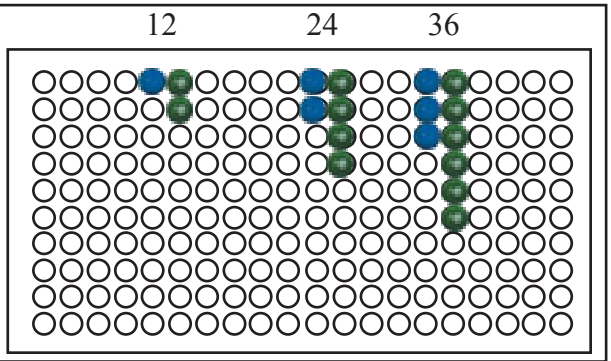
Lowest Common Multiples: Large Numbers:

We begin by using the lowest prime number (number that has its multiples itself and 1) Since the lowest is 2 we start to ask ourselves if 12 is divisible by 2.



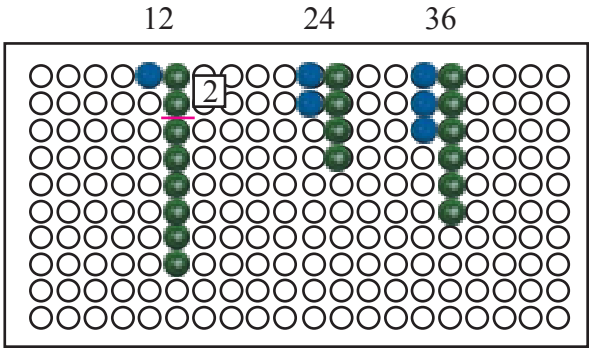
Ask question (using chart C) a factor of 12.

Can I break 12 into fair groups of 2?

Place the number card next to the 2 beads.

Say "What is 12 divided by 2? 6"

Lay 6 more beads under the dividing straw.



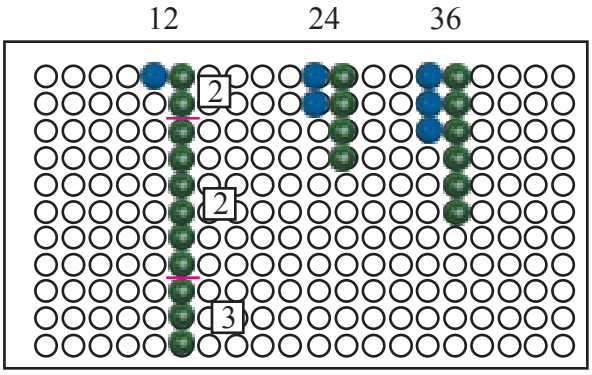
Ask question (using chart C) a factor of 6.

Can I break 6 into fair groups of 2?

Place the number card 2 next to the 6 beads.

Say "What is 6 divided by 2? 3"

Lay 3 more beads under the dividing straw.



Ask question (using chart C) a factor of 3.

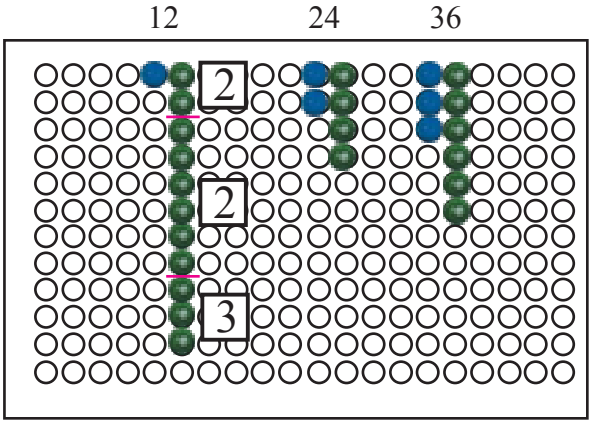
Can I break 3 into fair groups of 2?
No. Now we use the next lowest prime number or 3.

Can I break 3 into fair groups of 3?

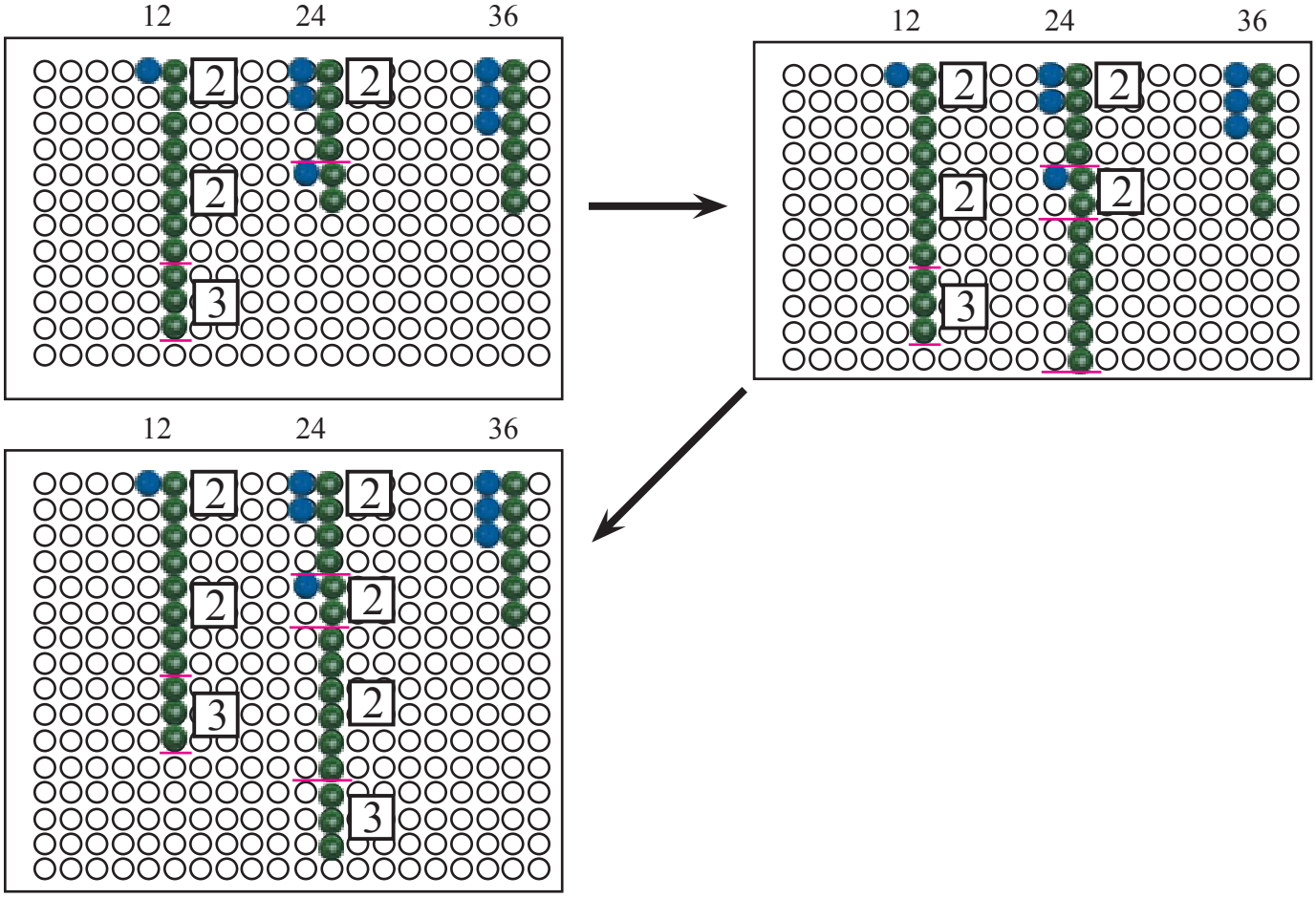
Place the number card 3 next to the 3 beads.

Say "What is 3 divided by 3? 1"

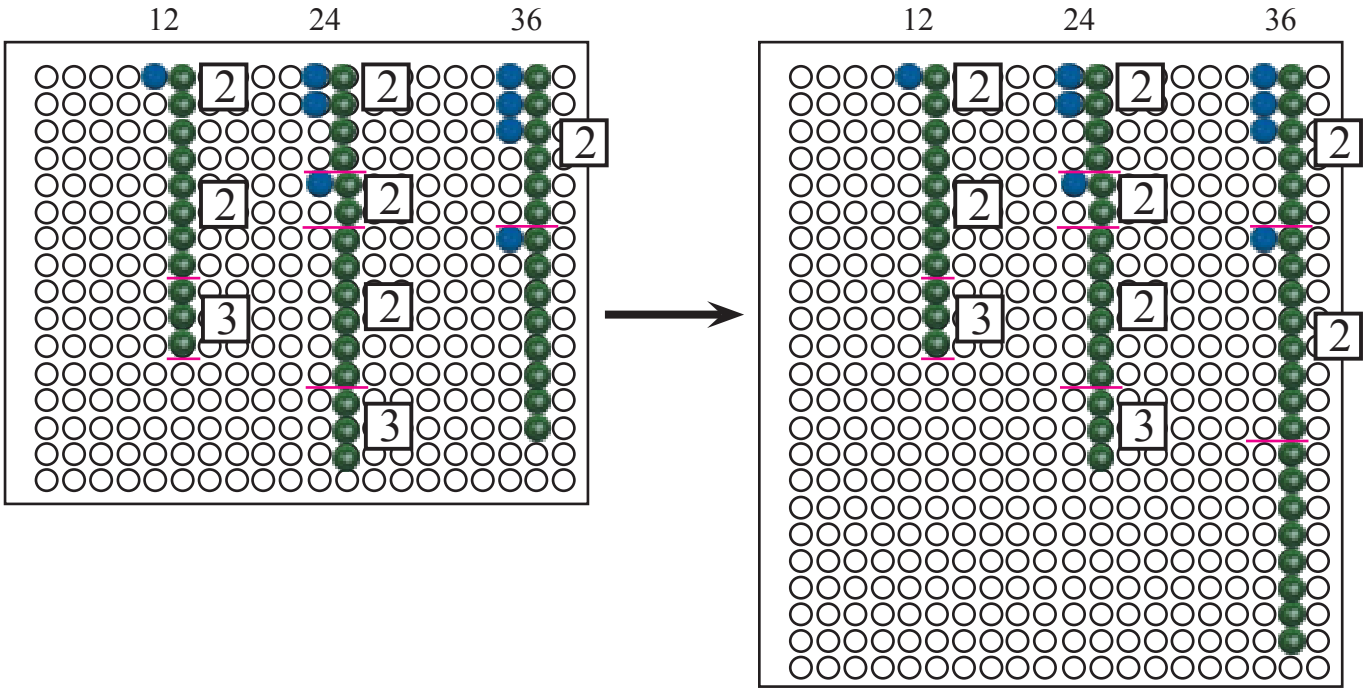
Since 1 is not a prime number you are done.



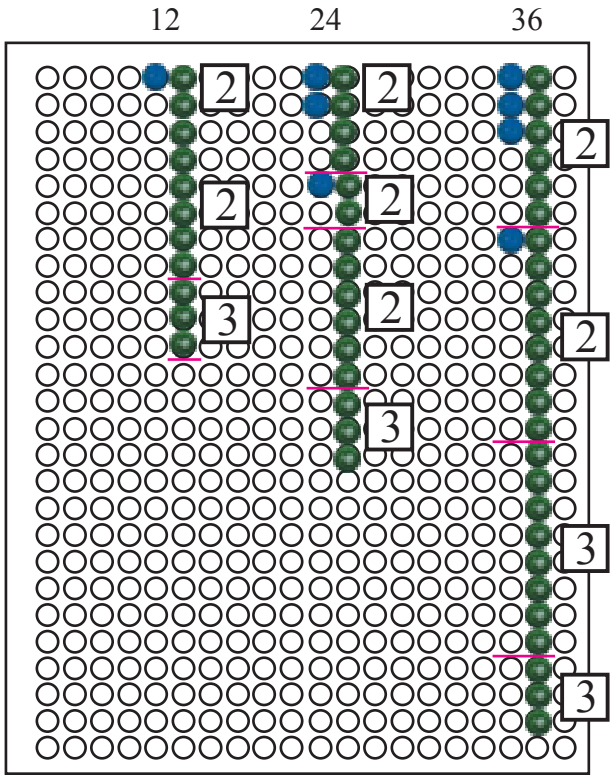
Continue the same process with 24.



Continue the same process with 36.



Continue on next page.

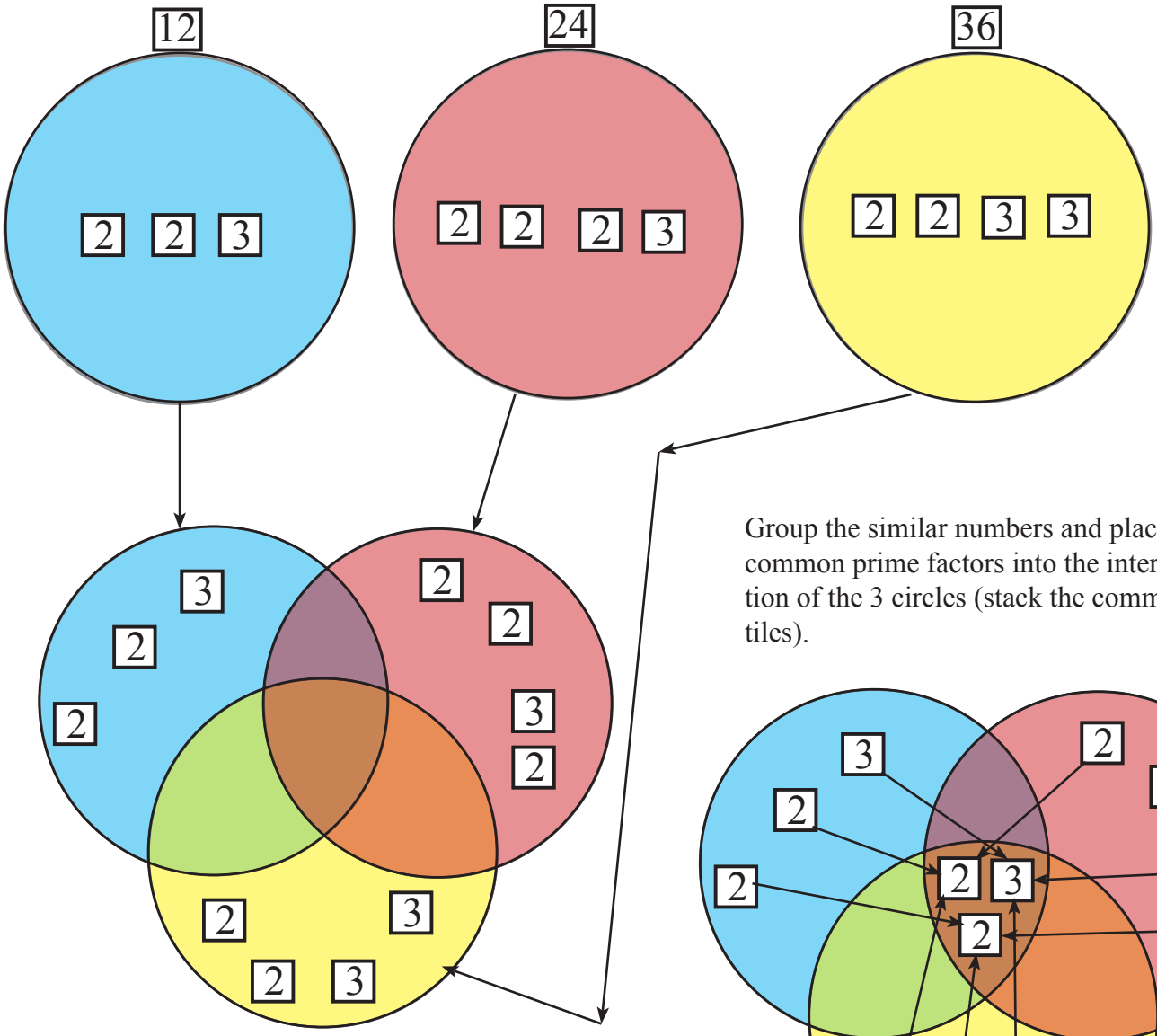


The reason we go from 2 to three is because 2 does not go into 9 equally so we have to go to the next smallest prime (greater than 1) and that is 3. 3 goes into 9 3 times so place 3 beads under the straw. How many times does 3 go into 3? 1. So prime factors of 36 are 2 x 2 x 3 x 3.

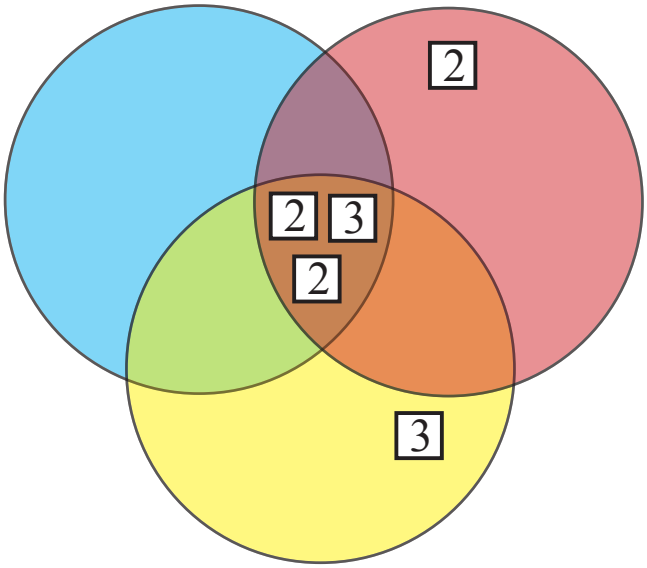
Now taking the prime factors we can come up with different combinations. We will use the Prime Factors to come up with LCM and GCMs.

12 2 2 3 24 2 2 2 3 36 2 2 3 3

First, create a Venn diagram. Lay out the 3 circles (made of red yarn). Label circles and place prime factors within the circles. Now overlap the circles.



Group the similar numbers and place the common prime factors into the intersection of the 3 circles (stack the common tiles).



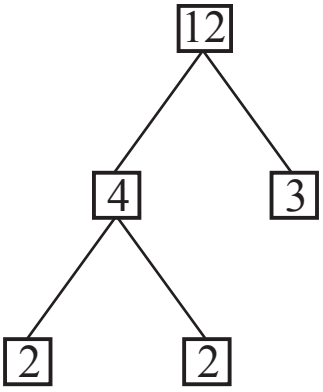
Using these common numbers we can find out the Greatest Common Factor is the center area multiplied together.

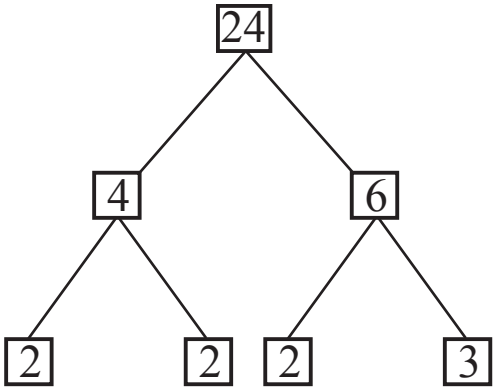
2 x 2 x 3 = 12

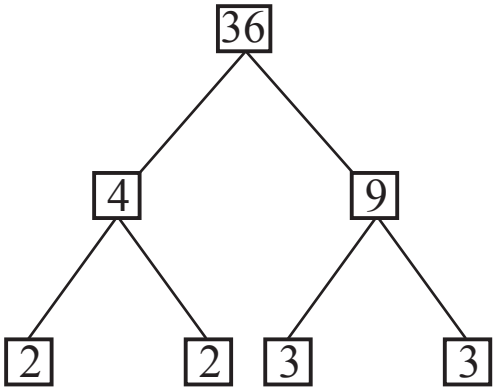
Using these common numbers we can find out the Lowest Common Multiple is the center area multiplied by the remaining numbers.

2 x 2 x 3 x 2 x 3 = 72

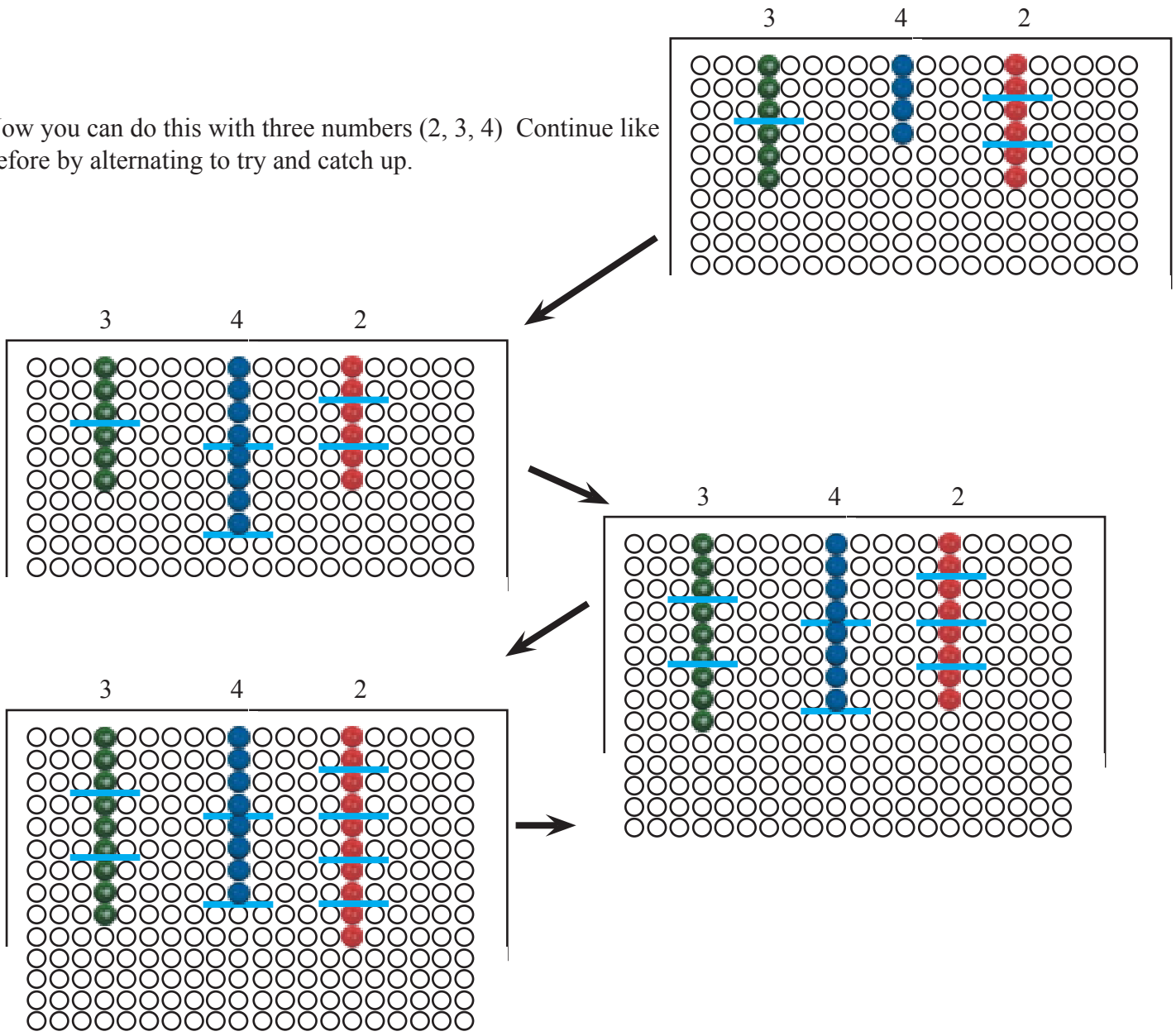
Factor Trees:



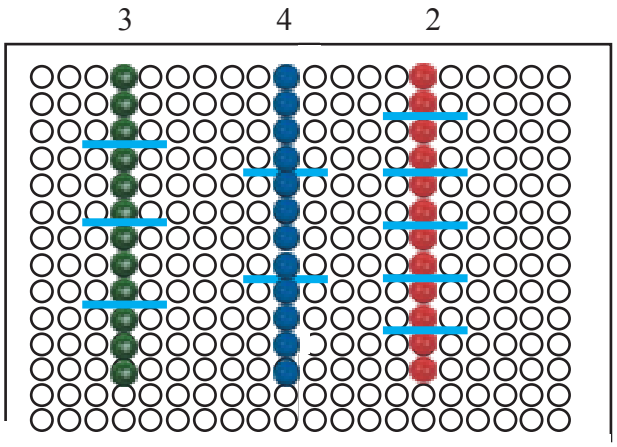




Now you can do this with three numbers (2, 3, 4) Continue like before by alternating to try and catch up.

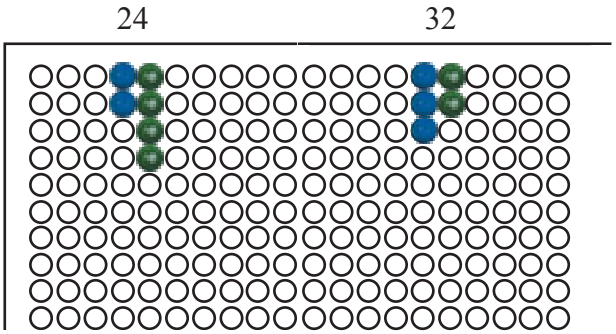


Since we see that the numbers have all equal beads on the board we know that 12 is the LCM of 2 and 3 and 4

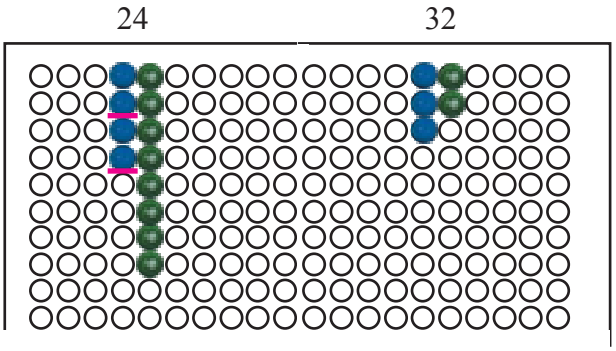


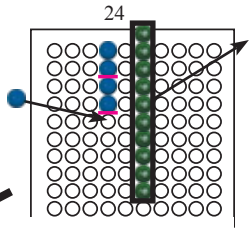
Lowest Common Multiples: Large Numbers:

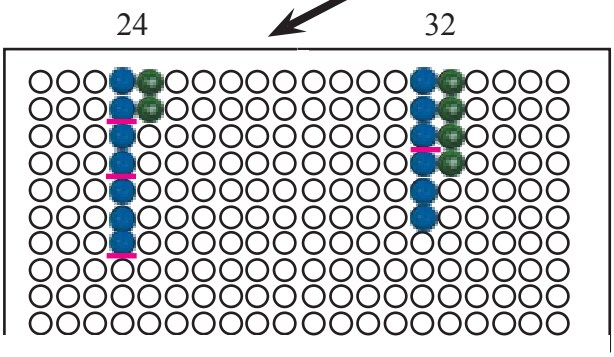
With larger numbers you need to use the hierarchal color scheme (red = 100, blue = 10s, ones = 1s)

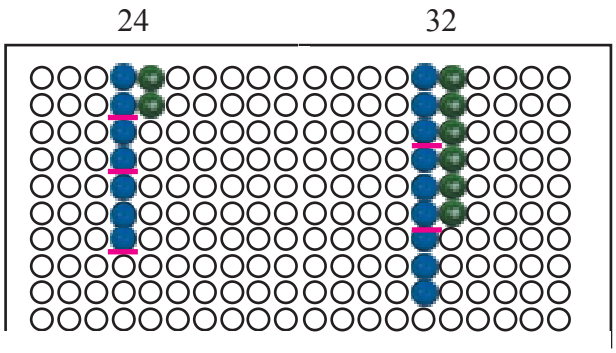


Using same principles of the smaller numbers, put out a straw and start laying out alternating groups to try and catch up the

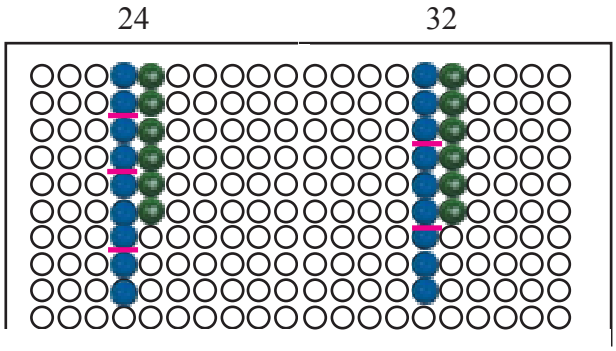








Remember: When you get 10 green beads, you need to substitute them for 1 blue bead. Put the straw under the substituted blue bead.



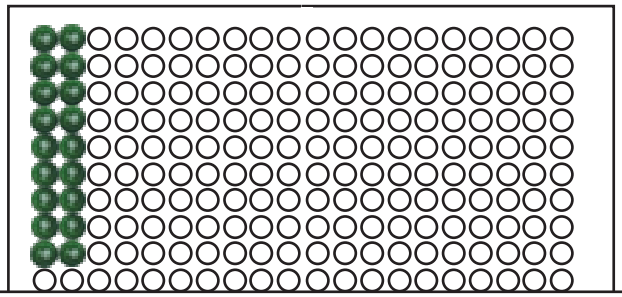
Since we see that these number beads are the same, we know that the LCM for the numbers 24 and 32 is 96.
or
96 is the LCM of 24 and 32

Greatest Common Factors.
Using the number 18. We will count groups of 18 beads with all different colors.

Taking the 18 beads from the bin we group them in groups of 2.

Can I take equal groups of 18 in groups of 2?

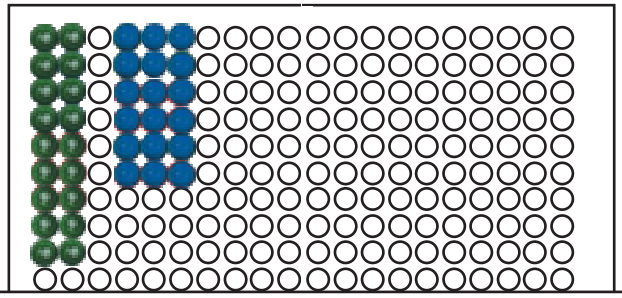
Yes, the pattern is fair.



Taking the 18 beads from the bin we group them in groups of 3.

Can I take equal groups of 18 in groups of 3?

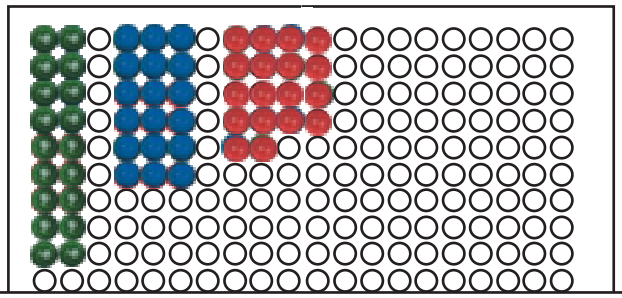
The pattern is fair.



Taking the 18 beads from the bin we group them in groups of 4.

Can I take equal groups of 18 in groups of 4?

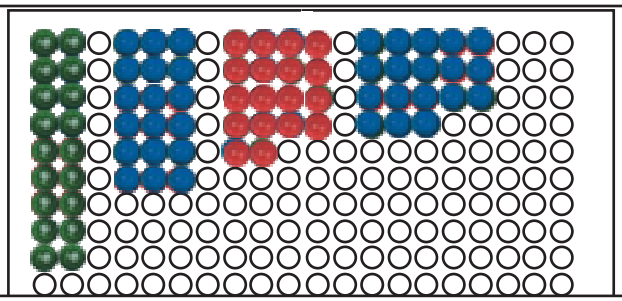
No, the pattern isn't fair.



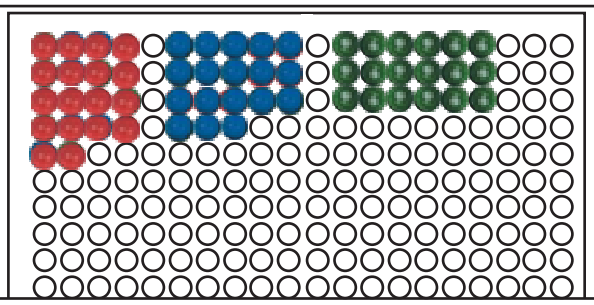
Taking the 18 beads from the bin we group them in groups of 5.

Can I take equal groups of 18 in groups of 5?

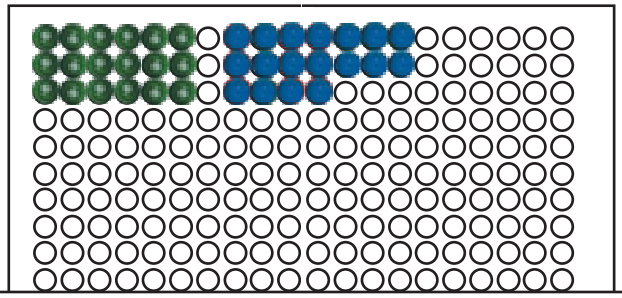
No, the pattern isn't fair.



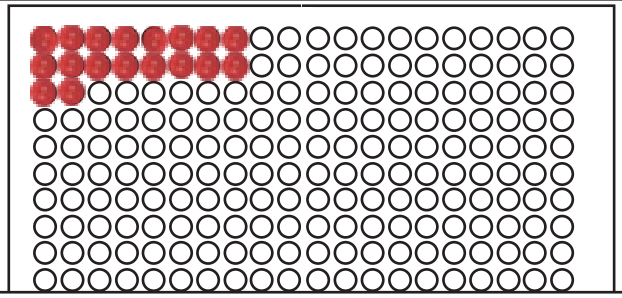
Taking the 18 beads from the bin we group them in groups of 6. The pattern is fair.



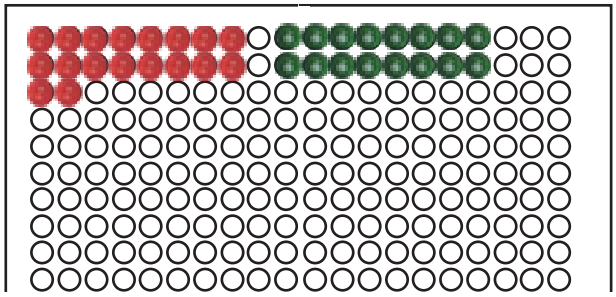
Taking the 18 beads from the bin we group them in groups of 7. The pattern isn't fair.



Taking the 18 beads from the bin we group them in groups of 8. The pattern isn't fair.



Taking the 18 beads from the bin we group them in groups of 9. The pattern is fair.



Since we see that the ones that work are 2, 3, 6, 9 we know the factors of 18 are 2, 3, 6, 9. Since 9 is the highest of the factors we know that 9 is the Greatest Common Factor (GCF) of 18.

After the diagrams of the larger number using the sequence above, we know that the factors of 24 are 2, 3, 4, 6, 8 and the factors of 32 are 2, 4, 8.

24 - 2 3 4 6 8

32 - 2 4 8

Now we want to know the greatest common factor of the numbers. The two numbers share 2, 4 and 8. Since we know that 8 is the greatest between the two numbers we know that 8 is the Greatest Common Factor (GCF) of 24 and 32

Diagram would look like this: 8 is the Greatest Common Factor of 24 and 32