

## **Conditionals Extra Practice Drill #2**

*Instructions: Symbolize the following rules. Be sure to symbolize contrapositives as well.*

*Each rule includes an indication as to what kind of game it is associated with. Ordering games consist solely of ordered spots. Binary games consist solely of two groups, one of which should be considered the “yes” group, with the other as the “no” group. Grouping games consist of more than two groups. Hybrid games consist of both ordered spots and an excluded (or “no”) group.*

1. If an animal eats F, then it eats G. (Binary game)
2. J is not played in a given time slot unless H is played in the immediately preceding slot. (Hybrid game)
3. Any subject studied by K or L is not studied by M. (Grouping game)
4. If N is added third, then O is added sixth. (Ordering game)
5. If either P or Q is on sale, then R is not. (Binary game)
6. Each building that contains S also contains T. (Grouping game)
7. If U serves on the appropriations committee, so does V. (Binary game)
8. If W ranks higher than X, X ranks higher than Y. (Ordering game)
9. If Z is not on the menu, then F is. (Binary game)
10. None of the tanks holds both Ps and Qs. (Grouping game)
11. Any program watched by G is watched by H. (Grouping game)
12. J is inspected earlier than K if both are inspected. (Hybrid game)
13. Whenever screen L is purple, screen M must be yellow. (Grouping game)
14. If both N and O are selected, then P is not selected. (Binary game)
15. If Q is repaired in week 1, R is repaired in week 2. (Ordering game)
16. If S is not billed, T cannot be billed. (Binary game)
17. If U is painted, V is also painted. (Binary game)
18. If either W or X is prescribed, the other must also be prescribed. (Binary game)
19. The lawyer cannot speak to both Y and Z. (Binary game)
20. If he purchases any F at all, then he purchases at least two F. (Binary game)

**Answers:**

1.  $F \rightarrow G$   
 $\sim G \rightarrow \sim F$
2.  $J \rightarrow H \text{---} J$   
 $\sim H \rightarrow \sim J$   
(You can also deduce that J is not first nor immediately after any letter other than H)
3.  $K \text{ OR } L \rightarrow \sim M$   
 $M \rightarrow \sim K \text{ AND } \sim L$   
(These conditionals apply to every group. You could also use MK and ML antiblocks.)
4.  $N_3 \rightarrow O_6$   
 $\sim O_6 \rightarrow \sim N_3$
5.  $P \text{ OR } Q \rightarrow \sim R$   
 $R \rightarrow \sim P \text{ AND } \sim Q$
6.  $S \rightarrow T$   
 $\sim T \rightarrow \sim S$   
(These conditionals apply to every group. Don't use a block symbol, because a group could have T without S.)
7.  $U \rightarrow V$   
 $\sim V \rightarrow \sim U$   
(Assuming that the appropriations committee is the "yes" group)
8.  $W \text{---} X \rightarrow X \text{---} Y$   
 $Y \text{---} X \rightarrow X \text{---} W$   
(Assuming that the higher-ranking elements are to the left. This rule does not mean X is always between W and Y, since it is possible to have X precede both of them. It means that at least one of W or Y must follow X.)
9.  $\sim Z \rightarrow F$   
 $\sim F \rightarrow Z$
10.  $P \rightarrow \sim Q$   
 $Q \rightarrow \sim P$   
(These conditionals apply to every group.)
11.  $G \rightarrow H$   
 $\sim H \rightarrow \sim G$
12.  $J \text{ AND } K \rightarrow J \text{---} K$   
(A contrapositive here does not make sense. You could also use an anti-relative order symbol showing that J cannot precede K.)
13.  $L_P \rightarrow M_Y$   
 $\sim M_Y \rightarrow \sim L_P$
14.  $N \text{ AND } O \rightarrow \sim P$   
 $P \rightarrow \sim N \text{ OR } \sim O$
15.  $Q_1 \rightarrow R_2$   
 $\sim R_2 \rightarrow \sim Q_1$
16.  $\sim S \rightarrow \sim T$   
 $T \rightarrow S$
17.  $U \rightarrow V$   
 $\sim V \rightarrow \sim U$
18. This looks like a conditional, but you can safely use a block here. W and X are always together, whether in the "yes" or "no" group.
19.  $Y \rightarrow \sim Z$   
 $Z \rightarrow \sim Y$
20.  $F \rightarrow 2^+F$   
(A contrapositive does not make sense with this rule.)