

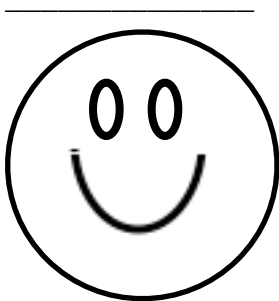
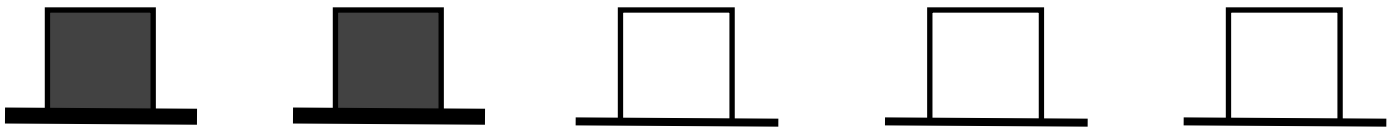
The Mad Hatter

A king had 3 prisoners come before him. One of the prisoners was blind. He told them he had 2 black hats and 3 white hats in a bag. Guards covered the eyes of the 2 prisoners who could see and then the king put a hat from the bag on each of the prisoners heads. Their eyes were uncovered. The 2 prisoners who could see could see the other prisoner hats but they could not see their own hat. The king told them he would release them all if one of them could tell them what colored hat each of them was wearing. They had to have the correct answer and also the correct explanation for how they got the answer.

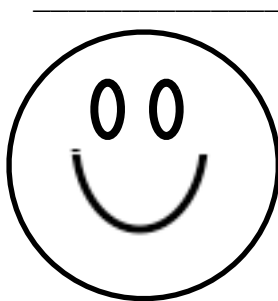
Prisoner 1 looked at the other 2 prisoners hats and said he could not tell what color hat he was wearing. Prisoner 2 looked at the other 2 prisoners hats and said he could not tell what color hat he was wearing. The blind prisoner could not see any of their hats yet he told the king what hat each of them was wearing and explained how he knew. The King set them all free.

What hats were each of the prisoners wearing?

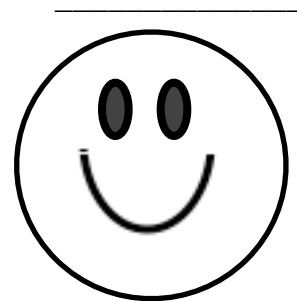
How did the blind prisoner know the hats each of them had on?



Prisoner 1



Prisoner 2



Blind Prisoner 3

Cut out the hats above and try different hats on the prisoners to see which arrangement will let the blind prisoner know which prisoner is wearing what hat.

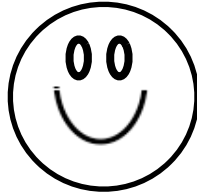
Worksheet: try different arrangements of hats by writing the colors on the blank lines and then see if the blind prisoner can tell who is wearing each hat given that the other two prisoners cannot.

color of hat on P1



Prisoner 1

color of hat on P1



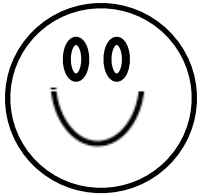
Prisoner 2

color of hat on P3



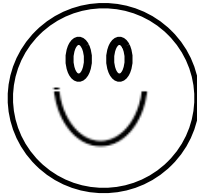
Blind Prisoner 3

color of hat on P1



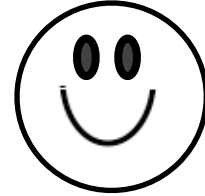
Prisoner 1

color of hat on P1



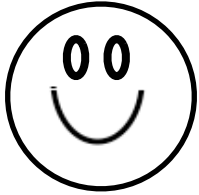
Prisoner 2

color of hat on P3



Blind Prisoner 3

color of hat on P1



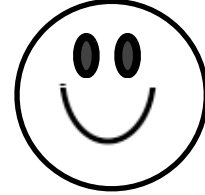
Prisoner 1

color of hat on P1



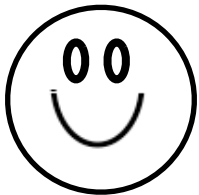
Prisoner 2

color of hat on P3



Blind Prisoner 3

color of hat on P1



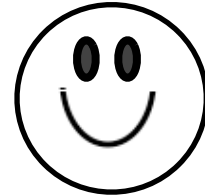
Prisoner 1

color of hat on P1



Prisoner 2

color of hat on P3



Blind Prisoner 3

Solution. The blind prisoner has a white hat on and the other 2 prisoners have black hats on.

How do you know.

Prisoner 1 and prisoner 2 can see the hats and prisoner 3 is blind.

There are only 2 black hats. If there are 3 hats on the heads of the prisoners then **at least one of the white hats must be used.**

The key to solving the puzzle is the fact that the first 2 prisoners can see 2 hats but that information **MUST NOT** be ENOUGH to determine the 3rd hat. The third prisoner who is blind must know what hats the other 2 have on without seeing the hats and that must be enough to allow him to know what color hat he has on.

There is only one arrangement where the 3rd prisoner can know for sure what hat he is wearing. He must know that the other 2 have the only 2 black hats on. If he knows that he then can say he has a white on.

The list below contains all the possible arrangements of white and black hats on the 3 prisoners.

Prisoner 1 and 2 can see and are listed as P1 and P2. The blind prisoner is listed as P3b

	P1	P2	P3b	P1	P2	P3b	P1	P2	P3b
1 has a white hat and 2 have black hats	W	B	B	B	W	B	B	B	W
2 have a white hat and 1 has a black hat	W	W	B	W	B	W	B	W	W
All 3 have white hats	W	W	W						