Math 8   Name:_____
Probability Simulation

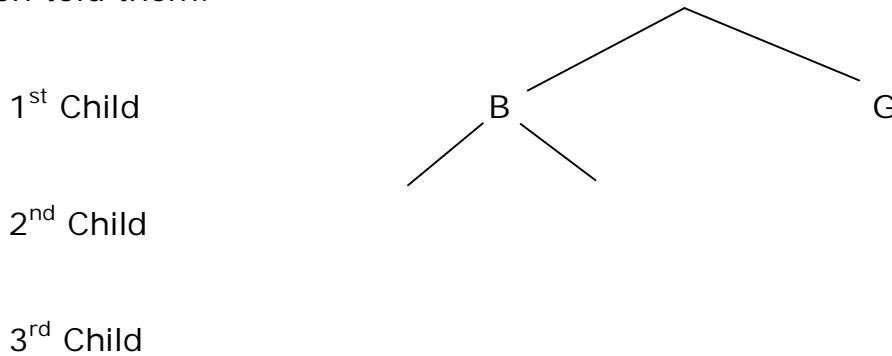| Tree	/2
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Jack and Diane are planning a family and want to have 3 children. They consult Dr. Watson, a medical geneticist because they want to find out the probability that they will have 2 boys and a girl.

Use a tree diagram to determine what the probability was that Dr Watson told them:

1st Child   B   G

2nd Child

3rd Child

Theoretical probability:

$$P(2B,1G) = \frac{\#favourable\ outcomes}{total\ \#\ of\ outcomes}$$

This is called the *theoretical probability.*
Write the theoretical probability of 2B and 1 G as a decimal and as a fraction:

    P(2B,1G) =

Find the definition of "theoretical probability" in your textbook in section 11.3. Rewrite the definition in your own words:

Theoretical probability is:

Jack doesn't believe Dr Watson, but he doesn't want to keep having sets of 3 children, so he and Diane design a **simulation** using 3 coins. They will flip 3 coins and record the results. A "heads" represents a girl and a "tails" represents a boy. Repeat this simulation 16 times:

Coin Outcomes	HHH	HHT	HTT	TTT
Child Outcomes:	3 girls	2 girls, 1 boy	1 girl, 2 boys	3 boys
Keep track of each by marking a slash in this row.				
Number of Results				

Diane doesn't think Jack has done enough work, and wants more data. Jack goes around to all of his neighbors and has them do the same experiment. Help him collect data from other people in the table below:

Coin Outcomes	HHH	HHT	HTT	TTT
Child Outcomes:	3 girls	2 girls, 1 boy	1 girl, 2 boys	3 boys
Group 1				
Group 2				
Group 3				
Group 4				
Group 5				
Total of All Groups				

Calculate the probability of 2 boys and a girl according to the formula:

$$P \ (2B,1G) = \frac{\#favourable \ outcomes}{total \ \# \ of \ outcomes}$$

This is the **experimental probability**.

Find the definition of "experimental probability" in your textbook in section 11.3. Rewrite the definition in your own words:

Experimental probability is:

Compare the theoretical and experimental probabilities that you determined in this assignment:

	Theoretical Probability	Experimental Probability
P(2B,1G)		

Why do you think the two values might be different?