Conditional Probability

Objectives:
- Find the probability of an event.
- Apply rules of conditional probability.
- Draw a tree diagram to determine a conditional probability.

Vocabulary:
- conditional probability 
  \[ p(A | B) = \]  
  \[ p(A \cap B) = \]

Tree Diagram Summary
1. Conditional probabilities start at their condition.
2. Nonconditional probabilities start at the beginning of the tree.
3. Multiply when moving horizontally across a limb.
4. Add when moving vertically from limb to limb.
Possible Classroom Examples:

In a newspaper poll concerning violence on television, 600 people were asked, "What is your opinion of the amount of violence on prime-time television -- is there too much violence on television?". Their responses are summarized in the table below.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don't Know</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>162</td>
<td>95</td>
<td>23</td>
<td>280</td>
</tr>
<tr>
<td>Women</td>
<td>256</td>
<td>45</td>
<td>19</td>
<td>320</td>
</tr>
<tr>
<td>Total</td>
<td>418</td>
<td>140</td>
<td>42</td>
<td>600</td>
</tr>
</tbody>
</table>

- $p(\text{Yes})$
- $p(\text{Men})$
- $p(\text{Yes} | \text{Men})$
- $p(\text{Men} | \text{Yes})$
- $p(\text{Yes} \cap \text{Men})$
- $p(\text{Men} \cap \text{Yes})$

Cards are dealt from a full deck of 52. Find the probability of each of the given events.
- the first card is a diamond
- the second card is a spade, given that the first card was a diamond
- the first card is a diamond and the second card is a spade
- draw a tree diagram illustrating this

Five cards are dealt from a full deck. Find the probability that the last four are spades, given that the first was a spade.

A personal computer manufacturer buys 38% of its chips from Japan and the rest from America. 1.7% of the Japanese chips are defective, and 1.1% of the American chips are defective.
- Find the probability that a chip is defective and made in Japan.
- Find the probability that a chip is defective and made in America.
- Find the probability that a chip is defective.
- Find the probability that a chip is defect-free.