

<b>Student Task</b>	Use probability to judge the fairness of a game involving a dice and coin toss.
<b>Core Idea 2 Probability</b>	<b>Apply and deepen the understanding of theoretical and empirical probability.</b> <ul style="list-style-type: none"><li>• Represent the sample space for simple and compound events in an organized way (table, diagram, organized list, and tree diagram) and express the theoretical probability of each outcome.</li><li>• Use data to estimate the probability of future events.</li><li>• Know the relationship between the probability of an event and its complement (i.e., if the probability of an event is <math>P</math>, then the probability of the event not occurring is <math>1-P</math>).</li><li>• Determine theoretical probabilities and use these to make predictions about events.</li></ul>

## Fair Game?

This problem gives you the chance to:

- use probability to judge the fairness of a game

Chris and Jack are playing a board game with a fair coin and a fair number cube numbered 1 to 6.



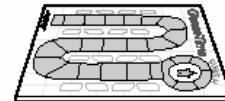
They take turns tossing the coin and the number cube.

Then they figure out the score.

If the coin lands on heads, the score is twice the number on the number cube.  
If the coin lands on tails, the score is two more than the number on the number cube.

1. Complete this table of possible scores.

		Number on the number cube					
		1	2	3	4	5	6
Coin	Heads	2	4	6			
	Tails	3	4	5			



2. If the score is a prime number, Chris moves two squares on the board.

If the score is not a prime number, Jack moves one square on the board.

What is the probability of getting a score that is a prime number? \_\_\_\_\_

Show your work.

3. Chris and Jack play a game in which there are 12 trials.

How many squares would you expect Chris to move?

\_\_\_\_\_

How many squares would you expect Jack to move?

\_\_\_\_\_

4. Is this game fair?

\_\_\_\_\_

Explain your answer.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8

Fair Game?		Test 7 Form A Rubric																								
<p>The core elements of performance required by this task are:</p> <ul style="list-style-type: none"> <li>• use probability to judge the fairness of a game</li> </ul> <p>Based on these, credit for specific aspects of performance should be assigned as follows:</p>		Points	Section Points																							
<p>1. Correctly completes the table:</p> <p style="text-align: center;">Number on the number cube</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>Coin</td> <td>Heads</td> <td>2</td> <td>4</td> <td>6</td> <td>8</td> <td>10</td> <td>12</td> </tr> <tr> <td></td> <td>Tails</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> </table> <p><i>Allow 1 point for each 2 correct values.</i></p>			1	2	3	4	5	6	Coin	Heads	2	4	6	8	10	12		Tails	3	4	5	6	7	8	$3 \times 1$	3
	1	2	3	4	5	6																				
Coin	Heads	2	4	6	8	10	12																			
	Tails	3	4	5	6	7	8																			
<p>2. Gives a correct answer as:</p> <p style="text-align: center;"><math>\frac{4}{12}</math></p> <p>Shows that there are 12 possible scores, only 2, 3, 5, 7 are prime.</p> <p><i>Accept <math>\frac{4}{12}</math> for work.</i></p>		1  1	  2																							
<p>3. Gives correct answers as:</p> <p>Chris moves <b>8</b> squares.</p> <p>Jack moves <b>8</b> squares.</p>		1  1	  2																							
<p>4. Gives correct answer as:</p> <p>Yes, the game is fair. and Explains that in the long term, both players move the same number of squares.</p>		1	1																							
<b>Total Points</b>			<b>8</b>																							

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<b>Student Task</b>	Use fractions and percents to calculate the answers to questions involving the production and profit of yogurt packaging.
<b>Core Idea 1 Number and Operation</b>	<b>Understand number systems, the meanings of operations, and ways of representing numbers, relationships, and number systems.</b> <ul style="list-style-type: none"><li>• Develop, analyze, and explain methods for solving problems involving proportional reasoning</li><li>• Understand the meaning and effects of operations with rational numbers</li><li>• Use the associative and commutative properties of multiplication and the distributive property of multiplication to simplify computations</li><li>• Work flexibly with fractions, decimals, and percents to solve problems</li><li>• Solve problems involving proportional reasoning and scaling.</li></ul>