

## 2015-2016 Primary Solutions Round II

- P2.1.** Susan has a bag of jelly babies. The bag contains seven red jelly babies, four orange jelly babies and six yellow jelly babies. What is the smallest number of jelly babies she must take out of the bag (without looking) to be sure of having one of each colour?

*Solution*

There are fewer orange jelly babies than any other colour.

The worst case is that Susan selects all the red and yellow jelly babies first.

So to be sure of getting an orange jelly baby Susan must take out enough to have all the red and yellow jelly babies and then one more i.e. 14 in all.

- P2.2.** An old farmer went halfway home by horse and cart, 15 times as fast as he could walk. He travelled the rest of the way on his stubborn donkey, which walked at half the pace of the farmer. Would he have saved time if he had walked the whole way ? Explain.

*Solution*

It is possible to say that in the second half of his journey, he covers half the distance at half the speed. This already takes his normal time so he must take longer overall.

He would have been quicker to walk at his normal pace for the whole way.

**P2.3.** Messrs. Baker, Butcher, Farmer, Joiner and Plumber are all residents of the small village of Haar. They are the sons of a baker, a butcher, a farmer, a joiner and a plumber, who are all retired, and they themselves work as a baker, a butcher, a farmer, a joiner and a plumber. None of the five has a name which is that of his father's occupation or of his own occupation; and none follows his father's occupation. None has, as yet, a son of his own.

Here are five clues to help you find out the occupation of each of the five villagers and the occupations of their fathers.

1. The retired plumber's son is engaged to a girl in the neighbouring village of Smirr.
2. The village badminton team, which has four players, consists of Mr Baker, Mr Plumber, the retired butcher's son and the joiner.
3. Mr Butcher and the retired baker's son married sisters.
4. The village folk group, HearHaar, is made up of the retired farmer's son on guitar, the plumber on fiddle and Mr Butcher on percussion.
5. The joiner is the only bachelor.

#### *Solution*

By 1. and 5. the retired plumber's son is the joiner. So the joiner's name is either Baker, Butcher or Farmer. But by 3. Mr Butcher is married, and by 2. the joiner's name cannot be Mr Baker. So the joiner is Mr Farmer.

By 2. the retired butcher's son is not Mr Baker nor Mr Plumber. We have just seen that it is not Mr Farmer and, of course, it is not Mr Butcher. So the retired butcher's son is Mr Joiner.

By 3. the retired baker's son is not Mr Butcher and we have already ruled out Mr Farmer and Mr Joiner. So the retired baker's son is Mr Plumber.

By 4. the retired farmer's son is not Mr Butcher, so having eliminated all the others, it must be Mr Baker.

Finally, the retired joiner's son must be Mr Butcher.

As we have seen, Mr Farmer is the joiner and his father was a plumber.

So Mr Baker cannot be the joiner, he is obviously not the baker. As the son of the farmer, he is not the farmer and, by 4. he is not the plumber. So Mr Baker is the butcher and his father was a farmer.

So Mr Plumber is not the joiner or the butcher, nor the plumber nor the baker. So Mr Plumber is the farmer and his father was the baker.

So Mr Butcher is not the butcher, the joiner, the farmer, and by 4. he is not the plumber. So Mr Butcher is the baker and his father was the joiner.

Finally, Mr Joiner must be the plumber and his father was the butcher.