

**Problem**

Someone’s dog goes around the neighborhood every night getting into people’s garbage pails and making a mess. Four of the neighborhood kids say they know what the guilty dog looks like, but the culprit strikes at night, so it’s hard to see it clearly. In their descriptions, each of the four witnesses has one and only one detail right, and each detail is described correctly by only one witness.

- Dan says the dog is white, fluffy, wears a red collar, and has a long tail.
- Karen says the dog is black, has short hair, wears a red collar, and has a long tail.
- Max says the dog is brown, has long, silky hair, wears a blue collar, and has a long tail.
- Emma says the dog is spotted, fluffy, wears a red collar, and has a short tail.



Fill in the table below to help sort out which details are correct, and hence describe the guilty pooch.

Child’s Name	Colour	Hair Type	Collar Colour	Tail Length
Dan				
Karen				
Max				
Emma				

**Extension :**

1. Work with a friend to make up another set of four descriptions which could also be used to correctly describe the guilty pooch.

**Hints**

*Suggestion:* Before students begin this problem, have them make the table as suggested in the problem.

**Hint 1** - If more than one witness says the dog is fluffy, can the dog be fluffy?

**Hint 2** - What does your table tell you immediately about the dog's tail?

***Extension :***

**Hint 1** - Could you solve this problem if all four people's descriptions were completely different from each other, according to the given rules?

## Solution

The completed table of attributes gives:

Child's Name	Colour	Hair Type	Collar Colour	Tail Length
Dan	white <sup>4</sup>	fluffy	red	long
Karen	black	short <sup>3</sup>	red	long
Max	brown	long silky	blue <sup>2</sup>	long
Emma	spotted	fluffy	red	short <sup>1</sup>

Reasoning in the order indicated by the numbered items in the table, we can see immediately that the correct tail length is short (Emma's answer is unique), and the correct collar colour is blue (Max's answer is unique). Thus Karen must be right about the hair type, short, since Max and Emma can only be correct about one item each, and Dan gave the same answer as Emma for hair type. So Dan must be correct about colour, since each witness is correct about one attribute.

Thus the guilty pooch is white with short hair, a blue collar, and a short tail.

**Extension :** Answers will vary.

*Suggestion:* Have students post their lists of four descriptions, and discuss with the class what reasoning will lead to the answer in each case. If a given set of descriptions does not determine a unique answer, have members of the class try to explain why.