**Sufficient and Necessary Conditions**

**‘S’ufficient conditions are ‘S’ircled**

Winning the lottery is sufficient to make you smile.



**‘N’ecessary conditions are ‘N’ot circled.**

Flour is necessary for cake.



**Contrapositives**

To make a contrapositive change 3 things

-Signs (Positive/Negative)

-Positions (In/Out of the circle)

-‘And’ becomes ‘Or’/’Or’ becomes ‘And’



**Splitting ‘And’ and ‘Or’**

**Split ‘And’ After the Arrow**

Flour and eggs are necessary for cake.



**Split ‘Or’ bef’OR’e the arrow.**

Winning the lottery or getting a 180 is sufficient to make you smile.



**Law of Conservation of Arrows**

‘For every arrow there is an equal and opposite arrow’ in the contrapositive. If there are two arrows into an element, there will be two coming out in the contrapositive.

Flour and Eggs are necessary for Cake



**Major Wordings for Conditionals**

‘**If…**’ precedes a sufficient condition. What follows ‘If’ goes ‘In’ the circle.

Delilah will get fired if she shaves her employees’ hair when they fall asleep.



‘**Only if…**’ precedes necessary conditions. What immediately follows ‘Only if’ goes ‘Outside’ the circle.

David will get above a 180 only if he does something other than osmosis to study.



‘**Unless**’ means you negate whichever element you put into the circle. ‘Un le ss’ ircle.

Harold will not get elected unless he stops bringing his 53 cats to his political speeches.



‘**No**’ means you Negate whatever is Outside the circle.

No nematodes have scored above a 174 on the LSAT.



**Using conditionals in 2-Group Games**

**When the rule doesn’t cross the line**

If A is selected B is selected.

If D is on team 2 F is on team 2.

If J is not chosen, neither L nor M are selected.

If K is selected, either O or P is selected.



**When the rule crosses the line.**



If Q then not R

If not O then M

If P is on team 1 then R and S are on team 2.



Remember, crossing the line creates an ‘and/or’ statement on the side the arrows point toward.

Conditionals in Non-2-Group games

In this case we do NOT use a contrapositive. Instead we simply run out the two possible states for the ‘If’ portion of the conditional. We simply run out the options for when the ‘If’ condition is met versus when it is not.

If J is third then K is fifth



If L is before M then O is before P.



If Q is in group 1 then R and S are in group 3.

