

Mind Reader

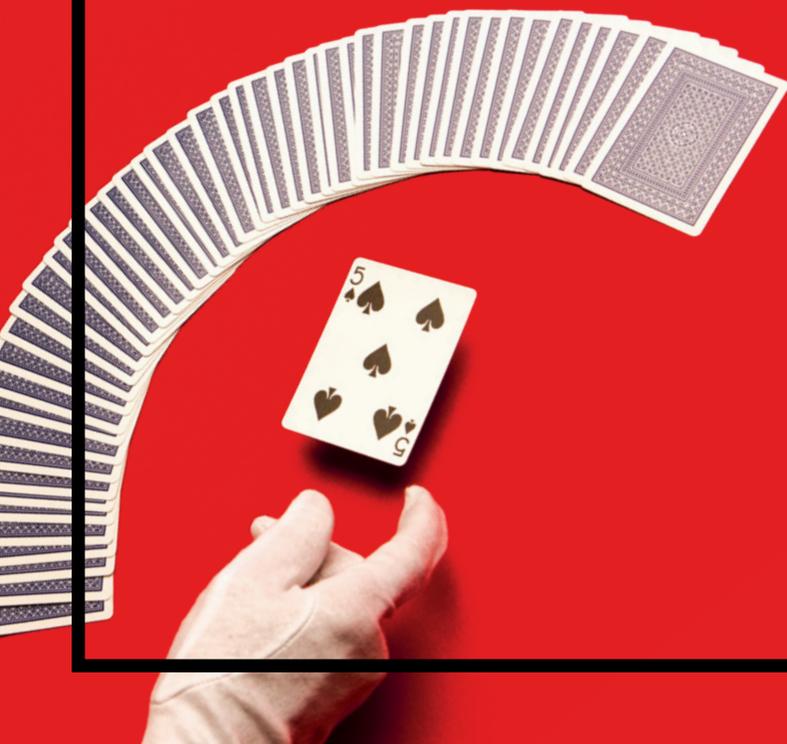
WEEK
5

Experiment: Card Trick Algorithm

Superheroes with the power to read minds always know what their enemies are up to. You can amaze your friends with your own mind-reading powers using this math-based predictive card trick.

MATERIALS

- Deck of playing cards
- A friend



INSTRUCTIONS

Count 21 cards from the deck and set the rest aside. Ask your friend to pick a card from the deck of 21 cards and remember it, but not tell you what it is. Have your friend shuffle the deck of 21 cards and return it to you.

Deal the cards face up into three columns moving from left to right, with the cards overlapping. You should have seven cards in each column when you're done. Ask your friend to point to the column their card is in: left column, middle column or right column. Slide each column of cards together so they're in three stacks, keeping the cards in order as you slide them.

Make the three stacks into one deck again but in a specific order—make sure that the stack your friend pointed to is always collected second! This is very important to remember. This ensures that the column they pointed to is always placed in the middle of the deck.

Repeat the process. Deal the cards into three columns and ask your friend to point to the column with their card. Make the columns into three stacks, and pick up the stacks into one deck making sure to pick up your friend's column second. Repeat twice more, for a total of four times.

Reveal that your friend's card is the fourth card down in the middle column. It will be there every time!





WHAT'S HAPPENING?

This trick uses an algorithm, or a specific set of steps that reach a predictable outcome. You deal the cards out in a way that organizes them and forces the selected card into a predictable position. When you repeat this pattern four times, the selected card always ends up in the exact middle of the deck. When dealt into columns, the card in the exact middle of the deck always ends up the fourth card down in the middle column.

Examples of algorithms can be found in many different natural environments, from the way that ants behave when foraging for food to the way enzymes work in our own bodies. Natural processes that follow a set of steps to result in a predictable outcome are examples of natural algorithms. Look for their results in patterns of plant growth, animal coloration patterns and the way water flows.

SAVE THE DAY!

To see how this works more clearly, set up the deck so each column has cards of the same suit only. Pick up the columns and deal them out again. How are the suits distributed now? Pick a card, collect the columns and deal them again and watch where your card is after each set of steps.

LEARN MORE

Discover the mathematical patterns that abound in the natural world (including a giant mirror maze!) in MSI's *Numbers in Nature: A Mirror Maze* exhibit.

RECOMMENDED READING

Mathemagic!: Number Tricks,
by Lynda Colgan

Zero the Hero, by Joan Holub

