FIVE- AND TEN-FRAMES

Course Purpose: To demonstrate how the **266 problem solving activities** on the back side of our dot cards and five- and ten frames develop **over 100** kindergarten through third grade fundamental mathematical concepts. To provide educators with the methods whereby students can **see** the mathematics they are expected to learn.

Learning Outcomes: With our dot cards, five- and ten-frames, your students will know and represent **over 100 fundamental math concepts** which **include but are not limited to:**

- 1) the meaning of numbers, the four ways to represent a number, the questions numbers answer;
- 2) the three classifications of numbers and how they are used;
- 3) the properties of the sets of numbers called odd numbers, even numbers, whole numbers, natural numbers, fractions;
- 4) transformations, meaning of the words two- and three-dimensional, names of the polygons;
- 5) relations between numbers; number sentences representing relations between numbers;
- 6) meanings of the operations of addition, subtraction, multiplication, and division;
- 7) three representations of each operation; 18 possible story problems for the operations;
- 8) magnitude of numbers on a number line, relative position of numbers on a number line.

Course Materials:

- 72 dot cards with 72 different combinations for numbers up to twenty
- 5 five-frames representing numbers 1 through 5
- 12 ten-frames representing numbers 0 through 10 and greater
- activity booklet and spiral bound five- and ten-frames for modeling with connecting cubes

Course Length: **After School for 1 or 2 hours, or Half-day Workshop:** Selected concepts from the backs of the cards.
One-day Workshop: Selected concepts from the backs of the cards.

Who Should Attend: kindergarten through third grade educators and all support staff

- Fourth grade educators are invited to attend.

Optional Materials: The collection of dot cards, five- and ten-frames and the booklet of five- and ten-frames with an activity booklet is \$29.50. We encourage schools to purchase one set for each participant.

Participants Bring: ✓ 3 by 5 Cards (50) ✓ Popsicle Sticks (25) ✓ Paper and Pencil

WORKSHOP II: PLACE VALUE & TRADE FOR WHOLE NUMBERS, ALGORITHMS REPRESENTING THE TRADING PROCESS

Course Purpose: To demonstrate how modeling the trading process on a place-value mat develops the algorithms that make multi-digit calculations for addition and subtraction easily **mastered by the end of second grade**; multi-digit calculations for multiplication and long division easily **mastered by mid-term third grade**.

Learning Outcomes: As a result of this workshop, your students will:

- 1) know the place-value structure of our base-ten numeration system for whole numbers.
- 2) write numbers in expanded form and approximate numbers by rounding.
- 3) demonstrate the trading process using a place-value mat and place-value pieces while describing the step by step trading process using the language of place value.
- 4) use the language of place value and the understanding of the trading process when writing traditional algorithms.

Course Materials: place-value mats and place value pieces; activity booklets

Course Length: **After School for 1 or 2 hours:** Learning outcomes 3 and 4 for addition and subtraction or multiplication and division.

Half-day Workshop: All learning outcomes for addition and subtraction or multiplication and division.

One-day Workshop: All learning outcomes for addition and subtraction and multiplication and division.

Who Should Attend: All elementary educators whose students struggle with place value and the trading process.

Optional Materials: Price of the place-value mat and pieces for addition and subtraction plus activity booklet is \$35. Price of the place-value mat and pieces for multiplication and division plus activity booklet is \$34. We encourage schools to purchase addition and subtraction materials for first and second grade educators; both sets of materials for third grade educators.

Participants Bring: ✓ Tablet of Wide Lined Paper and a Pencil

WORKSHOP III: MASTERING THE BASIC FACTS OF ADDITION AND SUBTRACTION BY MENTAL COMPUTATION, PLACE VALUE AND TRADE FOR THE BASIC FACTS

- Course Purpose:**
- 1) To teach the meanings of addition and subtraction and their representations.
 - 2) To teach the problem solving approach for developing the thinking strategies students will use to master the basic facts by **mental computation** by the **end of second grade**.
 - 3) To teach the trading process, the language of trade, and the algorithms for the basic facts.

Study Guide: X **MASTERING THE BASIC FACTS OF ADDITION AND SUBTRACTION BY MENTAL COMPUTATION**

Game Book: X **SCOOBEE™ GAME BOOK FOR MASTERING THE BASIC FACTS OF ADDITION AND SUBTRACTION BY MENTAL COMPUTATION**

Visuals: X classroom wall display representing the thinking strategies for the doubles

Modeling Tools: X connecting cubes, ten-frames, place-value mat and pieces

Learning Outcomes: By the **end of second grade**, your students will:

- 1) know the meanings of addition and subtraction and will represent each meaning in 3 different ways.
- 2) use thinking strategies based on numerical relations to name sums and differences by mental computation. No calculators. No counting on a number line. No finger counting.
- 3) based on the meanings of the operations, solve story problems easily and accurately!
- 4) know and understand the trading process for the basic facts of addition and subtraction.
- 5) write algorithms representing the trading process for the basic facts.

Course Length: **One-day Workshop:** Course purpose number 1 and 2.

Two-day Workshop: Course purpose numbers 1, 2, and 3.

Who Should Attend: kindergarten through second grade educators, special education teachers, teacher's aids, paraprofessionals, administrators

- All educators whose students struggle with addition and subtraction regardless of age or grade.

Optional Materials: The price of the **Study Guide**, **Scoobie Game Book**, and classroom wall display of the doubles is \$63. Our materials and methods assure mastery of the basic facts!

Participants Bring: ✓ 3 by 5 Cards (50) ✓ Popsicle Sticks (50) ✓ Two inch three-ring binder if purchasing materials

WORKSHOP IV: MASTERING THE BASIC FACTS OF MULTIPLICATION AND DIVISION BY MENTAL COMPUTATION, PLACE VALUE AND TRADE FOR THE BASIC FACTS

- Course Purpose:**
- 1) To teach the meanings of multiplication and division and their representations.
 - 2) To teach the problem solving approach for developing the thinking strategies students will use to master the basic facts by **mental computation** by **mid-term third grade**.
 - 3) To teach the trading process, the language of trade, and the algorithms for the basic facts.

Study Guide: X **MASTERING THE BASIC FACTS OF MULTIPLICATION AND DIVISION BY MENTAL COMPUTATION**

Game Book: X **SCOOBEE™ GAME BOOK FOR MASTERING THE BASIC FACTS OF MULTIPLICATION AND DIVISION BY MENTAL COMPUTATION**

Visuals: X classroom wall display of the basic facts grouped by their thinking strategies

Modeling Tools: X connecting cubes, place-value mat and pieces

Learning Outcomes: By **mid-term third grade**, your students will:

- 1) know the meanings of the operations of multiplication and division and represent each meaning in three different ways.
- 2) based on the meanings of the operations, solve story problems easily and accurately!
- 3) look for, recognize, and use relations between numbers as thinking strategies for naming products and quotients by mental computation. No counting by 2's, 3's, ... , 9's. No times tables!
- 4) know and understand the trading process for the basic facts of multiplication and division.
- 5) write traditional algorithms representing the trading process for the basic facts.

Course Length: **One-day Workshop:** Course purpose number 1 and 2.

Two-day Workshop: Course purpose numbers 1, 2, and 3.

Who Should Attend: third and fourth grade educators, special education teachers, teacher's aids, paraprofessionals, administrators

- All educators whose students struggle with multiplication and division regardless of age or grade.

Optional Materials: Price for the **Study Guide**, **Scoobie Game Book**, and wall display of the basic facts is \$53. These materials ensure your students will achieve basic fact mastery by mid-term third grade!

Participants Bring: ✓ 3 by 5 Cards (50) ✓ Popsicle Sticks (50) ✓ Two inch three-ring binder if purchasing materials

WORKSHOP V: NUMBER AND OPERATIONS, ALGEBRA, GEOMETRY, MEASUREMENT, DATA

Course Purpose: To provide K - 4th grade educators and their students with a dictionary where **fundamental** math concepts deemed important by **Common Core State Standards, Principals and Standards for School Mathematics, 2000**, and by research are clearly and accurately defined. To provide students with problem solving activities and fun and engaging games that encourage concept and language development.

Learning Outcomes: **Thinking Strategies for Mastering Math's®** dictionary for K - 4th grade students *is not* an alphabetized list of terms vaguely defined by examples. Concepts in our dictionary are defined in words, used in one or more examples, and developed by one or more problem solving activities. Scoobie games found throughout the dictionary encourage concept and language development. In our dictionary, related concepts are grouped into chapters. For example, to learn the four components of a numeration system, go to the chapter titled Base-ten Numeration System for Whole Numbers. To learn the numerals we commonly used to name the number of fingers on one hand, go to the chapter titled, Numerals. To learn what the three classifications of numbers are and how they are used, go to the chapter titled The Three Classifications of Numbers. Want to learn the rules of order of operations with examples showing the step by step process, go to the chapter titled Order of Operations. Venn Diagram, Patterns, Measurement, Time, Money, and Analogies are but a few of the selected chapters we will be exploring.

Course Materials: **X** **DICTIONARY OF MATHEMATICAL TERMINOLOGY FOR THE ELEMENTARY STUDENT**

Course Length: **One-day Workshop:** Selected topics from the dictionary.

Two-day Workshop: Course purpose numbers 1, 2, 3, 4, and 5.

Who Should Attend: kindergarten through fourth grade educators

- All educators whose students struggle with fundamental mathematical concepts.

Optional Materials: Dictionary and template for drawing the representations of geometric shapes is \$72.

Participants Bring: ✓ 3 by 5 Cards (50) ✓ Popsicle Sticks (25) ✓ Paper and Pencil

WORKSHOP VI: GEOMETRY FOR THE 3RD AND 4TH GRADE STUDENT

Course Purpose: To teach fundamental geometric concepts using:

- 1) a geometry dictionary where terms are clearly defined, represented in a drawing, and presented in the order the concepts are to be learned.
- 2) a workbook which explores the concepts defined in the dictionary by asking students to draw with a protractor, ruler, or a template; construct with a compass and a straightedge; build on a geoboard; make geometric figures from three by five cards.

Course Texts: **X** **DICTIONARY OF GEOMETRIC TERMS FOR THE ELEMENTARY STUDENT** (nonconsumable)

X **GEOMETRY WORKBOOK FOR THE ELEMENTARY STUDENT** (workbook: consumable or nonconsumable)

- Workbook teaches to the dictionary page by page!

Tools: **X** ruler, protractor, compass, template, geoboard and geobands

Learning Outcomes: With their dictionary and workbook, your students will:

- 1) **know** the attributes of one-, two-, and three-dimensional figures.
- 2) **draw** lines, segments, rays, angles, circles, polygons, irregular figures, and solids.
- 3) **see** relations between one-, two-, and three-dimensional figures.
- 4) **locate** and identify geometric figures in their real world.

***Example:** Students will draw the representation of a ray. With a protractor, students will add a second ray to the first ray making a right angle. Students will join this right angle with a second right angle making a square and then add squares to the first square making the representation of a cube. Students will see their drawing of a cube is like a cube of sugar and not like a cube of butter.*

Course Materials: **X** geometry dictionary and workbook

Course Length: **One-day Workshop:** One-half of the dictionary and workbook will be covered.

Two-day Workshop: Entire dictionary and workbook will be covered.

Who Should Attend: third and fourth grade educators and all support staff

Optional Materials: Learning geometry depends on *doing geometry*; therefore, we encourage each participant to purchase the dictionary, workbook, protractor, compass, and template for \$85.

Participants Bring: ✓ 3 by 5 cards (50) ✓ Popsicle Sticks (125) ✓ Glue (liquid) ✓ Geoboard and Geobands
✓ Scotch® Tape ✓ Two 2 inch three-ring binders if purchasing the dictionary and workbook