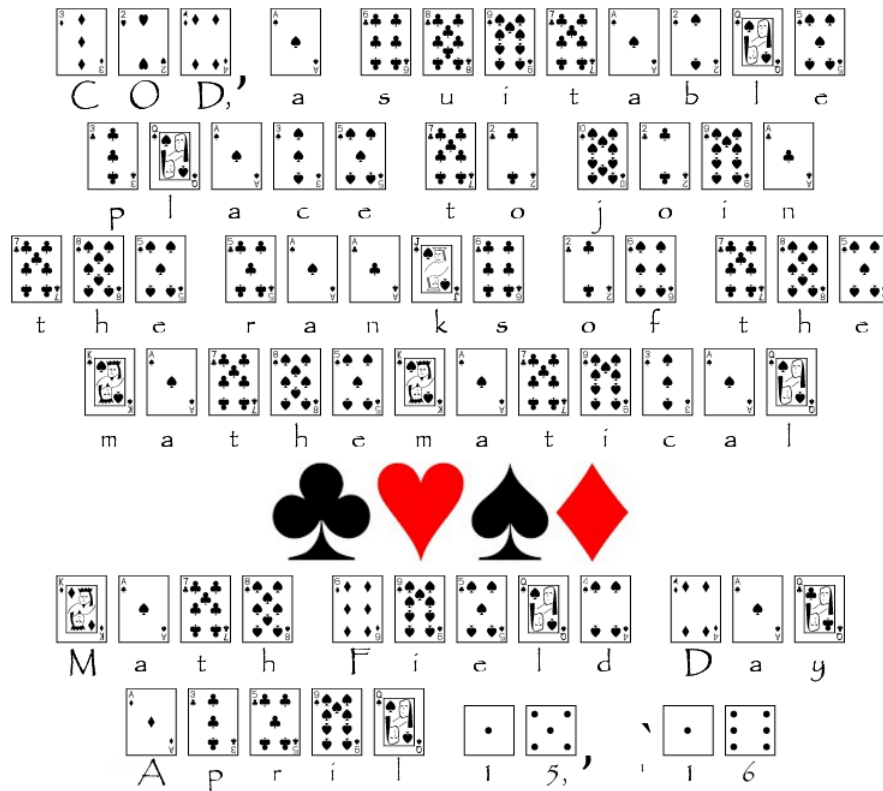


# Math Field Day—at COD—April 15, 2016



## 1 Overview

College of the Desert welcomes schools from across the Coachella Valley to join in Math Field Day, 2016. This year's theme is Prestidigitation and Playing Cards.

### Organizing Committee

- Karen Tabor, Math & Science Dean, COD;
- Carl Farmer, COD MESA Director;
- Raul Correa, MESA President, COD;
- Jorge Perez, Prof. of Math, COD;
- Geoff Hagopian, Prof. of Math, COD;
- Melissa Flora, Prof. of Math, COD;
- Steve Dostal, Prof. of Math, COD
- John Learned, Math Dept. Chair, COD;

### Participating High Schools

- Shadow Hills HS, Kate Keener;
- Desert Hot Springs HS, John Olver;
- Coachella Valley, Rommel Guerrero
- Indio HS, David Chavez
- Palm Springs HS, Richard Hunsperger
- West Shores, Roseanna Radoff
- Xavier Prep, Phil Epstein
- La Quinta HS, Daniel OGrady
- Cathedral City HS, Edward Perry

## 2 Schedule

Assemble in the hour before the start at 9:30 with an orientation to the day's events. Then teams will form to engage in various roughly 20-minute activities with a spirit of cooperative engagement. The plan is meant to be somewhat flexible to adapt to the circumstances at hand, but the general outline of the program will be:"

### 8:30am - 9:30am

#### Arrival time.

Assemble at the COD MESA Center in the MSTC building (see map.) Some groups will arrive earlier than others, so this is a sort of buffer zone for groups to arrive and find their way around.

### 9:30am - 10:00am

#### Orientation.

A description of the structure of the day's events and a brief description of the various activities.

### 10am - 12:30pm

#### Activities at various locations on campus.

COD MESA students and faculty will be host each of the six teams cycling through six 20-minute activities.

### 12:30pm - 2pm

#### Lunch and Awards.

The activities described below are loosely based on the theme of "playing cards" which are defined as "a piece of specially prepared heavy paper, thin cardboard, plastic-coated paper, cotton-paper blend, or thin plastic, marked with distinguishing motifs and used as one of a set for playing card games." Common examples include the traditional 52-card Bicycle decks, Set, the I-Ching and Tarot

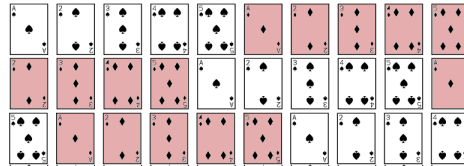


Stranger and Stranger

## 3 Activities

### 3.1 Learn Math-based Card Tricks

The 27-trick (that's a [hyperlink](#)), for instance.



Cyclic shuffling can lead to some surprising results!

### 3.2 The Game of Set.

You can play Set at the New York Times ([hyperlink](#)). Also, plenty of research pages available, not least of which is the page we created for the Summer Bridge back in 2011 ([hyperlink](#)).

### 3.3 Simplified 21

Remove all cards greater than 5 from the deck; you're left with 20 cards: Ace, 2, 3, 4, 5, in each suit. Each card is worth its face value except 5, which is worth 4. The rules are very similar to the rules for 21 ([hyperlink](#)). [Simpler hyperlink](#). What's the probability of being dealt 7 in this variation? What strategies guide optimal play?

### 3.4 Finding the Best Poker Hands

If you deal out 25 cards in a 5 by 5 grid, what are the five best poker hands you can make? Or other activities related to this [Martin Gardner article \(hyperlink\)](#).

### 3.5 The Mathematics of the I Ching

The I Ching is a base 2 system with 64 hexagrams. Read up on it here to prepare for the worst!

### 3.6 The Mathematics of Tarot

This is fairly amorphous at this stage. The wizards of MFD don't know much about Tarot, it turns out, so wait and see. There is a Math Tarot deck...

### 3.7 Create a deck of playing cards

This is a group activity. We expect there to be approximately  $52 = 8 * 5 + 12$  participants. If each one draws a particular card for a deck, we can make a deck of cards and publish it for all to use.