

Algebra/Geometry Institute Summer 2010

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School: Hayes Cooper Center

Grade Level: 6th



- 1 Teaching objective(s) The student will find the probability of a single event.
MS 1.f. Explain the relationship(s) among fractions, decimals, and percents and model and represent a specific quantity in multiple ways. (DOK 2)
- 2 Instructional Activities
Describe completely the class activities for your lesson.

Intro:

- A. Ask students the following question:
 - “How does knowing the number of favorable outcomes of an experiment help you find the theoretical probability of an event occurring?”
- B. Encourage students to give examples of probability from medicine or sports and from their own lives.
 - Weather forecasts are based on probability. (e.g. 70% chance for rain means that it has rained 70% of the time when specific conditions existed.)
 - Medical situations such as success rate for a specific type of surgery are based on probability. (A surgical procedure has a 98% success rate. This means that 98 out of 100 people have had this surgery successfully.)
 - In baseball a batter might go $\frac{3}{4}$. (This means that out of 4 at bats the batter was successful at hitting the ball 3 times.)
- C. Guide students to the conclusion that probability can be expressed as a fraction (or ratio), decimal or percent.

Activity 1:

- D. Group students into groups of two.
- E. Give each pair a blank spinner and have students to draw 8 numbers from 1 to 20 in order to label their spinners.
- F. Have students to count the even numbers on their spinners.
- G. Ask the students the following questions:
 - How does the number of even numbers on the spinner relate to the likelihood of spinning an even number? The more even numbers that are

present on your spinner, the more likely you are to spin and land on an even number.

- Suppose you categorize all the numbers on your spinner so that each number is in one of two categories. If one of the categories is “numbers that include the digit 2,” what would the other category be? Numbers that do not include the digit 2.

H. Have students count the numbers divisible by 3 on their spinners.

I. Ask students the following question:

- What fraction of the total number of sections are numbers divisible by 3 on your spinners?

Activity 2:

J. Give each pair a bag, index cards and a finding probability worksheet.
(Attachment 2)

K. Tell students to follow the directions on the handout for #1 and #2.

L. Allow each group to share their findings.

M. Introduce the definition of theoretical probability. Teacher will use transparency.
(Attachment 1)

N. Allow time for student questions.

Part 2 of Activity 2:

O. Direct students’ attention to #3 and #4 of part 2 (attachment 2) of the handout which involves finding the ratio of favorable outcomes to possible outcomes.

P. Give students the definition of complementary events and allow them to explore how they relate. (Use Attachment 1)

Q. Allow students to share their findings

R. Allow time for student questions.

3 Materials and Resources

Identify various materials and equipment needed for lesson activities. Provide complete references (include textbook and additional resources)

- Maletsky, E.M. & McLeod, J. (2009) HSP Math T.E. Volume 3, Orlando, FL: Harcourt. Inc.
- Blank 8 section spinners handout
- Clear spinners
- Paper bags
- Colored tiles
- Yarn
- Index cards
- Paper clips

4 Assessment

Describe completely the assessment to be used for this lesson.

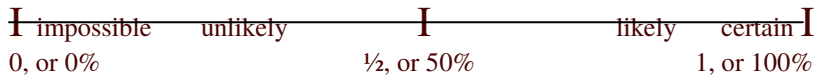
- The student will be given a colored spinner and a probability quiz.
- The student will follow the directions on the quiz.
- The student will then write their fraction, decimal, and percent on an index card and hang it on a benchmark (Number line labeled 0, $\frac{1}{2}$, 1) which will be hanging in the classroom.

outcome – a possible result of an experiment

sample space – the set of all possible outcomes of an experiment

probability – a measure of the likelihood that an event will occur

***The measure ranges from 0 or impossible, to 1, or certain.**



theoretical probability of an event, written **P(event)**, is the ratio of the number of favorable outcomes to the number of possible, equally likely outcomes.

***This ratio can be written as a fraction.**

$$\mathbf{P(event)= \frac{\text{Number of favorable outcomes}}{\text{Number of possible, equally likely outcomes}}}$$

complementary events – two events whose probabilities add up to 1.

e.g. $P(event) + P(not\ event) = 1$

Finding Probability

Part 1

1. Your group has been given a stack of index cards. Write each student's name on an index card. Now find the probability of randomly drawing your name from the bag by answering the following questions.
 - What is 1 favorable outcome?
 - What are 12 possible outcomes?
 - What is the probability of drawing your name out of the bag?
2. Now find the probability of randomly drawing a male or a female's name from the bag by answering the following questions.
 - What is the probability of randomly drawing a male's name from the bag?
 - What is the probability of randomly drawing a female's name from the bag?
 - Write each probability as a fraction, decimal, and percent.

Male

Female

Part 2

3. When looking at the probability of randomly drawing your name from the bag above, what is the probability of you not drawing your name from the bag?
 - Write the probability of drawing your name from the bag. (Answer to bullet one under #1)

- Add the ratio that shows the probability of you drawing your name from the bag to the ratio that shows the probability of you **NOT** drawing your name from the bag.
- Write the sum of the two ratios here. _____

4. Each group has a zip-loc bag with 8 colored tiles in it. Use the colored tiles to answer the following questions.

- If you were to put the colored tiles in the paper bag, what would be the probability that your group does **not** draw the color green from the bag? Write your answer as a ratio:

$$\frac{\text{Favorable outcomes}}{\text{Possible outcomes}}$$

- Now, use the complementary event to find the probability. Show your work below.

- Use the fraction tiles to find the probability of the following. Write each answer as a fraction, decimal, and percent.

P(not blue)=

P(not red)=

NAME _____ DATE _____ # _____

Probability Quiz

Use the spinner given to find each probability. Write your answer as a fraction, decimal, and percent.

1) $P(\text{green})$

2) $P(\text{blue})$

3) $P(\text{not red})$

4) $P(\text{yellow or red})$

5) $P(\text{not blue or green})$