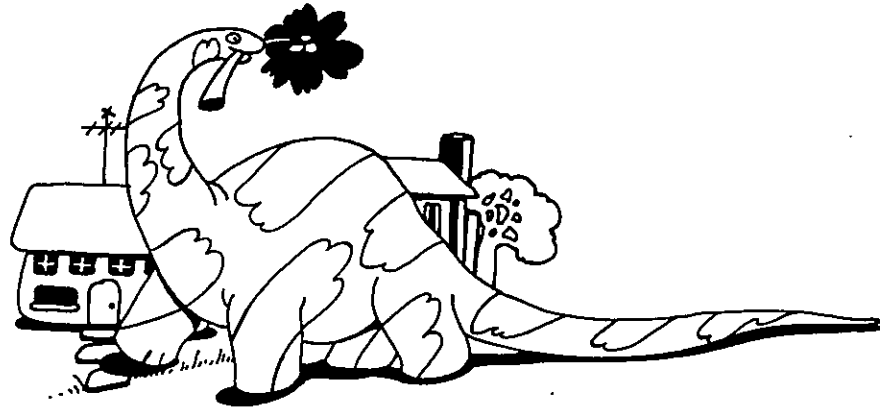
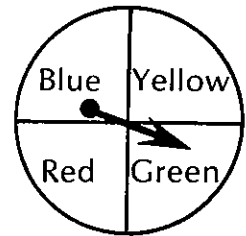


## ARE YOU CERTAIN? OR ARE YOU IMPOSSIBLE?



Some things are *certain* to happen. If today is Friday, you can be certain the next day is Saturday.

Some other things are *impossible*. It is impossible to spin a purple with this spinner.



Some other things may or may not happen. It may rain, or it may not. Things that may or may not happen are *possible*.

Let's decide which of the following are certain (C), possible (P), and impossible (I).

1. You walk down the block and pass a live dinosaur. \_\_\_\_\_
2. You throw a 6 on a die. \_\_\_\_\_
3. You get a head when you toss a coin. \_\_\_\_\_
4. Your teacher is over 16 years old. \_\_\_\_\_
5. You will ride on a jet airplane before the end of the year. \_\_\_\_\_
6. The moon will be proven to be made out of green cheese. \_\_\_\_\_
7. You will be given a homework assignment in mathematics this year. \_\_\_\_\_
8. Your school has a principal. \_\_\_\_\_
9. You will go to Disneyland sometime. \_\_\_\_\_
10. You will learn to play the flute. \_\_\_\_\_
11. Can you think of other events that are certain? Possible? Impossible? Write your own list. Use the same code letters.
12. What do you think the probability of an impossible event will be? \_\_\_\_\_  
*Hint.* How many ways can an impossible event happen?  
We say that the *probability of an impossible event is zero*, because it never happens.
13. What do you think the probability of a certain event will be? \_\_\_\_\_  
We say that the *probability of a certain event is one*, because it always happens.

MATERIALS: pencil.

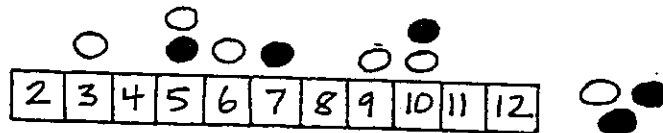
What are the chances of a certain event? 100%.

### The Two-Dice Sum Game

**You need:** a partner or small group  
counters, 11 per player  
pair of dice

This is a game for two or more players. Each player makes a number line from 2 to 12, with spaces large enough for the counters to fit on the numbers. Place your eleven counters on your number line in any arrangement. (You may put more than one counter on some numbers and none on others.) Take turns rolling the dice. On each roll, every player removes one counter that is on the number that matches the sum on the dice. (If players have more than one counter on a number, they may remove only one.) The winner is the first player to remove all eleven counters.

Decide on the best winning arrangement of counters on the number line. Explain your thinking.



From About Teaching Mathematics Math Solutions

# Dice Race

15											
14											
13											
12											
11											
10											
9											
8											
7											
6											
5											
4											
3											
2											
1											
	2	3	4	5	6	7	8	9	10	11	12

There are 4 aces in a regular deck of 52 cards.



1. If you shuffle the cards thoroughly and turn them over one by one, how many cards would you expect to turn over on the average before you get an ace? \_\_\_\_\_

2. Try this 10 times and record the number of cards you turn over *before* you get an ace.

Trial	Number of Cards <i>Before</i> First Ace
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total	

3. Calculate the average.

Average \_\_\_\_\_

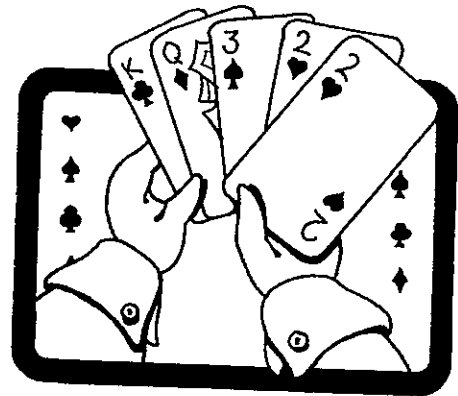
4. How close was this to your prediction? \_\_\_\_\_

Ask your teacher to help you work out the real average.

**MATERIALS:** regular deck of playing cards, pencil.

## THE BIG DEAL

An ordinary playing card deck has 52 cards. There are 4 suits: clubs ♣, diamonds ♦, hearts ♥ and spades ♠. There are 13 cards in each suit: Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, and King.



Take a deck of cards. Shuffle the cards thoroughly. Deal out 10 hands of 5 cards each. (You will have 2 cards left).

1. How many times did you get a pair in one of the hands of 5 cards? \_\_\_\_\_  
A pair is two cards with the same number. Try this 5 times (for a total of 50 hands). Keep track of the number of hands that contain pairs.
2. How many hands had a pair this time? \_\_\_\_\_
3. What fraction of your hands contained a pair? \_\_\_\_\_  
This is your experimental probability.
4. Write this fraction as a two-place decimal. \_\_\_\_\_
5. Would you always get this fraction in 50 hands? \_\_\_\_\_
6. Did your friends? \_\_\_\_\_

**MATERIALS:** playing cards, pencil.