

# 8-6b

# Graphing Calculator Investigation

## A Follow-Up of Lesson 8-6

Sharp EL-9900

### What You'll Learn

Use a graphing calculator to simulate probability experiments.

### Materials

- graphing calculator
- paper
- pencil

## Simulations

A **simulation** is an experiment that is designed to act out a given situation. You can use items such as a number cube, a coin, a spinner, or a random number generator on a graphing calculator. From the simulation, you can calculate experimental probabilities.

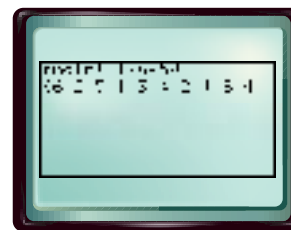
### ACTIVITY 1 *Work with a partner.*

Simulate rolling a number cube 50 times.

Use the random number generator on an EL-9900 graphing calculator. Enter 1 as the lower bound and 6 as the upper bound for 50 trials.

**Keystrokes:** **MATH** **ALPHA** [C] 2 1 , 6  
, 50 ) **ENTER**

A set of 50 numbers ranging from 1 to 6 appears. Use the right arrow key to see the next number in the set. Record all 50 numbers on a separate sheet of paper.



### Your Turn

- Use the simulation to determine the experimental probability of each number showing on the number cube.
- Compare the experimental probabilities found in Step 2 to the theoretical probabilities.

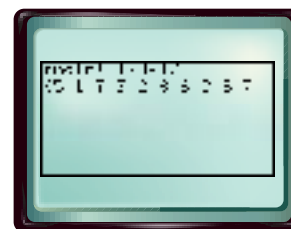
### ACTIVITY 2 *Work with a partner.*

A company is placing one of 8 different cards of action heroes in its boxes of cereal. If each card is equally likely to appear, what is the experimental probability that a person who buys 12 boxes of cereal will get all 8 cards?

Let the numbers 1 through 8 represent the cards. Use the random number generator on a graphing calculator. Enter 1 as the lower bound and 8 as the upper bound for 12 trials.

**Keystrokes:** **MATH** **ALPHA** [C] 2  
1 , 8 , 12 ) **ENTER**

Record whether all of the numbers are represented.



### STUDY TIP

#### Simulations

Repeating a simulation may result in different probabilities since the numbers generated are different each time.



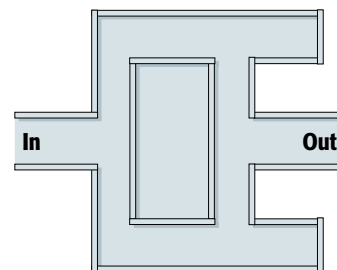
## Your Turn

- c. Repeat the simulation thirty times.
- d. Use the simulation to find the experimental probability that a person who buys 12 boxes of cereal will get all 8 cards.



## EXERCISES

1. **Describe** what you would expect if you repeated the simulation in Activity 1 more than 50 times.
2. **Explain** how you could use a graphing calculator to simulate tossing a coin 40 times.
3. **CLOTHING** Rodolfo must wear a tie when he works at the mall on Friday, Saturday, and Sunday. Each day, he picks one of his 6 ties at random. Create a simulation to find the experimental probability that he wears a different tie each day of the weekend.
4. **TOYS** A fast food restaurant is putting 3 different toys in their children's meals. If the toys are placed in the meals at random, create a simulation to determine the experimental probability that a child will have all 3 toys after buying 5 meals.
5. **SCIENCE** Suppose a mouse is placed in the maze at the right. If each decision about direction is made at random, create a simulation to determine the probability that the mouse will find its way out before coming to a dead end or going out the In opening.
6. **WRITE A PROBLEM** Write a real-life problem that could be answered by using a simulation.



### For Exercises 7–9, use the following information.

Suppose you play a game where there are three containers, each with 10 balls numbered 0 to 9. One number is randomly picked from each container. Pick three numbers each between 0 and 9. Then use the random number generator to simulate the game. Score 2 points if one number matches, 16 points if two numbers match, and 32 points if all three numbers match. Notice that numbers can appear more than once.

7. Play the game if the order of the numbers does *not* matter. Total your score for 10 simulations.
8. Now play the game if order of the numbers does matter. Total your score for 10 simulations.
9. With which game rules did you score more points?