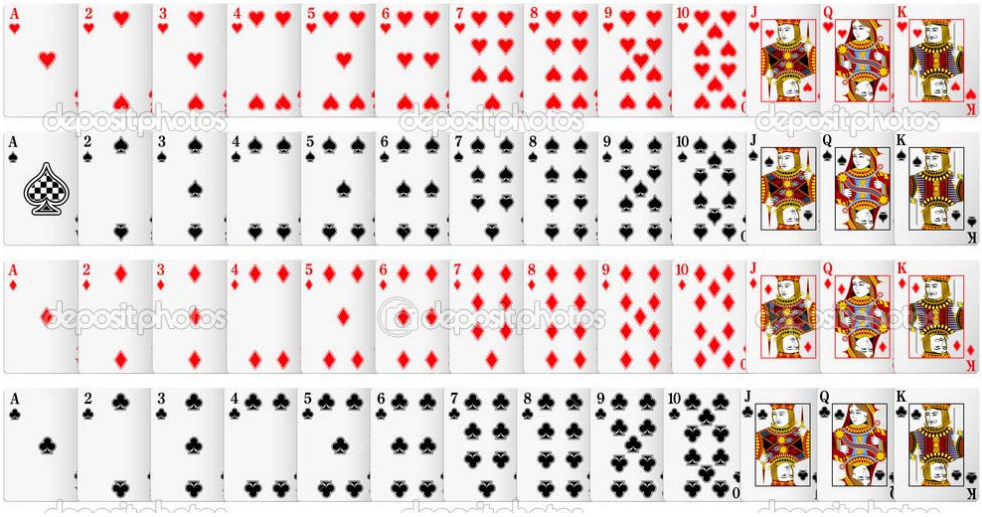
Supplemental Counting Problems NAME:

Use the Fundamental Counting Principle (FCP) to count the following possibilities.

1. Suppose you have a bag with three marbles – one red, one blue, and one yellow. You will pick two marbles out of the bag, labeling them as 1^{st} and 2^{nd}. How many ways can this be done? Use a tree diagram to list out the possibilities. (You will *not* replace the first marble in the bag before picking the second one.)

2. Suppose you have a bag with fifteen marbles – each a different color. You will pick six marbles out of the bag, labeling them as 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, and 6^{th}. How many ways can this be done? A tree diagram will be too cumbersome so just use the FCP to count the possibilities. (You will *not* replace the marbles in the bag as you go.)

3. A poker deck is composed of 52 cards: thirteen each (Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King) of four different suits (hearts, spades, diamonds, clubs). Below is a picture of a poker deck.



This problem will *not* involve the whole deck.

Select two cards – one Ace from the four Aces and one royal card from the twelve royals (Jack, Queen, and King from all four suits). How many ways can this be done? You can draw (or at least imagine) a tree diagram for this even though it gets a little whacky.