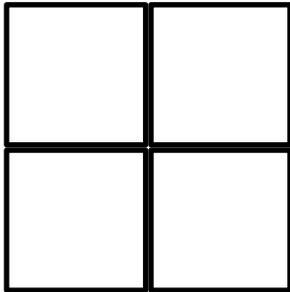Pigeonhole Week 2

Pigeonhole Principle: If I asked you to draw 5 circles inside of the boxes below, where each box can have at most 1 circle, is it possible?

Why can't it be done? This is called the pigeonhole principle.

If there are 10 pigeons and 9 pigeon holes, therefore some hole will have more than 1 pigeon.

Suppose there are several pigeons that have to be put into several pigeonholes. If there are more pigeons than pigeonholes, then at least one hole will contain at least 2 pigeons.

1. 5 friends are eating ice cream at a square table. Each is sitting on a side of the table and no one is sitting at the corner. Show that at least 2 friends are sitting on the same side of the table.

2. 3 friends went trick-or-treating on Halloween. Together they got 10 Hershey bars. They want to divide the bars among themselves. The bars can't be unwrapped and can't be broken. Prove that at least one of the friends ends up with more than 3 bars.

3. 4 friends checked out 7 books from the library and each checked out at least 1 book. Prove that at least 2 friends checked out the same number of books.

Borrowed from Marin Elementary Math Circle

4.   Harry the kitten eats his can of Friskies in 6 minutes, and Sally the cat eats the can twice as fast. How much time would it take both of them to eat a can of Friskies(they're working together)?

5.   We discussed the problem with 5 bags of coins(4 bags have real coins where each coin weighs 10 grams, and 1 bag has fake coins, where each coin weighs 11 grams). There is a scale that can only be used once. How do you tell which of the five bags has the fake coins?