

GED 2002 Teachers' Handbook of Lesson Plans

Content Area Mathematics	Lesson Topic/Theme Finding Probability for a Given Experiment	Correlation to Math Framework 05.08	Lesson Number - 47
<p>Title: How Likely Am I to...? Objectives/Learner Outcomes</p> <p>At the end of this lesson, the learner will be able to:</p> <ul style="list-style-type: none"> • Define the term <i>probability</i> • Define the term <i>trial</i> or <i>experiment</i> • Recall that the <i>outcome</i> of an experiment is the result. • State that probability always ranges from 0 to 1 (or 0% to 100%) • Calculate the probability for a given experiment 		<p>Materials/Resources/Internet Sites/Handouts/Worksheets</p> <ul style="list-style-type: none"> • Chart paper/white board • Markers • A spinner with four different colors, such as red, yellow, blue, and green (each representing an equal area) • 10 marbles of at least 3 or 4 different colors (blocks, small squares of paper, or anything else similar can be used if marbles aren't available) • Handout – <i>Probability – Side 1</i> • Handout – <i>Probability – Side 2</i> 	
<p>Pre-Requisite Knowledge</p> <p>The learner should be able to:</p> <ul style="list-style-type: none"> • Complete basic addition problems with whole numbers • Write a ratio comparing two numbers • Form a proper fraction • Reduce a fraction to simplest form • Convert a fraction into a percent or a decimal 		<p>Key Words</p> <ul style="list-style-type: none"> • Probability • Trial • Experiment • Outcome • Ratio 	
<p>Anticipatory Set/Introduction</p> <p>To introduce the lesson,</p> <p>Say: Today, we are going to discuss probability. Ask: Who has heard of probability before? Where have you heard the term “probability” used? (Answers may include the following: weather, casino games/gambling, healthcare, etc.)</p>			

Preview Questions for Lesson

1. What is a proper fraction? Is $\frac{5}{4}$ a proper fraction? Is $\frac{1}{3}$ a proper fraction?
2. How do you reduce a fraction? How would you reduce the fraction $\frac{10}{12}$?
3. How would you write a ratio comparing the numbers 1 and 7? (Accept all three forms of writing a ratio)
4. Is there a chance it could rain tonight? Is there a chance that it might not rain tonight?
5. If the weatherman says there's an 80% chance of rain tomorrow, is it likely to rain?
6. If I have a 1% chance of winning the lottery, am I likely to win?

Instructional Outline

Say: Probability looks at how likely something is to happen. Sometimes, we are told that there's a high probability of rain.

Ask: If this is true, is it likely to rain? (Answer: yes)

Say: Generally, people want to know the probability of a specific event happening, such as having rain or winning the lottery. Probability doesn't tell you for certain that something will or will not happen, just how likely it is to happen. Sometimes, there is an event that you know cannot ever happen, such as rolling a die and getting a "7" as the answer. (Explain, if needed, that the sides are only numbered from 1 to 6.)

Ask: If something will never, ever happen, what do you think the probability would be? (Answer: zero)

Say: Other times, an event may be sure to happen. For example, we know the sun will set tonight.

Ask: What probability do you think tells you that you're sure something will happen? (Answer: 100)

Students can be guided to this answer by asking if they're 70% sure, 80% sure, 90% sure, etc. They should recall the saying 100% sure.

Say: Probability is usually expressed as a percent, a ratio, or a decimal. There are a few key words you need to know when discussing probability. The first word is *experiment*. (Write this word on the board or chart paper.)

Ask: Who can tell us what an *experiment* is? (Answer: a situation involving chance that leads to an outcome)

Write this definition next to the word *experiment* that's already on the board or chart paper. Show the spinner to the class.

Say: An example of an experiment would be spinning this spinner.

Ask: Who can give another example of an experiment? (Encourage participation and accept multiple answers.)

Say: An experiment might also be called a *trial*. (Write this word on the board or chart paper near the word *experiment*.) An *outcome* is the result of the experiment or trial. (Write this word and definition on the board or chart paper.) Show the spinner to the class.

Ask: What's one (stress that) possible outcome if I spin this spinner? (Elicit all four colors as responses. Allow four different students to give answers. If no one volunteers, pick students to answer.)

Say: Probability measures how likely a particular outcome is to happen. (Write this word and definition on the board or chart paper.) The way to find the probability is to write a ratio comparing the number of ways an outcome can happen to the total number of possible outcomes.

Write: Probability = (number of ways a particular outcome can happen) / (total number of possible outcomes) Show the spinner to the class.

Ask: What's the probability of having this spinner land on green? (See if any students can give the correct probability. If one can, ask how he or she arrived at that answer.) Write: $P(\text{green}) = \frac{\quad}{\quad}$ (leaving the blanks empty for now). Explain that the notation $P(\text{green})$ stands for the probability of getting green when spinning the spinner. Point to the first blank. **Ask:** How many sections of our spinner show green? (Answer: only one section.) **Write:** 1 in the first blank. Point to the second blank. **Ask:** How many total outcomes are possible? (You may want to remind students that they told you there were four possible outcomes: green, red, yellow, and blue.) **Write:** 4 in the second blank. **Say:** This tells us that the probability of getting green after we spin is $\frac{1}{4}$.

Ask: Does a probability of $\frac{1}{4}$ mean that we're likely to have the spinner land on green? (Answers may vary from not likely to it is possible.)

Process/Activities

Pass out the Handouts – **Probability – Sides 1 and 2**. Have each student pair up with another student. Show them an empty bag (not one where the contents are viewable).

Say: I am going to put 10 marbles in here. There are 5 black marbles, 2 yellow marbles, and 3 blue marbles. (Change numbers or colors of marbles as appropriate.)

Say: Each person has a probability worksheet. Please look at #1. With your partner, fill in the answers to Parts A and B. (Give students a few minutes to complete these two sections.)

Ask: Who would like to read their answer for Part A? (After answers have been read, ask for a volunteer for Part B.)

Ask: How many different outcomes are there? (If students seem stuck, ask them how many different marbles (or blocks, etc.) are in the bag.)

Say: Fill this in for Part C.

Ask: Of all the colors in the bag, which one color do you hope to pick? (Allow one student to answer.)

Say: Fill in this color for Part D. To find the probability of picking this color, we need to write a ratio comparing the number of ways we can pick this color to the total number of things that are in this bag.

Ask: How many _____ (color name) marbles are in the bag? How many total marbles are in this bag? How do you write that ratio?

Say: Fill that in for Part E.

Ask: Is this ratio in simplest form? (If not, ask students to reduce it.)

Say: Notice that we used the number of _____ (color name) marbles and the total number of marbles to make our ratio.

Complete this activity to find the probability of a different color contained in the bag, using the space marked #2.

Second experiment: If time permits, ask students to get in small groups (of 3 or 4 students) and complete the 3 questions on the back side of the worksheet (**Probability – Side 2**).

Product/Evaluation/Summary

Review the three questions on Side 2 of the **Probability** handout. These questions will help evaluate student understanding.

Ask: In what form is probability usually expressed? (Acceptable answers: ratio, fraction, percent, decimal.) What is an *outcome* for an experiment? What percent would you say is associated with an event that'll never happen? What percent is associated with an event that's certain to happen?

Teaching to Different Types of Learners

	Visual	Auditory	Kinesthetic/Tactile
Learning Activity	Provide written directions, charts, and worksheets to students.	Incorporate activities that allow students to work together and discuss what they have done. Have students repeat answers or directions to you.	Students can draw pictures to reflect the numbers and situations (i.e., drawing the bag and showing the colored marbles inside of it). Students could be given marbles, blocks, coins, dice, or other objects with which to work.

<p>Special Differentiation Strategies</p>	<p>Use an overhead transparency to visually show the correct answers for the probability activity rather than just providing the answers verbally. When providing directions orally, have them in writing as well.</p>	<p>Check for understanding by asking questions when giving directions or assignments in writing.</p>	<p>Give students their own bags of marbles with which to work. Pictures can also be drawn instead of using marbles.</p>
<p>Evaluation</p>	<p>Allow learners to write their answers instead of saying them aloud.</p>	<p>Allow students to orally report what they have learned.</p>	<p>Allow students to use different types of manipulatives (marbles, dice, coins, paper slips) to demonstrate how to find probability for certain events.</p>
<p>The Family and Adult Literacy Connection</p> <p>If students have school-aged children, have them complete an additional example from the worksheet. Students can also replicate the probability activity with their children, allowing the children to put the marbles or slips of paper into a bag and then picking one out.</p> <p>Students can connect probability to the real world by looking for examples presented in newspapers or magazines. Instructors can facilitate this activity by having examples ready to show (i.e., reports talking about the probability of rain or snow in certain areas, the probability of a certain candidate winning an election, etc.).</p>		<p>ESE/ESOL Accommodations</p> <p>Partner students with a peer buddy who can facilitate discussion and model tasks. Allow for non-verbal responses such as pointing, nodding, or showing numbers on fingers.</p>	

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Probability

(Side 1)

1. First Experiment

A. List the colors contained in the bag.

B. Tell how many of each color are in the bag.

C. The total number of outcomes is _____

D. Find the probability of picking _____

E. _____

2. Second Experiment

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Probability

(Side 2)

1. In a bag, there are 12 blocks - 7 are pink, 2 are purple, 2 are white, and 1 is yellow.

- A. What's the probability of picking a pink block? _____
- B. What's the probability of picking a white block? _____
- C. Which color are you *least* likely to pick? _____

2. You see two dice on a table and decide to roll one of them.

- A. How many sides are on one die? _____
- B. How many of those sides say "3"? _____
- C. Using this information, state the probability of rolling a "3". _____

3. Your school is holding a raffle. There were 100 tickets sold and each one is put into a bowl. You bought 10 tickets and your friend bought 7 tickets.

- A. What's the probability that *your* ticket gets picked as the winning one? _____
- B. What's the probability that *your friend* has his/her ticket picked?

- C. Of the two of you, who's more likely to have his/her ticket picked? Why? _____