MTH323 – PROBABILITY, STATISTICS, AND DISCRETE MATHEMATICS
A Course Outline for Mathematics

Approved by the Board of Education
September 12, 2013

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Revised: August 2013
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STATEMENT OF PURPOSE

Probability, Statistics and Discrete Mathematics is a course designed to show students how the theory and techniques of mathematics are applied in business, economic and the life and social sciences. This application-oriented course is appropriate for students interested in a wide variety of disciplines. Separately we assess students to gauge progress and inform instruction. Benchmark assessments for students in grades 9 through 12 are administered in the form of a midterm and final exam for full year courses. *Special Note: Only final exams are administered at the end of quarter courses and semester courses.

Today’s applications of mathematics increasingly involve discrete models due to the integration of the computer into more aspects of modern society.

Throughout the course, heavy emphasis will be placed on the application of concepts to the solution of problems requiring higher-level thinking skills.

This revision is aligned with the revised New Jersey Student Learning Standards, AP Statistics Proficiencies, New Jersey New Jersey Student Learning Standards for Technology.
THE LIVING CURRICULUM

Curriculum guides are designed to be working documents. Teachers are encouraged to make notes in the margins. Written comments can serve as the basis for future revisions. In addition, the teachers and administrators are invited to discuss elements of the guides as implemented in the classroom and to work collaboratively to develop recommendations for curriculum reforms as needed.

AFFIRMATIVE ACTION

During the development of this course of study, particular attention was paid to material, which might discriminate on the basis of sex, race, religion, national origin, or creed. Every effort has been made to uphold both the letter and spirit of affirmative action mandates as applied to the content, the texts and the instruction inherent in this course.

MODIFICATIONS AND ADAPTATIONS

For guidelines on how to modify and adapt curricula to best meet the needs of all students, instructional staff should refer to the Curriculum Modifications and Adaptations included as an Appendix in this curriculum. Instructional staff of students with Individualized Education Plans (IEPs) must adhere to the recommended modifications outlined in each individual plan.
METHODS

The N.C.T.M. Standards and the NJ Core Curriculum Content Standards endorse the use of discovery-based, hands-on, group-oriented, non-routine problem solving and technology-dependent classes. These methodologies are the expected mode of instruction that must be used on a consistent basis throughout this course. Students will apply the concepts and methods of functions, statistics and discrete mathematics to model and explore a variety of practical situations and solve problems. Self-assessment and the use of individual strategies for personal growth will be utilized.

ASSESSMENT COMPONENT

“Assessment must be more than testing; it must be a continuous, dynamic, and often informal process,” according to National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics.

With this in mind, the assessment tools for the Probability, Statistics and Discrete Mathematics course should include:

- Open-Ended Questions
- Problem-Solving Experiences using real-life data
- Projects - Individual/Group
- Concepts and application of technology
- Unit Tests/Quizzes

Utilizing a variety of assessment techniques enables the teacher and the student to understand more fully the mathematical strengths and weaknesses of the student and the program.
**GRADING PROCEDURES**

**Marking Period Grades:**

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<th>Type of Assessment</th>
<th>Percentage</th>
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<tr>
<td>Long- and Short-Term Assessments</td>
<td>90%</td>
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<tr>
<td>Publisher prepared tests, quizzes and/or worksheets</td>
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<tr>
<td>Teacher prepared tests, quizzes and/or worksheets</td>
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<td>Authentic Assessments</td>
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<td>Technology applications</td>
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<td>Projects</td>
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<td>Reports</td>
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<td>Labs</td>
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<td>Daily Assessments</td>
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<td>Homework</td>
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<td>Do Now / Exit Questions</td>
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<td>Class participation</td>
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<td>Journal Writing</td>
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<td>Notebook - checks and open notebook assessments</td>
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<td>Explorations</td>
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**Final Grade:**

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<th>Final Grade – Full Year Course</th>
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<td><strong>Full Year Course</strong></td>
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<td>- Each marking period shall count as 20% of the final grade (80% total).</td>
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<td><strong>The midterm assessment will count as 10% of the final grade, and the final assessment will count as 10% of the final grade.</strong></td>
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In accordance with district policy as mandated by the New Jersey Administrative Code and the New Jersey Student Learning Standards, the following are proficiencies required for the successful completion of the above named course.

PART I – PROBABILITY AND STATISTICS

The student will:

Probability

1. solve problems by applying counting techniques.
2. solve problems using permutations or combinations.
3. find the odds of an event.
4. solve probability and compound probability problems.
5. expand binomials using Pascal’s Triangle or the Binomial Theorem credited to Blaise Pascal (French) and Jacques Bernoulli (French).
6. solve appropriate probability problems by applying a binomial expansion.

Descriptive Statistics

7. Organize and display data.
8. Calculate measures of central tendency.
9. Calculate measures of variability.

Distributions

10. Use the Standard Normal Distribution Table to find the z score.
12. Use the Binomial Distribution Table, technology, or the Binomial Formula to find the probability and examine binomial distributions.
13. Normal Distributions to calculate probabilities.
14. Student T- Distributions to calculate probabilities.
Experimental Design

15. Sampling Techniques
   a. Surveys
   b. Experiments
   c. Principles of experimental design

Inferential Statistics

16. Identify the null and alternate hypotheses.
17. Apply statistical hypothesis testing techniques named and credited as follows:
   a. Normal Distribution (Mean Only)—Karl Friedrich Gauss (German)
   b. Student-t Distribution (Mean Only)—W.S. Gosset (English)
18. Interpret the probability of the occurrence of the claim in context of the problem.

PART II – DISCRETE MATHEMATICS

The student will:

Logic

19. write statements in symbolic logic.
20. translate symbolic logic into statements.
21. solve logic problems using truth tables of Boolean Algebra [George Boole (English)].
22. identify tautologies and contradictions using truth tables.
23. determine if two symbolic statements are equivalent.
24. determine if a symbolic argument is valid.
25. apply logic to switching circuits.

Graphs and Networks

26. use graphs to model relationships between objects.
27. find the adjacency matrix of a graph.
28. traverse graphs to identify Euler circuits or paths [Leonard Euler (Swiss)].
29. traverse graphs to identify Hamiltonian circuits or paths [Sir William Rowan Hamilton (Irish)].
30. apply algorithms to determine network traversability.
31. Apply traversability concepts to directed graphs.
32. Find shortest route using the nearest neighbor heuristic.
33. find minimum-cost spanning tree.
Optional Topics:

Linear Mathematical Models and Functions
- solve business and physical problems using linear models.

Systems of Linear Functions
- solve systems of inequalities graphically using the coordinate system of René Descartes (French).
- solve business and physical linear programming problems graphically.
- reduce a matrix to echelon form using row operations.
- use the Gauss-Jordan Method of Elimination to solve systems of equations [Karl Friedrich Gauss (German) and Camille Jordan (French)].
I. **PROBABILITY AND STATISTICS**

**Essential Question(s):**

a) How can the properties of data be communicated to illuminate its important features?

b) How can a population be described when it is so large it would be impossible to collect all of the data?

c) In what ways does one event impact the probability of another event occurring?

d) How is probability used to make informed decisions about uncertain events?

**Enduring Understanding(s):**

a) Statisticians summarize, represent and interpret categorical and quantitative data in multiple ways since one method can reveal or create a different impression than another. Geometric relationships provide a means to make sense of a variety of phenomena.

b) Statisticians design experiments based on random samples and analyze the data to estimate the important properties of a population and make informed judgments.

c) Probability provides a process to determine the likelihood of events and determine whether the occurrence of one event makes some other event more or less likely.

d) The rules of probability can lead to more valid and reliable predictions about the likelihood of an event occurring.

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<tr>
<th>CONTENT OUTLINE</th>
<th>Standards</th>
<th>SUGGESTED ACTIVITY</th>
<th>EVALUATION/ASSESSMENT</th>
<th>TEACHER NOTES</th>
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<tr>
<td><strong>UNIT I PROBABILITY</strong></td>
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A. Counting Techniques (1)

SCP.1

8.1.12.E.1

- determine the number of possible outcomes using a tree diagram of the theorem.

- devise a probability experiment using spinners, die, and/or cards.

B. Complements (4)

SCP.2-3

8.1.12.E.1

- identify the event and its complement.

- determine the probability of an event using the probability of its complement.

Example: \( P(\text{no snow}) = 1 - P(\text{snow}) \)
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<tbody>
<tr>
<td><strong>C. Odds (3)</strong></td>
<td>SCP.5</td>
<td>• use the definitions of probability and odds to find the odds of an event.</td>
<td>• apply techniques of Probability unit to explore real-life situations.</td>
<td>Stress the differences between odds of a lottery, bridge hand, poker hand.</td>
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<td>8.1.12.E.1</td>
<td>• solve problems involving spinners, die, cards, and/or marbles.</td>
<td>Example: odds of a lottery, bridge hand, poker hand</td>
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<td></td>
<td>SCP.3-5</td>
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<td>Solve compound probability problems.</td>
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<td></td>
<td>SCP.9</td>
<td></td>
<td>Example: Two cards are drawn from a standard deck of cards; find the probability that</td>
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<td></td>
<td>8.1.12.E.1</td>
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<td>they are both red or both aces.</td>
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<td><strong>D. Permutations (2)</strong></td>
<td>SCP.3-5</td>
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<td>SCP.9</td>
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<td>8.1.12.E.1</td>
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<td><strong>E. Combinations (2)</strong></td>
<td>SCP.3-5</td>
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<td>SCP.9</td>
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<td>8.1.12.F.1</td>
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<td><strong>F. Dependent and Independent Events (4)</strong></td>
<td>SCP.3-5</td>
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<td>SCP.9</td>
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<td>8.1.12.F.1</td>
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<td>PROBABILITY AND STATISTICS</td>
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<td>Students will be able to:</td>
<td>The student will:</td>
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<tr>
<td>UNIT I PROBABILITY</td>
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<tr>
<td>G. Mutually Inclusive and Exclusion Events (4)</td>
<td>SCP.3-5 SCP.9 8.1.12.F.1</td>
<td>• solve problems involving spinners, die, cards, and/or marbles.</td>
<td>Solve compound probability problems. Example: Two cards are drawn from a standard deck of cards; find the probability that they are both red or both aces.</td>
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<tr>
<td>H. Conditional Probability (4)</td>
<td>SCP.6 8.1.12.F.1</td>
<td>• use a standard deck of cards to solve conditional probability problems.</td>
<td>Solve conditional probability problems. Example: Given a pair of fair dice, find the probability that the numbers match, given that the sum is greater than 6.</td>
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<tr>
<td>I. Binomial Experiments (5, 6)</td>
<td>SCP.9 8.1.12.F.1</td>
<td>• expand binomials using Pascal’s Triangle and/or combinatorials.</td>
<td>Solve binomial experiments using an expansion. Example: On a 5 question multiple-choice quiz with 4 choices per question, find the probability of getting at least 3 correct if you guess at every question.</td>
<td>Binomial experiments are further studied in Unit II – Distribution.</td>
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## PROBABILITY AND STATISTICS

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<th>CONTENT OUTLINE</th>
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<th>TEACHER NOTES</th>
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<tbody>
<tr>
<td><strong>UNIT II DESCRIPTIVE STATISTICS</strong></td>
<td><strong>Students will be able to:</strong> <strong>The student will:</strong></td>
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<tr>
<td>A. Sampling Techniques (7)</td>
<td>SMD.1-2 SMD.4</td>
<td>• solve real-life problems.</td>
<td>Solve real-life problems.</td>
<td>Stress the differences between variance and standard deviation</td>
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<td>8.1.12.F.1</td>
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<td>B. Measures of Central Tendency (8)</td>
<td>SID.4 8.1.12.F.1</td>
<td>• find the standard deviation and variance using the formula as well as using the graphing calculator.</td>
<td>Determine both the standard deviation and variance given a set of data.</td>
<td>Technology based</td>
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<td>C. Measures of Variability (9)</td>
<td>8.1.12.F.1</td>
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<td>UNIT III DISTRIBUTIONS</td>
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<tr>
<td><strong>A. The Normal Distribution (10a, 11, 12, 13)</strong></td>
<td><strong>Students will be able to:</strong></td>
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<td><strong>The student will:</strong></td>
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<td>• determine critical (real-life – deleted) values of a Normal Distribution given specific cumulative probabilities (percentages – deleted).</td>
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<td>• determine probabilities using the Normal Distribution when given real-life data scores.</td>
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<td><strong>EVALUATION/ASSESSMENT</strong></td>
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<td>Apply the standard Normal Distribution Curve and its effect on different grading situations.</td>
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<td><strong>Example:</strong> Assume thermometers are normally distributed with a mean of 0° and a standard deviation of .95°. If recalibration is needed for the top 4%, what reading is the cutoff for recalibration?</td>
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<td>Apply the Normal Distribution to real-life problems such as warranties.</td>
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<td><strong>Example:</strong> If IQ scores are normally distributed with a mean of 100 and a standard deviation of 13, find the probability of randomly selecting a person with an IQ score between 105 and 128, inclusive.</td>
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<td><strong>TEACHER NOTES</strong></td>
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<td></td>
<td>Emphasize advantages, disadvantages and appropriateness of each distribution.</td>
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<td>Always emphasize using the sketch and including the proper notation to explain the conversion of the z-score.</td>
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<td>CONTENT OUTLINE</td>
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<td><strong>UNIT III DISTRIBUTIONS (continued)</strong></td>
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<td>Students will be able to:</td>
<td>The student will:</td>
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<tr>
<td>B. The Student-t Distribution (10b, 13, 14, 15)</td>
<td>SID.1-4 8.2.12.D.1 8.2.12.D.1</td>
<td>• analyze a conjecture given a small sample size.</td>
<td>Complete a hypothesis test using a student-t Distribution.</td>
<td>Apply properties of the Student-t Distribution (sample size).</td>
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<td><strong>UNIT IV INFERENTIAL STATISTICS</strong></td>
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<tr>
<td>A. Hypothesis Testing (18,19,20)</td>
<td>SIC.2-3 SIC.6 8.2.12.D.1</td>
<td>• correctly identify the claim and express it as either the null hypothesis or alternative hypothesis.</td>
<td>Demonstrate the ability to complete a professional hypothesis test.</td>
<td>Emphasize step process for both the Normal and Student-t Distribution. Stress the last step of stating conclusion in terminology understandable to the non-mathematician.</td>
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## II. DISCRETE MATHEMATICS

**Essential Question(s):**

- a) How can business modeling be used to determine a break-even point?
- b) How can business modeling be used to make business decisions?

**Enduring Understanding(s):**

- a) Business models can be used to determine a break-even point.
- b) Business models can be used to determine profit/loss statements.

<table>
<thead>
<tr>
<th>PROFICIENCY / OBJECTIVE</th>
<th>Standards</th>
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<th>TEACHER NOTES</th>
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</table>
| 1. Business Modeling (26) | ACED.2 8.2.12.D.1 | • find the break-even point and/or profit given cost and revenue functions. | Be able to determine if new products should be manufactured given: 
  \[ c(x) = 75x + 800 \]
  \[ R(x) = 110x \]
  and the fact that no more than 40 products can be sold and justify their answer. | Emphasis should be placed on applying linear models to business, economic, and science situations.
  The new terminology associated with the real-life applications above, must be given special attention, e.g., fixed cost, variable cost, revenue, break-even, profit. |
III. LINEAR RELATIONSHIPS

Essential Question(s):
a) What techniques can be used to solve and graph a system of linear equations or inequalities in one or two variables?
b) How can we model and solve real-life situations using a system of linear equations or inequalities?
c) Functional relationship can be expressed in real contexts, graphs, algebraic equations, tables and words; each representation of a function is simply a different way of expressing the same idea.
d) How are functions and their graphs related?
e) How can systems of equations be used to solve real-life situations?

Enduring Understanding(s):
a) A variety of families of functions can be used to model and solve real-world situations.
b) Solve systems of linear equations and approximately focusing on pairs of linear equations in two variables.
c) Graph the solutions to a linear inequality in two variables as half-plane, and graph the solution set to a system of linear inequalities in two variables and the intersection of the corresponding half-planes.

### LINEAR RELATIONSHIPS

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<tr>
<td><strong>UNIT I  SYSTEMS OF LINEAR FUNCTIONS</strong></td>
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A. Graph Systems of Linear Inequalities (27)

- Determine the region formed by the following
- Differentiate between bounded and un-bounded regions.

B. Graphic Solution of Linear Programming Problems (28)

- Maximize/minimize the objective function based on restrictions.

minimize: \( z = 0.25x + 0.3y \)

Emphasize the
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<tr>
<td>B. (continued)</td>
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</table>
| C. Solve Systems by Gauss-Jordan Elimination Method Using Reduced Row Echelon Matrices (29, 30) | AREI.9   | • solve 2x2 and 3x3 systems including both consistent and inconsistent solutions. | Solve using the Gauss-Jordan Elimination Method:  
\[ x + 3y + 5z = 6 \]  
\[ y + 2z = 3 \]  
\[ 2x + y - 2z = -5 \] | Students may find it helpful to use graph paper to keep their rows and columns aligned. |
|                         |           |                    |                        | Emphasize proper row operation notation. |

The student will be able to:  
Students will:  
subject to:  
\[ 2x + 6y \geq 30 \]  
\[ 4x + 2y \geq 20 \]  
\[ y \geq 2 \]  
\[ x \geq 0 \]  
programming process of:  
• identifying the variables  
• listing constraints  
• graphing the system  
• interpreting the result  
Using a graphing calculator, substitute vertices into the objective function to determine maximum or minimum solution.
IV. **LOGIC**

**Essential Question(s):**

a) How can electrical circuits be used to show relationships?

b) What techniques could be used to show minimum and maximum distance?

c) How can we model and solve real life problems using logic?

**Enduring Understanding(s):**

a) Logic can be used to show electrical circuits.

b) Circuits should be designed to limit power outages.

c) Use logic gotten to simplify circuits and determine under what condition electricity will flow.

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<th>SUGGESTED ACTIVITY</th>
<th>EVALUATION / ASSESSMENT</th>
<th>TEACHER NOTES</th>
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<td><strong>UNIT I LOGIC</strong></td>
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<tr>
<td>A. Statements,</td>
<td>IV.A,B</td>
<td>• translate a</td>
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<td>Connectives, Boolean</td>
<td>8.2.2.A.3-4</td>
<td>sentence into</td>
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<td>Expressions (31, 32)</td>
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<td>symbolic form and</td>
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<td></td>
<td></td>
<td>vice versa.</td>
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<tr>
<td>B. Truth Tables and</td>
<td>IV.A,B</td>
<td>• construct truth</td>
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<tr>
<td>Logical Equivalences</td>
<td>8.2.2.A.3-4</td>
<td>tables to</td>
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<tr>
<td>(33)</td>
<td></td>
<td>determine if two</td>
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<td>statements are</td>
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<td>logically</td>
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<td></td>
<td></td>
<td>equivalent.</td>
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**The student will be able to:**

**Students will:**

Translate the following expressions given that:

- \( p: \) I studied.
- \( q: \) I passed.

\[
\begin{align*}
p \land q \\
p \lor q \\
p \rightarrow q
\end{align*}
\]

Use truth tables to show that:

\[
\lnot (p \lor q) \equiv \lnot p \land \lnot q
\]
<table>
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<tr>
<th>LOGIC</th>
<th>PROFICIENCY / OBJECTIVE</th>
<th>Standards</th>
<th>SUGGESTED ACTIVITY</th>
<th>EVALUATION/ASSESSMENT</th>
<th>TEACHER NOTES</th>
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<tbody>
<tr>
<td>The student will be able to:</td>
<td>Students will:</td>
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<td>UNIT I LOGIC (continued)</td>
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<tr>
<td>C. Tautologies and Contradictions (34)</td>
<td>IV.A,B 8.2.2.A.3-5</td>
<td>• construct truth tables to determine if two logical expressions are equivalent.</td>
<td>Determine if the statements are logically equivalent.</td>
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<td></td>
<td></td>
<td></td>
<td>$[\square p \rightarrow \square q]^r$</td>
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<td></td>
<td></td>
<td></td>
<td>$r \lor \square (p \lor q)$</td>
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<tr>
<td>D. Arguments (33, 34)</td>
<td>IV.A,B 8.2.2.A.3-5</td>
<td>• use symbolic logic and truth tables to determine the validity of an argument.</td>
<td>Determine if the following argument is valid through the use of truth tables:</td>
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<td></td>
<td></td>
<td></td>
<td>$p \lor q$</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>$nq$</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>$\therefore p$</td>
<td></td>
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<tr>
<td>E. Application to Switching Circuits (Logical Gates) (35)</td>
<td>IV.A,B 8.2.2.A.3-5</td>
<td>• use logic to simplify circuits and determine under what conditions electricity will flow.</td>
<td>Write the circuit symbolically:</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>$\neg \quad q \quad \neg \quad p$</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$\quad p$</td>
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</tbody>
</table>
V. GRAPH AND NETWORKS

**Essential Question(s):**

a) How can graphs be used to show minimum/maximum travel distance?
b) How can graphs be used to show relationships?
c) How can graphs be used to represent a tournament winner?

**Enduring Understanding(s):**

a) Use graphs to determine minimum/maximum travel distance.
b) Determine a tournament winner base in diagrams.
c) Model relationships using adjacency matrix.

### GRAPH AND NETWORKS

<table>
<thead>
<tr>
<th>PROFICIENCY / OBJECTIVE</th>
<th>Standards</th>
<th>SUGGESTED ACTIVITY</th>
<th>EVALUATION / ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Graphs and Networks</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1 modeling relationships (38)</td>
<td>9.1.12.A.1 9.4.12.A.16 8.2.2.A.3-5</td>
<td>• be able to represent real-life situations (e.g., routes) using graphs.</td>
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<td>Write the adjacency matrix for both undirected and directed graphs:</td>
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<td></td>
<td></td>
<td><img src="image" alt="Graph" /></td>
<td></td>
</tr>
</tbody>
</table>

| 1 Euler Paths and Circuits (40) |                        | • find an Euler or Hamiltonian path or circuit when possible.                      |                         |
| 2 Hamiltonian Paths and Circuits (41) |                        | Determine if the following graph is traversable:                                   |                         |
|                          |                    | ![Graph](image)                                                                    |                         |

**UNIT V GRAPH AND NETWORKS**

- **A.** Use the Historical Bridges of Konigsberg problem to introduce the topic of graph theory.
- **B.** Emphasize the difference between a path and a circuit.
### DISCRETE MATHEMATICS

<table>
<thead>
<tr>
<th>PROFICIENCY / OBJECTIVE</th>
<th>Standards</th>
<th>SUGGESTED ACTIVITY</th>
<th>EVALUATION / ASSESSMENT</th>
<th>TEACHER NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNIT IV GRAPH AND NETWORKS (continued)</strong></td>
<td></td>
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</tbody>
</table>

**C. Applications of Graphs**

1. Digraphs *(42, 44)*

2. Nearest neighbor algorithm *(42, 44, 46)*

3. Kruskal’s minimum spanning tree *(42, 43, 44, 45)*

| | Standards | | |

- **The student will be able to:**
  - Students will:

- **EVALUATION / ASSESSMENT**
  - Determine the winning order given:
    - Create a realistic traveling problem that can be represented as a graph and solve using the appropriate algorithm, e.g., Traveling Salesperson Problem.

- **TEACHER NOTES**
  - Stress the difference between Euler and Hamiltonian paths.

![Graph Diagram]

- **SUGGESTED ACTIVITY**
  - Determine the winning order given:
    - Represent a tournament in a digraph and determine the order of the winners.
    - Determine the shortest possible route that visits all vertices.
BIBLIOGRAPHY

PART 1 - PROBABILITY AND STATISTICS

RESOURCES:


PART 2 – DISCRETE MATHEMATICS

RESOURCES:


**WEBSITES:**

- [www.classzone.com](http://www.classzone.com)
- [www.domath.org](http://www.domath.org)
- [www.enc.org](http://www.enc.org)
- [www.forum.swarthmore.edu](http://www.forum.swarthmore.edu)
- [www.illuminations.nctm.org](http://www.illuminations.nctm.org)
- [www.mathforum.com](http://www.mathforum.com)
- [www.mathgoodies.com](http://www.mathgoodies.com)
- [www.nctm.org](http://www.nctm.org)
- [www.teacherspayteachers.com](http://www.teacherspayteachers.com)
APPENDIX A  SAMPLE AUTHENTIC ASSESSMENT
Project Outline

1. Select four topics in probability
   a. Permutations, Combinations, Factorials, and Fundamental Counting Principal
   b. Probability/ Odds, Mutually Exclusive/Inclusive, Independent & Dependent, Conditional Probability

2. Template

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<tbody>
<tr>
<td></td>
<td>Student 2</td>
<td>Student 1</td>
<td>Student 4</td>
<td>Student 3</td>
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<tr>
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<td>Student 3</td>
<td>Student 2</td>
<td>Student 1</td>
<td>Student 4</td>
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<tr>
<td></td>
<td>Student 4</td>
<td>Student 3</td>
<td>Student 2</td>
<td>Student 1</td>
</tr>
</tbody>
</table>

3. The theme for the project will be cards. All questions will be developed using a standard deck of cards.

4. Teacher assigns ½ row or column to each group

5. Students will come up with their own questions/answers and write questions on the pre board. Peer critique each other’s questions.
Objective: To build a town

In your town there must be:
1. Hospital
2. Police Station
3. Convenience Store
4. Library
5. Town Hall
6. Strip Mall (Little Shops)
7. School (K-8)
8. School (High School)
9. At least 5 homes in a neighborhood
10. At least 5 homes in a separate neighborhood
11. Select 2 additional locations to add (They can be anything)

Step 1: Draw a detailed diagram of your town. Be sure to label all of the items listed. (6 Points)
Step 2: Teacher checkpoint
Step 3: On the board – lay wiring secure with tape
Step 4: Based on your diagram, insert the light bulbs. (3 Point)
Step 5: Teacher Checkpoint - Apply power (1 Point)
Step 6: Pause – think about why all the lights are on. Discuss with your group.
Step 7: “Tree Down”
Step 8: Pause – think about why certain lights are out. Discuss with your group.

Group Discussion:

1. When you designed your town – what made you decide which light bulbs lost power first? (2 Points)

2. When you paused at step 6 – why did all the lights go on using terms discussed in class? (1 Point)

3. When you paused at step 8 – explain why certain lights are out and other lights are on using terms we discussed in class? (2 Points)
Business Models Project
28 points

Due: ________________________________

Outline:
You will be selling cakes, pies, cookies or muffins from your home. You need to determine:
  • the variable cost for making a recipe
  • the fixed cost for making your baked good
  • the price you charge for your baked goods (per pie or cake or dozen)
  • the break-even point
  • the number of cakes/pies/cookies/muffins needed to profit $500

Research:
  • Determine which type of baked good you will sell. Print a recipe from the internet. (2 pts)
  • Find the price per ingredient (ex: shoprite.com) (5 pts)
  • the conversions necessary to buy the correct amount of ingredients (1 pt)
  • the cost of the fixed items (2 pts)
  • the price you will sell your baked good (2 competitor prices) (2 pts)

Calculate:
  • the conversions for your recipe (write equivalency ex: 12 in = 1 ft) (2 pts)
  • your variable cost (1 pt)
  • your fixed cost (mixing bowls, measuring cup, measuring spoons, baking item, hand mixer) (1 pt)
  • write your cost function (1 pt)
  • write your revenue function (1 pt)
  • determine the break-even point (2 pts)
  • determine the revenue at the break even point (1 pt)
  • when you profit $500 (2 pts)

Written:
  • How did you determine the selling price of your pie? What made you choose that number? Your response should be business oriented. (2 pts)
  • How did you calculate when the profit is $500? Explain the business aspect. (1 pt)
  • Why would this not be accurate when you use your recipe more than once? (2 pts)
Descriptive Statistics –

DUE:

If any steps are missing, you may receive zero points. Attach this paper to your work and printout. You may use a calculator to do the calculations. The explanations must be typed.

Step 1: Select your favorite college or pro sports team.

Step 2: Go online, and find the scores for the entire season (if they are in the midst of a season, use last season). **Print** out the team’s results.

Step 3: On a clean sheet of paper, list the team’s first twelve scores. (no pre-season scores)

Step 4: Find the mean, median, mode, range, standard deviation and variance for their scores.

Step 5: Explain, in complete sentences, the concept of standard deviation in the context of your team’s scores.

Scoring of Descriptive Statistics Project

Step 1 - Complete

Step 2 – 1 Point

Step 3 – 1 Point

Step 4 – 12 Points Total (2 Points Each)

Step 5 – 2 Points

Step 6 – 2 Points

Step 7 – 5 Points (3 Points each measure – 2 Points explaining the meaning)

Step 8 – 2 Points

Step 9 – 1 Point
Experimental Design

Prompt: Conduct a survey or experiment of your choice.

• Section 1 – Group Proposal
  In a formal, written report, submit the following on ____________:
    o Act as if I know nothing in regarding to the topic of your research question. Provide any information that you feel is important for me to be able to follow your experiment.
    o Create your hypothesis – Use the control group mean as your population mean. Set a significance level of your choice.
  • Explain how your experimental group differs from your control group. Explain how you determined your random assignment of subjects (Total of 10 people).
    o Explain what data you actually plan to collect and how you plan to collect it.

• Section 2 – Group Data Analysis & Inference
  In a formal, written report, submit the following on ____________:
    1. State your research question
    2. Restate the hypothesis you plan to test – Use the control group mean as your population mean.
    3. State your level of significance
    4. State the formula your plan to use.
    5. State the type of distribution you plan on using and why it is that distribution.
    6. Draw and identify your critical region. State when to reject the null hypothesis. Use area notation and state degrees of freedom.
    7. Calculate the test statistic
    8. Determine if you are going to reject or accept the null hypothesis.
    9. In words, make a conclusion.
• Section 3 – Individual Assignments

Student 1 – Proposal Section & assist in creation of presentation (Student 5’s roles if no student 5)

Student 2 – Data Collector (Assign random and control groups) & Collect data and calculate mean for both the control and experiment group.

Student 3 – Find the critical region and the test statistic (Section 2).

Student 4 – Type final project and create presentation (PowerPoint, Video, Prezi, etc.)

Student 5 – Background information & assist in the creation of presentation

Example Topics:

1. Does soap increase time on a slip-in-slide?
2. Does adding water to nail polish make the time it lasts decrease?
3. Does food at the end of a dog run make the dog run faster?
4. Do athletic bracelets help decrease the time it takes to make 10 free throw shots?
5. Does eating before taking a SAT practice test influence the score on the test?

Experimental Design Grading

Group Section:

Background Information: 2 Points
Section 1: Remaining Parts of the Proposal: 4 Points
Data Collector: 6 Points
Section 2: 10 Points
Typing the project: 2 Points
Presentation: 4 Total Points – 2 Points for assembly and 2 for actual presentation

28 Total Points

Individual Section:

At the end of project, each member of the group will fill out a peer evaluation sheet. Members will be peer evaluated on how they contributed to their part of the project.

10 Total Points
Project Grade Form

Individual Grade:

1-Point Question  _____ / 2
2-Point Question  _____ / 4
3-Point Question  _____ / 6
4-Point Question  _____ / 8

Total Individual Grade:  _____ / 20

Group Grade:

1-Point Question  _____ / 2
2-Point Question  _____ / 4
3-Point Question  _____ / 6
4-Point Question  _____ / 8

Total Group Grade:  _____ / 20
APPENDIX B  SELF-ASSESSMENT
## SELF-ASSESSMENT SHEET FOR STUDENT WORKFOLDER

<table>
<thead>
<tr>
<th>Date</th>
<th>Assessment</th>
<th>Grade</th>
<th>What I did well... How I could improve...</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Things I need to work on...</td>
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Marking Period _____
MID-YEAR REFLECTION

After looking over your work folder with all of your assessments from this year, what are your strengths in math? What are your weaknesses?

How can you continue to use your strengths to be successful in math? Be specific and explain.

How can you improve your areas of weakness? Give yourself at least one goal in order to help you improve.

Which assessment(s) are you most proud of? Explain why.

Which assessment(s) do you think you could have done better on? Explain why and how.

We are now half-way through the school year. What will you continue to strive for in math? How do you plan on doing this?
Workfolder Reflection

Look through the various items in your workfolder and take a moment to think about this school year. Answer the following questions in the form of a paragraph to reflect on your mathematical progress so far this year.

- What were some of your goals in the beginning of this school year? Have you made progress towards achieving them?

- What are some goals you have for the rest of this school year?

- In what areas did you have the most success? Be specific by indicating the topics in which you feel most confident.

- In what areas did you have difficulty? What are some ways you can improve in those areas?

- What can you do to prepare yourself for the final exam?

- Now that more than half of the year has passed, what are some things that you have learned that will help you next year? (i.e. study skills, putting more effort in homework, etc.)

- What are some things that you enjoy about this class? What are some things you don’t like? Do you have any suggestions as to what would make the class better?
APPENDIX C  NEW JERSEY STUDENT LEARNING STANDARDS
NEW JERSEY STUDENT LEARNING STANDARDS

4 - Mathematics
8 - Technology
9 - 21st Century Life and Careers
APPENDIX D       CURRICULUM MODIFICATIONS & ADAPTATIONS
There is no recipe for adapting general education curriculum to meet each student’s needs. Each teacher, each student, each classroom is unique and adaptations are specific to each situation.

Keep in mind that curriculum does not always need to be modified. By providing multi-level instruction you will find that adapting a lesson may not always be necessary. Differentiating instruction and providing multiple ways assess allows more flexibility for students to meet the standards and requirements of the class. At other times, the curriculum can be made more accessible through accommodations. In addition, supports for one student may not necessarily be the same in all situations, e.g., a student who needs full time support from a paraprofessional for math may only need natural supports from peers for English, and no support for art. And, supports should not be determined by the disability label, instead supports should be used when the instructional or social activity warrants the need for assistance. (Fisher and Frey, 2001).

The forms and examples on the following pages provide information about curriculum and types of adaptations that could be considered in developing the appropriate strategy for a particular student. Examples are provided for both elementary and secondary levels.
A Curricular Adaptation and Decision-making Process

This decision-making flowchart can be used to conceptualize the process of selecting and implementing curricular adaptations. It should be used as a tool for a team in determining an individual student’s needs.

1. Identify the student’s individual educational goals and objectives to be emphasized during general education activities
2. Articulate the expectations for the student’s performance in general education activities
3. Determine what to teach
   - As a team, determine the content of the general education activity, theme or unit study
4. Determine how to teach
   - As a team, determine if, without modification, the student can actively participate and achieve the same essential outcomes as non-disabled classmates. If the student cannot achieve the same outcomes...
5. Select of design appropriate adaptations
   - Select instructional arrangement
   - Select lesson format
   - Employ student-specific teaching strategies
   - Select curricular goals specific to the lesson
   - Engineer the physical and social classroom environment
   - Design modified materials
   - Select natural supports and supervision arrangements
6. If the above adaptation strategies are not effective, design an alternative activity
7. Evaluate effectiveness of adaptations
A Curricular Adaptation and Decision-making Model

Examine the Structure of the Instruction

1. Can the student actively participate in the lesson without modification? Will the same essential outcome be achieved?
2. Can the student’s participation be increased by changing the instructional arrangement?
   - From traditional arrangements to:
     • Cooperative groups
     • Small groups
     • Peer partners
     • Peer or cross-age tutors
3. Can the student’s participation be increased by changing the lesson format?
   • Interdisciplinary/thematic units
   • Activity-based lessons, games, simulations, role-plays
   • Group investigation or discovery learning
   • Experiential lessons
   • Community-referenced lessons
4. Can the Student’s participation and understanding be increased by changing the delivery of instruction or teaching style?

Examine the Demands and Evaluation Criteria of the Task

5. Will the student need adapted curricular goals?
   • Adjust performance standards
   • Adjust pacing
   • Same content but less complex
   • Similar content with functional/direct applications
   • Adjust the evaluation criteria or system (grading)
   • Adjust management techniques

Examine the Learning Environment

6. Can the changes he made in the classroom environment or lesson location that will facilitate participation?
   • Environmental/physical arrangements
Examine the Materials for Learning

7. Will different materials be needed to ensure participation?
   - Same content but variation in size, number, format
   - Additional or different materials/devices
   - Materials that allow a different mode of input
   - Materials that allow a different mode of output
   - Materials that reduce the level of abstraction of information

Examine the Support Structure

8. Will personal assistance be needed to ensure participation?
   - From peers or the general education instructor?
   - From the support facilitator’?
   - From therapists’?
   - From paraprofessionals?
   - From others?

Arrange Alternative Activities that Foster Participation and Interaction

9. Will a different activity need to be designed and offered for the student and a small group of peers?
   - In the classroom
   - In other general education environments
   - In community-based environments

## Curriculum Adaptations

It is important to correlate adaptations with the IEP. In other words, we are not adapting for adaptations sake but, to meet the student’s needs as identified on an IEP.

<table>
<thead>
<tr>
<th>a. <strong>Curriculum as is.</strong> This is the type we forget most frequently. We need to constantly be looking at the general education curriculum and asking if the students on IEPs may gain benefit from participating in the curriculum as is. We need to keep in mind that incidental learning does occur. Curriculum as is supports outcomes as identified in standard curriculum.</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. <strong>Different objective within the same activity and curriculum.</strong> The student with an IEP works with all the other students in the classroom participating in the activity when possible but, with a different learning objective from the other students. This is where the principle of partial participation fits. Examples include:</td>
</tr>
<tr>
<td>c. <strong>Material or environmental adaptations.</strong> The material or environmental changes are utilized so that participation in the general education curriculum by the student with the IEP may occur. Examples include:</td>
</tr>
<tr>
<td>Move in this direction only when necessary</td>
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<tr>
<td>• A student with a short attention span staying on task for 5 minutes.</td>
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<tr>
<td>• Using a switch to activate communication devices to share during a class discussion.</td>
</tr>
<tr>
<td>• Expressing one’s thoughts by drawing in a journal instead of writing.</td>
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<tr>
<td>• Holding a book during reading time.</td>
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<tr>
<td>• Understanding the effect World War II has on the present rather than knowing the names and dates of key battles.</td>
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<tr>
<td>• 5 spelling words from the weekly list instead of the standard 20.</td>
</tr>
<tr>
<td>• Completing a cooking assignment by following picture directions rather than written directions.</td>
</tr>
<tr>
<td>• Changing the grouping of the class from large group to small groups (possible with the additional support staff).</td>
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<tr>
<td>• Changing the instructional delivery from lecture to the cooperative learning format.</td>
</tr>
<tr>
<td>• Using a computer to write an assignment instead of paper and pencil.</td>
</tr>
<tr>
<td>• Reading a test to a student.</td>
</tr>
<tr>
<td>• Highlighting the important concepts in a textbook.</td>
</tr>
<tr>
<td>• Having the student listen to a taped textbook.</td>
</tr>
<tr>
<td>• Using enlarged print.</td>
</tr>
<tr>
<td>• Using assistive technology device.</td>
</tr>
<tr>
<td>• Using visual cues such as picture and/or word schedules for those who have difficulty staying on task.</td>
</tr>
<tr>
<td>• Using a note taking guide listing the key concepts during a lecture.</td>
</tr>
</tbody>
</table>
d. Providing Physical assistance. Assistance from another person may be needed for a student to participate in a classroom activity. If possible, it is better to use natural supports (peers) as these will be the people always present in the student’ life. If the use of peers is not possible, then either the support teacher, the paraprofessional, the classroom teacher, the classroom aide, or a parent volunteer may provide the assistance. Most peers and staff will need training in the correct way of providing physical assistance. In addition, we need to keep in mind the principle of partial participations. Examples include:

- Starting a computer for an student with an IEP to use.
- Guiding a hand during handwriting.
- Assisting in activating a switch.
- Completing most of the steps of an activity and having a student with an IEP do the remainder.
- Pushing a student in a wheelchair to the next activity.

e. Alternative/substitute curriculum. This is sometimes referred to as functional curriculum as it usually involves the acquisition of “life skills.” The decision to use alternative/substitute curriculum is a major change and needs to be reflected on the IEP. This decision should be carefully made after weighing all of the pros and cons of using an alternative curriculum. The alternative curriculum may or may not take place in the general education classroom. Examples include:

- Community-based instruction (which all students may benefit from!)
- Learning job skills in the school cafeteria.
- Learning how to use a communication device.
- Doing laundry for the athletic department.
- Learning cooking/grooming skills at the home.

Overlap does occur among the five types of curriculum adaptations.
## Nine Types of Adaptations

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapt the way instruction is delivered to the learner.</td>
<td>Adapt how the learner can respond to instruction</td>
<td>Adapt the time allotted and allowed for learning, task completion or testing.</td>
</tr>
<tr>
<td><em>For example:</em> Use different visual aids; plan more concrete examples; provide hands-on activities; place students in cooperative groups.</td>
<td><em>For example:</em> Allow a verbal vs. written response; use a communication book for students; allow students to show knowledge with hands-on materials.</td>
<td><em>For example:</em> Individualize a timeline for completing a task; pace learning differently (increase or decrease) for some learners.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Level of Support</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapt the skill level, problem type, or the rules on how the learner may approach the work.</td>
<td>Increase the amount of personal assistance with specific learner.</td>
<td>Adapt the number of items that the learner is expected to learn or compete.</td>
</tr>
<tr>
<td><em>For example:</em> Allow a calculator for math problems; simplify task directions; change rules to accommodate learner needs.</td>
<td><em>For example:</em> Assign peer buddies, teaching assistants, peer tutors or cross-age tutors.</td>
<td><em>For example:</em> Reduce the number of social studies terms a learner must learn at any one time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree of Participation</th>
<th>Alternate Goals</th>
<th>Substitute Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapt the extent to which a learner is actively involved in the task.</td>
<td>Adapt the goals or outcome expectations while using the same materials.</td>
<td>Provide the different instruction and materials to meet a learner’s individual goals.</td>
</tr>
<tr>
<td><em>For example:</em> In geography, have a student hold the globe, while others point out the locations.</td>
<td><em>For example:</em> In social studies, expect one student to be able to locate just the states while others learn to locate capitals as well.</td>
<td><em>For example:</em> Individualize a timeline for completing a task; pace learning differently (increase or decrease) for some learners.</td>
</tr>
</tbody>
</table>

Adaptations

Creating Ways to Adapt Familiar Lessons - Elementary

1. Select the subject area (and grade level) to be taught:
   reading  math  science  social studies  writing  music  health  P.E.  art
   Grade Level: ................................

2. Select the lesson topic to be taught (on one day):

3. Briefly identify the *curricular* goal for most learners: By the end of this class, most students will know .................................................................

4. Briefly identify the *instructional* plan for most learners: As teacher, I will .................................................................

5. Identify the name(s) of the learner(s) who will need adaptations in the curriculum or instructional plan:

6. Now use “Nine Types of Adaptations” as a means of thinking about some of the ways you could adapt what or how you teach to accommodate this learner in the classroom for this lesson.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty</td>
<td>Level of Support</td>
<td>Size</td>
</tr>
<tr>
<td>Degree of Participation</td>
<td>Alternate Goal</td>
<td>Substitute Curriculum</td>
</tr>
</tbody>
</table>
Creating Ways to Adapt Familiar Lessons - Elementary

1. Select the subject area (and grade level) to be taught:
   - [ ] reading  [ ] math  [ ] science  [ ] social studies  [ ] writing  [ ] music  [ ] health  [ ] P.E.  [ ] art
   Grade Level: .......... 4 ..........

2. Select the lesson topic to be taught (on one day): Vocabulary comprehension

3. Briefly identify the curricular goal for most learners: By the end of this class, most students will know the meaning of new vocabulary words from their story.

4. Briefly identify the instructional plan for most learners: As teacher, I will ask students to complete a matching activity in which they match words and definitions on paper. The students will also choose one word and write a sentence using the word on the bottom of their paper.

5. Identify the name(s) of the learner(s) who will need adaptations in the curriculum or instructional plan: Kim

6. Now use “Nine Types of Adaptations” as a means of thinking about some of the ways you could adapt what or how you teach to accommodate this learner in the classroom for this lesson.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place students in cooperative groups and divide the task between group members. Each member teaches their vocabulary work to team members.</td>
<td>Allow the student to record all or part of the assignment on tape.</td>
<td>Ask the student to complete the assignment at home and return it the next day.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Level of Support</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select different vocabulary words for the student to learn; words that are less difficult or in some cases more difficult.</td>
<td>Ask a classmate, peer tutor or teaching assistant to assist in completing the assignment.</td>
<td>Select fewer (or more) words for the student to learn, but leave the assignment the same as for other students.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree of Participation</th>
<th>Alternate Goal</th>
<th>Substitute Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask the student to check classmates’ definitions against as answer key.</td>
<td>Set the goal as being to write the words only, or being able to pronounce the words, or just listening to the words and definitions.</td>
<td>Choose a different story for the student to read and identify one or several words the learner needs to know.</td>
</tr>
</tbody>
</table>

Center for School & Community Integration, Institute for the Study of Developmental Disabilities, Indiana University, Bloomington, IN
Creating Ways to Adapt Familiar Lessons - Secondary

1. Select the subject area (and grade level) to be taught:
   math    science    history    literature    business    P.E.    fine arts    health
   Grade Level: __________________

2. Select the lesson topic to be taught (on one day):

3. Briefly identify the **curricular** goal for most learners: By the end of this class, most students will know
   ..........................................................................................................................

4. Briefly identify the **instructional** plan for most learners: As teacher, I will ..........................................................................................................................

5. Identify the name(s) of the learner(s) who will need adaptations in the curriculum or instructional plan:
   ..........................................................................................................................

6. Now use “Nine Types of Adaptations” as a means of thinking about some of the ways you could adapt what
   or how you teach to accommodate this learner in the classroom for this lesson.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Creating Ways to Adapt Familiar Lessons - Secondary

1. Select the subject area (and grade level) to be taught:
   - math
   - science
   - history
   - literature
   - business
   - P.E.
   - fine arts
   - health

   Grade Level: 10

2. Select the lesson topic to be taught (on one day): **Concept comprehension**

3. Briefly identify the curricular goal for most learners: By the end of this class, most students will be able to define and explain the relevance of five concepts from their text chapter.

4. Briefly identify the instructional plan for most learners: As teacher, I will ask the students to read the chapter, identify five key concepts and write a short paragraph describing each concept they have chosen.

5. Identify the name(s) of the learner(s) who will need adaptations in the curriculum or instructional plan:
   - John

6. Now use “Nine Types of Adaptations” as a means of thinking about some of the ways you could adapt what or how you teach to accommodate this learner in the classroom for this lesson.

<table>
<thead>
<tr>
<th>Input</th>
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<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide a review of the chapter prior to having the student complete the written work.</td>
<td>Allow the student to use a tape recorder to dictate the assignment instead of having to write the answers.</td>
<td>Allow the student an extra day to complete the task either in study hall or at home.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Level of Support</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the key concepts for the student but keep the remainder of the assignment the same.</td>
<td>Place the students in cooperative groups to complete this assignment. Group members can assist the student with reading or writing.</td>
<td>Select fewer or more concepts for the student to learn, but leave the assignment the same as for other students.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree of Participation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ask the student to pick out related books from the library that will provide supplementary information for classmates.</td>
<td>Set the goal as being to write the key concept words only, or being able to pronounce the words, or just listening to the words and descriptions.</td>
<td>During this lesson the student can work on keyboarding skills in the computer lab.</td>
</tr>
</tbody>
</table>
## Thematic Lesson Plan

<table>
<thead>
<tr>
<th>School Name</th>
<th>Class</th>
<th>Unit</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>Room:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age:</td>
<td></td>
</tr>
<tr>
<td>Grade:</td>
<td></td>
</tr>
<tr>
<td>Parent/Guardian:</td>
<td>Phone:</td>
</tr>
<tr>
<td>Classroom Teacher:</td>
<td>Inclusion Support Teacher:</td>
</tr>
</tbody>
</table>

### Major standards, objectives and expectations for the unit

### Materials, books, media, worksheets, software, etc.

| Items requiring accommodations and/or modifications |

### Instructional arrangements. Time and opportunities for large group, small group, core, group, learning centers, individual activities, non-classroom instruction. Does it change day to day? Explain:

| Items requiring accommodations and/or modifications |

### Projects, supplemental activities, and homework

| Items requiring accommodations and/or modifications |

### Assessment(s) and final products. Summarize actual student performance (attach examples as appropriate) on the reverse.

| Items requiring accommodations and/or modifications |
## Thematic Lesson Plan

### School Name: Palm View Elementary
### Class: Social Studies
### Unit: More Alike Than Different

### Student Name: Corey Santos
- Age: 8
- Grade: 2
- Parent/Guardian: Ms. Anita Santos
- Phone: 555-5432
- Classroom Teacher: Mr. Sean Garrett
- Inclusion Support Teacher: Ms. Tangelia Hunter

### Major Standards, Objectives and Expectations for the Unit
1. Understand why personal and civic responsibility are important.
2. Understand the cultural traditions and contributions of various societies and groups.
3. Display appreciation of diversity in our society, including cultural, gender, and ability.

### Materials, books, media, worksheets, software, etc.
1. Children’s books on topic
2. “Chocolates” posterboard (Activities for a Diverse Classroom)
3. Family interview questions
4. Slides and overheads

### Materials requiring accommodations and/or modifications
1. Some books on tape
2. Highlighted posterboard
3. Fewer questions - done on audio tape

### Instructional arrangements, Time and opportunities for large group, small group, cross group, learning centers, individual activities, non-classroom instruction
- Does it change day to day? Explain:
  1. Large group for read aloud
  2. Interactive lessons using various media
  3. Cooperative groups to complete Hyperstudio project
  4. Small group for chocolate activity

### Instructional arrangements requiring accommodations and/or modifications
- Modify if necessary
- Paraprofessional assistance with computer

### Projects, supplemental activities, and homework
1. “Box of Chocolates” activity (Activities for a Diverse Classroom)
2. Hyperstudio group project: Are We More Alike Than Different?
3. Homework - family interview

### Projects, supplemental activities, and homework requiring accommodations and/or modifications
1. Highlight posterboard of key points
2. Select task items at student’s instructional level
3. Provide word bank or magazine pictures

### Assessment and final products. Summarize actual student performance (attach examples as appropriate) on the reverse.
1. Completion of group activities
2. Rubric for Hyperstudio presentation
3. Family interview

### Assessment and final products requiring accommodations and/or modifications
1. Assess on use of language
2. Modify rubric
## Thematic Lesson Plan

**School Name:** Palm View Elementary  
**Class:** Language Arts  
**Unit:** One Book, Two Book, Red Book, Blue Book: Author Study of Dr. Seuss  
**Room:** 21

### Student Information
- **Name:** Corey Santos  
- **Age:** 8  
- **Grade:** 2  
- **Parent/Guardian:** Ms. Anita Santos  
- **Phone:** 555-5432  
- **Classroom Teacher:** Ms. Sean Garrett  
- **Inclusion Support Teacher:** Ms. Tangula Hunter

### Major standards, objectives and expectations for the unit
1. Increase comprehension by rereading, retelling, and discussion.  
2. Determine the main idea in nonprint communication.  
3. Write, question, and make observations about familiar topics, stories, and new experiences.  
4. Recognize personal preferences in literature.

### Materials, books, media, worksheets, software, etc.
- 1. Dr. Seuss books;  
- 2. Formatted reflective journal;  
- 3. Summary sheet to be completed on each book;  
- 4. Family response journal (homework);  
- 5. Video versions of Dr. Seuss books;  
- 6. Computer - ClarisWorks program;  
- 7. Biographical source materials

### Items requiring accommodations and/or modifications
- 2. Pictures available for use in journal  
- 6. Picture vocabulary writing program  
- 7. Taped readings of source materials

### Instructional arrangements, time and opportunities for large group, small group,  
corporate group, learning centers, individual activities, non-classroom instruction.  
Does it change day to day? Explain:  
1. Large group for K-W-L chart;  
2. Large group read aloud;  
3. Read-write-pair-share;  
4. Individual journal writing;  
5. Partner research in media center;  
6. Concept web of themes;  
7. Small group editing

### Items requiring accommodations and/or modifications
1. Preview for prior knowledge  
3. Picture schedule of activity  
4. Design with sentence stems  
5. Create list of materials to locate  
6. Pictures for web  
7. Picture checklist of process

### Projects, supplemental activities, and homework
- 1. Read 2 books-parent and child write in response journal (homework);  
- 2. Choose 4 books from list (one must be a video), analyze for common themes;  
- 3. Analyze for a kindergarten, then read aloud to him or her

### Items requiring accommodations and/or modifications
1. Parent tips for activity  
2. Assistance in selecting books

### Assessment(s) and final products. Summarize actual student performance  
(attach examples as appropriate) on the reverse.
- 1. Reflective journal entries  
- 2. Author project rubric of presentation  
- 3. Self-assessment of kindergarten reading  
- 4. Portfolio selection

### Items requiring accommodations and/or modifications
1. Reduce rubric to focus on thematic analysis  
3. Use pictures to support self-assessment

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*PEAK Parent Center, Inc. 1999*
### Academic Unit Lesson Plan

<table>
<thead>
<tr>
<th>School Name</th>
<th>Class</th>
<th>Unit</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Class Schedule</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent/Guardian</td>
<td>Phone</td>
<td></td>
</tr>
<tr>
<td>Advocate Teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom Teacher</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Major standards, objectives and expectations for the unit**

<table>
<thead>
<tr>
<th>Materials, books, media, worksheets, software, etc</th>
<th>Items requiring adaptations and/or modifications</th>
</tr>
</thead>
</table>

**Instructional arrangements. Time and opportunities for large group, small group, core group, learning centers, individual activities, non-classroom instruction. Does it change day to day? Explain.**

<table>
<thead>
<tr>
<th>Items requiring adaptations and/or modifications</th>
</tr>
</thead>
</table>

**Projects, supplemental activities, and homework**

<table>
<thead>
<tr>
<th>Items requiring adaptations and/or modifications</th>
</tr>
</thead>
</table>

**Assessment(s) and final products. Summarize actual student performance (attach examples as appropriate) on the reverse.**

<table>
<thead>
<tr>
<th>Items requiring adaptations and/or modifications</th>
</tr>
</thead>
</table>
### Academic Unit Lesson Plan

**School Name:** Central  
**Class:** Biology  
**Unit:** The Cell

**Student Name:** Kelley Glass  
**Age:** 15  
**Grade:** 10  
**Parent/Guardian:** Ms. Rebecca Glass  
**Phone:** 555-1212  
**Advocate Teacher:** Mr. David Porter  
**Classroom Teacher:** Ms. Janita Foucheh

**Class Schedule:**  
Block 1: Math  
Block 2: English  
Block 3: Biology  
Block 4: World Geography  
Block 5: 3-D Art

**Room:**  
Block 1: 212  
Block 2: 149  
Block 3: 10  
Block 4: 150  
Block 5: 17

**Major standards, objectives and expectations for the unit:**
1. Students will understand the structure and function of the cell.
2. Students will identify the parts of the cell.
3. Students will identify how cells are organized in multi-cellular organisms.

#### Materials, books, media, worksheets, software, etc.
1. **Book:** Modern Biology  
2. Educational video/CDs related to chapter contents  
3. Art supplies for cell projects  
4. Chapter worksheets  
5. Primary source: Science magazine article on the cell  
6. Local biology professor to discuss current research on cells

**Items requiring adaptations and/or modifications:**
1. Order textbook from publisher on cassette.  
2. Modify worksheets to emphasize key points of chapters.  
3. Record science magazine article on audio tape.

#### Instructional arrangements: Time and opportunities for large group, small group, co-op group, learning center activities, non-classroom instruction. Does it change day to day? Explain:
1. Large group instruction with overheads to introduce the cell  
2. Small groups to complete labs, worksheets, mind map, and chapter review  
3. Two cell labs will be completed in partners (onion skin & Jell-O)  
4. Individual time to complete illustrated vocabulary

**Items requiring adaptations and/or modifications:**
1. Copy of teacher's overhead transparencies given to students.  
2. Peer reads notes and highlights key points; student types on to computer for both  
3. Use of "Read, write, pair, share" strategy (see description on page 12) as chapter review.

#### Projects, supplemental activities, and homework:
1. **Homework:** Complete vocabulary, bring in Jell-O cell food items  
2. "Design a cell" and "Parts of the cell" group projects & presentations  
3. Write-up for each completed lab with illustrations

**Items requiring adaptations and/or modifications:**
1. Magazine pictures to illustrate the meaning of vocabulary words  
2. Lab write-up sheet completed with peer using computer graphics & illustrations to supplement write-up

#### Assessment(s) and final products: Summarize actual student performance (attach examples as appropriate) on the reverse.
1. Add illustrated vocabulary words to class portfolio  
2. Cultivating activity: "Design a cell" and "Parts of the cell" projects  
3. Chapter test

**Items requiring adaptations and/or modifications:**
3. Chapter test read orally with additional time given, reducing the number of options for multiple choice questions to focus on major concepts, and providing options for short answer questions.
# MTH323 - Probability, Statistics and Discrete Math

## Tools for Teachers
### Curriculum Modifications & Adaptations

## Sample Form

### Academic Unit Lesson Plan

<table>
<thead>
<tr>
<th>School Name:</th>
<th>Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class:</td>
<td>Sophomore</td>
</tr>
<tr>
<td>English:</td>
<td>Unit: OF Mice and Men</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>Kelley Glass</th>
<th>Class Schedule:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age:</td>
<td>15</td>
<td>Block 1: Math</td>
</tr>
<tr>
<td>Grade:</td>
<td>10</td>
<td>Block 2: English</td>
</tr>
<tr>
<td>Parent/Guardian: Ms. Rebecca Glass</td>
<td>Phone: 555-1212</td>
<td>Block 3: Biology</td>
</tr>
<tr>
<td>Advocate Teacher: Mr. David Porter</td>
<td>Classroom Teacher: Ms. Shari Moore</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Room:</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 4: World Geography</td>
<td>Block 5: 3-D Art</td>
</tr>
<tr>
<td>147</td>
<td>17</td>
</tr>
</tbody>
</table>

### Major standards, objectives and expectations for the unit:
1. Students will evaluate their beliefs related to prejudice and diversity.
2. Students will learn about the plight of the migrant farm worker.
3. Students will learn about the times during the Depression and the time period in which Steinbeck did his writing.

### Materials, books, media, worksheets, software, etc.
1. Copy of the short story "The Circuit" by Francisco Leal
2. Copy of the novel OF Mice and Men by John Steinbeck
3. Worksheets for each of the six chapters
4. Video of the book OF Mice and Men
5. Video camera
6. "I Am" Poem, to use with "The Circuit"
7. "Open Mind" worksheet (see activity under Projects)
8. Circle of Friends worksheet (see activity under Projects)

### Items requiring adaptations and/or modifications
1. Audio/visual recap of the short story "The Circuit"
2. Audio/visual recap of the novel OF Mice and Men
3. Reconfigure chapter summary worksheets and comprehension questions using visuals, pictures, or yes/no format

### Instructional arrangements, time and opportunities for large group, small group, coop group, learning centers, individual activities, non-classroom

1. Large group instruction for introduction of the time period, Steinbeck, the Depression, and migrant farm workers; use of opening question in Socratic dialogue format: Are my brother's keeper?
2. Small groups for "I Am" poem for "The Circuit"
3. Student pairs to complete worksheets
4. Large group presentation for trial of George (with every student having a part in the trial)

### Projects, supplemental activities, and homework
1. Class complete chapter worksheets
2. "I Am" poem on short story "The Circuit" Students complete outline of short story that includes descriptive phrases, parallel structure within lines, and constructive thinking
3. Student trial of George for killing Louisa
4. Homework: review worksheet, some reading of novel at home
5. Illustration of vocabulary words
6. "Open Mind" activity: students fill in thoughts from the perspective of specified characters
7. Circle of Friends activity: students complete circular diagram to identify their relationships with family and friends; students complete similar diagram for Louisa's character (from OF Mice and Men)

### Assessments and final products: Summarize actual student performance (attach examples as appropriate) on the reverse.
1. Trial presentation/handout
2. Objective test
3. Evaluative essay

### Items requiring adaptations and/or modifications
1. Reconfigured worksheets completed on the computer with the peer tutor
2. Give options for responses for completing poem (3 choices for each line of the poem)
3. Listen to audio/visual and/or family members read book
4. Rehearse part in play with picture cards
5. Word bank to use for completing "Open Mind" activity

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PEAK Parent Center, Inc. 1999
Glossary: Basic technology terms for preschool: Examples digital camera, battery, screen, computer, Internet, mouse, keyboard, and printer. Controversial issue: For example, global warming, scarcity of water, alternative energy sources, election campaigns. Current and emerging technology resources: For example, cell phones, GPS, online communities using wikis, blogs, vlogs, and/or Nings. Data-collection technology: For example, probes, handheld devices, and geographic mapping systems. Digital learning game: For example, Alice, Lively. Developmentally appropriate: Students’ developmental levels prescribe the learning environment and activities that are used. Digital tools for grade 2: For example, computers, digital cameras, software. Digital tools for grades 4, 8, and 12: For example, computers, digital cameras, probing devices, software, cell phones, GPS, online communities, VOIP, and virtual conferences. Electronic authoring tools: Software that facilitates online book development (e.g., multimedia electronic book). Mapping tools: For example, Google earth, Yahoo maps, and Google maps. Media-rich: Multiple forms of digital applications in one product (e.g., graphic design, word processing, and spreadsheet). Multimedia presentation: For example, movie, podcast, vlog. Online discussion: UNICEF, Oracle, i-Earn, blogs, wikis. Online learning community: For example, i-Earn, Ning, blogs, wikis, Second Life. Operations and related applications: For example, saving a word processing file to a network drive, printing a spreadsheet. Reverse engineer: To isolate the components of a completed system. Shared hosted services: For example, podcasts, videos, or vlogs. Technologies: Medical, agricultural, and related biotechnologies, energy and power technologies, information and communications technologies, transportation technologies, manufacturing technologies, and construction technologies. Virtual environments: For example, games, simulations, websites, blogs. Web-based publication: For example, web pages, wikis, blogs, ezines.