MA 138
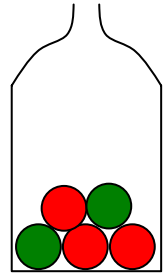**A Probability Activity**

A jar contains three red marbles and two green marbles.

In this experiment, you mix the marbles up, then pull two marbles out, one at a time without replacing the first marble.
1. List all the possible outcomes in the sample space as ordered pairs, e.g., (R1, R2) is one outcome, (G1, R2) is another.

2. List the elements of the following events
      Event A = "you get a green marble then a red marble."
      Event B = "you get two red marbles."
      Event C = "you get two different colored marbles."

3. Find the probabilities of the three events listed in number 2. That is, find P(A), P(B), and P(C).

4. It is possible to look at this experiment with a slightly different point of view. Look at the tree diagram below, which shows the possibilities for the first draw, with the probability of each outcome:
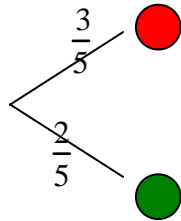
If you continue this tree in the same manner to show the second stage of the experiment, you will come up with four outcomes. Please complete this tree to show the next stage. As is done for the first stage, list the probability of each outcome in the second stage. Keep in mind that the first marble drawn is not replaced before the second draw!

5. Use the tree diagram to find the probabilities of the events listed in number 2. Make use of the property that the probability of a path along a tree is equal to the product of the probabilities of each outcome along that path.
6. Find the probability of event D = "you get two marbles of the same color."

A new experiment: Using the same jar as above, pull out a marble and note its color. Then *after replacing the first marble,* pull out a second marble and note its color.
7. Make a tree diagram for this new experiment, noting the probabilities along each branch of the tree.
8. Find the following probabilities:
      a. P(two reds)
      b. P(two greens)
      c. P(different colors)