

What are the Chances?

Purpose

Students will summarize and display the results of probability experiments in a clear and organized way.

Materials

For the teacher: *Probability Pistachio* by Stuart J. Murphy, transparency of Black Line Master (BLM) *Keeping Track*, transparency of centimeter graph paper, pair of overhead number cubes, overhead projector, overhead markers

For each pair of students: 1 pair of different-colored number cubes, centimeter graph paper, 2 copies of BLM *Keeping Track*

Activity

A. Introduction

1. Read and discuss *Probability Pistachio* by Stuart J. Murphy.
2. Tell students they are going to do an activity in which they are going to predict the outcome by figuring out what the chances are, or the *probability*.

B. Partner Activity

1. Hand out number cubes, graph paper, and a copy of the BLM *Keeping Track* to each pair of students.
2. Ask students to draw a straight line at least half way down the graph paper that extends the width of the page. Tell the students to place the numbers 1 through 6 along this line to resemble the chart shown on the BLM.
3. Tell students they will take turns with their partner rolling a number cube 20 times and recording the results.
4. Say: "Before you roll, guess or predict which number from one to six will come up most often. Write this number somewhere on your graph paper and circle it."
5. Ask one student in each pair to roll the number cube while the other student records the results on the graph paper by placing an X above the number that is rolled. (The Xs should stack on top of each other each time the same number is rolled.)
6. After the students have completed 20 rolls, have the students switch jobs.
7. Repeat steps 4 and 5.
8. Talk about what the chances or probability would be of rolling each number. Students should conclude that the chances are the same. (You may need to pool the data from the whole class for this to become clear.)

(continued)



INCORPORATING

TECHNOLOGY

Use Ken's Coin Flips, shazam.econ.ubc.ca/flip to predict and then see the results of coin flipping. Have students graph their results to compare with others in the class.



EXTENDING
THE

ACTIVITY

Give a pair of students a cup with six round counters in it (2 yellow, 2 red, 2 blue). Tell students that the counters represent socks in a drawer. Have students draw two counters and try to get a matching pair of socks out of the draw. Have students record and summarize their data.

Standards Links
4.7.1, 4.7.4

Activity (continued)

9. Have the students draw a new line labeled two through 12 on the back side of the graph paper.
10. Have students repeat steps four through six using both number cubes and recording the sum of the two numbers. Students should be reminded to make predictions before they roll.
11. Compare and record results. Talk about the probability of rolling each of the numbers. Accept all suggestions.

C. Individual Activity

1. Tell students they are going to roll the number cubes again using the BLM. They will roll until one column is filled.
2. Write the numbers two through 12 on the overhead and ask each student to predict which column they think will fill the quickest. Use tally marks to record predictions.
3. Tell students to roll the number cubes and record the roll as the sum of the two faces. (e.g., a roll of two and three would be recorded as $2+3$ in the five column of the table.) Model a few rolls and record on the overhead transparency of the BLM.
4. Allow students time to complete the task and then ask: “How many of your predictions were correct?”
5. Again, write the numbers two through 12 on the overhead and make tally marks to show the most frequently occurring sum.

D. Conclusion

1. Ask students to think about why the probability of seven being rolled is more likely than the other numbers.
2. Write on the overhead transparency of the BLM the possibilities of rolling each number. (See the Teacher Directions for the BLM.)
3. Have students repeat the activity, this time recording with two colors their number facts.
4. Record predictions and results.
5. Conclude with students that knowing the possibilities of an outcome increases their ability to understand what the chances are or the probability.

Questions for Review

Basic Concepts and Processes

During the activity, discuss the following questions with students to gauge their understanding of the indicator:



What outcome did you predict?



How did you make your prediction?



Which do you think is more likely: a total of 5 or a total of 11?



Why do you think that?

Keeping Track

Teacher Directions

Have students use the BLM to record the results of rolls of the number cubes in the Individual Activity.

Write on the overhead transparency of the BLM the possibilities of rolling each number. Use two different-colored markers to match the colors of the two number cubes.

Answer Key

The chart should look like this:

					$4 + 3$					
				$3 + 3$	$3 + 4$	$4 + 4$				
			$3 + 2$	$4 + 2$	$5 + 2$	$5 + 3$	$5 + 4$			
		$2 + 2$	$2 + 3$	$2 + 4$	$2 + 5$	$3 + 5$	$4 + 5$	$5 + 5$		
	$2 + 1$	$3 + 1$	$4 + 1$	$5 + 1$	$6 + 1$	$6 + 2$	$6 + 3$	$6 + 4$	$6 + 5$	
$1 + 1$	$1 + 2$	$1 + 3$	$1 + 4$	$1 + 5$	$1 + 6$	$2 + 6$	$3 + 6$	$4 + 6$	$5 + 6$	$6 + 6$
2	3	4	5	6	7	8	9	10	11	12