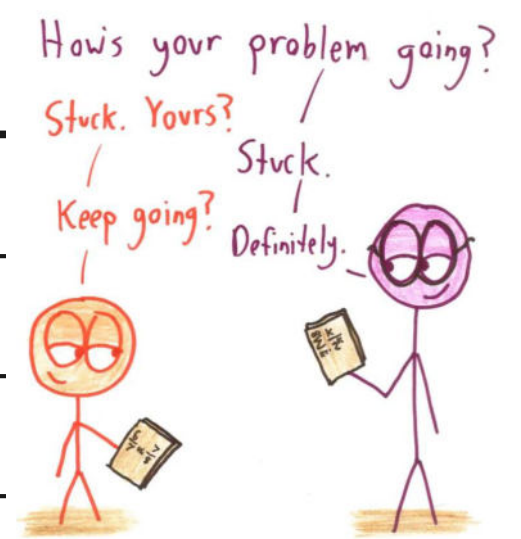
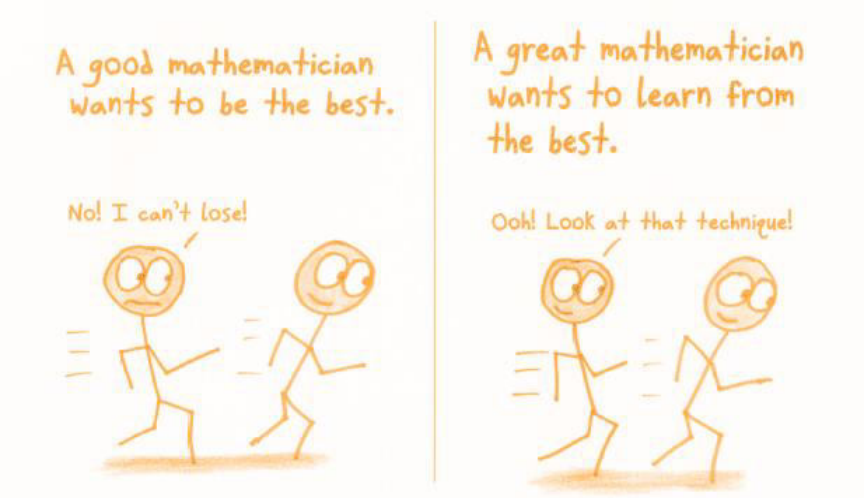
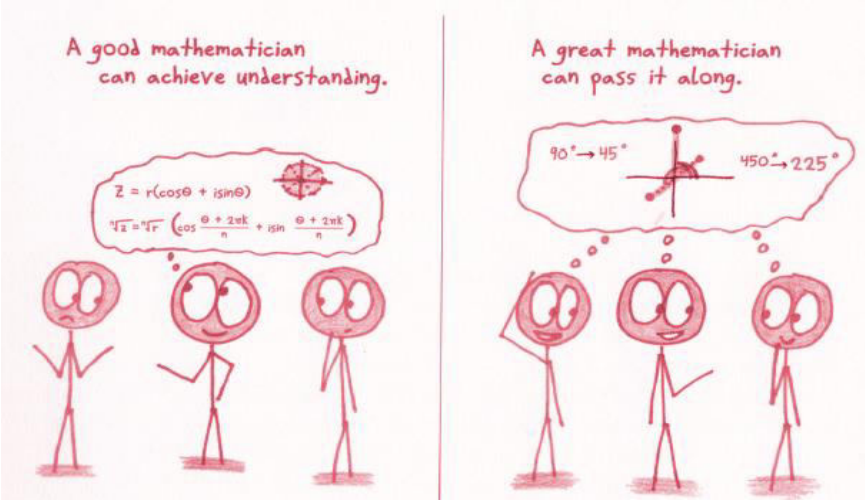
Building Thinking Classrooms







Collaboration

Working with Your Partners

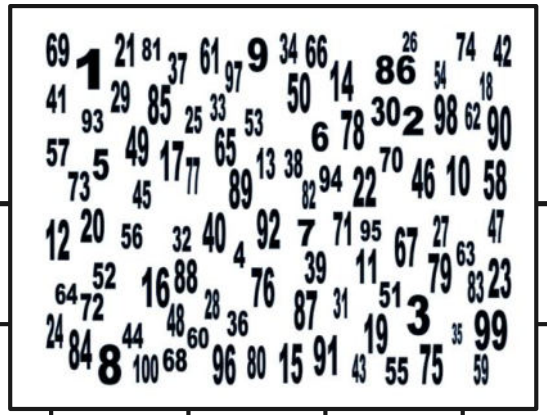
DOES NOT LOOK LIKE	LOOKS LIKE
Walk away from partners, distract others, talk loudly, lay down	Stay with your partners the whole time, use indoor voices, face them
Give up, refuse to help your partners or other groups	Ask for help when you feel stuck, share knowledge with others
Off topic conversation, get distracted	Help each other stay on task, work productively
Don't talk to each other, interrupt each other, let one person dominate, use unsupportive or unkind language	Share ideas, listen and respond, encourage each other, use positive language, take turns writing

1-100

Goal: Find all the numbers 1-100 in order with your partners in 3 minutes.

Lesson Link & Instructions & Student Copy

3 Person Version OR Operations Version



Build It

Goal: The goal of this exercise is to work together to build the structure described on the clue cards.

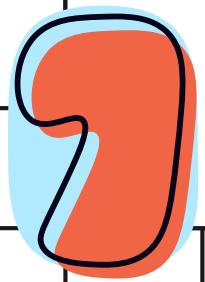
Lesson Link & Student Copy & Instructions

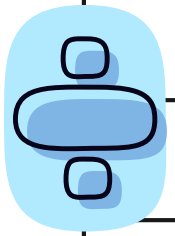
Digital Cubes

Work Habits

Group Expectations

- Only 1 marker & 1 eraser per group
- Try not to erase - reorganize as needed
  - Remember “wrong” thinking can lead to better ideas
- Write the current problem you are working on at the top of your board
- You can ONLY write someone else’s thinking - NOT your own
- EVERYONE must understand so that ANYONE can explain
- You may look around the room but you must stay with your group





The Answers Are + & -

Goal: Using each of the numbers from 1-10 exactly once and each of the operations add & subtract at least twice (one will be used three times,) make 5 expressions whose answers are 17, 17, 8, 1 , 2.

Challenge: Try these too.

13, 9, 13, 1, 13

2, 2, 2, 3, 8

13, 1, 9, 1, 17

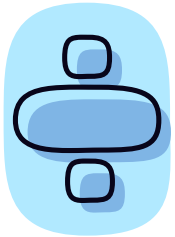
3, 3, 3, 3, 19

15, 1, 1, 1, 19

2, 2, 7, 7, 7

The Answers Are

Goal: Using each of the numbers from 1-10 exactly once and each of the operations add, subtract, multiply & divide at least once (one will be used twice,) make 5 expressions whose answers are 5, 8, 13, 24, 20



Challenge: Try these too.

17, 2, 21, 3, 2

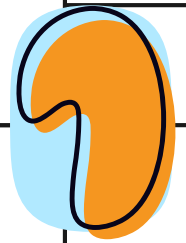
3, 3, 3, 3, 24

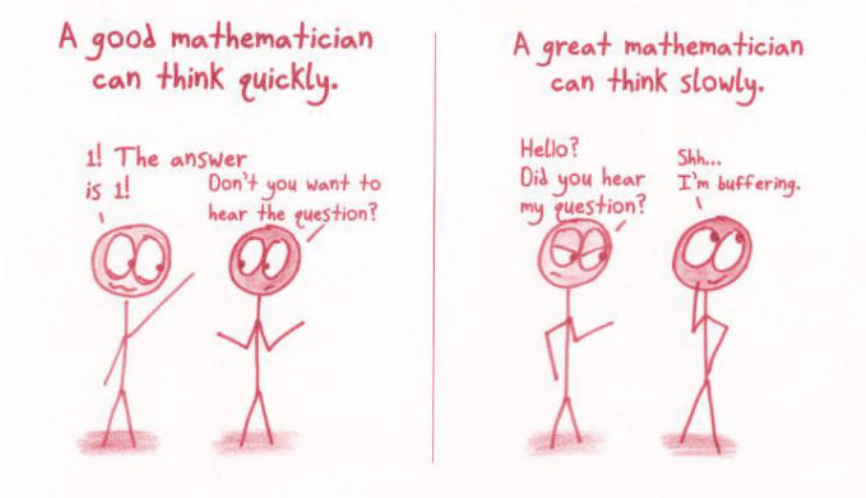
2, 3, 7, 7, 7

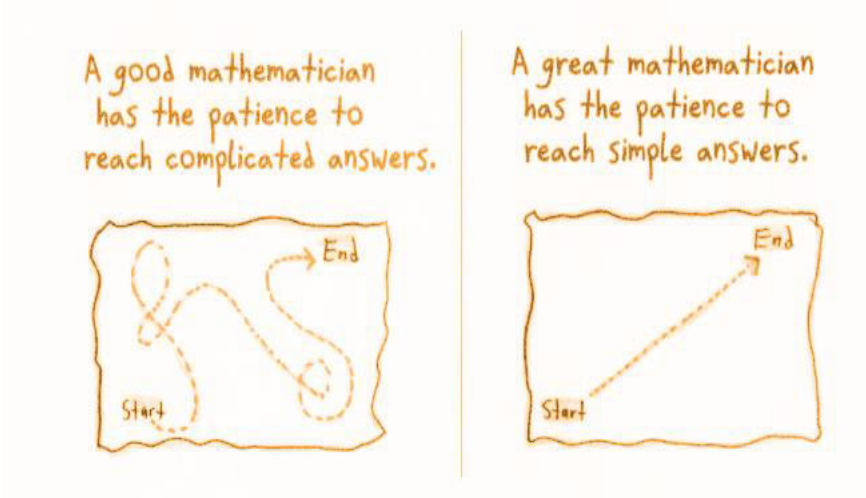
10, 14, 1, 20, 16

2, 2, 2, 2, 9

1, 2, 3, 4, 5



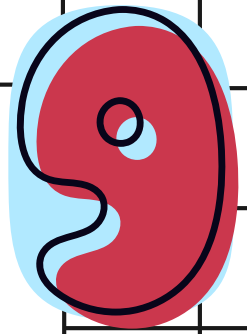


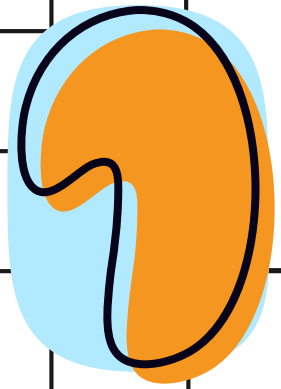


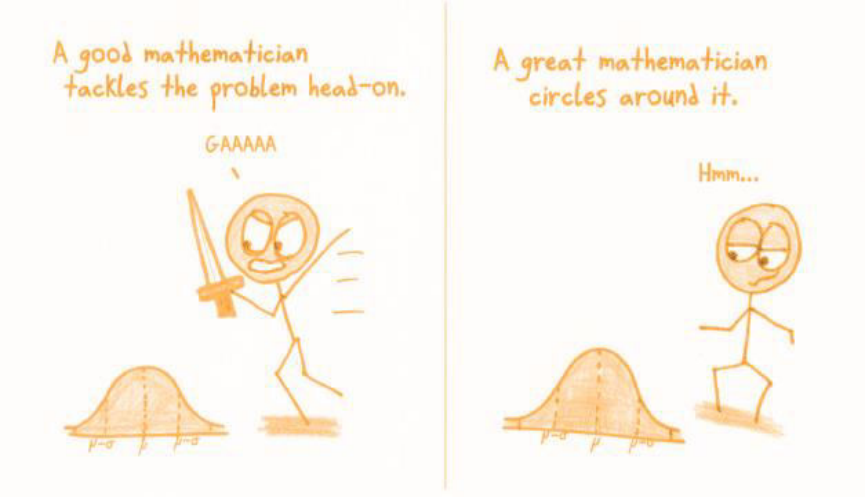
Perseverance

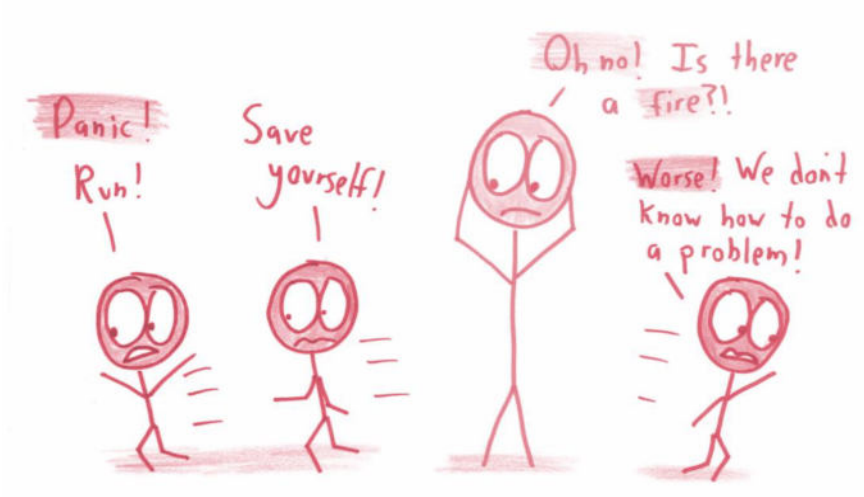
Tax Collector

Goal: I have 12 envelopes, numbered 1 to 12. Each contains a number of dollars equivalent to the number on it. The game starts with you taking one of the envelopes-the money inside of which is yours to keep. The tax collector will then take all of the remaining envelopes whose number is a factor of the envelope you took. The tax collector must be able to take at least one envelope every turn. Play continues until you can no longer take an envelope, at which point the tax collector will take any remaining envelopes. What is the most amount of money that you can get?
Challenge: Try it with 18. Try 24. How about 30?






A good mathematician tackles the problem head-on.
GAAAAA
A great mathematician circles around it.
Hmm...


Panic!
Run!
Save yourself!
Oh no! Is there a fire?!
Worse! We don't know how to do a problem!

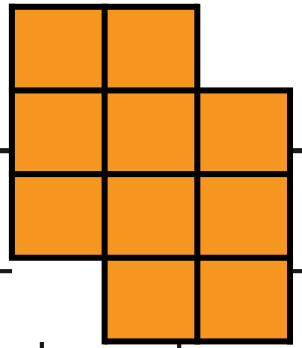
Risk Taking

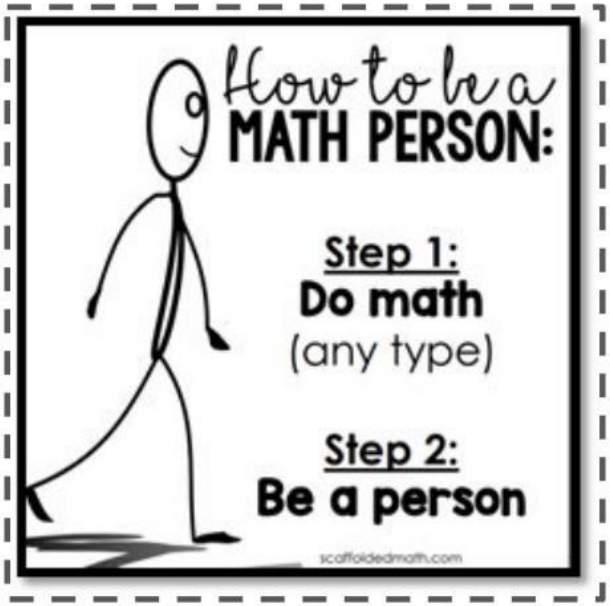
Next Door Number

Goal: Place the numbers 1-10 into the 10 boxes. There is one rule. Two numbers that are next to each other in number order, **cannot** be next to each other in the boxes.

Challenges:

- They also cannot be above or below each other.
- Numbers can not be diagonal either.
- Ten-friends cannot be together



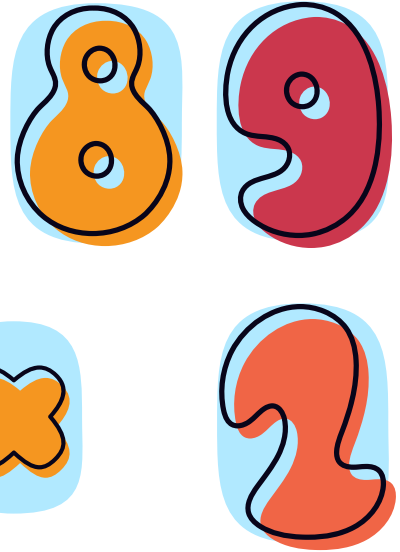


Additional Tasks

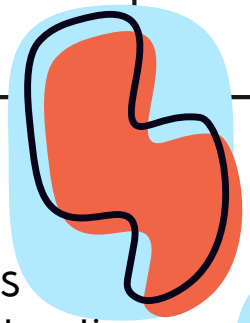
Tricky 24

Goal: Find a solution using only 1, 2, 3, & 4 to get an answer of every number 1-24 using each number ONLY once and any mathematical operation in any order.

Study Copy & Instructions



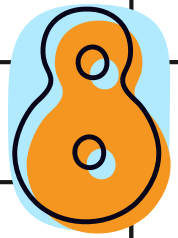
5-4-3-2-1



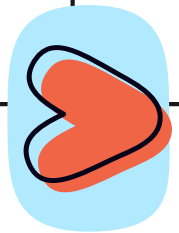
Goal: Use the digits 5, 4, 3, 2, and 1. The digits must remain in that order. Place the four arithmetic signs - plus, minus, times, and divided by - between the digits and as many parentheses as you like around the digits to make each answer.

Lesson Link & Study Copy & Instructions

5 4 3 2 1



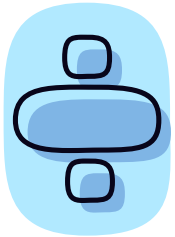
How Many 7's?

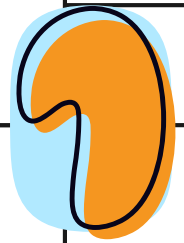


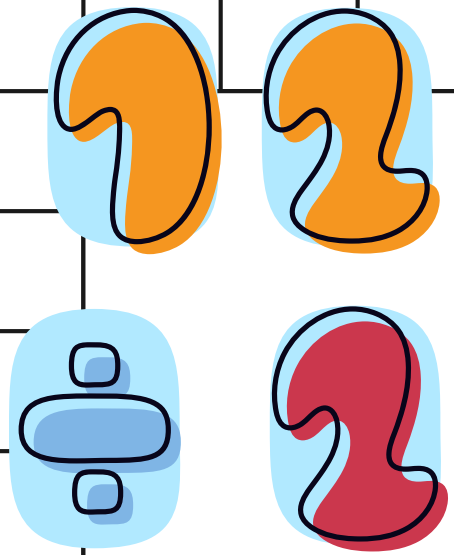
Goal: See how many 7's you would write in the numbers 1-100.

Want a challenge? Try 1-1000

Bigger challenge? How many 0's?







Two's Day

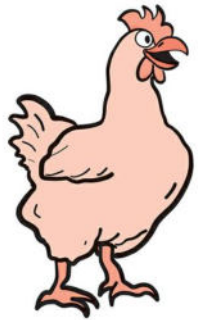
Goal: Find the numbers 0-22 using 5 2's and ANY operations..

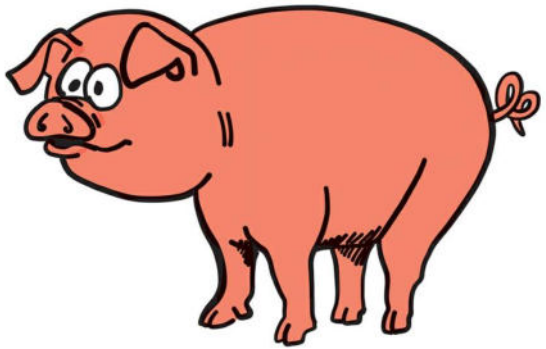
Lesson Link & Student Copy & Instructions

Farmer John

Goal: A farmer has some chickens and some pigs. One day they notice that their animals have a total of 26 legs. How many chickens and how many pigs might they have?

Challenge: What if there is spiders, pigs, and chickens?





Palindromes

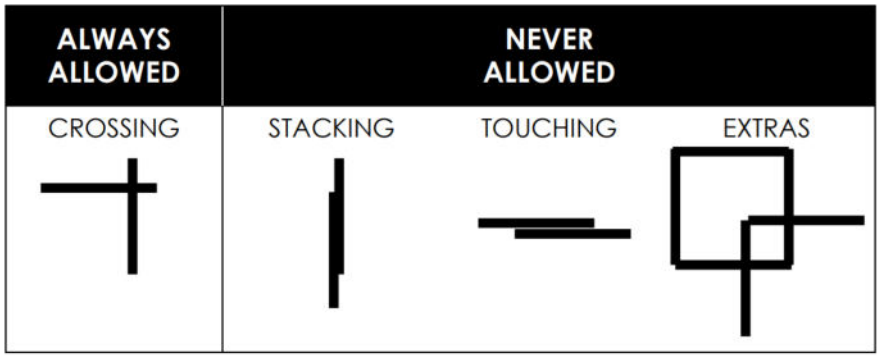
Goal: Consider the number 28. It is not a palindrome. So, I reverse the number and add it to itself (28 + 82 = 110). 110 is not a palindrome. So, I reverse it and add it to itself (110 + 011 = 121). 121 is a palindrome. This means that 28 is a depth 2 palindrome (it took two iterations to make it a palindrome.) What is the depth of all two digit numbers?

Student Copy

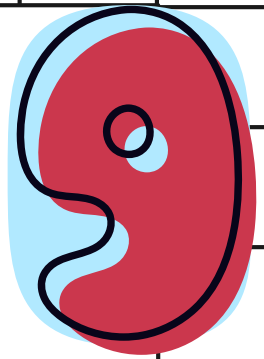
Let's Make Squares

Goal: Work with your group to create patterns of 12 pieces that contain the specified number of squares.

Lesson Link & Student Copy



Split 25



Goal Take the number 25 and break it up (decompose) into as many pieces as you want. What is the biggest product you can make if you multiply those pieces together?:

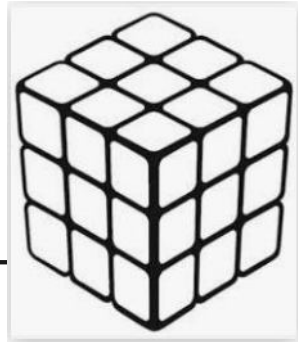
Lesson Link

Painted Cubes

Goal: Imagine you have this 3x3x3 cube, made up of 27 1x1x1 cubes. It is dipped in a bucket of paint. After the paint has dried, the 3x3x3 cube is taken apart into its 27 individual cubes. How many of these individual cubes have paint on three sides, two sides, one side, zero sides?

Challenge: What about a 4X4X4? 5X5X5? Is there a pattern?

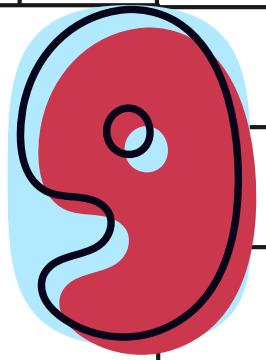
Video Link



Nickels, Dimes & Quarters

Goal: Find all the ways you can make a dollar using any combination of nickels, dimes, and quarters.

Ice Cream Cones



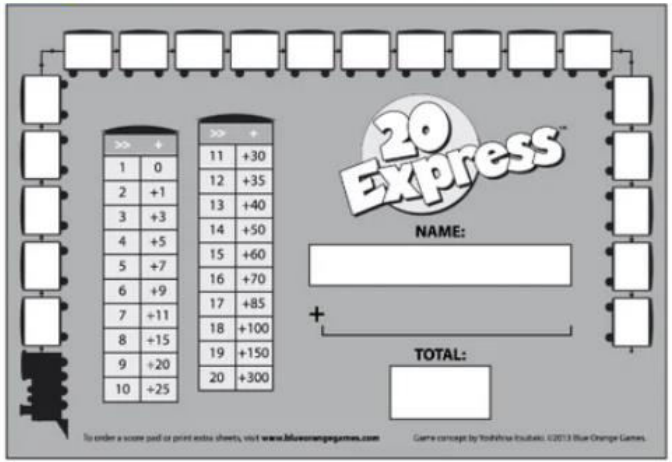
Goal The Ice Dream ice cream shop has 10 flavors of ice cream. How many different two-scoop ice cream cones can you make?

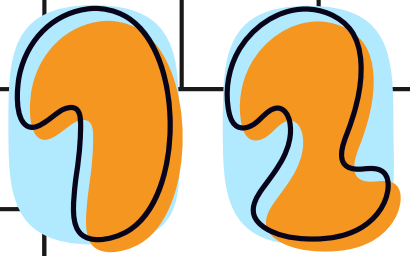
Challenge: What if there were 11 flavors? What if there were 12? What if it were 20 flavors? What if each cone had at most three scoops?:

Train Game

Goal: Determine the pattern for winning & then accumulate the most points by building number trains.

Lesson Link & Game Pieces & Student Copy & Instructions





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Goal: