

Practice with Probability

Summary

Students will complete various activities to reinforce the concept of probability.

Materials

- *Probability Pistachio*
, by Stuart J. Murphy
Popsicle sticks (three per person)
Colored markers
- [A Stick Game recording sheets](#) (pdf)
Six-section spinner, pencil, and large paper clip for each person
Paper bags (one per person)
Colored Unifix cubes (ten per person, two each of five colors)
Two 1-6 number cubes per person (one green and one red per person)
- [1-6 number cube throw recording sheet](#) (pdf)
Transparency of a "tree diagram"

Additional Resources

Books

- *Probably Pistachio*
, by Stuart J. Murphy; ISBN 0-06-446734-1
- *Data, Chance, and Probability*
(Grades 4-6) (Learning Resources, Incorporated); ISBN 1-56-911997-X
- *Math At Hand*
, by Great Source Education Group Staff; ISBN 0-669-46922-X

Game

- *Yahtzee*
(Dice game involving probability)

Background for Teachers

It is helpful to know if something is *likely* or *unlikely* to happen. It's more useful if you can use a number to describe that likelihood. Probability will help you decide how often something is likely to happen. However, it usually won't help you to know exactly when that event will happen.

An event is something that may happen. The *probability* of an event can be any number from zero through one. It can be written as a *fraction*, a *decimal*, or a *percent*. If the probability of an event is zero, it is *impossible*. If an event is *certain*, it has a probability of one. The more unlikely an event is, the closer its probability is to zero. The more likely an event is, the closer its probability is to one.

When you flip a penny, two things can happen. These two things are called *outcomes*. When using a spinner with eight equal sections, there are eight *possible outcomes*. When three of those eight sections are red, and other colors have less than three sections, there are three favorable outcomes. When you do an experiment to get an idea about probability, you are sampling, but you may not get exactly the same number as finding the ratio of favorable to possible outcomes, and sampling can fool you.

Intended Learning Outcomes

3. Reason mathematically.
5. Make mathematical connections.

Instructional Procedures

Invitation to Learn

Read *Probably Pistachio*.

Guiding questions: What are the boy's chances of choosing a bag of popcorn from the coach's basket? What are some examples of probability in our own lives?

Instructional Procedures

Lesson 1

Distribute popsicle sticks and ask participants to list three features of Utah (one feature per stick). Examples: Utah counties, plants or animals, landmarks, regions, deserts, wetlands, forests. Leave the back of the sticks plain.

Before you begin the Native American Stick Game, record all the different ways the sticks might land. Then write your prediction of the combination you think will happen most often on *A Stick Game* recording sheets.

Drop the sticks on the floor ten times and record the results. How close was your prediction?

4. Ask

: Why would the plain sticks most likely appear more than the colored ones?

Show a six-section spinner to explain probability in the Stick Game. Discuss the simple ratios (fractions) shown in this experiment.

Lesson 2

Demonstrate with "probability bags" (paper bag with ten Unifix cubes inside). Ask questions about probability:

What are the chances of my drawing out a red cube?

If I put the cube back (replacement), what are my chances of drawing it again? If I don't put the cube back (without replacement), what are my chances now?

Using overhead projector, record data as you go.

Distribute 1-6 number cubes; students experiment with how many combinations of cube throws to complete the chart. Notice a pattern (e.g., How many different ways can you throw the cube to get a total of seven?).

Extensions

When teaching about Native American tribes of Utah, teach the Native American Stick Game as part of the unit.

What is the probability that a given county in Utah was named after a mineral? State this as a fraction.

Tree diagrams are used to find all possible outcomes in a sample space by drawing a diagram or making an organized list.

Example:

Family Connections

Assign students to choose four of their shirts and four pairs of pants. Draw pictures to show how many different combinations of outfits they could wear to school (outcomes) using those items of clothing.

Election outcome: Six people are running for class president; the person with the most votes will be president. The person who comes in second will be vice president. How many different pairs of president and vice president combinations (outcome) are possible?

Assessment Plan

Problem Solving

What is the probability that a number between one and 50 contains the digit four in it? State this as a fraction.

What is the probability that a person was born in a summer month? State this as a fraction.

Authors

[Utah LessonPlans](#)