

Purposeful Play: Using Math Games to Strengthen Number Topics K-5

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ACTM Fall Forum

Games can reinforce computational skills, but they can also inspire curiosity, build number sense, and strengthen mathematical reasoning.

Game-Changing Decisions When Selecting or Designing Games:

- ✓ Steer clear of speed or elimination.
- ✓ Integrate a variety of models into games.
- ✓ Consider games that allow for varied levels of play.
- ✓ Consider games that encourage repeated play.
- ✓ Consider games that challenge students to use mathematical reasoning and number sense when practicing other math skills.
- ✓ Consider a way for students to check their thinking or their accuracy.

How might you modify the traditional game of Multiplication War?

Multiplication War
Variation: Find your product. The one with the greater product gets all of the cards.

8 5

$$8 \times 5 = 40$$

7 3

$$7 \times 3 = 21$$

Benefits?

Modifications of War?
The student whose number has the greater value keeps both cards.

15

18

Is comparing without speed still beneficial?

Modifications of War?
The student whose number has the greater value keeps both cards.

$\frac{2}{3}$

$\frac{3}{8}$

Modifications of War?
The student whose number has the greater value keeps both cards.

0.4

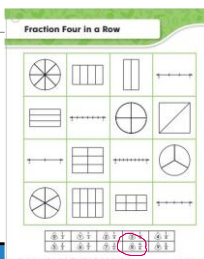
0.04

How might you integrate models into game play?

Understanding Fractions

Fraction Four in a Row
Create models of fractions and try to get four in a row!
Partner A, roll to see which fraction to model.

Complete a model to show the fraction.
Take turns until someone has 4 in a row!
Then, erase your board and play again.



Navigating Numeracy

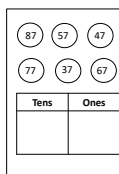
Adding Tens to 2-digit Numbers

Students apply their understanding of adding multiples of 10 to two-digit numbers.

Draw 6 circles.

Decide on a starting 2-digit number less than 40 (e.g., 27).
Think about adding 1-6 tens to that number and randomly record the sums in each circle.

Provide a place value mat for students to work out the sums.



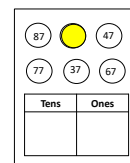
Adding Tens to 2-digit Numbers

Roll to see how many tens to add.

3

Draw 27 on the place value mat.
Add 3 more tens to your drawing.
Have students write their equation on paper. $27 + 30 = 57$
Cover the sum.
Take turns until someone covers all of their circles.

Benefits? Modifications?



How can you develop tiered games for students to advance through skills?

Near-Doubles Addition

What foundations do they need?

Spin a 1-10 spinner or pick a 1-10 card and build 2 towers with that many cubes.

Place your towers side by side.

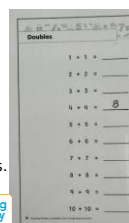
Tell your partner how many cubes you see.

Say the math fact and write the sum in the blank on your work mat.

$$4 + 4 = 8$$

Take turns. The first to fill in their mat wins.

Benefits?



Navigating Numeracy

Near-Doubles Addition

How can we connect doubles facts to near-doubles facts?

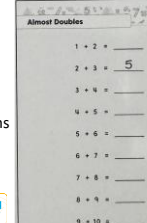
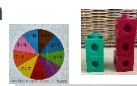
Spin and build towers to show each addend.

Find the sum. Say the fact.

$$2 + 3 = 5$$

Write the sum on your Almost Doubles mat.

Take turns. The first to write all the sums wins.



Navigating Numeracy

Near-Doubles Addition

How might we provide mental practice for near-doubles facts?

Complete the doubles mat and put it face down.

Spin and add to find the sum.

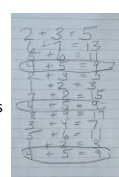
Say and write the fact on your paper.

Hint: Flip the Doubles mat to use as help.

The first one to write the same fact 3 times is the winner!

Then, play again.

Benefits?



Navigating Numeracy

How might you encourage repeated play?

Target 500

Roll for the tens digits.

Tell your partner if you will make a new hundred.
Explain your thinking.
Show the addition on your place value mat.
If your sum is 500 or more, cross out a target.
The first to cross out all 4 targets wins!

What do you notice?



How might you integrate math reasoning into games?

Multidigit Multiplication

Who has the greater product?



Roll 3 decahedron (0-9) dice.

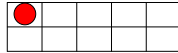
Fill in the blanks in order of the rolls 27×4

Multiply and compare with partner.

The one with the greater product fills a spot on their ten frame.

The first to fill the frame wins.

Benefits? Modifications?



Multidigit Multiplication

Who has the greater product?



Roll 3 decahedron (0-9) dice.

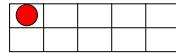
Fill in the blanks with the digits in any order: $___ \times ___$

Multiply and compare with partner.

The one with the greater product fills a spot on their ten frame.

The first to fill the frame wins.

Benefits?



Multidigit Multiplication

How might we challenge students to use their number sense to place digits to result in a greater product?

The goal is to get the greater product.

Roll a 0-9 die and fill in a place:

Me: $___ \times ___$

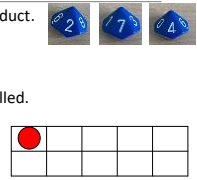
Partner: $___ \times ___$

Take turns until all 3 blanks are filled.

Multiply and compare products.

The one with the greater product fills a spot on their ten frame.

The first to fill the frame wins.



Largest Quotient Wins

Who can create a division problem with the greater quotient?

Pick 4 digit cards.

Create a division problem with a 3-digit dividend and 1-digit divisor.

Compare quotients with a partner.

The greater quotient gets a point. Then, play again!



MATH PRACTICE

How Close Can You Get?

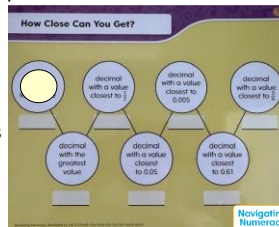
Deal 7 decimal cards to each player.

Read 1st clue. Find your decimal that fits it best.

Compare with your partner to see whose decimal works best.

That player covers the clue.

The player who covers the most clues wins.



NAVIGATING NUMERACY

Card Crazy

Randomly pull 3 digit cards or roll for 3 digits.

2 7 5

Pull a clue card and create a 3-digit number to satisfy the clue.

Compare with a partner. Find the best example for each round.

Make the 3-digit number with the greatest value

Make the 3-digit number with the least value

Make the number closest to 800

MATH PRACTICE

How might you build accuracy tools into game play?

Facts Practice: Close to the Target

• Shuffle together 2 sets of 1-9 cards.

• Deal 10 cards to each player.

• Roll a 0-9 die and multiply by 10 to get the target number. (e.g., roll 5, 50 is target number).



• Find 2 cards in your hand that have a product close to the target number.
• The one with the closer product discards both cards.

• The first one to get rid of all of their cards wins.
• How did the target number change the game?



Back to the Hive: Number Pairs that Make 10

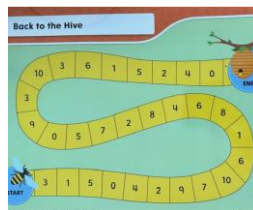
Roll and move that many spaces.

Tell your partner the number you landed on.

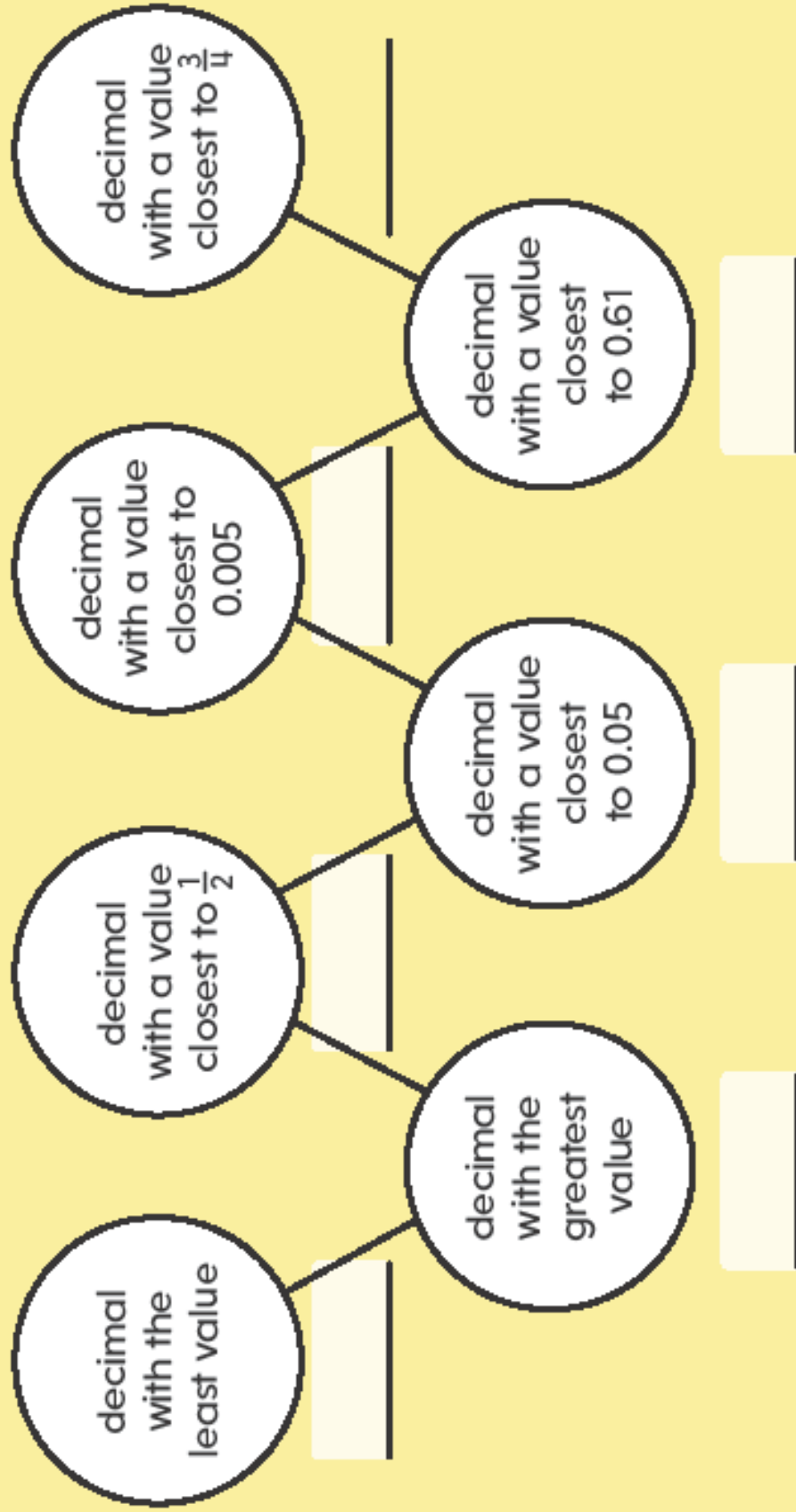
Tell your partner how many more make 10. Your partner uses the rekenrek to check your thinking.



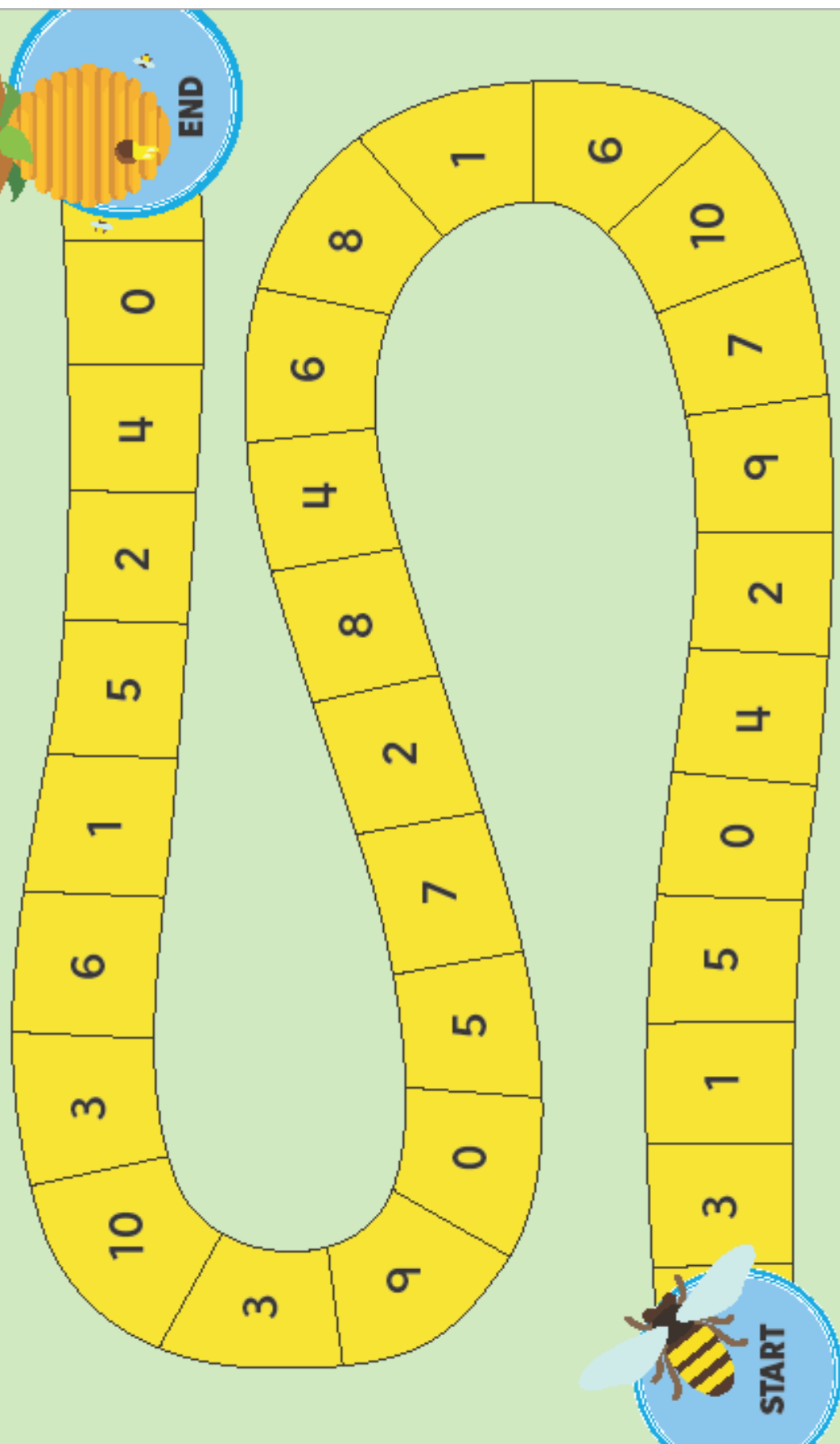
NAVIGATING NUMERACY



How Close Can You Get?



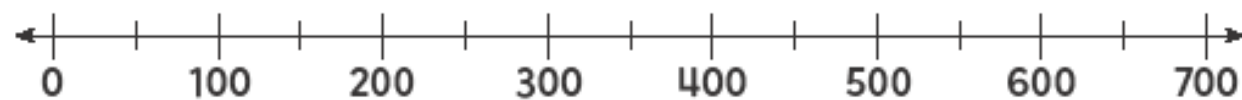
Back to the Hive



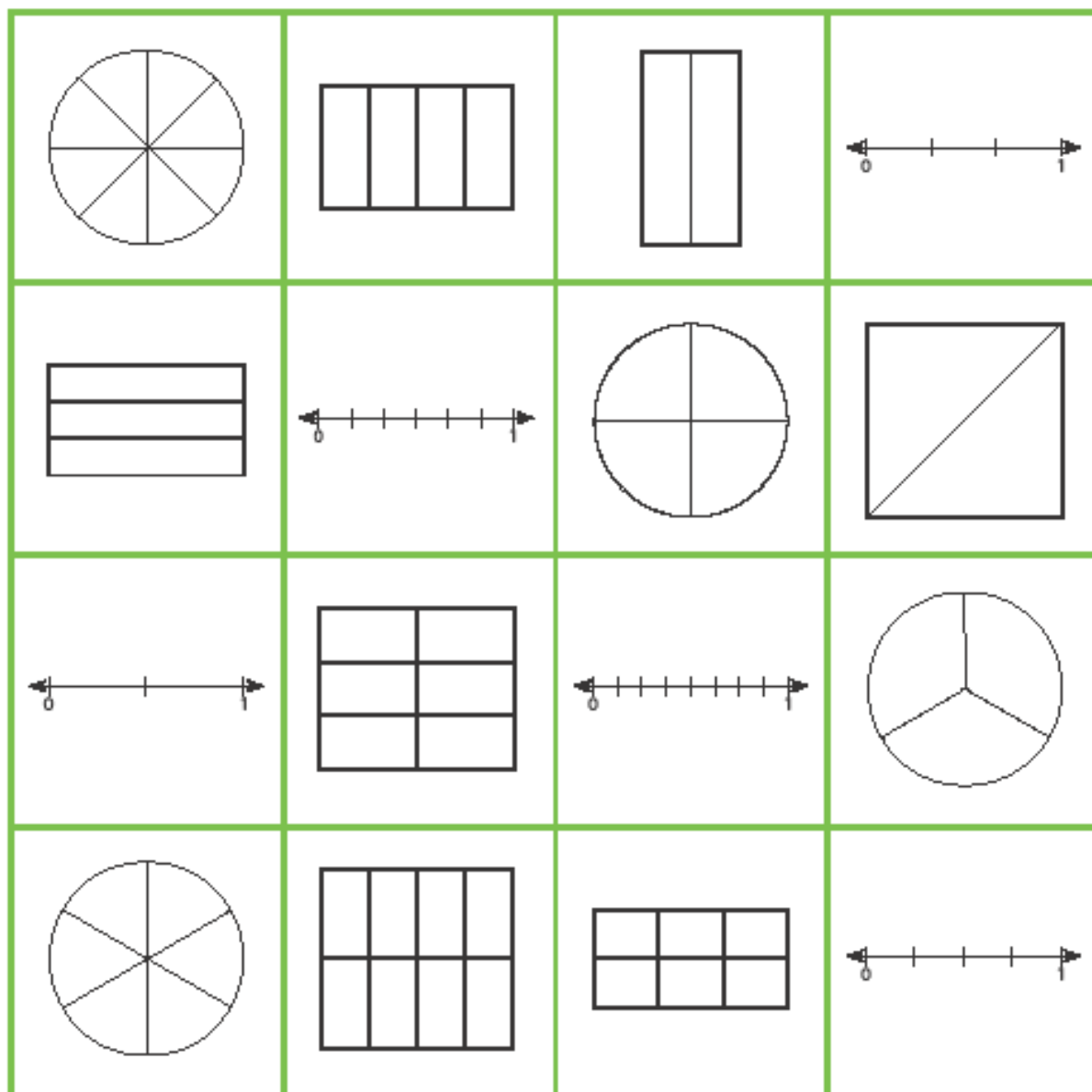
Navigating Numeracy, by Sue O'Connell: Back to the Hive game board

hand2mind.com

Strike Out



Fraction Four in a Row



0 $\frac{1}{2}$	1 $\frac{1}{3}$	2 $\frac{1}{4}$	3 $\frac{1}{6}$	4 $\frac{1}{8}$
5 $\frac{2}{2}$	6 $\frac{2}{3}$	7 $\frac{3}{4}$	8 $\frac{4}{6}$	9 $\frac{5}{8}$

Resources:

Visit Sue's website at: <https://www.qualityteacherdevelopment.com/>

Join the Math in Practice/Sue O'Connell Facebook group (shares lots of math teaching resources and instructional ideas): <https://www.facebook.com/groups/MathinPractice>

Navigating Numeracy Learning Progression Center Kits (hand2mind) (grade-specific kits filled with center games and tasks to build skills in priority number standards): www.hand2mind.com/navigating-numeracy

Math by the Book site – linking math and literature (Heinemann) (grade-specific lessons, problems, practice tasks that are taught through the context of a story): <https://www.heinemann.com/mathbythebook/>

Math in Practice K-5 Supplemental Series (Heinemann) (grade-specific lessons, problems, prompts, practice tasks that focus on building math understanding through interactive explorations)
[Math in Practice Series for mathematics coaches and teachers grades K-5](#)

Follow Sue on social media:

Join the Math in Practice/Sue O'Connell Facebook group (shares lots of math teaching resources and instructional ideas): <https://www.facebook.com/groups/MathinPractice>

Bluesky: @sueoconnellmath.bsky.social

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Twitter (X): @SueOConnellMath