(A) Opening Exploration

A box contains three green marbles (G), five blue marbles (B) and eight orange marbles (O). Use a tree diagram (or create lists) to help you visualize or analyze and then calculate the probabilities of the following events:

TREE DIAGRAM:

(a) that the first two picked will both be green if the first marble is ***replaced*** after its colour is noted.

(b) that the first two picked will both be green if the first marble is ***NOT replaced*** after its colour is noted.

(c) Should the answers for Q(a) and Q(b) be the same? Why or why not?

Now we will assume NON-replacement and make 2 picks, so how probable is:

(d) Selecting a blue marble AND then a green marble.

(e) Selecting a green marble given that your first pick had been blue.

(f) Selecting at least one orange marble in your first two picks.

(g) NOT selecting an orange marble .

(h) Selecting an orange marble AND a blue marble.

(i) Selecting an orange marble OR a blue marble.

(j) Selecting a green marble given that your first marble was NOT blue.

(B) **Further Exploration**

A shuffled deck of cards is placed face-down on the table. It contains 3 hearts (H), 4 diamonds (D), 5 clubs (C) and 2 spades (S). Use a tree diagram (or create lists) to help you visualize or analyze and then calculate the probabilities of the following events:

1. the top two cards are both spades.
2. The top 2 cards are EITHER hearts OR spades.
3. The top two cards are clubs AND diamonds.
4. The top two cards are NOT red.
5. The top two cards are NEITHER spades NOR hearts.

(C) Lesson Objectives

1. Introduce the concept of compound events and dependent events
2. Present algebraic and visual models for solving probabilities of compound, dependent events

(D) Key Terms:

1. Dependent Events:

2. Special Notation:

(E) Probabilities to be Calculated – AND/OR

1. We can determine p(A) AND p(B) ➔

2. We can determine p(A) OR p(B) ➔

(F) Models useful in calculating probabilities

1. **Algebraical Models** ➔ we can develop formulas to use in probability questions

2. **Visual Models** ➔ we can draw various representations that help us to see outcomes and sample spaces which include:
   i.
   ii.
   iii.
   iv.

(G) Working with Dependent Events

The key to many of these problems is to reword the problem so that the "AND" or the "OR" nature of the problem becomes apparent.

1. A jar contains 8 red marbles and 12 green marbles. A marble is chosen at random, not replaced, and another marble is chosen. What is the probability that the following outcome occurs?

(a) selecting a red marble first, then a green marble

(b) selecting two red marbles

(c) NOT selecting a green marble

(d) selecting a red marble and a green marble

2. If you draw two cards from a standard deck of 52 cards without replacement, find:

(a) P(King first, Jack second)

(b) P(face card first, ace second)

(c) P(2 aces)

(d) getting a King

3. Ten runners enter a race – four from ISM and six from SAS. If the runners finish the race at random, what is the probability that

(a) ISM runners finish in first, second, and third place?

(b) SAS runners finish in first, second and third place?

4. Erica is talking with Diana about her plans this weekend. She tells Diana that if it doesn't rain on Saturday then there is a 30% probability she will spend the day at the beach and if it does rain, she won't go at all. The weather forecast states that the probability of rain on Saturday is 20%. How probable is it that Erica will go to the beach?

5. Mr. Edgar is choosing students from his French club to be president and vice-president. The club consists of 12 girls and 7 boys. If Mr. Edgar pulls names randomly from a hat, without replacement, what is the probability that a girl is chosen for both the president and vice-president positions?

6. In a one-and-one free throw shooting situation in basketball, a player gets to shoot a second free throw if he or she has made the first one already. If Fiona has a 70% chance of making any given free throw, in one-and-one situation, what is the probability that she will miss the second free throw?

Probability of Dependent Events | LESSON 51

A box contains 5 purple marbles, 3, green marbles, and 2 orange marbles. Two consecutive draws are made from the box without replacement of the first draw. Find the probability of:

a. P(orange first, green second)	b. P(both marbles are purple)
c. P(the first marble is purple, and the second is ANY color EXCEPT purple)	d. P(orange or green)

A jar contains 8 red marbles, 6 white marbles, and 2 green marbles. A marble is drawn randomly from the jar and not replaced. A second marble is drawn. Find the probability of each of the following events.

The first marble is red and the second marble is green._____
The first marble is white and the second marble is red._____
The first marble is green and the second marble is white._____
The first marble is red and the second marble is not red._____
The first marble is not green and the second marble is not white._____
Getting a red marble._____
Getting either a green marble or a white marble._____

Independence vs dependence??

If we roll two dice, determine the probability of the event of rolling 5 on the first die and the event of the numbers on the two dice summing to 8

http://www.shmoop.com/probability-statistics/independent-dependent-events.html