

# MATH

LENGTH OF TIME: One year

GRADE LEVEL: 4

## COURSE STANDARDS:

Students will:

1. Use numbers, number systems, and equivalent forms (including numbers, words, objects, and graphics) to represent theoretical and practical situations. (PA Academic Stds 2.1.5)
2. Compute, measure, and estimate to solve theoretical and practical problems using appropriate tools which include modern technology such as calculators and computer software. (PA Academic Stds 2.2.5, 2.3.5)
3. Apply the concepts of patterns, functions, and relations to solve theoretical and practical problems. (PA Academic Stds 2.8.5, 2.11.5)
4. Formulate and solve problems while being able to communicate the mathematical processes used and the reasons for using them. (PA Academic Stds 2.4.5, 2.5.5)
5. Understand, apply and use the mathematical vocabulary to describe the basic concepts of algebra, geometry, probability, and statistics to solve theoretical and practical problems. (PA Academic Stds 2.6.5, 2.7.5, 2.9.5, 2.10.5)
6. Evaluate and draw references from charts, tables, and graphs showing the relationships between data and real-world situations. (PA Academic Stds 2.6.5)
7. Make decisions based upon the collection, organization, analysis, and interpretation of statistical data and predictions of outcomes based upon the application of probability. (PA Academic Stds 2.7.3)
8. Conducts one large scale mathematical investigation and communicates the mathematical processes used, the reasoning, and the results found. (PA Academic Stds 2.2.5, 2.4.5, 2.5.5, 2.6.5)

## RELATED PA ACADEMIC STANDARDS FOR MATHEMATICS

- 2.1.5 Numbers, Number Systems and Number Relationships
- 2.2.5 Computation and Estimation
- 2.3.5 Measurement and Estimation
- 2.4.5 Mathematical Reasoning and Connections
- 2.5.5 Mathematical Problem Solving and Communication
- 2.6.5 Statistics and Data Analysis
- 2.7.5 Probability and Predictions
- 2.8.5 Algebra and Functions
- 2.9.5 Geometry
- 2.10.5 Trigonometry
- 2.11.5 Concepts of Calculus

#### PERFORMANCE ASSESSMENTS:

Students will demonstrate achievement of the standards by:

1. Complete unit tests using pencil, paper, and calculator activities with/without rubrics. (Course Standards 1-7)
2. Demonstration of the problem solving process with routine and non-routine problems. (Course Standards 1-7)
3. Oral questioning and interviewing. (Course Standards 1-7)
4. Self and peer assessment. (Course Standards 1-7)
5. Teacher observation at completion of task or activity. (Course Standards 1-7)
6. Student portfolio to maintain student work. (Course Standards 1-7)
7. Math journal, math messages. (Course Standards 1-7)
8. Oral or written presentation to demonstrate a solution, concept, project, survey, etc. with/without rubrics. (Course Standards 1-7)
9. Group and individual mathematical investigations. (Course Standards 8)
10. Free response questions with/without rubrics. (Course Standards 1-7)
11. Class and homework assignments. (Course Standards 1-7)

#### DESCRIPTION OF COURSE:

This course stresses the fundamentals, application, and appreciation of mathematics. Students will solve problems using skills commensurate to those standards indicated above and communicate effectively using mathematical language. Students will demonstrate number sense, problem solving skills, reasoning abilities, and technological skills throughout the course.

Instruction will include, but not be limited to: Numeration through the million's period and decimals through thousandths; addition of 2, 3, or more addends into the thousand's period with regrouping to include money; subtraction into the thousand's period with regrouping to include money; multiplication and division facts through the tens times table; multiplication of three-digit factors by two-digit factors with regrouping; division with two-digit divisors and three-digit dividends; adding and subtracting decimals to the hundredths place value; renaming fractions to lowest terms; rename fourths, fifths, tenths and hundredths as decimals and percents; addition and subtraction of fractions with unlike denominators; tell time to the nearest minute; metric and standard measurements in length, capacity, and weight; find perimeter, area, and volume of geometric figures; with problem solving skills, estimation abilities, and technology integrated throughout the course.

#### TITLES OF UNITS:

Spiral program – on-going

1. Numbers and Numeration
2. Operations and Computation
3. Data and Chance
4. Measurement
5. Geometry
6. Pattern Functions and Algebra

Technology, estimation, and problem solving (including algebra, graphs, charts, patterns, and interpretation of data) are integrated throughout the year.

#### Unit Pacing Completion

Unit 1 – Naming and Constructing Geometric Figures – mid September

Unit 2 – Using Numbers and Organizing Data – mid October

Unit 3 – Multiplication and Division, Numbers Sentences and Algebra – mid November

Unit 4 – Decimals – mid December

Unit 5 – Big Numbers, Estimation and Computation – mid January

Unit 6 – Division/Measuring Angles – mid February

Unit 7 – Fractions, Chance and Probability – end of February

Unit 8 – Perimeter and Area – mid/end March

Unit 9 – Fractions, Decimals and Percents – beginning of April

Unit 10 – Reflection and Symmetry – end of April

Unit 11 – 3-D Shapes, Weight, Volume and Capacity – mid/end May

Unit 12 – Rates - June

#### SAMPLE INSTRUCTIONAL STRATEGIES:

1. Teacher/student made activities
2. Teacher/student led discussions and activities
3. Problem solving strategies
4. Calculators and computers
5. Individual and group explorations and investigations
6. Games and manipulatives
7. Written explanations and journal activities
8. Teacher/peer modeling
9. Math Word Wall

#### MATERIALS:

1. Everyday Mathematics: The University of Chicago School Mathematics Project, Everyday Learning Corporation, 2007, Chicago, Illinois.
2. Calculators, TI-15
3. Computers
4. Materials suggested by Everyday Math, Everyday Math games
5. Computer software
6. Standard related games and manipulatives
7. Base 10 blocks
8. Number lines and number grids
9. Everyday Math templates
10. Student reference book
11. Reflective mirrors

#### METHODS OF ASSISTANCE AND ENRICHMENT:

- A. Assistance
  1. IST

2. Cooperative groups
3. Peer helpers
4. Volunteer tutors
5. Flexible/modified grouping
6. Re-teaching with alternative strategies
7. Extended instructional time
8. Differentiated grouping – Everyday Math Differentiation Handbook
9. Teacher assessment CD – Everyday Math
10. Modified testing

B. Enrichment

1. Enhanced ed curriculum
2. Peer tutoring
3. Modified testing
4. Math journal and/or projects
5. Individual mathematical investigations
6. IST
7. PAL
8. Differentiated grouping – Everyday Math Differentiation Handbook
9. Teacher assessment CD – Everyday Math

PORTFOLIO DEVELOPMENT:

1. Teacher/student assessments
2. Math journals
3. Individual/group investigations, projects, and/or activities
4. Written explanation of problem solving strategies
5. Student reflections
6. Pre/post grade level assessment

METHODS OF EVALUATION:

1. Recognizing student achievement checklists
2. Self assessments – Everyday Math
3. Written unit assessments – Everyday Math
4. Investigations, projects, and/or journals (on-going assessments)
5. Problem solving activities
6. Written and oral presentations
7. Pre and Post grade level district assessments

INTEGRATED ACTIVITIES:

1. Concepts
  - demonstrate knowledge of the basic concepts and principles for the above mentioned standards

2. Communication
  - compose and make oral presentations using appropriate mathematical language
  - written entries in math journal using appropriate mathematical terms and vocabulary
  - explains solutions and strategies clearly and logically with supporting evidence
  - listen to, and understand, oral math presentations
3. Thinking/Problem Solving
  - apply the concepts of the above mentioned standards to formulate and solve problems
  - make critical judgments using the learned skills
  - draw conclusions and show relationships in mathematical settings
  - make decisions and predictions based upon the application of learned skills
4. Application of Knowledge
  - use learned skills to solve authentic problems
  - exhibit skills with calculators and computer software and application programs
  - examine, evaluate, and solve routine and non-routine problems
5. Interpersonal Skills
  - work cooperatively with others on projects and investigations
  - work effectively with others on projects and investigations
  - communicate effectively using appropriate mathematical language