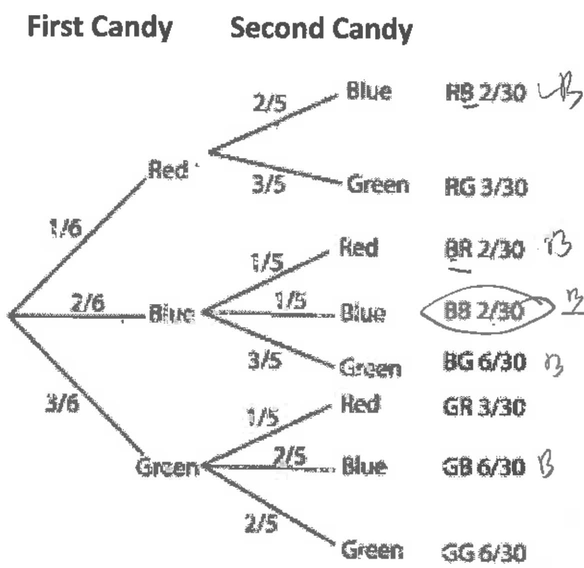
For *dependent events*, a ***tree diagram*** is the easiest way to determine all probabilities for an experiment. We recommend using tree diagrams to find the sample space for any question involving *dependent events*.

Example 3

$P(R) = \frac{1}{6}$ $P(B)\ \frac{2}{6}$ $P(G) = \frac{3}{6}$

You have a bag that contains 1 red, 2 blue, and 3 green candies. You select one candy from the bag, eat it, and then select another candy from the bag.

The tree diagram below shows all of the probabilities of every possible outcome in this experiment.



Both candies Blue

a) Are these events (choosing the first candy and choosing the second candy) independent or dependent? How do you know?

Dependent, because the first candy is eaten, so only 5 candies are left. The first event affect the second event or second choice. So the second time a candy is selected, only 5 candies you can select from

b) What is the probability that both candies selected are blue? (2 nd event) $= \frac{2}{30}$

$P(2B) = \frac{2}{30}$

c) What is the probability that neither one of the candies selected are blue?

TOTAL - Blue $\frac{30}{30} - \frac{18}{30} = \frac{12}{30}$

$P(B') = \frac{30}{30} - \frac{2}{30} - \frac{2}{30} - \frac{2}{30} - \frac{6}{30} - \frac{6}{30} = \frac{12}{30}$

OR NOT Blue $\frac{3}{30} + \frac{6}{30} + \frac{6}{30} = \frac{12}{30}$

d) What is the probability that at least one of the candies selected is blue?

total - Not Blue $\frac{30}{30} - \frac{12}{30} = \frac{18}{30}$

$P(\text{one blue}) = \frac{30}{30} - \underbrace{\frac{3}{30} - \frac{3}{30} - \frac{6}{30}}_{\text{not Blue}} \Rightarrow \frac{18}{30}$ OR Blue $\frac{2}{30} + \frac{2}{30} + \frac{2}{30} + \frac{6}{30} + \frac{6}{30} = \frac{18}{30}$

e) Would the tree diagram change if you selected both candies at the same time? Why or why not?

Yes. Because selecting 2 candies at the same time would change the probabilities of the 2nd candy. It would result in only 4 candies to select from instead of 5, if only one is selected.