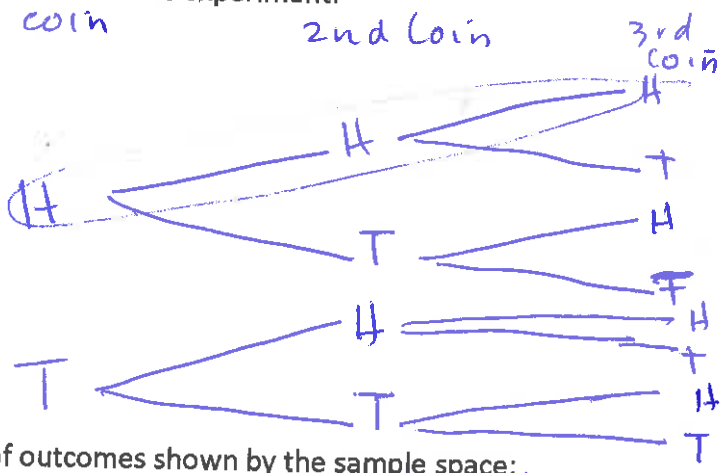
Graphic Organizers

Sometimes using a logical approach to creating a sample space can help. You have already used a table to create a sample space. In the next example, we will explore a ***tree diagram***. A tree diagram can help determine the sample space for compound events (made up of two or more 'simple' events).

Example 8: Use a tree diagram for a compound event

John performs a probability experiment. He tosses 3 coins and records the results. Answer the following questions about John's experiment.

a) What results are possible when John tosses the three coins? Use a tree diagram to help construct the sample space showing all the possible outcomes of this experiment.



Possible outcomes
HHH
HHT
HTH
HTT
THH
THT
TTH
TTT

b) State the number of outcomes shown by the sample space: 8 possible outcomes.

c) Are all of the outcomes shown by the sample space equally likely to occur? Explain your answer.

yes. Equally likely to occur, they are all different outcomes.

d) Determine the probability that the result is all heads: $P(H) = \frac{1}{8}$

e) Determine the probability of the final outcome containing at least one tail: $P(\text{one tail}) = \frac{7}{8}$

f) Determine the probability of the experiment resulting in exactly one head: $P(\text{one Head}) = \frac{3}{8}$

g) If John performs the experiment 500 times, how many times would you expect to see all three coins land "Tails"?

$\frac{1}{8} \times 500$

$= 62.5$

round $\Rightarrow$ 63 times