

Innovative Learning Strategies in Math Course Outline

Course Number: 106
Level: College Prep C
Textbook: None
Number of Credits 5
Revised: June, 2009

Prerequisite

Ninth grade students are placed in this course based on their scores on the ASK 8, as well as other indicators.

Course Description

Innovative Learning Strategies is a course that accompanies the first year of our practical level program. It is designed for 9th grade students who have not shown proficiency on the ASK 8. The Innovative Learning Strategies course is aligned with both the Core Curriculum Content Standards and the HSPA proficiencies. Areas studied are number sense, ratio and proportion, percents, patterns, multiples, factors, and exponents. Mathematical reasoning and problem solving are emphasized throughout the course.

District Policy: Equal Opportunity

High Point Regional High School's curriculum and instruction are aligned to the State's Core Curriculum Content Standards and address the elimination of discrimination by narrowing the achievement gap, by providing equity in educational programs and by providing opportunities for students to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

New Jersey Core Curriculum Content Standards Addressed:

- **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.

- **Standard 4.3: Patterns and Algebra**

All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions and algebraic concepts and processes.

- **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.

- **Standard 4.5: Mathematical Processes**

All students will develop an understanding of the methods of problem solving. They will be able to communicate their answers in a mathematical fashion and make connections between real-life applications. They will use reasoning in order to determine and select the best process in order to solve problems. In addition they will use representations to display their work. The students will incorporate technology throughout the curriculum.

Course Objectives:

The student will be expected to succeed in meeting the following course objectives.

- Demonstrates the ability to set reasonable goals.
- Demonstrates the responsibility for carrying out self-set goals.
- Demonstrates cooperation by working constructively with other students.
- Demonstrates cooperation with the instructor by using time constructively and with purpose, relative to course oriented goals.
- Demonstrates cooperation with the instructor by performing requested special program oriented tasks.
- Demonstrates independence by exploring all possible avenues in the solution of problems with the minimum of help.
- Demonstrates independence and scholastic growth by using resources efficiently.
- Progresses at a rate satisfactory to the teacher.

Course Proficiencies

Students will be able to:

1. Extend their understanding of the number system by constructing meanings for rational numbers, percents, and whole numbers with exponents.
2. Understand and use ratios, proportions, and percents (including percents greater than 100 and less than 1) in a variety of situations.
3. Demonstrate a sense of the relative magnitudes of numbers and compare and order numbers of all named types.
4. Use and explain procedures for performing calculations with integers and all number types.
5. Understand and apply the standard algebraic order of operations, including appropriate use of parentheses.
6. Use equivalent representations of numbers such as fractions, decimals, and percents to facilitate estimation.

7. Understand and apply properties of polygons such as quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi, and regular polygons.
8. Use logic and reasoning to make and support conjectures about geometric objects.
9. Understand and apply the concept of similarity using proportions to find missing measures.
10. Use coordinates in four quadrants to represent geometric concepts.
11. Use a coordinate grid to model and quantify transformations.
12. Understand and apply transformations.
 - a. Finding the image of a geometric figure, given the pre-image, and vice-versa.
 - b. Use the sequence of transformations needed to map one figure onto another.
 - c. Use reflections, rotations, and translations that result in images congruent to the pre-image.
 - d. Use dilations (stretching/shrinking) that result in images similar to the pre-image.
13. Solve problems requiring calculations that involve different units of measurement within a measurement system.
14. Select and use appropriate units and tools to measure quantities to the degree of precision needed in a particular problem-solving situation.
15. Develop and apply strategies for finding perimeter, area, and volume.
16. Analyze functional relationships to explain how a change in one quantity can result in a change in another, using pictures, graphs, charts, and equations.
17. Recognize, describe, extend, and create patterns involving whole numbers, rational numbers, and integers.
18. Use models and algebraic formulas to represent and analyze sequences and series.
 - a. Explicit formulas for n th terms.
 - b. Sums of finite arithmetic series.
 - c. Sums of finite and infinite geometric series.
19. Develop an informal notion of limit.
20. Use inductive reasoning to form generalizations.
21. Extend understanding of the number system by constructing meanings for the following:
 - a. Exponents
 - b. Roots
 - c. Absolute values
 - d. Numbers represented in scientific notation
22. Select and use appropriate representations for sets of data, and measures of central tendency (mean, median, and mode).
 - a. Determine the type of display most appropriate for a given data set.
 - b. Construct a box-and-whisker plot and determine the upper and lower quartile.
 - c. Construct scatter plots.
 - d. Use calculators and computers used to record and process information.
 - e. Finding the median and mean (weighted average) using frequency data.
 - f. Determine the effect of additional data on measures of central tendency.
23. Interpret probabilities as ratios, percents, and decimals.
24. Model situations involving probability with simulations (using spinners, dice, calculators and computers) and theoretical models.
25. Estimate probabilities and make predictions based on experimental and theoretical probabilities.

26. Play and analyze probability-based games, and discuss the concepts of fairness and expected value.
27. Apply the multiplication principle of counting.
28. Use permutations in order to determine the number of possible outcomes.
29. Determine probabilities of compound events.
30. Explore the probabilities of conditional events (e.g., if there are seven marbles in a bag, three red and four green, what is the probability that two marbles picked from the bag, without replacement, are both red).
31. Model situations involving probability with simulations (using spinners, dice, calculators and computers) and theoretical models.
32. Use factorial notation
33. Use combinations to determine possible outcomes. (e.g., number of possible delegations of 3 out of 23 students).

Implementation of Technology

In this course, we will be using Study Island at least two days per week. Study Island will be used for homework assignments as well as for evaluation and benchmark achievement. Scientific calculators will be used on an everyday basis and graphing calculators will be used when appropriate.

Materials and Resources

- Study Island Software
- Teacher Generated Materials
- Scientific Calculators
- Various HSPA Preparation Books

Student Evaluation

Quizzes, based on the course proficiencies, will be given about once or twice a week. Major tests will be given at the end of each unit. An exam will be given at the end of each semester, covering all the work of the semester. Homework will be checked on a regular basis. Sometimes homework may be collected and graded. All work must be shown neatly to receive credit for assignments. Class work, including group work, will also be evaluated. The student's participation in the class assignment, as well as the completed assignment, will be considered in the grade. Study Island assignments will also count for a percentage of their grade.

Grades will be calculated according to the school grading policy and the following guidelines:

A Marking Period

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| 1. Quizzes and Tests | 70% - 80% |
| 2. Study Island Assignments | 10% - 15% |
| 3. Homework and Class Work | 10% - 15% |

B. Final Grade

1. Each Marking Period	20%
2. Midterm Exam	10%
3. Final Exam	10%

District Policy: ACADEMIC INTEGRITY

Pupils are expected to be honest in all of their academic work. This means that the students in this course will not engage in any of the following acts:

- Cheating on examinations or other school assignments, including but not limited to, the non-authorized use of books or notes, the use of crib sheets, copying from other students' papers, exchanging information with other students orally, in writing, or by signals, obtaining copies of the examination illegally and other similar activities. Cheating through the use of technology to exchange information on any school assignment, examination, etc. is prohibited. Technology is defined as, but not limited to, computers, telephones, text messaging, palm pilots, calculators, cameras or any other hand held device.
- Plagiarism is not permitted in term papers, themes, essays, reports, images, take-home examinations, and other academic work. Plagiarism is defined as stealing or use without acknowledgment of the ideas, words, formulas, textual materials, on-line services, computer programs, etc. of another person, or in any way presenting the work of another person as one's own.
- Falsifications, including forging signatures, altering answers after they have been graded, inserting answers after the fact, erasing of grader's markings, and other acts that allow for falsely taking credit.

A pupil found guilty of academic dishonesty may be subjected to a full range of penalties including, but not limited to reprimand and loss of credit for all of the work that is plagiarized. Disciplinary action may also be a consequence of such behavior. Additional consequences may apply as defined in specific department policies and guidelines.

A teacher who believes that a pupil has been academically dishonest in his/her class should resolve the matter in the following manner:

- Reprimand the student orally and/or in writing. The teacher is also authorized to withhold credit in the work due to academic dishonesty.
- If warranted, the teacher shall file a written complaint against the student with the Administration, requesting a more stringent form of discipline. The complaint must describe in detail the academic dishonesty that is alleged to have taken place, and must request that the matter be reviewed by the Administration.
- The Administration will determine if further discipline of the pupil is appropriate, and will determine the nature of the discipline on a case-by-case basis.
- If the pupil is not in agreement with the disciplinary action of the Administration, he/she may appeal the action first to the Principal and secondly to the Superintendent. If the pupil is dissatisfied with the Superintendent's disposition of the case, he/she may grieve the action in accordance with Policy No. 5710, Pupil Grievance.