



Port Augusta Secondary School – Mathematical Investigation

Task Title

Same or Different

Student Name

Playing the 2,1 Game

Rules:

1. You will play the game in pairs
2. Place 2 red blocks and 1 blue block in a container
3. Player A reaches into the container and pulls out a block
4. Player B then reaches into the container and pulls out a block
5. Player A wins if the block colours are the SAME, Player B wins if they are DIFFERENT

Initial Perceptions

Having read the rules does the game appear to be fair? If so, why do you think it is fair, and if not who has the best chance of winning and why?

During the Game Trials

Have your initial perceptions changed at all? Explain your position with supporting evidence (e.g. game data)

Upon Viewing the Simulation

Now that you have seen the results for 100000 games how does your view of this game compare to your initial thoughts. Explain how you have come to this decision

Calculations

Can you prove whether this game is fair or not using some mathematics.



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Same or Different

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Playing the 2,2 Game

Rules:

1. You will play the game in pairs
2. Place 2 red blocks and 2 blue blocks in a container
3. Player A reaches into the container and pulls out a block
4. Player B then reaches into the container and pulls out a block
5. Player A wins if the block colours are the SAME, Player B wins if they are DIFFERENT

Initial Perceptions

Having read the rules does the game appear to be fair? If so, why do you think it is fair, and if not who has the best chance of winning and why?

During the Game Trials

Have your initial perceptions changed at all? Explain your position with supporting evidence (e.g. game data)

Upon Viewing the Simulation

Now that you have seen the results for 100000 games how does your view of this game compare to your initial thoughts. Explain how you have come to this decision

Calculations

Can you prove whether this game is fair or not using some mathematics.



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Trying to Find Fair Games

You have been given six of each block colour. The possible game combinations are

(2,1)	(2,2)				
(3,1)	(3,2)	(3,3)			
(4,1)	(4,2)	(4,3)	(4,4)		
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

Only two of these game combinations are fair. Your task is to determine which two.

Initial Perceptions

Are there any games that you can eliminate as not being fair immediately? Explain why you believe that we can get rid of them.

Are there any two combinations in particular that you think may be possible solutions? If so which ones and why?

Problem Solving Process

Describe the steps you took to find the two fair combinations.

Calculations

Use probability calculations to prove that these games are fair.