

# What Are the Odds?

Get students on a roll with understanding fairness with this probability task!

**Purpose:** To determine fairness of a game

**Students will do the following:**

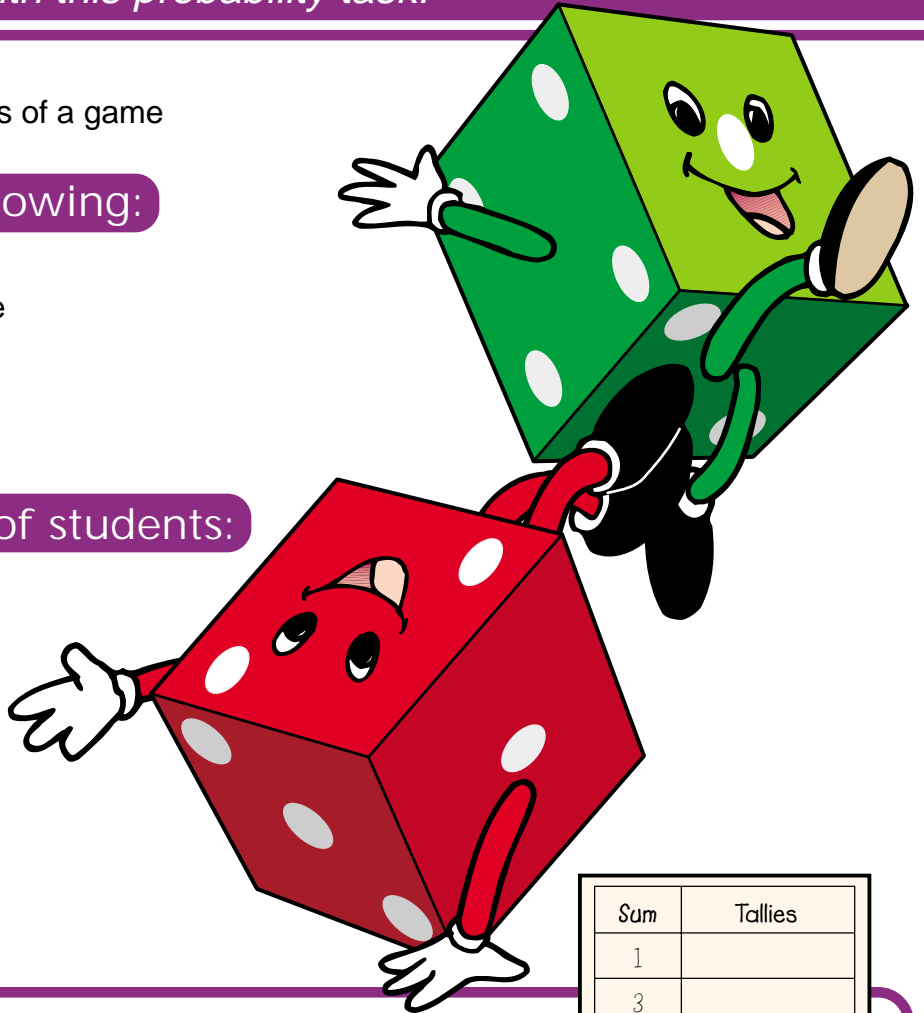
- identify possible outcomes
- determine the fairness of a game
- complete a tally table
- record data on a tally table
- write to explain thinking

**Materials for each pair of students:**

- copy of page 126
- pencil
- die

**Vocabulary to review:**

- fair
- possible outcomes
- equally likely
- odd/even



Sum	Tallies
1	
3	
5	
8	
9	
12	

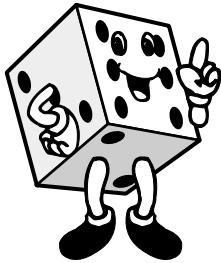
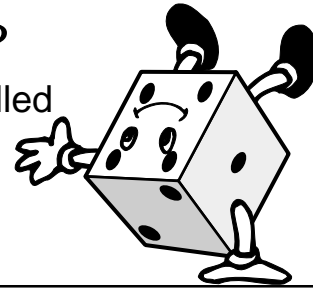
**Extension activities to use after the reproducible:**

- Chances are that students will love playing this probability partner game! Give each twosome a pair of dice and two sheets of paper. Instruct each partner to draw a tally table as shown. In turn, each player chooses a sum from 1 to 12 until all have been chosen. To begin, Player 1 rolls the dice and adds the numbers shown. If the sum is one that she chose, she makes a tally mark on the table. If not, then her partner makes a tally mark. Alternate play continues until one player rolls a sum ten times. After a few rounds of play, have students discuss which sums are more likely to be rolled and why. (*Sums six, seven, and eight are more likely to be rolled because there are more ways to roll them.*) If desired, have students play the game again, using what they learned to select numbers more carefully.
- Have students further explore probability with personalized dice! In advance, make a copy of the die pattern on page 162 for each group of six students. Before assembling each die, label each section with a student's name in the group. (If a group has less than six students, leave that section of the die blank.) Challenge each group to study its die and predict the probability of rolling a girl's (or boy's) name as being certain, likely, equally likely, unlikely, or impossible. Direct each student to record his group's predictions and make a tally table for recording results. Instruct group members to take turns rolling the die until it has been rolled 20 times. Then have each student compare his final results to his predictions. For further exploration, have students determine the probability for rolling the name of a student who is a bus rider, went to a different school the previous year, or has a younger sibling.

# What Are the Odds?

The Fair Game toy company is working on a new game called What Are the Odds?

Play the game according to the directions. Then answer the questions below.

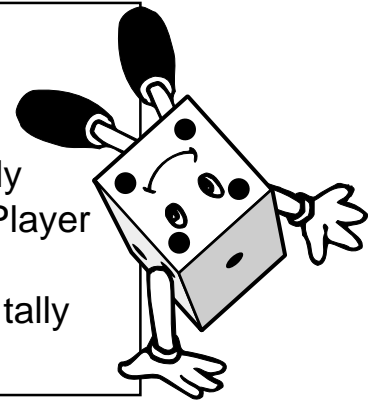
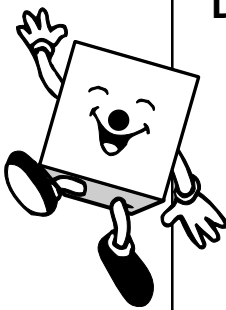


Remember, a game is fair when each player has an equal chance of winning!

Tally Table—Number Rolled	
Players	Tallies
Player 1 (Odd)	
Player 2 (Even)	

### Directions for 2 players:

1. Decide who will be Player 1 and Player 2.
2. In turn, roll the die.
3. If an odd number is rolled, Player 1 makes a tally mark on the table. If an even number is rolled, Player 2 makes a tally mark.
4. After a total of 20 rolls, the player with the most tally marks wins the game.



1. One *possible outcome* for rolling the die is rolling the number 1. List the other possible outcomes. \_\_\_\_\_
2. How many even numbers are on the die? \_\_\_\_\_ How many odd numbers? \_\_\_\_\_
3. Do you think that the game is fair? \_\_\_\_\_ Explain why or why not. \_\_\_\_\_
4. What if the toy company decides to create a new die for the game using the following numbers: 2, 3, 4, 6, 7, 8, and 9. Is this a fair die? \_\_\_\_\_ Explain why or why not. \_\_\_\_\_
5. Create 2 new dice for the game: 1 fair and 1 unfair. List the 6 numbers for each die. \_\_\_\_\_

**Bonus Box:** Create a die that would be unfair for Player 1. Then create a die that would be unfair for Player 2.