First Name: _____	**Last Name:** _____	**Grade:** _____
Teacher: _____	**Parent's email:** _____	

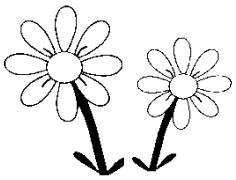
Finding Possibilities

Welcome to the Math Challenge #5. In this challenge, we focus on '**making an organized list' strategy** to solve problems. This strategy is particularly useful when you need to find all the possible solutions to a problem that has more than one answer to it. By making an organized list we make sure to count all the possibilities and avoid double counting.

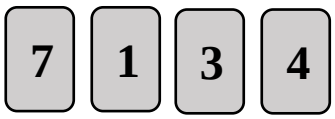
This set of problems is quite challenging. Get your families (grandparents, parents, siblings, cousins and neighbors) to help you solve these math problems. If they can't help you in person, get them to help you virtually).

For a complete overview of elementary problem-solving strategies, visit at https://www.mathinaction.org/problem-solving-strategies.html.

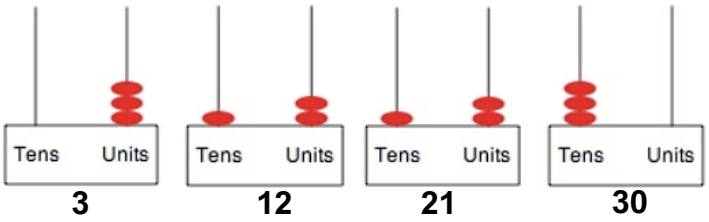
Kinder & First Grade: solve <u>at least</u> 3 problems.
Second & Third Grade: solve <u>at least</u> 7 problems.
Fourth Grade and above: solve <u>at least</u> 12 problems.

		Answer
1.	Myra has a blue crayon and a red crayon. She starts coloring a coloring page that has 2 flowers below. If Myra colors each flower with either blue or red, how many different ways can coloring page look like? 	
2.	Tanisha was given 3 colored blocks to play. She loves to build a tower by stacking these blocks then knocks them down. In how many ways can Tanisha build a tower using a red, purple, and pink blocks? 	
3.	Mischa dresses up her teddy bear. Her teddy bear's coat has 3 buttons. She sometimes buttons them up starting with the top button, but sometimes starts somewhere else. How many possible ways can Mischa button-up the coat for her teddy bear? 	
4.	Mrs. Heins has 3 different flowers and she would like to use two different vases. How many different ways can Mrs. Heins put all 3 flowers in to 2 vases so that each vase has at least one flower? 	

5. Wesley was given 4 cards with 4 different numbers as shown below. How **many 2-digit numbers** can be formed from these cards?

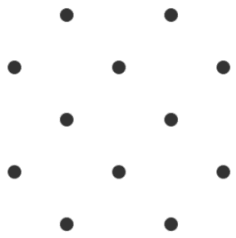


6. Sarah was given a place value tool to form some numbers. She made the number 3, 12, 21 and 30 using 3 beads (see picture below).



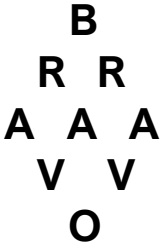
How many numbers can you make using a total of six beads for placing on either tens and/or units place?

7. Trisha has one each of a $1, $5, $10, $20 and $50 bill in a jar. She closes her eyes and select one of the bills out of the jar. How many possibilities that the amount would be less than $75 left in the jar?

8. 

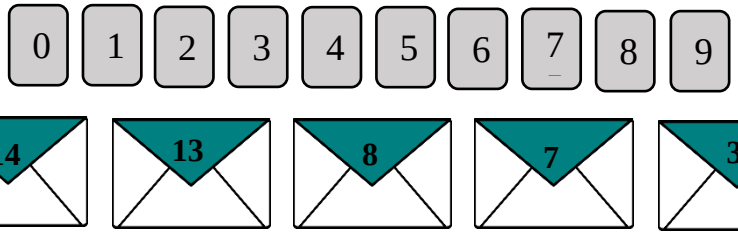
How many different **sets of four dots** can be joined to form a square?

9. In the diagram on the right, each "path" from top to bottom correctly spells the word **BRAVO**. What is the total number of different paths in the diagram?



10.	Carla is making bracelets. She has a bucket full of red and blue beads. How many different bracelets are there if Carla uses only 4 beads in her design, using just these beads and no clasp, so she can rotate it or flip it?	
11.	Carla's sister, Veronika, is also making bracelets using 2 different colors of beads (red and blue). How many different bracelets are there if Veronika uses 6 beads in her design?	
12.	Katie and her friend Jackson went to the grocery store. Jackson bought 3 apples and 4 oranges. Katie bought apples, oranges, and pears. She bought the same total number of fruits as Jackson. How many possible combinations of fruits that Katie could have bought?	
13.	An ice cream shop offers customers the choice of a cup or a cone. It offers a choice of three different flavors: chocolate, vanilla, or strawberry. It also offers three different toppings: sprinkles, peanuts, or hot fudge. How many different combinations result from choosing a cone or a cup, one kind of ice cream, and one topping? 	
14.	In how many distinct ways can the letters of the word PEACE be arranged?	

15. A set of ten cards, each showing one of the digits from 0 to 9, is divided up between five envelopes so that there are **two cards** in each envelope. The sum of the cards inside is written on each envelope:



How many possible combinations of two cards could be inside the envelope with number 8? What are they?

16. When you roll two regular six-sided dice

a. How many possible combinations of numbers that can result?

a.

b. How many of those combinations, when the number on the two dice are added together, have a sum that is ten or greater?

b.

17. How many solutions can you find to this cryptarithm?
Hint: eliminate the impossibles first.

$$\begin{array}{r} \text{TWO} \\ +\ \text{TWO} \\ \hline \text{FOUR} \end{array}$$

18. When a clock turned from 08:32 to 08:33, the digit 3 appeared 3 times. Once when it was 08:32, and the second and third appearance is when it was 08:33.

On a digital clock showing 24-hour time, over a whole day, how many times does a 5 appear?

Solution is available on Dec 11, 2020 at www.mathinaction.org