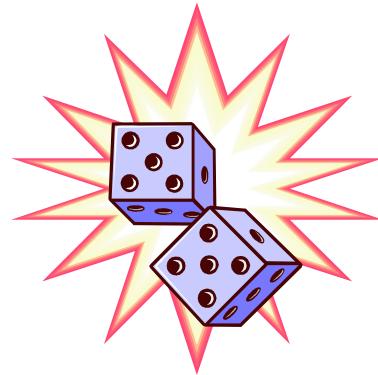# Algebra/Geometry Institute Summer 2005

Lesson Plan 2: Playing With Probability

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School: West Bolivar Middle School
Grade Level: 6th

1   Teaching objective(s)
       #10--Use probability to predict the outcome of a single event and express the result as a fraction or decimal


2   Instructional Activities
       The teacher begins class by saying, "If I had two quarters, three dimes, and one penny in my pocket, which coin would I have a better chance of pulling from my pocket without looking?" (Wait for student responses.) "Which coin would have the least chance of being pulled from my pocket?" (Wait for student responses.)

The teacher says, "What we will be doing today is using probability to predict the outcome of a single event and express the result as a fraction or decimal. Now who can tell me what they think the word probability means." (Wait for student responses.)

Using a transparency, the teacher defines probability (P) as a comparison between the number of favorable outcomes and the number of possible outcomes. The teacher will also write the following fraction on the transparency:

       (P) =<u>number of favorable outcomes </u>(a part of the total/whole)
             number of possible outcomes   (total/whole)

The teacher will then state that probability can also be expressed using a number line. (The following number line will be drawn on the transparency as well, and the teacher will discuss the numbers 0, 1/2 and 1 as they are written on the number line.)

0	½	1
Impossible	may/may not happen	certain
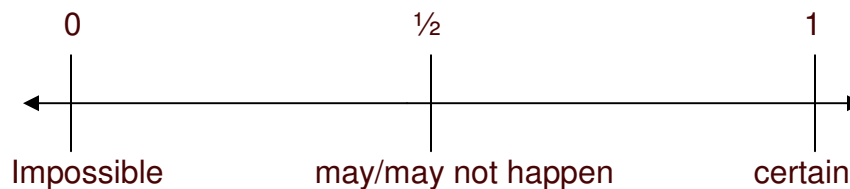
The teacher says, "We will begin finding probability using the number line first. I will need three volunteers to help me with this activity by forming a

number line." The first student will hold up a sheet of paper with 0 written on it; the second student will hold up a sheet of paper with ½ written on it; and the third student will hold up a sheet of paper with 1 written on it. The teacher will read some sentences and the remaining students will be asked to stand behind the person who represents the probability of that event. If the student chooses to stand behind the 0 or the ½, the teacher should ask the student to justify his or her answer or explain the reason he or she chose that answer.

The questions are to be read as follows:
1. What is the probability that the sun will shine tomorrow?
2. What is the probability that the sun will shine at midnight?
3. What is the probability that it will rain tomorrow?
4. What is the probability that the next baby born will be girl?
5. What is the probability that you will get out of school for spring break?
6. What is the probability that you will get out of school only 1 week for Christmas break?
7. What is the probability that Valentine's Day will come on February 14?
8. What is the probability that Christmas will come in January?
9. What is the probability that there will be 9 days in a week?
10. What is the probability that summer will begin in May?
11. What is the probability that Easter will fall in March?
12. What is the probability that Thanksgiving falls in November?
13. What is the probability that it will snow in January?
14. What is the probability that Good Friday falls on Thursday?
15. What is the probability that Mother's Day will fall in May?
(The teacher may want to add more questions in order to allow all students sitting a chance to participate.)

After commenting on the previous activity, the teacher says, "The next activity we will be doing will involve writing probability as a fraction and a decimal. I am going to place some colored counters on the overhead projector and ask some questions. (This activity may be done more than once by changing the number of counters being placed on the overhead projector.) First of all, I want you all to count the number of counters that you see. This number will be used to represent the number of possible outcomes for each question that I will ask. We will pretend that these counters were in a bag and we were going to pull them out one at a time." The teacher will ask a series of questions using the color of the counters placed on the overhead projector?

The following questions will be asked:
1. What is the probability of choosing a blue counter?
2. What is the probability of choosing a green counter?
3. What is the probability of choosing a purple or yellow counter?
4. What is the probability of not pulling a red counter?

5. What is the probability of not pulling a green counter?
6. Which counter has the greatest probability of being pulled from the bag?
7. Which counter has the least probability of being pulled from the bag?
8. What is the probability of pulling a <u>(state a color that is not visible)</u>?
9. What is the probability of pulling a blue and a yellow counter?

After answering questions 1-9, the teacher will have the students convert the answers to questions 1 through 5 to a decimal, without using a calculator. (Have the students round their answers to the nearest hundredth, if possible.)

After the completion of this activity, the students will complete a worksheet on probability (Attachment 1).

3   Materials and Resources
Chalkboard/whiteboard
Transparency
Overhead projector
Colored transparency counters
Worksheet (Attachment 1)
Paper
Pencil
Textbook: Harcourt Brace & Company; <u>Mathematics Plus</u>; Copyright 1994.

4   Assessment
The teacher will assess the students using their oral responses. The teacher will also observe the students as they complete their worksheet. The teacher will observe the students to make sure that they are writing the correct fractions and writing each fraction correctly as a decimal. The teacher may want to give the students "brownie points" for participating in all the activities.

Name: _____   Date: _____

Probability

Think about a number cube labeled 1, 3, 5, 7, 9 and 11. Use this information to answer questions 1 through 6.

1. What is the probability of rolling an odd number? _____

2. What is the probability of rolling an even number? _____

3. What is the probability of rolling a number less than 5? _____

4. What is the probability of rolling a number greater than 3? _____

5. What is the probability of rolling a number that is a factor of 45? _____

6. What is the probability of rolling a number that is composite? _____

For numbers 8-10, write the answers to numbers 3, 4, and 6 as a decimal rounded to the nearest hundredth.

7. _____   8. _____   9. _____

For number 10, complete the following table.

Experiment	Possible Outcomes	Probability
Pretend that you are drawing a card from the following deck of cards without looking: 2 white, 4 red, and 3 blue cards.	1. _____ 2. _____ 3. _____	1. P(white) _____ 2. P(blue) _____ 3. P(red or blue) _____

Use the table above to answer questions 11-13.

11. Which color has the least probability of being drawn? _____

12. Which color has the greatest probability of being drawn? _____

13. I have a probability of 1/9 of pulling a black card from the deck. Do you agree? Explain your answer.