**Statistics Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Activity Expected Value Game**

**The purpose of the activity**

In this activity, the learners explore issues related to gambling to further develop their concept of

chance. They calculate theoretical probabilities of game outcomes and develop an understanding of expected value.

**Resources:** • Die is divided into three options; Red = even numbers, Blue = one, Green = odd

 numbers other than one

**The guided teaching and learning sequence**

The die is rolled.

• You pay $2 to play.

• If the face is red, (even numbers) you lose the $2 it cost you to play.

• If the face is blue, (one) you are paid $5 (you win $3).

• If the face is green, (odd numbers other than one) you are paid $3 (you win $1).

Play 10 rounds of the game with the class. Keep a running tally of the money won or lost for each student. Class results:

|  |  |  |
| --- | --- | --- |
| Game Number | Result | Total/Value |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |
| 9 |  |  |
| 10 |  |  |

**Work in pairs**. **Each student will start with $10 and have to stop playing if they run out of money.**

|  |  |  |
| --- | --- | --- |
| Round number | Result | Total |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |
| 9 |  |  |
| 10 |  |  |
| 11 |  |  |
| 12 |  |  |
| 13 |  |  |
| 14 |  |  |
| 15 |  |  |

1. How many winners were there in your group—in the class? What was the greatest win?
2. How many losers? What was the largest loss?
3. Do you think this is a fair game to play? Why or why not?
4. What is a fair game? How can you work out whether the game is fair or not?

**Follow up game idea.** Two players play a game where a single dice is rolled. The following is what happens for each result of the roll.

|  |  |
| --- | --- |
| Roll a 1 | Player 1 wins $3.00 |
| Roll a 2 | Nobody wins or loses |
| Roll a 3 | Player 2 wins $5.00 |
| Roll a 4 | Player 1 wins $3.00 |
| Roll a 5 | Player 2 wins $4.00 |
| Roll a 6 | Player 1 wins $2.00 |

Is this game a good idea to play? Is it fair? If not how would you change it to make it fair?