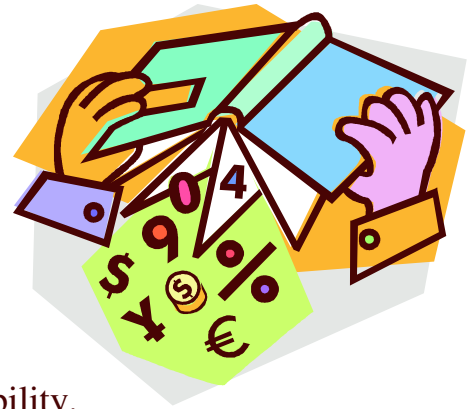


Algebra/Geometry Institute Summer 2007

Faculty Name: Bernard Berryhill
School: North Delta Alternative School
Sumner, MS
Grade Level: 8th



1. Teaching objective:

The student will calculate and apply basic probability.

2. Instructional Activities:

Opening

- With all the students' names written on folded strips of paper placed into a box, select a name and give that student a prize. Ask students if the event was fairly done. Ask students to brainstorm ways to alter the outcome of the drawing. Ask students to also brainstorm other related situations. Make a list of the students' responses.
- Discuss the key terms and definitions associated with this topic using the opening demonstration as a reference. (See below)

Key terms & definitions

1. A **probability** is a number between 0 and 1 that measures the likelihood of an event. A probability of 0 indicates that the event will not happen, and a probability of 1 indicates that the event is certain to happen.
2. An **event** is one outcome or a combination of outcomes. Examples of an event are tossing a coin, rolling a die, and selecting an item from a bag.
3. The **sample space** is the set of all possible outcomes. Some methods used to find the sample space includes using a list, tree diagram, the counting principle, permutations and combinations.
4. An **outcome** is one possible result of a probability event. For example, 4 is an outcome when a die is rolled.
5. The **probability of a certain outcome** is the ratio of the number of ways a certain outcome can occur to the number of possible outcomes. It is expressed as follows

$$p = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

Activity 1

Working in pairs, simply observing a ten (10)-section spinner, the students will construct on a dry erase board, the given number line to show the mathematical probability of an event.

- a. Landing on white
- b. Landing on red or orange
- c. Landing on blue
- d. Landing on yellow
- e. Landing on red, yellow, blue or orange

Label the line mathematical probability.

Now spin the spinner 25 times and use tally marks to record your data in the chart.

Colors	Number of Times
Red	
Yellow	
Blue	
Orange	

Based on the data in your chart, find the probability of the events above. Graph this on a separate number line. Label this line experimental probability.

Compare your number lines. How are they alike? How are they different?

Activity 2

Student A will place 20 cubes using orange, yellow and green cubes in a brown paper bag without Student B knowing how many of each is in the bag. Student B will render a “guess” at the amount of each color of cubes. Student B will then select 10 cubes without looking into the bag and record the data in the chart. Student B will put cubes back in bag, shake it and repeat selection process. This is done a total of 10 times.

1. Prior to selecting cubes from the bag, **GUESS**

How many orange cubes are in the bag? _____

How many yellow cubes are in the bag? _____

How many green cubes are in the bag? _____

2. Record your data in the chart provided.

Color	1	2	3	4	5	6	7	8	9	10
Orange										
Yellow										
Green										
Total	10	10	10	10	10	10	10	10	10	10

Using the data in the chart, **PREDICT**

How many orange cubes are in the bag? _____

How many yellow cubes are in the bag? _____

How many green cubes are in the bag? _____

3. List actual number of each color:

orange cubes _____ green cubes _____

yellow cubes _____

4. Compare your guess and your influenced data to the actual amounts of each cube.

5. Find the probability of each

a. P(yellow)

b. P(orange)

c. P(green)

6. If you had to choose one cube, what color is most likely to be selected? Why?

Activity 3

Using three coins, a quarter, nickel, and penny, student will create a tree diagram displaying the possible outcomes.

Find probability of

- a. $P(\text{exactly one tail})$
- b. $P(\text{at least one tail})$
- c. $P(\text{no heads})$
- d. $P(\text{exactly two heads})$
- e. $P(\text{more heads than tails})$
- f. $P(\text{an equal amount of heads and tails})$
- g. $P(\text{a head or a tail})$

If you flipped the three coins 100 times, about how many times would you have **more tails than heads**? **At least one head**?

Activity 4

Using miniature bags of candy of M & M's, find probability of each color. Predict amounts of each color in the large bag using your data and justify your prediction.

Find amounts of each color in large bag of candy.

Find probability of each color in large bag of candy.

Using data from both bags compare the relationship among the amounts of each color.

Materials:

Colored cubes

Coins

Overhead projector

Transparencies

Spinner

Dry erase boards

Resources:

Price, Jack, Rath, James N., & Leschensky, William, et. al. *Merrill Pre-Algebra: A Transition to Algebra Teacher's Edition*. Glencoe/McGraw Hill, 1995, pgs 620 – 627.

Assessment:

Students will be assessed by interview (activities 1, 2, 3 & 4), self assessment (activities 2 & 3) and performance tasks (activities 2 & 3). A teacher made test can be administered.

Probability Test

Name _____

Date _____

Grade _____

Score _____

Instructions: Choose the correct to the following questions.

1. Michael has a set of cards numbered 1 through 26. If Michael draws one card without looking, what is the probability that the number on the card will be multiple of 4?
A. $\frac{3}{13}$ B. $\frac{1}{4}$ C. $\frac{7}{26}$ D. $\frac{4}{13}$
2. Tom put 15 red balls, 20 black balls, and 12 orange balls in a box. If he takes one ball from the box without looking, what is the probability of taking a red ball?
A. $\frac{1}{4}$ B. $\frac{5}{13}$ C. $\frac{5}{18}$ D. $\frac{2}{9}$
3. Sarah put 18 buttons into a can. There are 8 black buttons, 7 brown buttons, and 3 red buttons. If Sarah takes a button from the jar without looking, what is the probability of taking a black button?
A. $\frac{1}{3}$ B. $\frac{7}{18}$ C. $\frac{1}{6}$ D. $\frac{4}{9}$
4. John's father owns a small automobile dealership. On the lot are 12 sports utility vehicles, 28 sports cars and 20 luxury cars. If John selects a car for his graduation present, what is the probability that he chooses a sports car?
A. $\frac{4}{7}$ B. $\frac{6}{25}$ C. $\frac{14}{25}$ D. $\frac{2}{5}$

