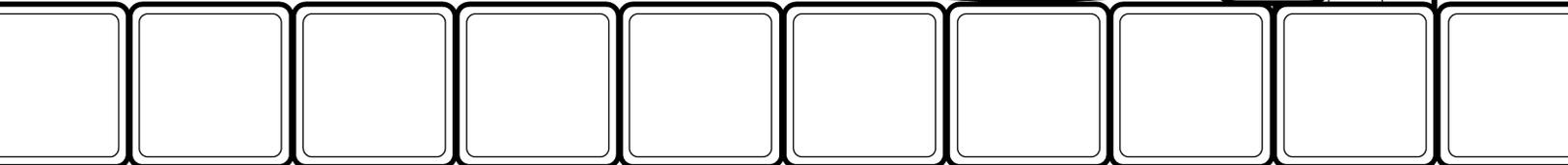
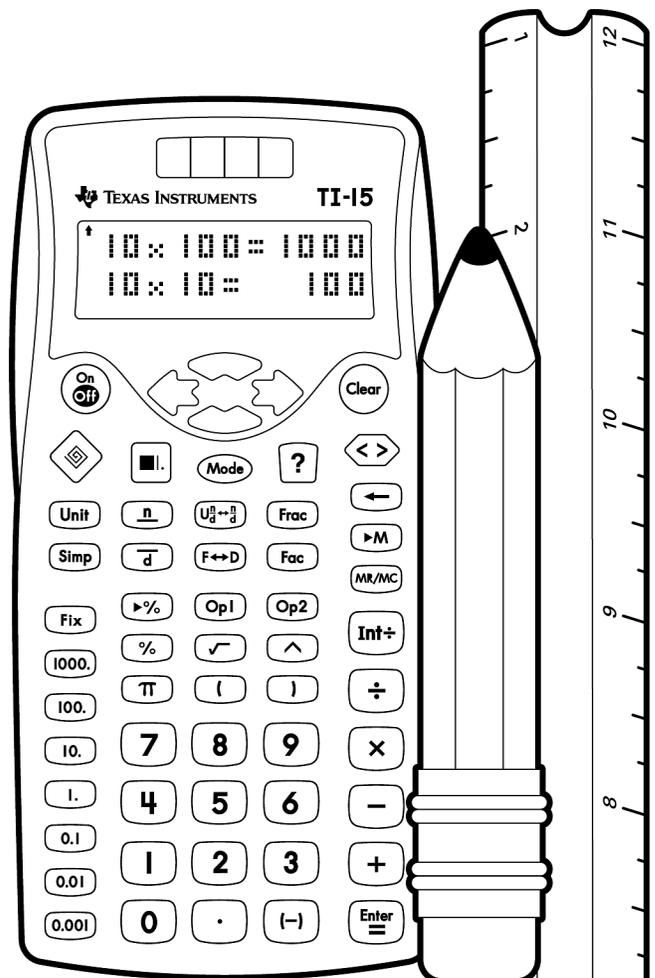


## Activities:

- Spin Me Along
- Tiles in a Bag
- Number Cube Sums
- Analyzing Number Cube Sums
- Picturing Probabilities of Number Cube Sums
- An Average Lunch?

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# Spin Me Along

## Math Concepts

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

## Materials

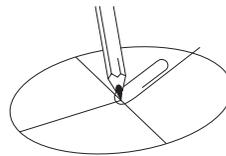
- TI-15 Explorer™
- **Spin Me Along** recording sheets
- small paper clips
- pencils

## Overview

Students will explore probability and patterns in fractions, decimals, and percents by spinning three spinners and recording and analyzing the results.

## Introduction

1. Have students discuss Spinner A on page 109. 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 will look like? Have students make similar predictions for Spinners B and C.
2. Make a simple spinning device by bending out one end of a paper clip. Then place the tip of a pencil through the curve at the end of the paper clip and onto the center of one of the spinner circles provided on page 109.
3. Model the **Spin Me Along** activity for students on the overhead projector using Spinner A on page 109. Tally the results for the first ten spins.
4. Show students how to record the fractional part of the spins for 1 and 2.



### Example:

Out of ten spins, 1 comes up four times (4/10), and 2 comes up six times (6/10). Show students how to use  $\frac{F \leftrightarrow D}{}$  on the calculator to change each fraction to a decimal. Use  $\frac{\%}{}$   $\frac{\text{Enter}}{}$  to change the fraction or decimal to a percent.

Results	Result of 1	Result of 2
Tally of Results — After 10 spins		
Fractions	$\frac{4}{10}$	$\frac{6}{10}$
Decimals	0.4	0.6
Percents	40%	60%
<hr/>		
Tally of Results — After 20 spins		
Fractions	$\frac{9}{20}$	$\frac{11}{20}$
Decimals	0.45	0.55
Percents	45%	55%

# Spin Me Along *(continued)*

## Introduction (continued)

- Have students spin Spinner A 40 times to collect data, recording the fractions and decimals after every 10 spins. Then have students spin and collect data in the same way for Spinners B and C.
- As a whole class, compile the data into one class chart for each spinner. Then have students analyze the class data and write about what they notice.

## Collecting and Organizing Data

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

- Is each number equally likely to occur on each of the spinners? Why or why not?
- Which numbers do you think are more likely to occur than others? Why do you think that? Does the data you are collecting seem to support your ideas?
- How are you deciding which fraction to use to describe each outcome?
- What is the “whole” to which the fractions and decimals are referring?
- Do you see any patterns in the fractions and decimals you are recording?

## Analyzing Data and Drawing Conclusions

After students have collected their data and added their information to a class chart, have them discuss the results as a whole group. Ask questions such as:

- What information did you use to predict which number would come up most often on each of the spinners?
- Are each of the numbers equally likely to come up on all three spinners? Why or why not?

-  How are you using the calculator to help you in this problem?
-  How can you use the  $\boxed{F \leftrightarrow D}$  key to compare fractions and decimals?
-  Would you want to use the  $\boxed{\ln \div}$  key to compare fractions and decimals? Why or why not?
-  How can you use the  $\boxed{\pm}$  key to compare fractions and decimals?
-  How can you use the  $\boxed{\triangleright \%}$  key to compare the fractions, decimals, and percents?
-  Did you use the  $\boxed{F \leftrightarrow D}$  key to compare fractions and decimals? Why or why not?

# Spin Me Along *(continued)*

## Analyzing Data and Drawing Conclusions (continued)

- How did your individual results compare with the class results for each spinner?
- How could you describe the patterns in the fractions and decimals?
- What if you changed the sizes of the sections on the spinners? How do you think it would change your results?

 Did you use the  $\frac{\square}{\square}$  key to compare fractions and decimals? Why or why not?

 Did you use the  $\frac{\square}{\square}$  key to compare fractions and decimals? Why or why not?

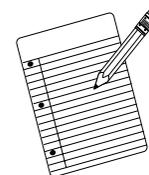
## Continuing the Investigation

Have students:

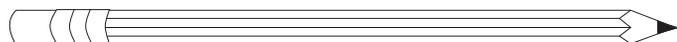
- Change the sizes of the sections on the spinners, predict how the outcomes are likely to change, and collect data to compare with their predictions.
- Invent a spinner that they think will produce a given set of results and collect data to compare with their predictions.

### Example:

A spinner on which 1 will come up half as often as 2 or a spinner on which 2 will come up four times as often as 1.



Name: \_\_\_\_\_



## Spin Me Along Recording Sheet

### Collecting and Organizing Data

**Results**

**Result of 1**

**Result of 2**

Tally of Results — *After 10 spins*

\_\_\_\_\_

\_\_\_\_\_

Fractions

\_\_\_\_\_

\_\_\_\_\_

Decimals

\_\_\_\_\_

\_\_\_\_\_

Percents

\_\_\_\_\_

\_\_\_\_\_

Tally of Results — *After 20 spins*

\_\_\_\_\_

\_\_\_\_\_

Fractions

\_\_\_\_\_

\_\_\_\_\_

Decimals

\_\_\_\_\_

\_\_\_\_\_

Percents

\_\_\_\_\_

\_\_\_\_\_

Tally of Results — *After 30 spins*

\_\_\_\_\_

\_\_\_\_\_

Fractions

\_\_\_\_\_

\_\_\_\_\_

Decimals

\_\_\_\_\_

\_\_\_\_\_

Percents

\_\_\_\_\_

\_\_\_\_\_

Tally of Results — *After 40 spins*

\_\_\_\_\_

\_\_\_\_\_

Fractions

\_\_\_\_\_

\_\_\_\_\_

Decimals

\_\_\_\_\_

\_\_\_\_\_

Percents

\_\_\_\_\_

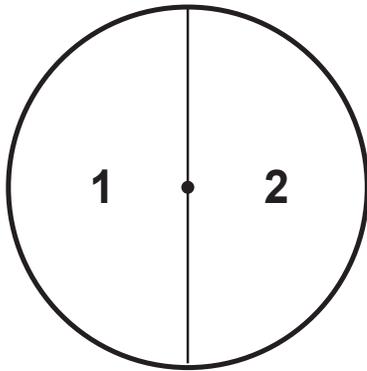
\_\_\_\_\_

### Analyzing Data and Drawing Conclusions

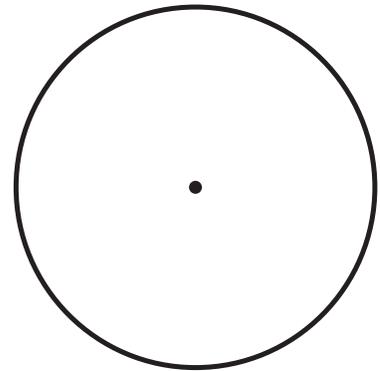
On the back of this page, write about the information that you gathered.

# Spin Me Along

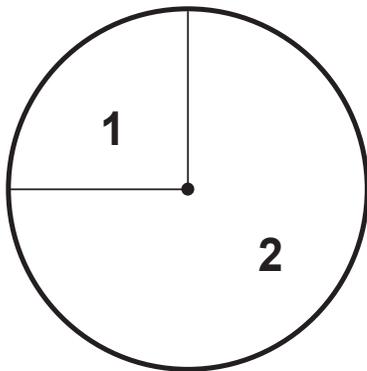
## Spinners



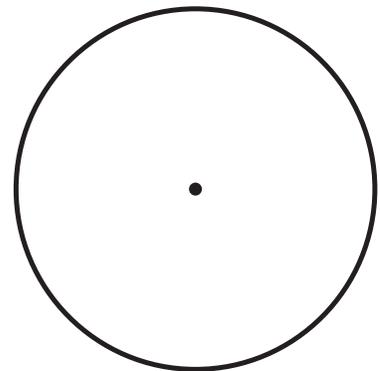
Spinner A



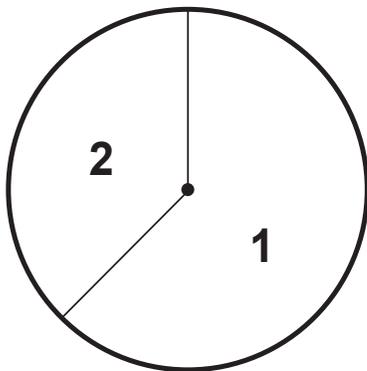
Spinner \_\_\_\_\_



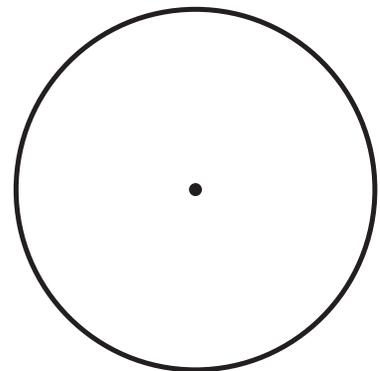
Spinner B



Spinner \_\_\_\_\_



Spinner C



Spinner \_\_\_\_\_

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# Tiles in a Bag

## Math Concepts

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

## Materials

- TI-15 Explorer™
- **Tiles in a Bag** recording sheets
- tiles in two different colors
- small lunch bags
- pencils

## Overview

Students will explore probability and patterns in fractions, decimals, and percents by drawing tiles out of a bag and recording and analyzing the results.

## Introduction

1. Prepare a “mystery bag” containing ten tiles of two different colors; for example, six red and four blue. Ask students to guess how many tiles of each of the two colors are in the bag. Have students draw out one tile, record its color, and replace it in the bag. After ten such trials, ask students if they wish to change their guesses.
2. Discuss with students how to record the fractions that represent the draws for each color.

### Example:

From ten draws, 3 tiles are blue (3/10), and 7 tiles are red (7/10). Show students how to use  $\boxed{F \leftrightarrow D}$  on the calculator to change each fraction to a decimal. Use  $\boxed{\%}$   $\boxed{ENTER}$  to change the result to a percent.

<b>Colors</b>	<u>red</u>	<u>blue</u>
<b>Tally of Results</b>	<u>7</u>	<u>3</u>
Fractions	<u>7/10</u>	<u>3/10</u>
Decimals	<u>0.7</u>	<u>0.3</u>
Percents	<u>70%</u>	<u>30%</u>
After 10 draws we think there are:	<u>7</u> out of 10	<u>3</u> out of 10

3. Have a student draw 10 more times from the bag just as before, recording in fraction and decimal form the number of tiles drawn of each color. Give students another chance to change their predictions on the basis of the new information.

**Note:** This time the denominator of the fraction will be 20.

4. Have students go through the same process two more times until a total of 40 trials have been made.
5. Then ask students to make final predictions about the tiles in the bag.

# Tiles in a Bag *(continued)*

## Introduction (continued)

- After each group of ten draws, have students analyze the patterns in the fractions and decimals that they recorded as their results.
- Give each group of students a new bag with a different combination of tiles in two colors. Have them repeat the process with their new bags and write about their discoveries.

## Collecting and Organizing Data

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

- What information are you using to make your predictions each time?
- Have your results changed or remained the same after every ten draws? What do you think affects your results?
- How are you deciding which fraction to use to describe each color?
- What is the “whole” to which the fractions and decimals are referring?
- Do you see any patterns in the fractions and decimals that you are recording?

## 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 combination of colored tiles is in the bag?
- Is each of the colors equally likely to occur each time you draw a tile? Why or why not?
- Look at each set of ten draws. Is any set exactly the same as what you discovered was actually in the bag? How many sets were not the same? How can you explain the differences?

 How are you using the calculator to help you?

 How can you use  $\boxed{F \leftrightarrow D}$  to compare fractions and decimals?

 How can you use  $\boxed{\div}$  to compare fractions and decimals?

 How can you use the  $\boxed{\rightarrow \%}$  key to compare fractions, decimals, and percents?

 Would you want to use  $\boxed{\text{Int} \div}$  to compare fractions and decimals? Why or why not?

 Did you use  $\boxed{F \leftrightarrow D}$  to compare fractions, decimals, and percents? Why or why not?

 Did you use  $\boxed{\rightarrow \%}$  to compare fractions, decimals, and percents? Why or why not?

# Tiles in a Bag *(continued)*

## Analyzing Data and Drawing Conclusions (continued)

- How could you describe the patterns in the fractions and decimals?
- What if you changed the number of tiles in the bag? How do you think your results would change?

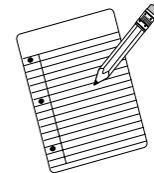
 Did you use  $\frac{\square}{\square}$  to compare fractions and decimals? Why or why not?

 Did you use  $\frac{\square}{\square}$  to compare fractions and decimals? Why or why not?

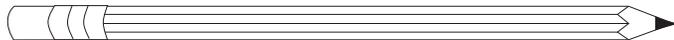
## Continuing the Investigation

Have students:

- Change the combinations of tiles in their bags, predict how the likelihood of the outcomes will change, and collect data to compare with their predictions.
- Put together a combination of tiles that will produce a given set of results and collect data to compare with their predictions.



Name: \_\_\_\_\_



## Tiles in a Bag Recording Sheet

### Collecting and Organizing Data

Colors \_\_\_\_\_

#### Tally of Results

Fractions \_\_\_\_\_

Decimals \_\_\_\_\_

Percents \_\_\_\_\_

After 10 draws we think there are: \_\_\_\_\_ out of 10 tiles in the bag \_\_\_\_\_ out of 10 tiles in the bag

#### Tally of Results

Fractions \_\_\_\_\_

Decimals \_\_\_\_\_

Percents \_\_\_\_\_

After 20 draws we think there are: \_\_\_\_\_ out of 10 tiles in the bag \_\_\_\_\_ out of 10 tiles in the bag

#### Tally of Results

Fractions \_\_\_\_\_

Decimals \_\_\_\_\_

Percents \_\_\_\_\_

After 30 draws we think there are: \_\_\_\_\_ out of 10 tiles in the bag \_\_\_\_\_ out of 10 tiles in the bag

#### Tally of Results

Fractions \_\_\_\_\_

Decimals \_\_\_\_\_

Percents \_\_\_\_\_

After 40 draws we think there are: \_\_\_\_\_ out of 10 tiles in the bag \_\_\_\_\_ out of 10 tiles in the bag

### Analyzing Data and Drawing Conclusions

On the back of this sheet, write about what your information shows you.

# 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	$\frac{1}{50}$	0.02	2%
	3	$\frac{4}{50}$	0.08	8%
	4	$\frac{4}{50}$	0.08	8%
###	5	$\frac{8}{50}$	0.16	16%
### ###	6	$\frac{13}{50}$	0.26	26%
	•			
	•			
	•			

- Have students record the class results using fraction, decimal, and percent representations.
- Have students analyze the patterns in the fractions, decimals, and percents used to record the results.
- 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  $\frac{\square}{\square}$  key and  $\frac{\square}{\square}$  to compare fractions and decimals?
-  How can you use  $\frac{\square}{\square}$  to compare fractions and decimals?
-  How can you use  $\frac{\square}{\square}$  to compare fractions, decimals, and percents?
-  Would you want to use  $\frac{\square}{\square}$  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?

 Did you use  $\boxed{F\leftrightarrow D}$  to compare fractions and decimals? Why or why not?

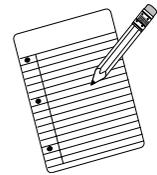
 Did you use  $\boxed{\div}$  to compare fractions and decimals? Why or why not?

 Did you use  $\boxed{\text{int}\div}$  to compare fractions, decimals, and percents? Why or why not?

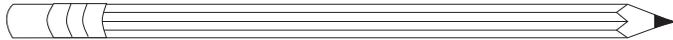
 Did you use  $\boxed{\triangleright\%}$  to compare fractions, decimals, and percents?

## 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.



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.

# Analyzing Number Cube Sums

## Math Concepts

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

## Materials

- TI-15 Explorer™
- **Analyzing Number Cube Sums** recording sheets
- small group and class results from **Number Cube Sums**
- number cubes
- pencils

## Overview

Students will extend their understanding of theoretical probability and patterns. Using number cubes, they will build awareness that a fraction and its decimal and percent representation on the calculator are “close,” but not necessarily equal.

## Introduction

The **Number Cube Sums** activity on page 115 should be completed before beginning this activity.

1. Have students refer to their fraction, decimal, and percent representations from **Number Cube Sums**. Ask students to summarize why they think the experimental probabilities came out the way they did.
2. Ask students to record all the ways of rolling two number cubes to get each possible sum of 2 through 12.

**Note:** If students use number cubes of two different colors, it will become clear that a sum of 3 can be rolled in two different ways:  $1 + 2$  and  $2 + 1$ .

3. Have students record the theoretical probability of each sum in fraction, decimal, and percent forms.

### Example:

The probability of rolling a sum of 6 is  $5/36$ , which is approximately 0.138888889 or about 13.8888889%.

4. Have students investigate the sum of all the fractional probabilities, the sum of all the decimal representations, and the sum of all the percents found with the calculator.
5. Ask students to write about their observations and discoveries.

# Analyzing Number Cube Sums *(continued)*

## Collecting and Organizing Data

While students are recording the fractions and decimals for the probability of each sum, ask questions such as:

- Why are you using this fraction to describe the probability of rolling a \_\_\_\_\_?
- What is the “whole” to which the fractions, decimals, and percents are referring?
- What do you notice about the denominator of each of your fractions? What does the denominator represent? What does the numerator represent?
- Do you notice any patterns developing in your table? How could you describe them?
- What do you notice about the sum of the fractions?
- What do you notice about the sum of the decimals?
- What do you notice about the sum of the percents?

## Analyzing Data and Drawing Conclusions

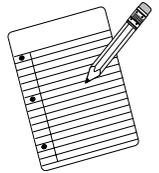
After students have collected their data, have them discuss the results as a whole group. Ask questions such as:

- How did using number cubes of two different colors help you verify what you were recording in your table?
- How does the information in your table compare with the results in **Number Cube Sums**?
- What was the sum of your fractional probabilities? What sums did other groups get? How can you explain this?
- What was the sum of your probabilities as the calculator showed them in decimal form? How do you explain the difference?
- What was the sum of the probabilities shown as percents? How do you explain this?
- Report your observations. How can you explain what you observed?

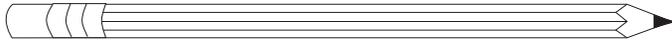
## Continuing the Investigation

Have students use other polyhedral dice and predict each outcome in the sample space. Have them perform a similar investigation with the fraction and decimal representations of the probability of each possible sum.

-  How are you using the calculator to help you?
-  How can you use the  $\frac{\square}{\square}$  key and  $\frac{\square}{\square}$  to compare fractions and decimals?
-  How can you use  $\frac{\square}{\square}$  to compare fractions and decimals?
-  Would you want to use  $\frac{\square}{\square}$  to compare fractions and decimals? Why or why not?
-  How can you use  $\frac{\square}{\square}$  to compare fractions, decimals, and percents?
-  How can you explain what the calculator appears to be doing as it changes fractions to decimals? Fractions to percents? Decimals to percents?



Name: \_\_\_\_\_



## Analyzing Number Cube Sums Recording Sheet

### Collecting and Organizing Data

Ways to Get Each Sum	Possible Sums	Fraction	Decimal	Percent
_____	2	_____	_____	_____
_____	3	_____	_____	_____
_____	4	_____	_____	_____
_____	5	_____	_____	_____
_____	6	_____	_____	_____
_____	7	_____	_____	_____
_____	8	_____	_____	_____
_____	9	_____	_____	_____
_____	10	_____	_____	_____
_____	11	_____	_____	_____
_____	12	_____	_____	_____

### Analyzing Data and Drawing Conclusions

Write about what your information shows.



# Picturing Probabilities of Number Cube Sums

## Math Concepts

- whole numbers
- angle measure
- fractions
- circles
- decimals
- perimeter
- ratio
- area
- proportion
- sample space
- multiplication
- probability

## Materials

- TI-15 Explorer™
- **Picturing Probabilities of Number Cube Sums** recording sheets
- data from **Analyzing Number Cube Sums**
- number cubes
- rulers
- linking cubes
- large paper
- protractors
- pencils

## Overview

Students will use ideas of ratio and proportion to investigate various ways to make a circle graph. The graph will display the probabilities of the different sums that can be generated with two number cubes.

## Introduction

The **Analyzing Number Cube Sums** activity on page 119 should be completed before beginning this activity.

1. Show some examples of circle graphs from newspapers and magazines, and discuss them with students.
 

**Examples:**  
Talk about what the sections represent, comparisons of sizes, the visual impressions they give that are different from bar graphs, and so on.
2. Have students use the probabilities they found in **Analyzing Number Cube Sums** on page 119.
3. Have students represent the 11 different sums (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12) in their data with different colors of linking cubes.

**Note:** Linking cubes usually come in ten colors. You can place a sticky dot on one of the colors to distinguish it as the eleventh color. Students will need 36 cubes to represent the 36 possible outcomes of tossing the two number cubes.

# Picturing Probabilities of Number Cube Sums

## *(continued)*

### Introduction (continued)

**Example:**

Students will need one red cube to represent the one way to get a sum of 2, two blue cubes to represent the two ways to get a sum of 3, three green cubes to represent the three ways to get a sum of 4, and so on.

- Have students join all the linking cubes, keeping the same colors together, into a long bar. Then have them join the ends of the bar into a “circle” and place the “circle” on a large sheet of paper.

**Note:** Students may have to lay the bar on a table, allowing a few breaks in the bar to get it to form a circle. Or, the linking cubes with the hole through them can be strung on a string.

- Have students sketch a “circle” around the inside of the linking cubes, estimate the center of the circle, and mark sections of the circle by drawing lines from the center to the circumference to show the number of cubes of each color. Remind the students to label each section. Discuss with students what these sections represent.
- Review with students the angle measure of a circle (360 degrees), and have them work together in small groups to predict the angle measures for each section in the circle graph. Then give the groups protractors so that they can evaluate their predictions and sketch their results on the recording sheet.

**Example:**

Number Cube Sum	Probability	Angle Measure
2	$1/36$	$10^\circ$
3	$2/36$	$20^\circ$
4	$3/36$	$30^\circ$

# Picturing Probabilities of Number Cube Sums

## (continued)

### Collecting and Organizing Data

While students are constructing their circle graphs and exploring with the calculator, ask questions such as:

- What does each linking cube represent?
- What part of the circle does each linking cube represent?
- How are you estimating the sizes of each section of the circle?
- How can you use linking cubes to predict the angle measure of each section?
- How can you use the fractions to help you predict the angle measure of each section?
- What should be true about the sum of the angle measures of all the sections?

### Analyzing Data and Drawing Conclusions

After students have made and evaluated their predictions, have them discuss their strategies as a whole group. Ask questions such as:

- How did you use the linking cubes to make your predictions of angle measures?
- How did you use the fractions to make your predictions of angle measures?
- What other strategies did you use?
- What strategies did you use to determine whether your predictions were reasonable?
- What does the circle in the circle graph represent?
- What does each section in the circle graph represent?
- What advantages are there in presenting data in a circle graph?
- What disadvantages are there in presenting data in a circle graph?

 How did you use the calculator to help you find the angle measures?

 How can you use the calculator to help you determine whether your predictions of angle measures are reasonable?

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

 Were you able to stop using the calculator? Why or why not?

 Describe a similar type of problem for which you might need the calculator more.  
**Example:** Suppose that there had been 35 pieces of data instead of 36.

 When are calculators most useful?

 When are calculators not as useful?

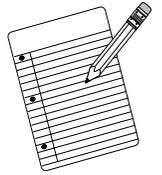
# Picturing Probabilities of Number Cube Sums

*(continued)*

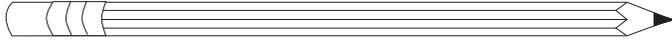
## Continuing the Investigation

Have students:

- Estimate the areas of the sections using centimeter grid paper, record the areas as fractions of the whole circle's area, and compare the area fractions with the probabilities of the sums.
- Design a plan for making a circle graph from any set of given information.



Name:



# Picturing Probabilities of Number Cube Sums

## Recording Sheet

### Collecting and Organizing Data

Sketch your circle graph to represent the number cube sums.

### Analyzing Data and Drawing Conclusions

Number Cube Sum	Probability	Angle Measure

We found the angle measure of each section by (write on the back of this page):



# An Average Lunch?

## Math Concepts

- whole numbers
- division
- addition
- mean
- multiplication

## Materials

- TI-10, TI-15 Explorer™
- **An Average Lunch?** recording sheets
- pencils

## Overview

Students will explore the meaning of the average (mean) value for a set of data.

## Introduction

1. Have students read about Wayside School in *Sideways Stories from Wayside School* by Louis Sachar.
2. Present a scenario about managing the cafeteria at Wayside School. Tell students: It doesn't matter how much an individual lunch costs at Wayside School, just as long as the average price per lunch for the lunches sold is \$1.85 each day.
3. Have students work in small groups to brainstorm different possible combinations of lunch prices that could satisfy this requirement. Have them record these combinations in the Data Set column on their recording sheets. Encourage students to use efficient mathematical notation.

### Example:

$3(\$1.00)$  for three lunches costing \$1.00 each.

4. Have students look for patterns in the sets of data they recorded in the table.
5. Have students write three summary statements on their recording sheets. These statements should describe characteristics that might be expected in a data set that has a given mean value.

## Collecting and Organizing Data

While students are creating data sets for the given mean value, ask questions such as:

- What does it mean for the “average” lunch price to be \$1.85?



How can you use the calculator to find the mean of each data set?

# An Average Lunch? *(continued)*

## Collecting and Organizing Data (continued)

- How many pieces of data do you want to have in your data set? Why? What is the least number possible? What is the greatest number possible?
- Do all the lunches have to cost the same amount? Can they?
- What happens when you sell a lunch for less than the mean value? What happens when you sell a lunch for more than the mean value?

## Analyzing Data and Drawing Conclusions

After students have investigated a variety of data sets that all have the same mean, have them discuss their observations as a whole group. Ask questions such as:

- What does a mean represent?
- What does the mean of a data set tell you about the number of pieces of data in a data set?
- What does the mean tell you about the values of individual pieces of data in the data set?
- What are some advantages of using the mean to describe a set of data?
- What are some disadvantages of using the mean to describe a set of data?

## Continuing the Investigation

Have students:

- Change the mean for the school lunches and investigate how their data sets need to change to produce the new given mean.
- Collect examples from newspapers and magazines illustrating uses of means and write short paragraphs evaluating these uses.

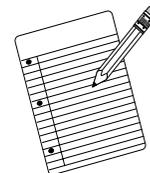
 How can you use the calculator to help you find data sets that will produce a given mean?

 How can you use  $\square$  and  $\square$  to help you investigate this problem?

 How did you use the calculator to help you investigate this problem?

 How were you able to tell whether the displayed values on your calculator were reasonable?

 How did you use  $\square$  and  $\square$  to help you investigate this problem?



Name: \_\_\_\_\_



## An Average Lunch? Recording Sheet

### Collecting and Organizing Data

For a mean value of: \_\_\_\_\_

Data Set	Total Cost	Number of Lunches

### Analyzing Data and Drawing Conclusions

Characteristics we might expect in a data set with a mean of \_\_\_\_\_:

- A.
  
  
  
- B.
  
  
  
- C.

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