

Math 5 - Act. 28: Dodecahedron Race

Summary

Students' understanding of probability will be strengthened playing the game "Dodecahedron Race" using a dodecahedron die.

Materials

- 1 dodecahedron, numbered 1-12
- 3-4 race charts
- Probability Questions worksheet

Additional Resources

Exploring Math with Polyhedra Dice by Nancy Segal Janes

Background for Teachers

Students may not be familiar with polyhedra dice. Be sure to allow students plenty of time to explore the polyhedrons. Most students seem fascinated by the different polyhedrons and enjoy taking a closer look at them. Focusing their attention on the games later will be easier if they are initially given time to explore the materials on their own. If students play the games at their desktops or tables, a good suggestion to keep the polyhedrons from flying all over the room is to set a rule that if the polyhedrons fall onto the floor, the student loses a turn. Have students roll the dice into a shoebox or shoebox lid to contain them. Most games work best when students play as a two-person team. Interacting with a partner encourages students to discuss and reflect on their strategies and ideas -- a wonderful way for students to communicate mathematically.

Intended Learning Outcomes

3. Reason mathematically.
4. Communicate mathematically.

Instructional Procedures

Invitation to Learn

Show students a dodecahedron die (numbered 1-12). Ask if anyone has ever seen a die with this many sides. Discuss the name of the die, dodecahedron. Ask for students to help define dodecahedron. Dodeca = twelve, hedron = a figure having _____ number of sides. . . so. . . dodecahedron is a twelve sided object. Tell students you are going to teach them a game called Dodecahedron Race in which they will be using a dodecahedron. In this game the first number whose row is completely filled wins.

Instructional Procedures

Students will take turns rolling the dodecahedron and recording the results on the chart. Place an X in the box of the number that is rolled. Demonstrate to students how to record their numbers.

Have students predict which number will win the race. They should write their prediction on the top of their score sheet. Discuss with their partner why you think your number will win the race. One person rolls the dodecahedron. The other person marks an X in that number's row on the race chart.

Continue rolling the dodecahedron until one row is filled with Xs.

Play the game at least three times.

Extensions

Possible Extensions/Adaptations

“Probability Questions” worksheet

Answers to Probability Questions:

1 out of 12 because there are twelve possibilities and only one number 2.

1 out of 12 because there are twelve possibilities and only one number 6.

$\frac{1}{6}$, 1 out of 6, and 1:6.

$\frac{1}{12}$, 1 out of 12, and 1:12.

5 out of 12

9 out of 12

BONUS: $\frac{1}{12}$, 1 out of 12, and 1:12.

Assessment Plan

Use the following questions as a beginning to a discussion on probability. It is helpful to record the different ways to write each outcome.

What are the chances that 1 will win the next race you play? Why?

What are the chances that 10 will win? Why?

Continue explaining the chance of each number winning. Discuss it this way:

The probability of rolling a 3: There is one way to roll a 3, and there are 12 possible outcomes. The probability of rolling a 3 equals 1 out of 12, 1:12 or $\frac{1}{12}$.

The probability of rolling a 4: There is one way to roll a 4, and there are 12 possible outcomes. The probability of rolling a 4 equals 1 out of 12, 1:12 or $\frac{1}{12}$.

- The probability of rolling an odd number: There are six ways to roll an odd number (1,3,5,7,9,11) and there are 12 possible outcomes. The probability of rolling an odd number equals 6 out of 12, or 6:12 or $\frac{6}{12}$.

The probability of rolling a number less than 12: There are 11 ways to roll a number less than 12. The probability of rolling a number less than 12 is 11 out of 12 or 11:12 or $\frac{11}{12}$.

Authors

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