

Number Routines in the Math Classroom

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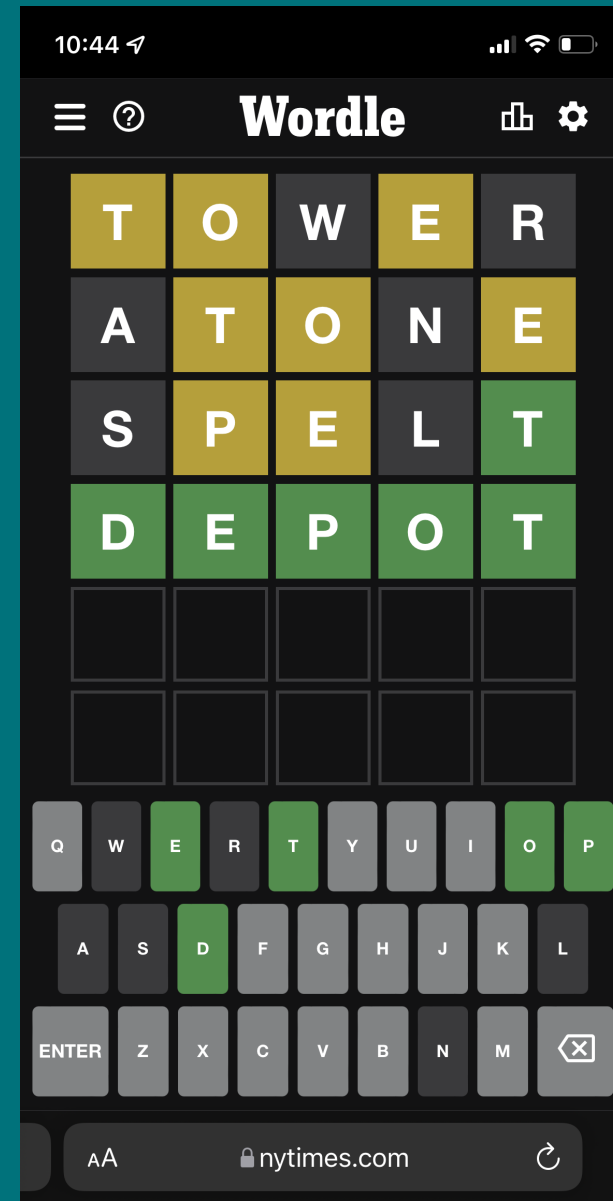
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Why Routines?



Let's start by talking about Wordle



Wordle is Just a Routine

- Short and the stakes are LOW
- You aren't expected to get it right on the first try – in fact, it's less interesting if you do
- Predictable (the rules never change)
- Mistakes help you move forward
- It's adaptable (variations within the game & with those that you play with)
- People who don't normally play word games (like myself) still love to play



Math Routines

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- Predictable (the rules never change)
- Mistakes help you move forward
- It's adaptable (variations within the game & with those that you play with)
- People who aren't always engaged in math still love to engage



For many students, math class is intimidating.

Math class often focuses on what students don't know, creating a more fearful environment that is difficult to learn and succeed in.



**When students know HOW
the experience will go, they
are better able and more
likely to engage in the WHAT
we hope they learn.**



Some popular routines that teachers are using

-Number talks

-Splat

-How Many?

-Which One Doesn't Belong?

-Number Routines with

NumberBlocks

-Three Act Tasks

-Counting Collections

-Notice/Wonder

-Math Flips

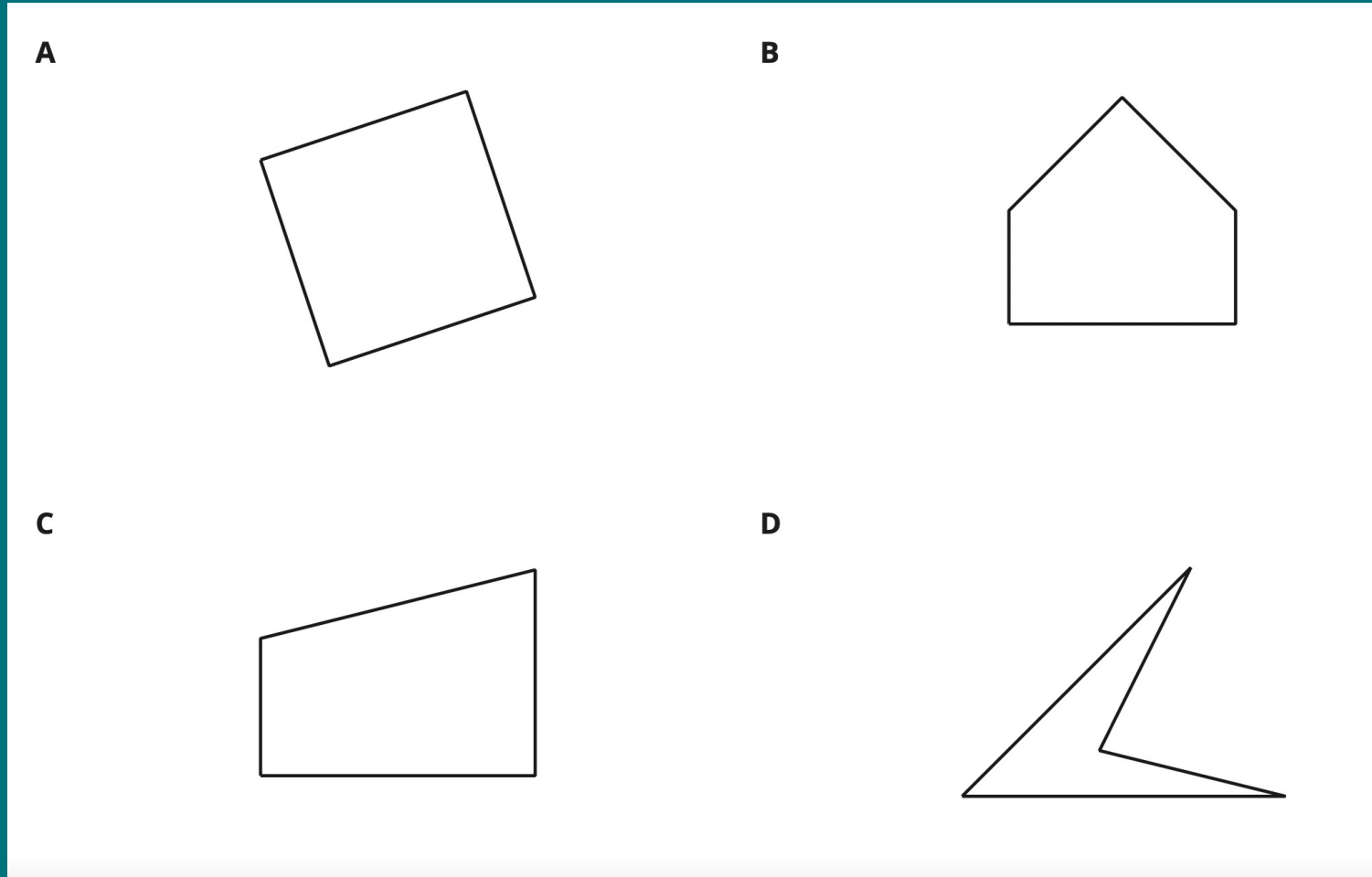
-Ways to Make



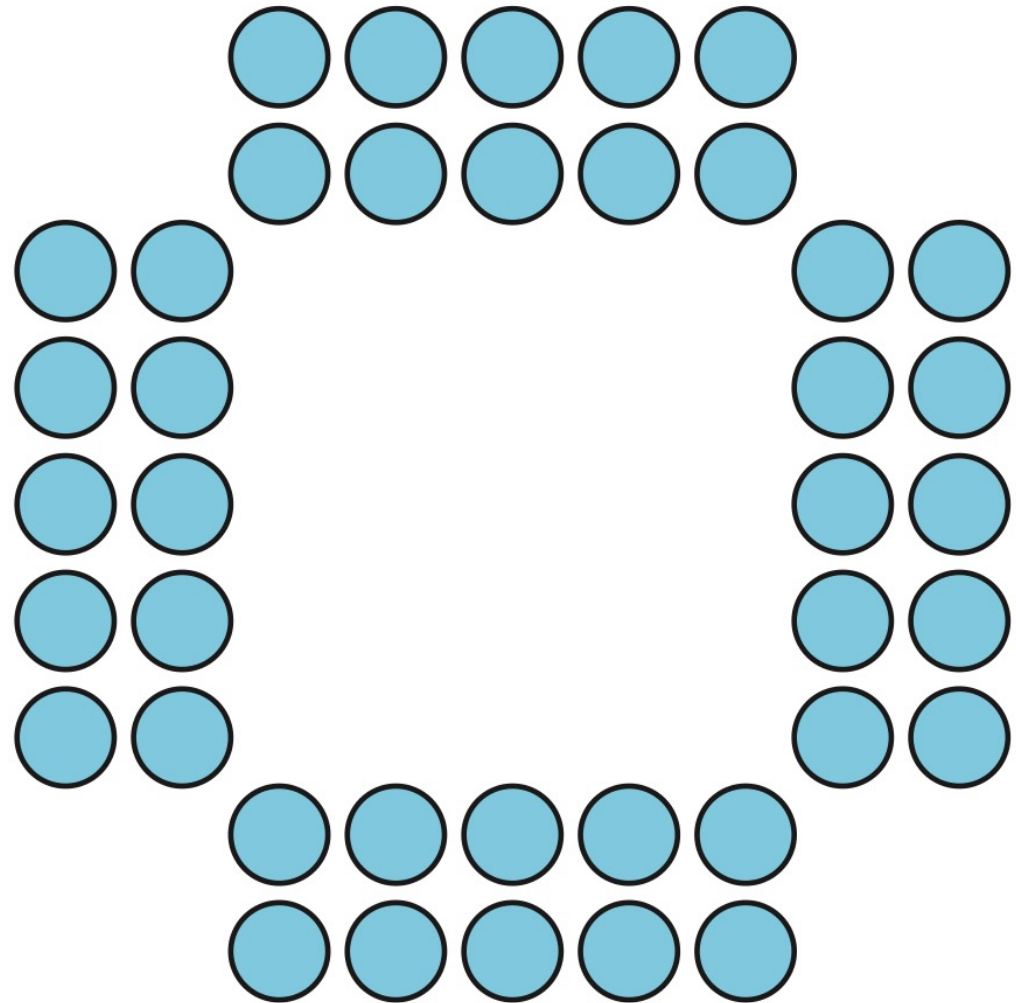
Let's Engage in Some Routines



Which One Doesn't Belong?



How Many?



Ways to Make 100



The Counting Principles:

- 1 Stable Order/Standard Order
- 2 One to One
- 3 Cardinality
- 4 Conservation of Cardinality
- 5 Successor



Stable Order

When counting, the list of words used to count must be said in a repeatable order.



Standard Order

When counting, the names of the counting numbers are always said in the same order, and that order is meaningful.



One to One

When counting a set of objects, each and every object in the set is tagged with one and only one number in the counting sequence and each number with one and only one object.



Cardinality

When counting (in accordance with the standard order and one to one principles) the last number word spoken describes an important characteristic of the whole set.

The last number word indicates the cardinality of the set.



Conservation of Cardinality

The cardinality of a set remains stable when:

- The order in which the objects in the set are counted is changed, or
- The objects in the set are rearranged or transformed.



Successor

There is a number that is one greater than every counting number.



Important Counting Concepts

- 1 Subitizing
- 2 Unitizing
- 3 Hierarchical Inclusion



Subitizing

Subitizing is quickly recognizing and naming the number in a group without counting.



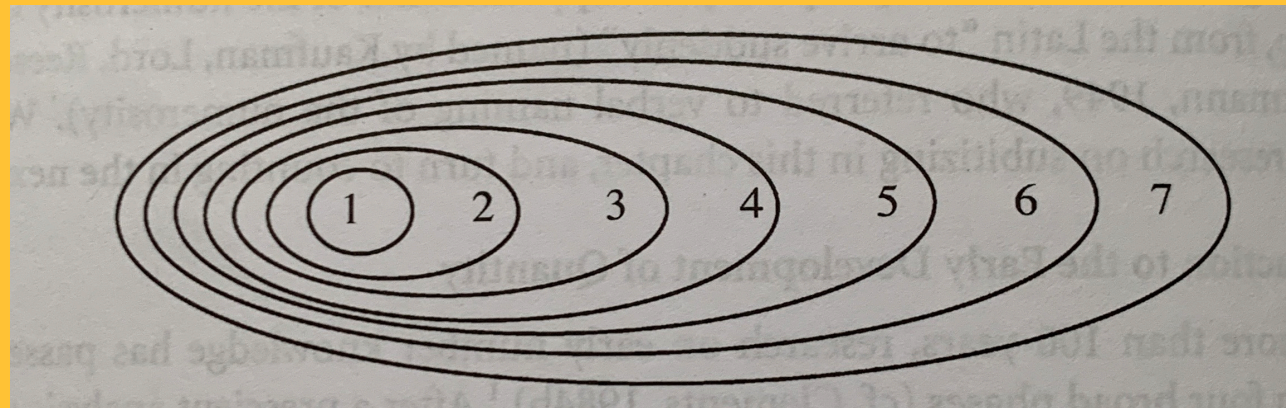
Unitizing

Understanding that you can count a large group of items by counting smaller, equal groups of items from within the large group.



Hierarchical Inclusion

Each cardinal number includes those that come before it. The number 7 contains a set of 6, a set of 5, a set of 4, etc.



Sarama & Clements, 2009



More or
Less

Today's
Number

Conservation
of Number



What's
Missing?

7
Number Routines

Guess
My
Number

Choral
Counting

Ways
To Make
A
Number



Ways to Make Four

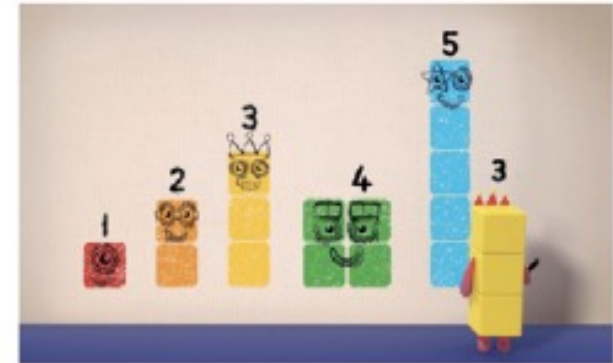


Ways to Make Four



Introduce the Routine

- **Ask:** *What are the Numberblocks doing?* [They are making different shapes by moving around their blocks.]
- *What did the Numberblocks notice about the different shapes they became?* [No matter their shape, they are always their same number.]
- **Ask:** *In the beginning One was sad because she could not make different shapes. What did One learn at the end that made her happy again?* [She learned that all the other numbers are made from 1s.]

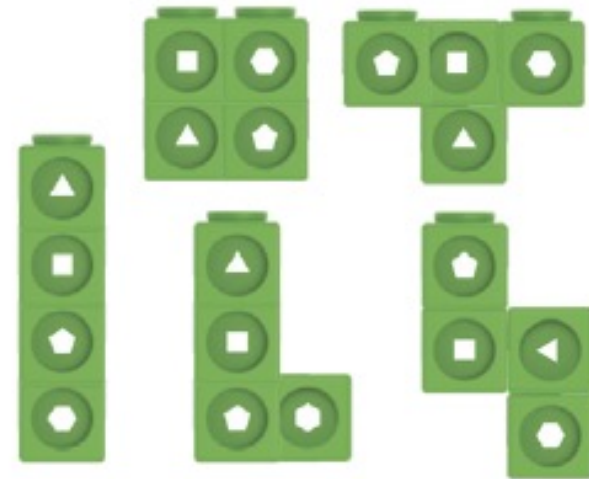


Ways to Make Four



Activity

- Have students work individually. Give each student 4 green MathLink® Cubes.
- Have the students build Numberblock Four using green cubes, then have them draw the model on paper.
- Students can continue building new shapes of Four and drawing the build on their paper. Have them continue until they think they have made all possible shapes.



Ways to Make Four



Wrap Up

- Bring students back as a whole group to share all the different ways Four could be shaped. Draw them on the whiteboard as students share. Ask probing questions:
 - *Are all of our shapes still Four? How do we know?*
 - *Why can One only be 1 shape? Make sure students understand that One is made of just 1 cube, so she has nothing to rearrange. Four is made of 4 cubes, so they can be moved around but always still show the quantity 4.*



Why Number Routines with Numberblocks?



- Help students to see and experience the core counting principles and ancillary ideas
- Each episode allows students to engage in foundational mathematical ideas and concepts
- Short videos engage and meet students where they are



- Hands-on development of some “big ideas” in mathematics with focus on the Counting Principles
- Routine structure allows students a safe place to discuss, take risks, and collaborate with peers
- Repeatable lessons are low-prep and high-engagement
- Supports wide variety of learning styles with visual, auditory, and kinesthetic components in every lesson





THANK YOU!

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