Number Cube Sums

Math Concepts

- whole numbers
- sample space
- fractions
- probability
- decimals
- percents

Materials

- TI-15 Explorer™
- **Number Cube Sums** recording sheets
- class graph
- number cubes
- pencils

Overview

Students will explore experimental probability and patterns in fractions, decimals, and percents by rolling two number cubes and recording and analyzing the sums that come up.

Introduction

1. Show students a pair of number cubes. Ask them: How many different sums are possible if you roll the number cubes and add the numbers that come up together?

   Examples:
   1 + 1, 1 + 2, 1 + 3, 1 + 4, 1 + 5, 1 + 6, 2 + 1, 2 + 2, 2 + 3, and so on.

   Verify the suggested number of sums by analyzing the possible combinations that can be made with the numbers on two different number cubes.

2. Have students predict which sum will come up the most if the number cubes are rolled a large number of times.

3. Have all students roll the number cubes 50 times and tally the sums that occur. Then have them record their results in fraction, decimal, and percent forms.

   Example:
   If the sum 7 comes up 10 times out of 50 rolls, the tally is 10/50 (or 1/5) in its fractional form, 0.2 in its decimal form, and 20% as a percent.

4. Ask students to analyze the results and decide whether to revise their predictions concerning which sum will come up the most often.

5. Ask each student to record his or her results on a class graph in which each tally represents more than one piece of data.

Number Cube Sums *(continued)*

Introduction (continued)

Example:

Tally of Results	Possible Sums	Fraction	Decimal	Percent
/	2	1/50	0.02	2%
////	3	4/50	0.08	8%
////	4	4/50	0.08	8%
𝍸 ///	5	8/50	0.16	16%
𝍸 𝍸 ///	6	13/50	0.26	26%
	•			
	•			
	•			

6. Have students record the class results using fraction, decimal, and percent representations.
7. Have students analyze the patterns in the fractions, decimals, and percents used to record the results.
8. Ask students to write about their observations and discoveries.

Collecting and Organizing Data

While students are collecting data and recording the fractions, decimals, and percents, ask questions such as:

- What information are you using to make your predictions?
- Which sums seem to be coming up the most often? Why do you think they are?
- What do you think affects your results? Does "luck" have anything to do with the results you are getting? Why or why not?
- What information are you using to determine the fractions that represent how often each sum occurred?
- What is the "whole" to which the fractions, decimals, and percents are referring?
- Do you see any patterns in the fractions, decimals, and percents you are recording?

How are you using the calculator to help you?

How can you use the [n/d] key and [F↔D] to compare fractions and decimals?

How can you use [÷] to compare fractions and decimals?

How can you use [▸%] to compare fractions, decimals, and percents?

Would you want to use [Int÷] to compare fractions and decimals? Why or why not?

Number Cube Sums *(continued)*

Analyzing Data and Drawing Conclusions

After students have collected their data, have them discuss the results as a whole group. Ask questions such as:

- What information did you use to predict which sum would occur the most often?
- Is each of the sums equally likely to occur each time you roll the number cubes? Why or why not?
- Look at your set of 50 rolls on your recording sheet. Compare these results with the class results. How are they the same? How do they differ? How can you explain the differences?
- How could you describe the patterns in the fractions, decimals, and percents?
- How do the patterns differ when you compare your individual data with the data on the class graph? How are they the same?
- What does each tally represent on the class graph? How did you decide to represent data that did not come out to be a whole tally mark?

Continuing the Investigation

Have students use other polyhedral dice, predict how the outcomes are likely to change, and collect data to compare with their predictions.

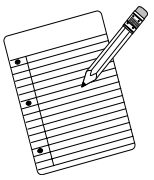
Did you use F↔D to compare fractions and decimals? Why or why not?

Did you use ÷ to compare fractions and decimals? Why or why not?

Did you use Int÷ to compare fractions, decimals, and percents? Why or why not?

Did you use ▶% to compare fractions, decimals, and percents?

Name:



Number Cube Sums

Recording Sheet

Collecting and Organizing Data

Tally of Results	Possible Sums	Fraction	Decimal	Percent
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			

Add your information to the class graph.

Analyzing Data and Drawing Conclusions

Write about what the information you gathered shows.