

Place-Value Spinners

Math Concepts

- whole numbers
- area
- place value
- sample space
- addition
- probability
- fractions

Materials

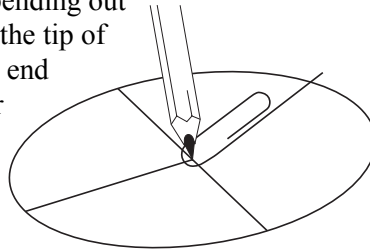
- TI-10
- **Place-Value Spinners**
- recording sheets
- small paper clips
- pencils
- centimeter cubes

Overview

Students will explore probability and patterns in place value by spinning two spinners and recording and analyzing the results.

Introduction

1. Have students discuss Spinner A on their recording sheets. Ask questions such as: What do you think will happen when you spin this spinner? Why do you think that? If we all spin Spinner A once and display our results in a bar graph, what do you think it would look like?
2. Make a simple spinning device by bending out one end of a paper clip. Then place the tip of your pencil through the curve at the end of the paper clip and onto the center of the spinner circle provided on page 62. Tap the paper clip with your finger to spin it about the pencil point.
3. Have students work as a whole class to collect data by spinning Spinner A once. Display the results in a bar graph. Discuss the results.
4. Have students go through the same process to collect data for spinning Spinner B once. Discuss the results.
5. Have students work in pairs to play a game.



Tell students: You are going to play a game with your partner where one of you will spin Spinner A and the other will spin Spinner B. Before you begin, each of you will put a marker (centimeter cube) on a number on the number line on your recording sheet. You must choose different numbers. After both of you spin, one partner will add the numbers together and the other will record the sum on the recording sheet. If your marker is on the sum of the two spins, you win a point. The game ends when one person wins 10 points.

Place-Value Spinners *(continued)*

Introduction (continued)

6. Have students play the game and:
 - a. Collect data about their spins.
 - b. Record the data on their recording sheets.
 - c. Analyze the data in order to develop better strategies for winning the game.

Note: Encourage students to use a calculator for finding sums.

Collecting and Organizing Data


While students are playing the game and collecting data about the sums of the spins, ask questions such as:


- What numbers are you putting your counter on? Why are you choosing those numbers?
- Is every number a possible winner? Why or why not?
- Which numbers do you think are more likely to win than others? Why do you think that? Does the data you are collecting seem to support your ideas?
- What strategies are you using to play the game? Why did you choose those strategies?
- What patterns do you see in the sums you are spinning? How are those patterns useful?

Analyzing Data and Drawing Conclusions


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


- What sums are possible outcomes?
- How do you know that is all of them?
- Are all the sums equally likely, or do some happen more often than others? Why?
- What strategies did you use to play the game? Why did you choose those strategies?


 How can you use the calculator to help you find the sums?


 What patterns do you see that will help you find the sums without using the calculator?

 How can you use the scroll feature   to help you?

 How did you use the calculator to help you in this game?

 Were you able to stop using the calculator? Why?

 When are calculators most useful?

 When are calculators not very useful?

Place-Value Spinners (*continued*)

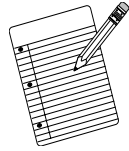
Analyzing Data and Drawing Conclusions (*continued*)

- What if you changed the sizes of the sections on the spinners? How do you think it would change the game?
- What if you changed the numbers on the spinners? How do you think it would change the game?
- What are the advantages, if any, of knowing when something is more likely to happen than something else?
- What are the disadvantages, if any?

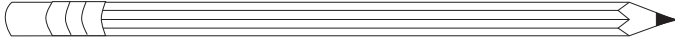
Continuing the Investigation

Have students:

- Change the sizes of the sections on the spinners, predict how the likelihood of the outcomes will change, and collect data to compare to their predictions.
- Change the numbers on the spinners, predict how the outcomes will change, and collect data to compare to their predictions.



Name: _____



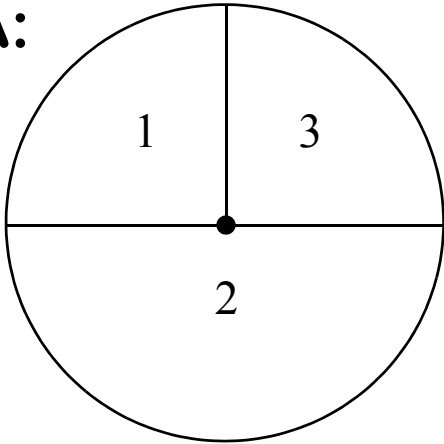
Place-Value Spinners Recording Sheet

Collecting and Organizing Data

Number Line

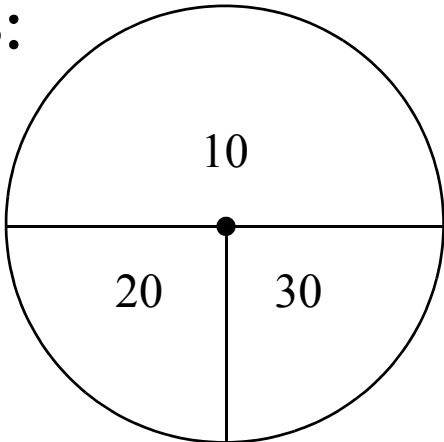
11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33

A:



Sum of Two Spins	Number of Times It Happened

B:



Scores:
 Player 1: _____
 Player 2: _____

Patterns we found while we were doing this activity: