Questions 1–6
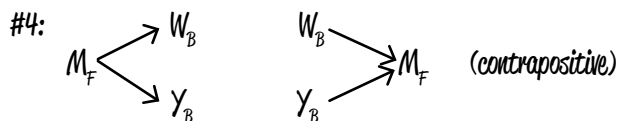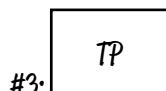
Setup:
o   ten crayons: M N O P R S T V W Y
o   two rows: F B
o   five columns: 1 2 3 4 5

Conditions:

#1: | O/P | ____ | ____ | P/O |

#2: (S / W)

#3: [TP]

#4:
M_F → W_B ; M_F → Y_B W_B → M_F ; Y_B → M_F (contrapositive)

#5: $W_F \longrightarrow O_B$; $O_F \longrightarrow W_B$ (contrapositive)
#6: R_3
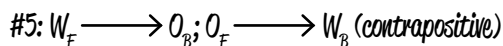
Overview:
This game yields a number of initial inferences. The first condition stipulates that O and P span a full five slots, and thus, they occupy the two outside slots of either the front or the back row. Combining this with the third condition, we know that the order must be O _ _ T P. As only the second and third slots will be open, it initially looks like the WS piece (second condition) can occupy either the second or third column. However, since the sixth condition tells us that R occupies one of the slots in the third column, the WS piece must be placed in the second column. We can sketch these options with two molds. When O is in the front row, W cannot be in the front row, since that would trigger the fifth condition.

#1 F | O | S | R/ | T | P | ~W
     B | ___ | W | /R | ___ | ___ |
        1   2   3   4   5

#2 F | ___ | S/W | R/ | ___ | ___ |
     B | O | W/S | /R | T | P |
        1   2   3   4   5
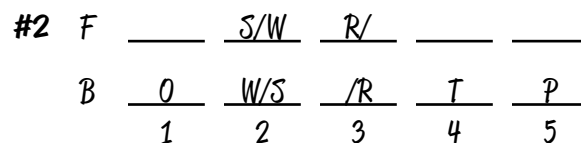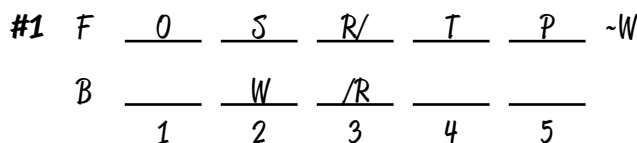
1.   **(B)** In standard fashion, the game starts off with an orientation question.

   (A)   violates the second condition
   (B)   Correct
   (C)   violates the third condition
   (D)   violates the sixth condition
   (E)   violates the fourth condition

2. **(E)** Combining this information with our inference about O, T, and P, we can place them all in the front row. As shown in mold #1, W is in the second column of the back row, and choice E is therefore correct.

3. **(D)** This could only be true of mold #2. We cannot place M in the front row, since this would trigger the fourth condition, and violate the stimulus. Therefore, M must be in the back row, in the third slot. The sixth condition tells us that R must be in the front row of the third column, and we have thus placed seven of the ten variables.

```
F  ____   W    R   ____  ____  ~M

B   O     S    M    T     P
    1     2    3    4     5
```

4. **(B)** This information triggers the fourth condition, and W and Y must be in the back row. We can create two diagrams. In both cases, S is in the front row, and choice B is therefore correct.

```
F   O     S    M    T     P         F  ____   S    R   ____  ____

B  ____   W    R   ____  ____   or   B   O     W    Y    T     P
    1     2    3    4     5              1     2    3    4     5
```

5. **(A)** This could only be true of mold #2, since mold #1 only leaves one slot open in the front row. With Y in the front row, we cannot place M in the front row, as this would trigger the fourth condition. Note that none of the choices address the column numbers, so we can simply establish the row occupants and move on. There's only one remaining slot in the front row for N, so that is where it will go.

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F   V     S    R    Y     N

B   O     W    M    T     P
```

(A)   Correct. Note that this must be true, which is fairly unusual for a could be true question.
(B)   O has to be in the back row.
(C)   T must be in the back row.
(D)   As shown, M is in the back row.
(E)   As shown, R must be in the front row.

6. **(D)** When W is in the second column of the front row, we must use mold #2. The second condition allows us to place S in the second column of the front row. We know that M can't be placed in the front row since W is already in the front row and this would trigger the fourth condition. With only one slot open in the back row, M must be placed in the third slot, and R must be placed in the front

row. Hence, the back row is completely determined.

F		W	R		
B	O	S	M	T	P
	1	2	3	4	5