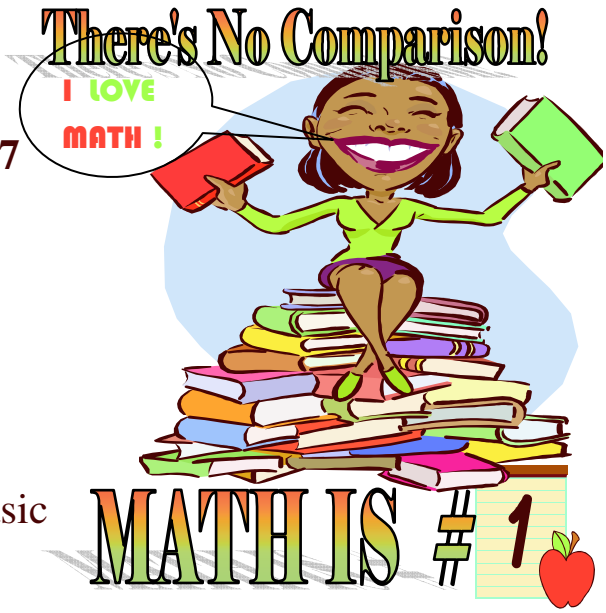

Algebra/Geometry Institute Summer 2007

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9th-12th Grade (Algebra II)

Teaching Objectives

The student will be able to solve basic probability problems.

Instructional Activities

Students will be asked: *If given three red cubes and two green cubes, what is the likelihood that if you put all of the cubes together, you will get a red cube*? I will then give each student the aforementioned arrangement of cubes. Students will be given a few minutes to use the cubes or mental reasoning to come up with a response. After listening to student responses, I will explain the solution to the problem. First, you will add the number of green cubes to the number of red cubes to get the total number of cubes. Then you will write the number of red cubes as your numerator and the total number of cubes as your denominator. This will give you the *probability* of choosing a red cube. I will then define probability.

- probability-the likelihood that a certain event will take place or a certain event will happen; the odds of a certain event taking place

- Probability can be expressed in a variety of ways: a:b; a out of b; a to b; $\frac{a}{b}$ where b is not zero.

After going over the definition of probability, I will discuss some ways probability is used in everyday life.

People who buy lottery tickets, people who do predictions of the weather, insurance statistics about the rate of theft in a particular city; these are all examples of the use of probability in everyday life. Some examples of the use of probability that may be of interest to the students would be attempting to determine the number of possible meal combinations at McDonald's or drink combinations at Sonic's Drive-In.

At this point, we are only introducing simple probability. Therefore, students must practice on various basic problems before moving on to problems involving the Binomial theorem. I will divide the students into groups of three and give each group a set of color blocks. Students will use the blocks with the worksheet activity if they need them to model either of the problems. I will then administer the attached worksheet with the remaining example problems and have students work in their groups while I observe their progress and help where needed. This will enable me to determine if they are grasping the concept. After about fifteen minutes, we will reassemble as a class and talk about the solutions they got to their problems and render correct solutions.

After working through each of the example problems on the board, students will be asked to come up with a problem involving probability based on one of their real-life situations. They can choose problems related to a sport they play, an extracurricular activity they participate in, or their favorite subject. I will give them an idea of how to come up with a problem based on the following: *The Jones' have eight children. One plays basketball, two play hockey, two play soccer, and three play football. What is the possibility that if you randomly picked one of the Jones' children that child would play football?*

I will explain to the students that they must first pay close attention to what is being asked and decide what

information is important in coming up with a solution. I will explain to them that it is important that we know the total number of children. It is also important that we know how many children play each sport. Then I will focus on the fact that the question is interested in the child or children that play football. We know that three of the children play football and that there are eight children total. Therefore, the probability of picking one of the Jones children who plays football is 3:8 or $\frac{3}{8}$. The example problem they come up with will be checked by me to ensure that it is, in fact, a valid representation of a probability problem. Once any necessary changes have been made to the problems, I will administer each student a problem from another student in a manner such that no student has his own problem. Students will solve these problems and their solutions will be evaluated for a grade. Since this is an introduction to probability, it is my intention to allow students to practice extensively so that they will be able to relate these simple concepts to higher order thinking problems at a later date.

Materials and Resources

Color blocks
Worksheet

Assessment

Observation of student responses in class will be one method I will use for assessment. As stated earlier, careful monitoring of student progress on in-class assignments will give me an indication as to whether or not a student is ready to move to the next level. Also, justification of their reasoning for problem solutions to the in-class examples will be used.

Probability

Directions: Read the following problems and provide the correct solution. If needed, you may use color blocks to model items or activities in the problems.

Kris has a lemonade stand. At her lemonade stand, she sells lemonade as well as some other items. Kris has sold all of her lemonade and only has five cakes, three cookies, and four bags of chips left. Based on this information, answer the following questions:

1. How many items does Kris have left to sell?

2. Suppose you made a trip to Kris's Lemonade stand and you wanted to buy a pickle, is it possible to buy a pickle? Why or why not?

3. Frank was in a hurry when he went to Kris' stand and he told her, "Just give me something, quick! It doesn't matter what!" What is the possibility of Kris handing him a bag of chips? A bag of chips or a bag of cookies? A bag of chips or a cake?

This summer, Vanessa plans to participate in summer activities at the community recreation center. One day, she saw the Rec center's director, Mrs. Hemphill. "Mrs. H., what kinds of activities will you guys offer at the Rec center this summer?" said Vanessa. Mrs. Hemphill replied, "Well, Vanessa, we will have swimming, boxing, miniature golf, softball, basketball, art, and basket weaving." "Basket weaving!" Vanessa exclaimed. "What a Drag! Well, you know I love to swim, and I was hoping you guys would have flag football. My brother has been showing me how to play." Mrs. Hemphill told Vanessa that she would mention it to her supervisor but in the meantime, the only activities that would be available are the ones she just mentioned.

1. How many activities is the Rec center offering this summer?

2. Suppose you wanted to play basketball at this Rec center during the summer. Your mom filled out a permission form to allow you to participate, but she wasn't paying attention when she checked the box beside the activity. You turned the form in before she realizes what she has done and it is now too late to change it. What are the odds that she checked the activity you were interested in?

3. If you wanted to go to this Rec center to play hockey during the summer, could you? Why or Why not?

4. If you wanted to make a basket for your mom or learn to throw a fastball, would the Rec center offer activities that would enable you to do these things? If yes, name the activities and write a proportion to represent the possibility of you randomly choosing one of your preferred activities. If no, write the probability of your chosen activity being chosen from the activities available at the Rec center.