RED OR BLACK GAME


This is a game for 2 players. You need a pack of 52 playing cards. Shuffle the cards.

One player is dealer and turns the cards face up one at a time.

Before seeing the card, the other player must say 'red' or 'black' and wins the card if the guess is correct, otherwise the dealer wins the card.

The winner is the player with the most cards at the end.

Is there a winning strategy?

HELP

This is such a simple game, everyone can play.

NEXT

To vary the game, 5 cards are removed at the start and put aside and nobody knows what they are. Otherwise the game is played in exactly the same way.

What difference, if any, does this make to the game?

NOTES FOR TEACHERS

SOLUTION

In the basic version of the game there is a fifty-fifty chance that the first card will be red, so it does not matter which colour is called. After that the chance of red or black depends on how many cards of each colour have been turned over. By keeping a count of how many reds and how many blacks have been turned over the player who is guessing the colour of the next card can get a slight advantage by calling the colour for which the dealer holds the most cards.

'On average' the probability of red is $\frac{1}{2}$ and the probability of black is $\frac{1}{2}$.

The probability changes slightly if 5 cards are removed randomly at the start. Without seeing which cards have been removed from play there is no way of telling the exact probabilities so the game becomes entirely a game of chance.

Why do this activity?

This is an enjoyable game for people of all ages. It can lead to some discussion about probability.

Learning objectives

In doing this activity students will have an opportunity to become familiar with playing cards and the numbers on them and begin to think about probability.

Generic competences

In doing this activity students will have an opportunity to become accustomed to losing cheerfully as well as winning a game.

Suggestions for teaching or home learning

Pre-school and Lower Primary. An adult can play the game with very young children. They only need to be able to recognize the difference between red and black suits. As they get older they will learn that there are 4 suits with 13 cards in each suit and they can enjoy sorting the cards into suits and into order.

Upper Primary and Lower Secondary. This game can be introduced as a starter for a lesson on probability with the teacher playing against the whole class. The teacher should shuffle the cards and explain that she will ask different members of the class to guess if the next card is red or black. The class win the card if the guess is correct and the teacher gets the card if the guess is wrong.

Key questions

- Do you think the next card is more likely to be red or black or are they equally likely? Why?
- The last 3 cards have been red. Is the next card more likely to be red or black. Why?
- What difference does it make if we remove 5 cards at random and play the game without seeing what cards have been removed? Explain.

Follow up

Primary: Same Sweets https://aiminghigh.aimssec.ac.za/same-sweets/

Lower Secondary: In a Box https://aiminghigh.aimssec.ac.za/in-a-box/

Same Birth Month https://aiminghigh.aimssec.ac.za/same-birth-month/

Upper Secondary: Same Birthday https://aiminghigh.aimssec.ac.za/same-birthday/

Go to the **AIMSSEC AIMING HIGH** website for lesson ideas, solutions and curriculum links: http://aiminghigh.aimssec.ac.za

Subscribe to the **MATHS TOYS YouTube Channel**
https://www.youtube.com/c/mathstoys

Download the whole AIMSSEC collection of resources to use offline with the **AIMSSEC App** see https://aimssec.app or find it on Google Play.

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and school years up to Secondary 5 in East Africa.
New material will be added for Secondary 6.
For resources for teaching A level mathematics (Years 12 and 13) see https://nrich.maths.org/12339
Mathematics taught in Year 13 (UK) & Secondary 6 (East Africa) is beyond the SA CAPS curriculum for Grade 12

	Lower Primary Approx. Age 5 to 8	Upper Primary Age 8 to 11	Lower Secondary Age 11 to 15	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13