Mathematics for Students with Multiple Disabilities
(NEW JERSEY CORE STANDARDS for MATHEMATICS)
August 15, 2003

COURSE DESCRIPTION:

This course is designed for student who are academically challenged and in need of small group and individualized instruction. The learning challenges of the students require a course of study which departs from and replaces regular education curriculum, while affording the students an opportunity to earn credits to meet the graduation requirements as determined by the Hopatcong Schools and the NJ State Dept. of Education.
The students will participate in a mathematical course which, will focus on the application of developmentally appropriate basic and functional math skills. Students will employ the use of manipulatives, simulation activities and real life experiences to extend their knowledge of essential mathematical problem solving skills.

CORE CURRICULUM CONTENT STANDARDS:

I. Standard 4.1 (Number and Numerical Operations) All students will develop number sense and will perform standard numerical operations and estimations on all types of numbers in a variety of ways.

CUMULATIVE PROGRESS INDICATORS:

A. Number and Numerical Operations

1. Use real-life experiences, physical materials and technology to construct meanings for numbers.
2. Demonstrate an understanding of whole number place value concepts
3. Compare and order numbers.
4. Demonstrate a sense of relative magnitude of numbers.
5. Understand the various uses of numbers
6. Use concrete and pictorial models to relate whole numbers, commonly used fractions, and decimals to each other and to represent equivalent forms of the same number.

B. Numerical Operations

1. Develop the meanings of addition and subtraction by concretely modeling and discussing a large variety of problems.
2. Explore the meanings of multiplication and division by modeling and discussing problems.
3. Construct, use and explain procedures for performing addition and subtraction calculations with a calculator.
4. Count and perform simple computations with money

C. Estimation

1. Judge without counting whether a set of objects has less than, more than, or the same number of objects as a reference set.
2. Determine the reasonableness of an answer by estimating the results of operations

SUGGESTED ACTIVITIES THAT ADDRESS THESE STANDARDS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Students will use manipulatives, computer, calculators and pencil/paper to solve computation problems.
- Students will participate in simulations that employ the use of computation, estimation and numerical concepts.
- Students will transfer knowledge of basic computational skills to real-life settings and experiences.
- Students will use games to reinforce mathematical concepts, computations and estimations.

II. Standard 4.2 (Geometry And Measurement) All students will develop spatial sense and the ability to use geometric properties, relationships, and measurement and model, describe and analyze phenomena.

CUMULATIVE PROGRESS INDICATORS:

A. Geometric Properties
   1. Identify and describe spatial relationships among objects in space and their relative shapes and sizes.
   2. Recognize, describe, extend and create designs and patterns with geometric objects of different shapes and color.

B. Transforming Shapes
   1. Use simple shapes to make designs, patterns, and pictures.
   2. Investigate the occurrence of geometry in nature and art

C. Coordinate Geometry
   1. Give and follow directions for getting from one point to another on a map or grid.
   2. Investigate the occurrence of geometry in nature and art.

D. Units of measurement
   - Select and use appropriate standard and non-standard units of measure and standard measurement tools to solve real-life problems.

SUGGESTED ACTIVITIES THAT ADDRESS THESE STANDARDS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Students will use manipulatives, computer, calculators and pencil/paper to develop spatial sense and geometric properties.
- Students will participate in simulations and modeling activities that employ the use of spatial relationships, geometric concepts and measurement through the use of texts, equipment, supplies and everyday tools and materials.
- Students will transfer knowledge of basic geometrical concepts and measurement activities to real-life settings and experiences.
- Students will use games and puzzles to reinforce measurement and spatial relationships.

III. Standard 4.3 (Patterns and Algebra) All student will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes.

CUMULATIVE PROGRESS INDICATORS:

A. Patterns
   - Recognize, describe, extend, and create patterns.

B. Functions and Relationships
   - Use concrete and pictorial models of function machines to explore the basic concepts of a function

C. Modeling
   1. Recognize and describe changes over time
   2. Construct and solve simple open sentences involving addition or subtraction

D. Procedures
   - Understand and apply the following properties of addition: Commutative, zero as identity element, associative

SUGGESTED ACTIVITIES THAT ADDRESS THESE STANDARDS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Students will use manipulatives, computers, calculators and pencil/paper activities to categorize, sort and tally variable quantities.
- Students will participate in simulations activities that employ the use of recognizing pattern, analyzing similarities and differences in a given group of objects.
- Students will transfer knowledge of patterns and relationships by recognizing and describing changes over time (temperature, height, seasons, hours, minutes, seconds) using real-life simulations and experiences.
- Students will use games and puzzles to reinforce concepts of patterns, functions and math problem solving.

IV. Standard 4.4 (Data Analysis, Probability, and Discrete Mathematics) All students will develop an understanding of the concepts and techniques of data analysis, probability and discrete mathematics, and will use them to model situations, solve problems and analyze and draw appropriate inferences from data.

CUMULATIVE PROGRESS INDICATORS:

A. Data Analysis
   1. Collect, generate, record and organize data in response to questions, claims, or curiosity.
   2. Read, interpret, construct, and analyze displays of data

B. Discrete Mathematics – Systematic Listing and Counting
   1. Represent and classify data according to attributes, such as shape or color, and relationships.

2. Represent all possibilities for a simple counting situation in an organized way and draw conclusions for this representation.

C. Discrete Mathematics – Vertex Edge Graphs and Algorithms
1. Follow simple sets of directions
2. Color simple maps with a small numbers of colors
3. Play simple two-person games
4. Explore strategies for making fair decision

SUGGESTED ACTIVITIES THAT ADDRESS THESE STANDARDS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Students will engage in individual and small group activities to collect, record and organize; quantitative, qualitative information about objects, people, places.
- Students will engage in activities that necessitate the transfer of skills, problem solving and analysis to everyday and real-life situations (e.g. inventories, sort/collating and packaging).
- Students will engage in individual and collaborative activities that result from group decision making using information from data collection.

INSTRUCTIONAL STRATEGIES:

- Direct individualized and small group instruction for teaching of basic computational, money, time, measurement skills.
- Multi - sensory mathematical instruction
- Strategy based mathematical problem solving
- Review, repetition of functional and computational math skills leading to mastery
- Directly teach the sub-steps of the skill, model steps of skill, role-play and, or rehearse skill, transfer skill to real-life applications and settings.
- Cooperative group learning tasks
- Structured and scaffold class discussion

EVALUATION/ASSESSMENT OF STUDENTS:

- Portfolio Assessment
- Pre and Post-test of specific skills (criterion referenced)
- Inventories
- Structured observations
- Demonstration of target skills
- Tests and quizzes

WORKPLACE READINESS STANDARDS: (Please see Career Skills Course of Study)

EVALUATION/ASSESSMENT OF CURRICULUM:

This course of study will be evaluated/assessed by instructional staff during the first year of implementation for the purpose of necessary revision at the end of the first year. In addition, this course of study will be reviewed according to the Five-Year Curriculum Review schedule (see attached).

RESOURCES/BIBLIOGRAPHY:

Brolin, D. E. (1989) Life Centered Career Education: A competency Based Approach (3rd ed.). Reston, VA: The Council for Exceptional Children.

Bender, Michael (1996) A Functional Curriculum for Teaching Students with Disabilities (3rd ed.) Austin, TX: PRO-ED.

Dever, Richard B.; Knapczyk, Dennis (1997) Teaching Persons with Mental Retardation: A Model for Curriculum Development and Teaching. Madison WI: Brown and Benchmark Publishers.