

Math 5 - Act. 30: Spinner Experiment

Summary

This activity provides students experience collecting and analyzing data.

Group Size

Individual

Materials

- Spinner Face A (one per student)
- 5-by-8-inch index cards, one each student
- Spinner recording sheet, one to two for each student
- Paper clips
- Plastic straws, one 1/2- inch length per student
- Scissors
- Tape
- Sample spinner made ahead of time

Additional Resources

Math by All Means: Probability Grades 3-4 by Marilyn Burns

About Teaching Mathematics: A K-8 Resource, 2nd Edition by Marilyn Burns

Background for Teachers

Part 1 of this lesson introduces children to probability through an experiment in which one outcome is more likely than the others. The experiment provides experience for children to collect and analyze data. The probability of spinning each number provides a context for talking about fractions and percents and engages students in comparing the areas of the regions of a circle. Making their own spinner gives children practice in following directions and helps develop their fine motor skills.

Intended Learning Outcomes

2. Become mathematical problem solvers.
3. Reason mathematically.
4. Communicate mathematically.

Instructional Procedures

Invitation to Learn

Hold up the sample spinner you made. Tell students they are going to make a spinner like yours. Ask what they notice about its face. Spin the spinner and point out how the indicator line tells what number the spinner lands on. Demonstrate for the children how to make a spinner.

Instructional Procedures

Directions for making a spinner:

- Cut out the spinner face.

- Cut the 5-by-8-inch index card in half. Mark a dot near the center of one of the halves. Using a straightedge, draw a line from the dot to one corner of the card.

- Glue the spinner face to the side of the index card you did not draw on. Cut out the face of the spinner with its new, heavy backing.

- Bend up the outside part of a paper clip. This part should point straight up when the paper clip is lying flat on your desk.

- Use the paper clip to poke a hole in the center of the spinner face and through the dot near the

center of the index card.

Push the bent end of the paper clip through the hole in the index card and use tape to secure the rest of the paper clip to the bottom of the card. Make sure the side of the card with the line is facing up.

Put the 1/2-inch length of plastic straw and then the spinner face on the paper clip.

Cover the tip of the paper clip with a piece of tape.

Demonstrate for the students how to do the spinner experiment:

Write the numerals 1, 2, and 3 at the bottom of the first three columns on the spinner recording sheet.

Spin the spinner and record the number it lands of in the lowest square of its column. Point out to the students that they should start writing at the bottom of the columns. Do five or six spins, recording the number each time.

Tell students that they will continue spinning and recording until one number reaches the top of its column.

Children then cut out the three-column strip and post it on the chalkboard under 1, 2, or 3 heading.

Pose a part of the problem:

Ask, "When you spin the spinner, is any number more likely to come up than any other number? Why do you think so?" Explain: You can keep track of spins on a graph recording sheet that is 3 squares by 12 squares. Demonstrate for the class how to spin and record on the graph. After three or four spins, ask, "What do you think the entire graph will look like when one number reaches the top of the paper?" Ask, "Which number do you think will reach the top of the recording sheet first?" Write your prediction on paper.

Present the problem to be solved:

Explain: Each of you will use your spinner and graph recording sheet to conduct an experiment.

When one of the numbers reaches the top, you've completed the experiment. Cut the 3 x 12 recording sheet apart from the graph paper. Then post your 3 x 12 recording sheet on the board under the winning number. (Have students tape their graphs to the board under the heading 1, 2 or 3).

Students should conduct the experiment three times (using their entire graph recording sheet).

Discuss the class results when all students are finished comparing the results to their predictions.

Most likely, 3 was the winning number, but there will be instances of 1 or 2 as winner. Ask: how might we find out if 3 actually comes up in half of all the spins?

Extensions

Possible Extensions/Adaptation

You could have students take their graph recording sheets and cut apart each column. Then cut off any blank squares. Have small groups of students then tape their 1s end to end. Continue doing this with the 2s and 3s. Next combine each group's strips of numbers together to get one long strip of 1s, 2s and 3s. Tape one end to the chalkboard. This will provide a visual for students to see which number actually won. See "Homework & Family Connections" to add to this activity.

Homework & Family Connections

Each student can take their spinner and one graph recording sheet home to conduct the experiment again. Explain to students that they are going to gather more data to add to their first experiment. Ask students why this would be helpful. If students do not suggest it, tell them the mathematical theory of probability says that the more times you spin a spinner, the closer the results will match the theoretical distribution.

The next day, have students again cut apart their numbers, discard blank squares, and add to the class strip of 1s, 2s and 3s. Discuss the results. If there is time, have students actually count the

number of 1s, 2s and 3s. This could be accomplished by cutting the strips into groups of ten, then compiling the 10s to form hundreds and so on. Some students may devise their own strategies for counting. Divide the strips among small groups for counting, then gather together for a class total. Discuss the total numbers finding out if there were any surprises with the additional data. Ask, "Does the mathematical theory of probability (gathering more data) seem to be evident in our experiment? How can you tell? Can you find a way to prove that 3 came up in half of the spins?" Add applicable questions and discussion.

Assessment Plan

Have children write about what they did, what they had predicted and what the results were. Pose these questions to students who might not know how to begin:

How do the class results compare with your prediction?

How did your individual experiments compare with the class results?

Why do you think mathematicians say that a large sample of data is better for analyzing information than a small sample of data?

Authors

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