Indicators

Objective:

4.05 Determine and compare experimental and theoretical probabilities for independent and dependent events.

Vocabulary and Resources		
experimental results	sample space	favorable outcomes
possible outcomes	with replacement	without replacement

A. Charlie received a miniature gumball machine for his birthday. The machine holds ten large gumballs. Currently there are two yellow, three blue, one white and four red gumballs in the machine. Assuming the gumballs have an equal chance of being released, what is the probability that the gumball machine releases a blue gumball followed by a yellow gumball if Charlie does not put the first gumball back in the machine? Does the probability of the situation change if Charlie puts the first gumball back into the machine after seeing what color it is? Explain.

B. Janet is tossing a fair coin and rolling a fair number cube numbered 1 to 6. What is the probability that the coin will land on heads and she will roll a factor of 6?

C. There are three green, four red, five orange, and six brown M&M's™ in a bag. Without looking, you pick one M&M™ out of the bag and eat it. You then pick another M&M™ out of the bag. What is the probability that both M&M's™ will be red? What is the probability that one will be orange and the other will be green?

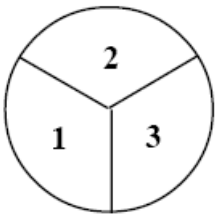
D. There are three blue chips and two red chips in a bowl.

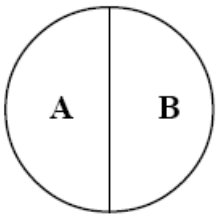
a) List the sample space if you draw two chips in succession, without replacement. What is the probability of drawing two blue chips?

b) List the sample space if you draw two chips in succession, with replacement. What is the probability of drawing two blue chips?

c) Explain why the probabilities are different.

E. Given the following two spinners:





List the sample space when you spin both spinners. What is the probability of spinning a 2B?

F. A bowl contains three pieces of paper labeled with the numbers 1, 2, and 3.

a) Suppose you draw two pieces of paper out of the bowl, without replacing the first piece before drawing the second piece, and add the numbers. List the sample space. What is the probability of a sum of five?

b) Suppose you draw two pieces of paper out of the bowl, replacing the first piece before drawing the second piece, and add the two numbers. List the sample space. What is the probability of a sum of five?

c) Explain why these two probabilities are not the same.

G. Jamal is playing "Pick-A-Fish"at the carnival. There are ten fish in the pond. Two of the fish are worth 15 points, three are worth 10 points and five are worth 8 points. The prize he would like requires two 15-point fish. What is the probability he will win the prize with only two picks if he does not put the first fish he selects back in the pond? What is the probability he will win the prize with only two picks if he does put the first fish he picks back in the pond?

H. Your teacher has a bag of M&M's™. The bag contains 12 red M&M's™, 10 blue M&M's™, 15 orange M&M's™, and 10 green M&M's™. If you are the first person to select candy from the bag and the teacher allows you to keep the first piece you select and then select a second piece, what is the probability that you will select one red M&M™ and one orange M&M™? What is the probability that you will select one red M&M™ and then one orange M&M™? Are these answers the same? Explain.