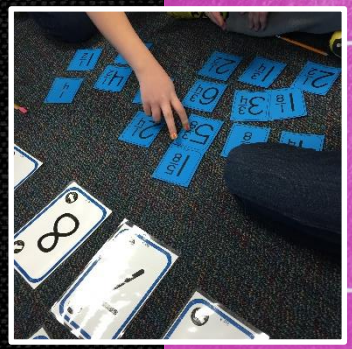
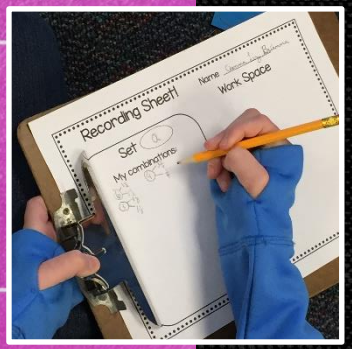
FRACTURED FRACTIONS!

Composing and Decomposing Fractions and Mixed Numbers

COOPERATIVE PROBLEM SOLVING PUZZLES TO HELP STUDENTS WITH FRACTION UNDERSTANDING (GRADE 3 -5)







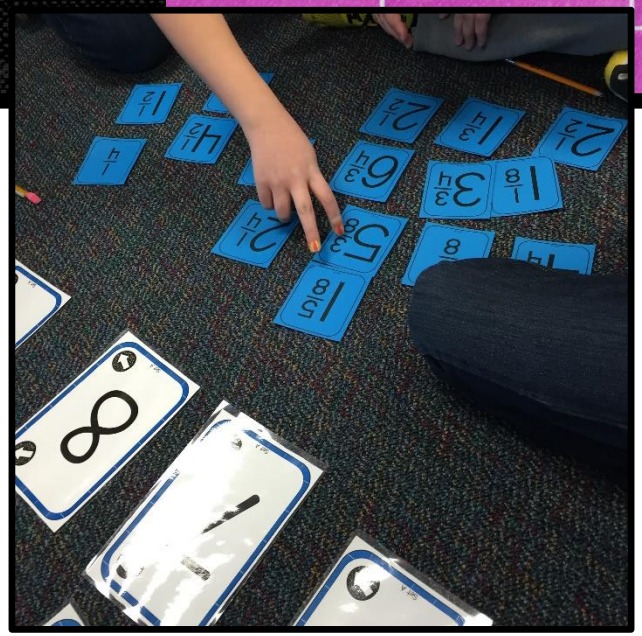
WHAT IS THIS?

Whether you teach from the Common Core or other sets of rigorous standards, the ability to decompose or "break apart" fractions and mixed numbers is key to strong "fraction sense" and the ability to successfully add and subtract fractions and mixed numbers. Simple denominators are used (2, 4, 8 for the first 3 sets and 2,3,4,6,8,12 for the final set) and only "like" denominators are used except for the final orange set.

You may have heard of "number bonds" in the primary grades. This resource taps into that concept to use fractions instead! Students gain valuable practice in breaking apart fractions and putting them back together-all in a cooperative, "puzzle-like" activity! This resource has 4 puzzle sets plus recording sheets, formative assessment, and a bonus math journal activity.

PUZZLE CARDS

The following 4 sets of cards can be used in order (more simple to more complex) or as stations where students rotate to all of them. The following page explains the differences among the sets. Cooperation and "math talk" are encouraged. Directions are simple-use each set of fraction cards and the decomposed fraction cards to try to "match" all the numbers correctly. See the resource in action on the next pages with teaching tips!



For each set, students lay out the larger number cards and the smaller fraction cards. Cooperatively, they work to find the "decomposed" parts that add up to make the "total" number. To keep my sets organized, I copied my small cards on card stock of the same color as the border of the larger cards. That way I know sets won't get mixed up! You could easily print on white and put a swipe of color on the cards to accomplish the same thing.

Before they begin, I tell the students a few things:

1. Remember to use "like" denominators. This resource does NOT ask students to change denominators.
2. There are several ways to make some of the numbers. You may not pick the correct one first and may need to "trade" cards to make the puzzle work.
3. Use scratch paper or the recording sheet to keep track of your "tries" if it helps you stay organized.
4. Be patient with each other and persevere!

It was very interesting to watch my students work. Some were very strategic and methodical while others were very random and struggled to keep track of what they had already tried. This can lead to some good "coaching" moments for you!

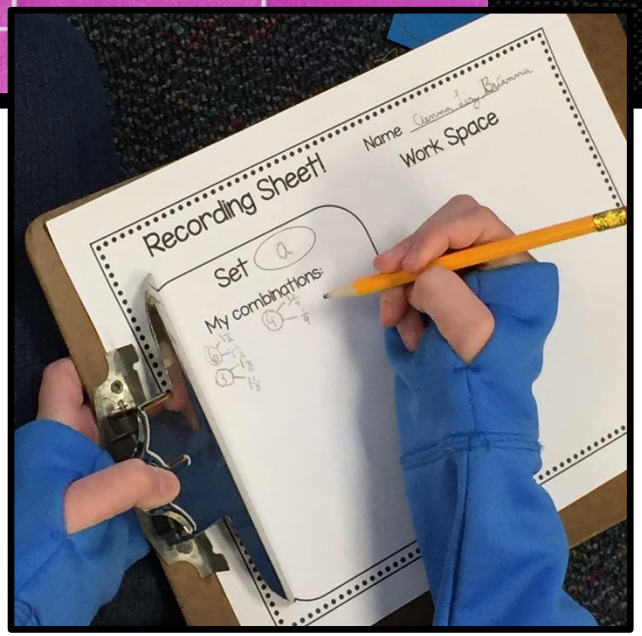
I created the sets in the following order of sophistication:

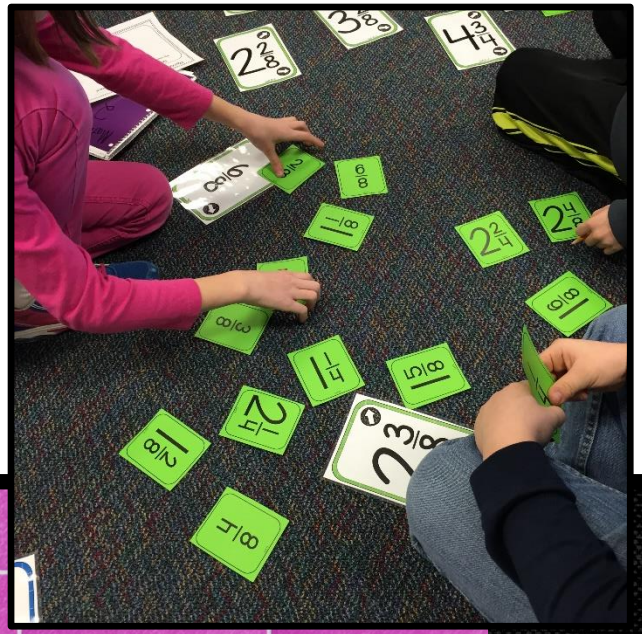
Set A Blue—all cards are geared toward making "whole" numbers. This helps students look for combinations that make "one" such as ¼ and ¾.

Set B1 Pink—cards have some whole numbers and some mixed numbers. Students won't need to "regroup" and make new ones (ex. 1 ¾ + 1 ¾)

Set B2 Green—this set requires some "regrouping" and making new "ones". (both pink and green use the "Set B" cards)

Set C Orange—this set asks students to "compose" rather than "decompose". The larger cards are blank and have 3 and 4 arrows. Students use the smaller cards to BUILD fractions. They can use "like" denominators or challenge themselves by using different denominators.





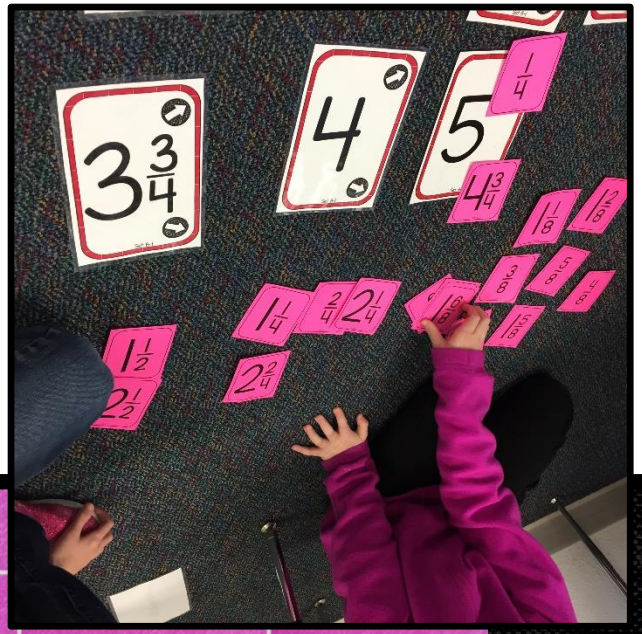
Students did a lot of mental math as they looked for numbers to join together to make "the big number". Often, they needed several attempts. On some of the sets, there are multiple ways to make numbers, and some students got a little frustrated. I used some guiding questions to help.

Are you checking to make sure your denominators are the same?

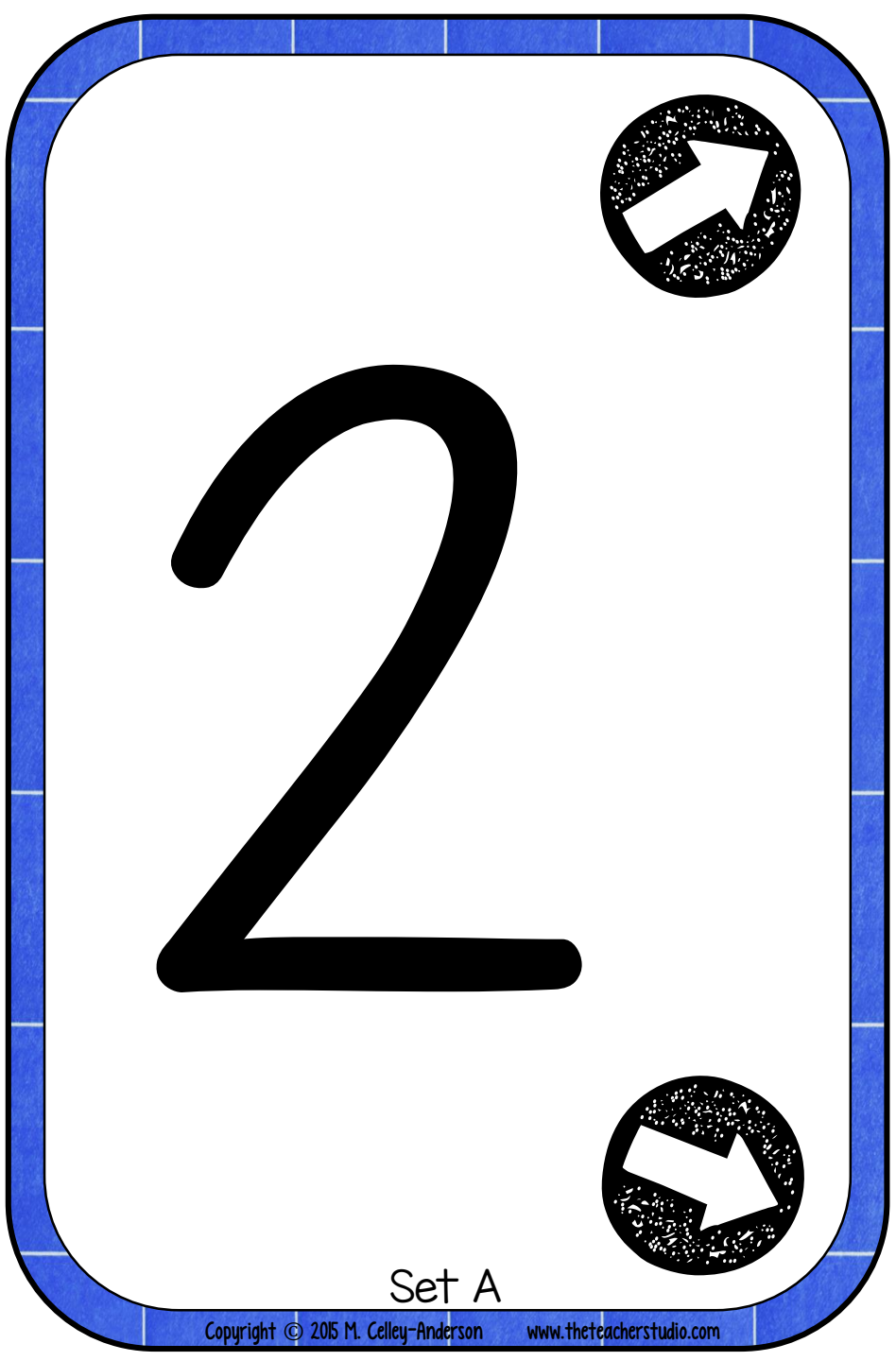
If your "big number" is in eighths, what do you know about the smaller numbers?

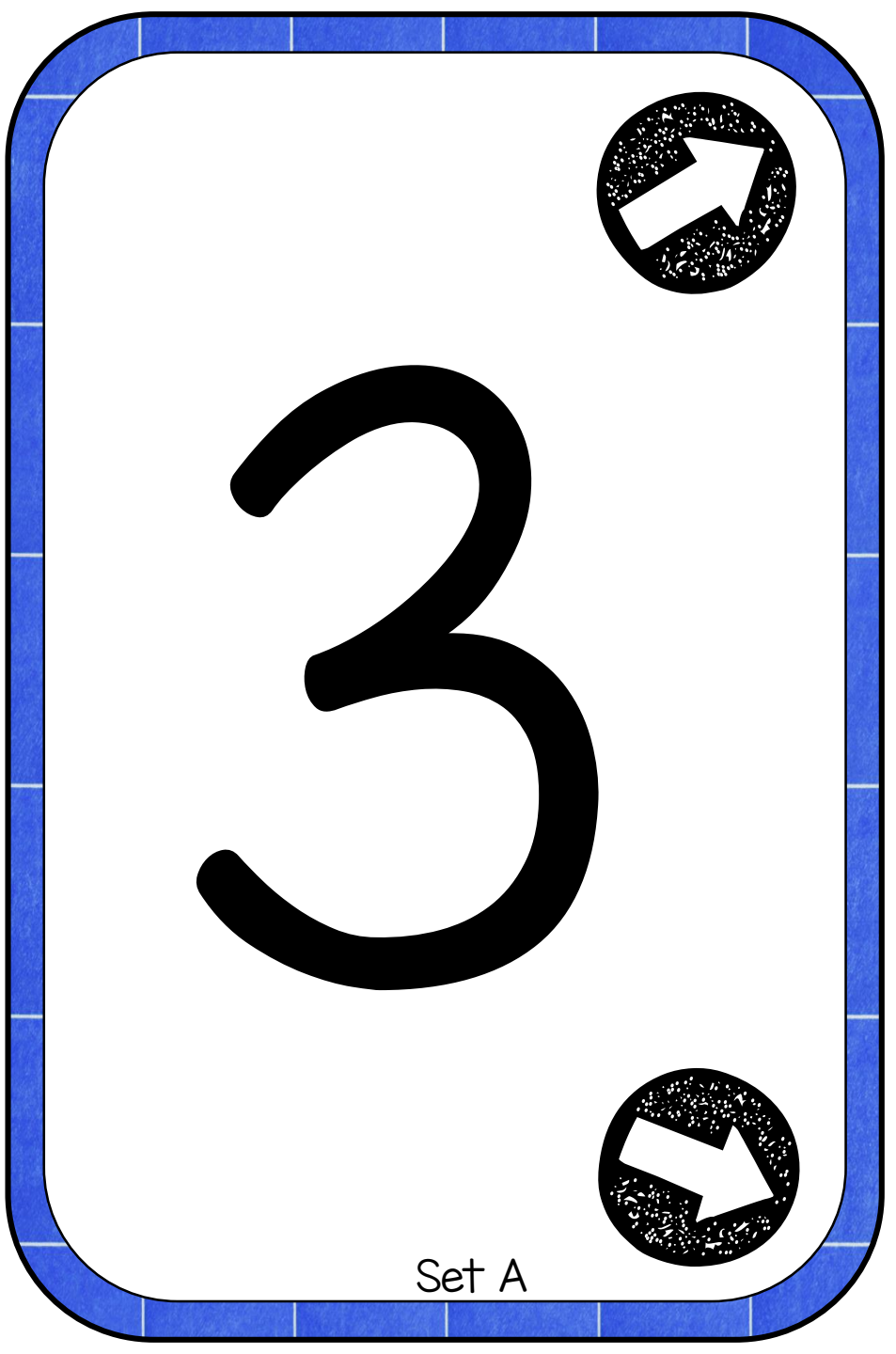
Would there be another way to make ____?

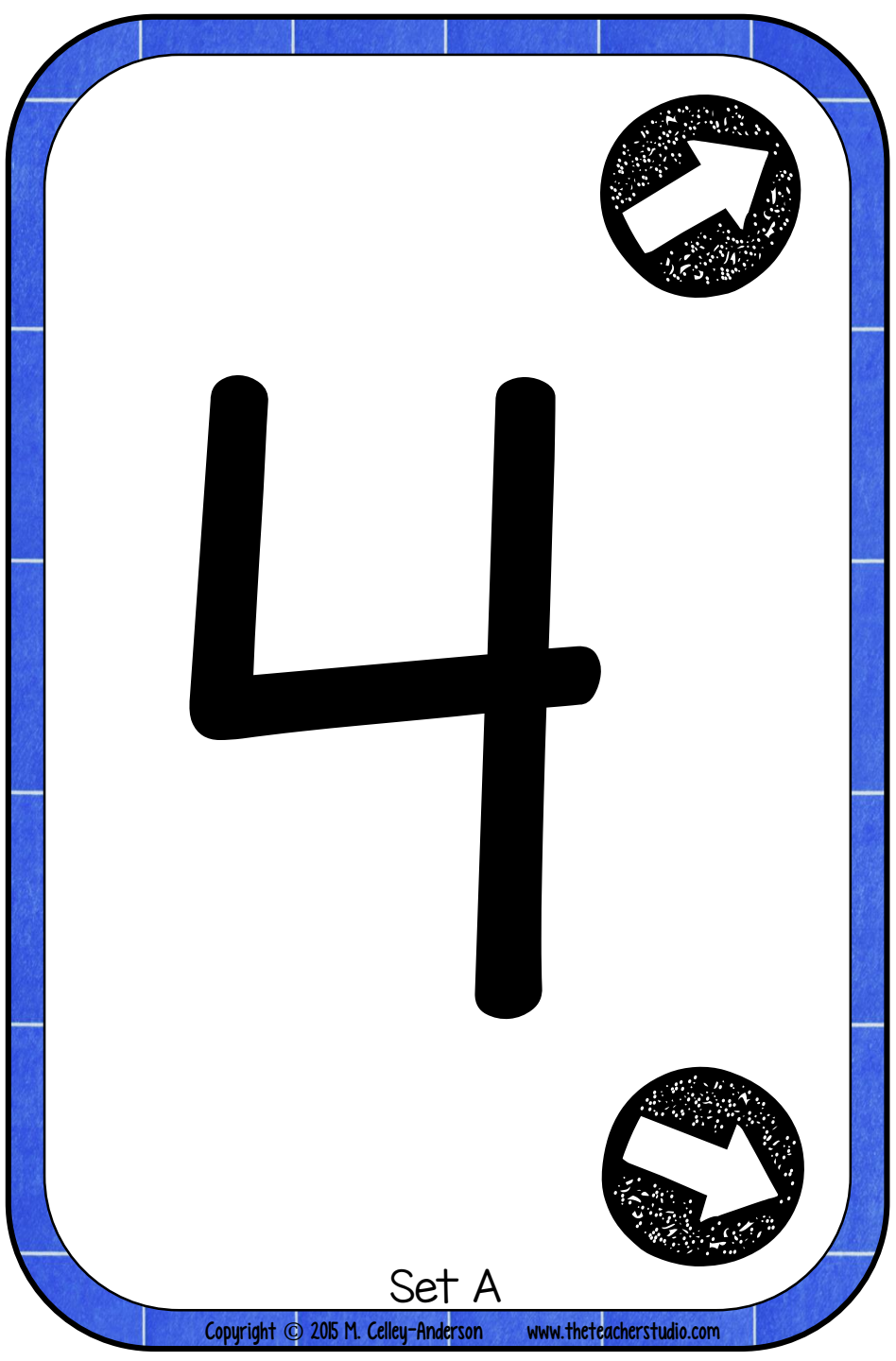
What numbers might work to make the smallest/largest number first?

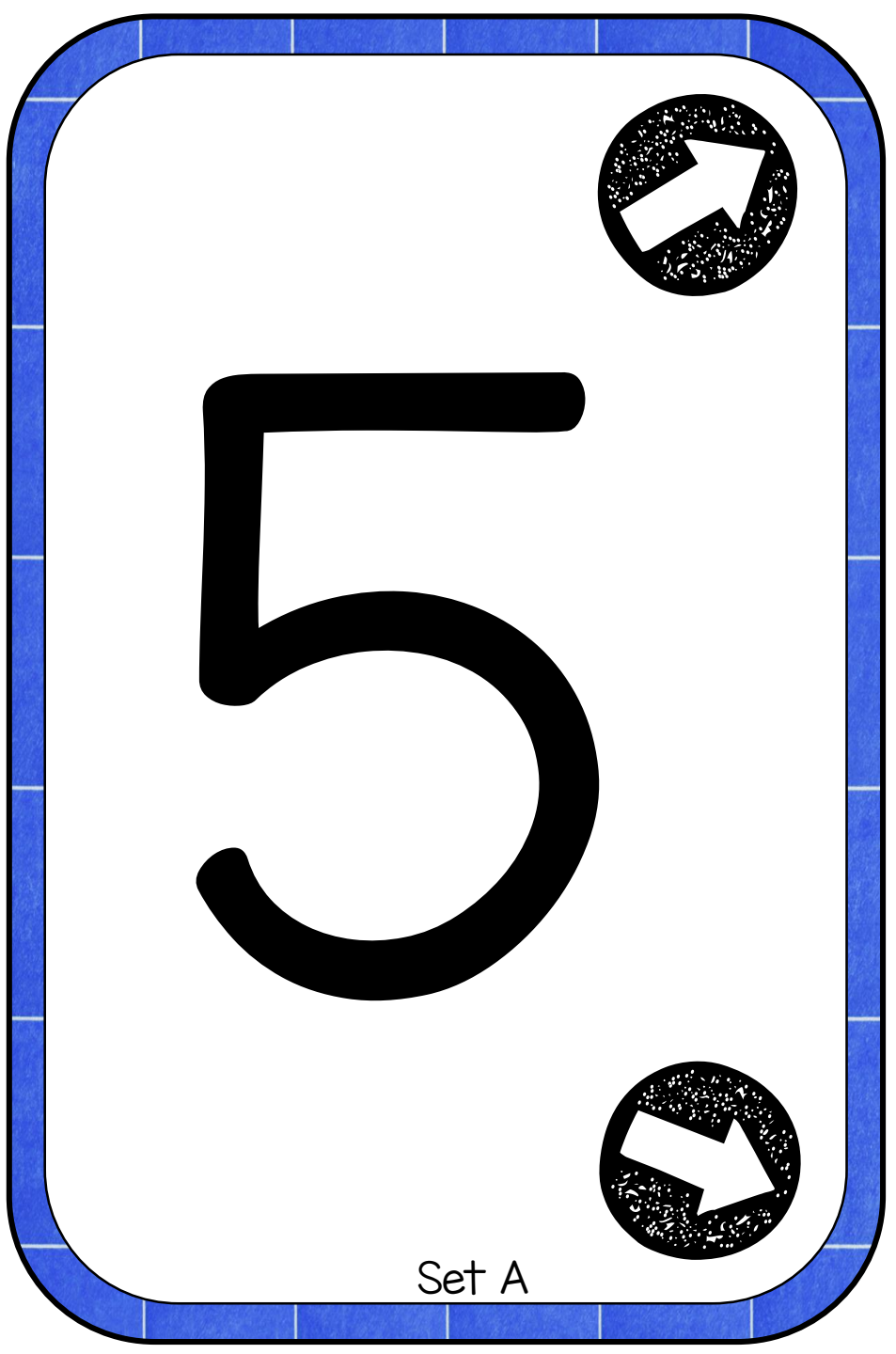


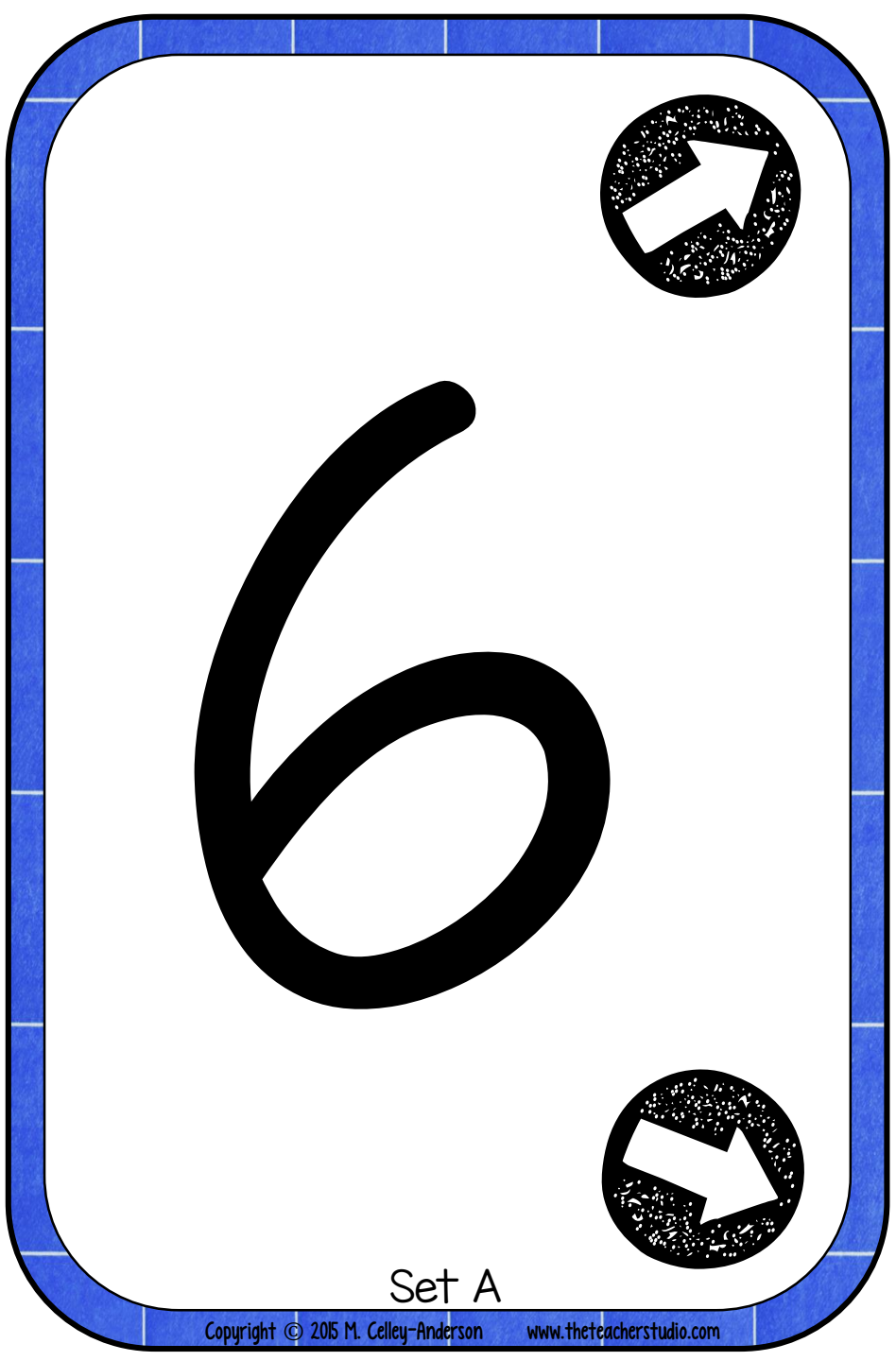
My students LOVED it...and want me to make some even more challenging ones! ENJOY! The card sets follow on the next pages.

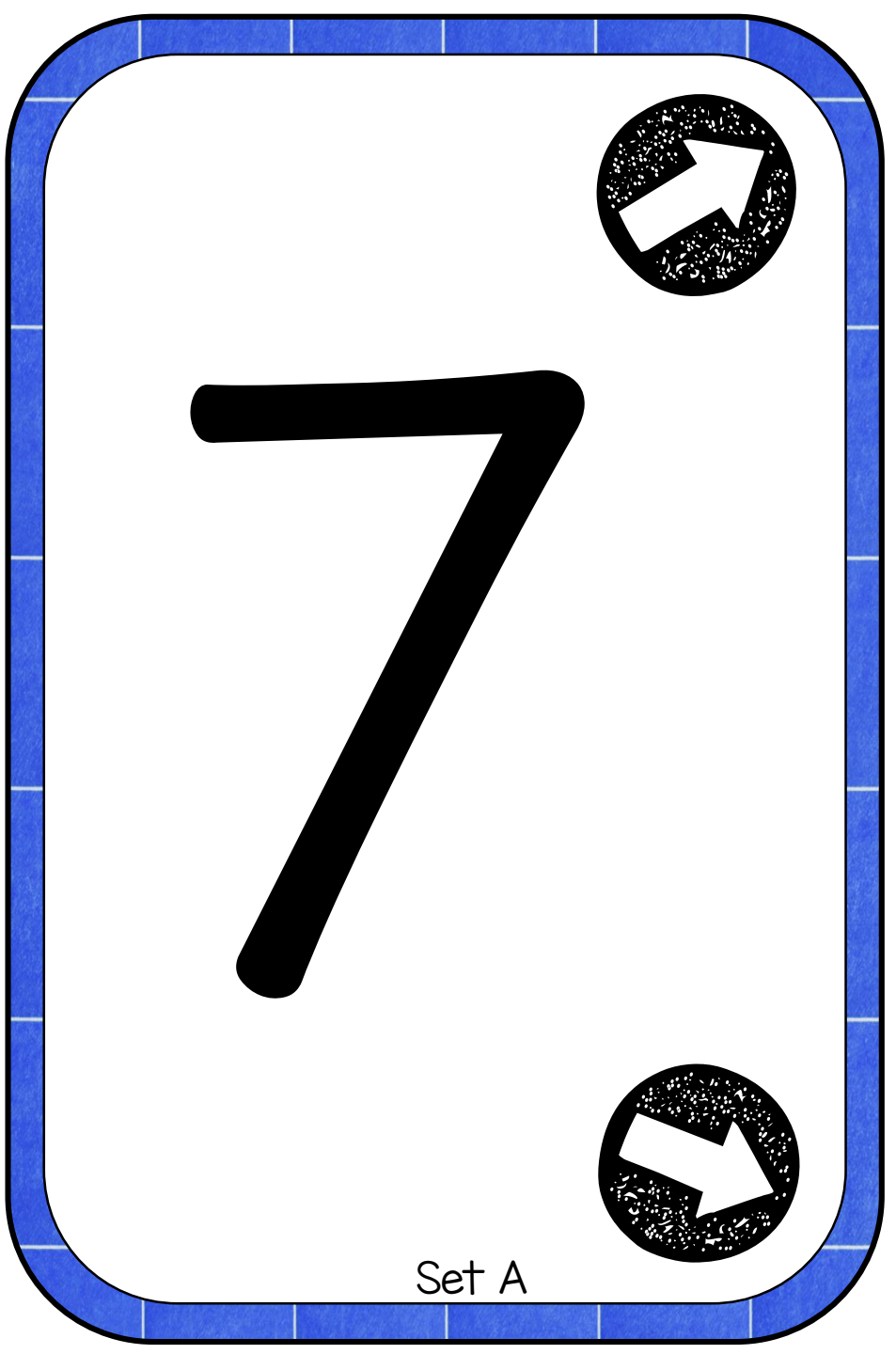


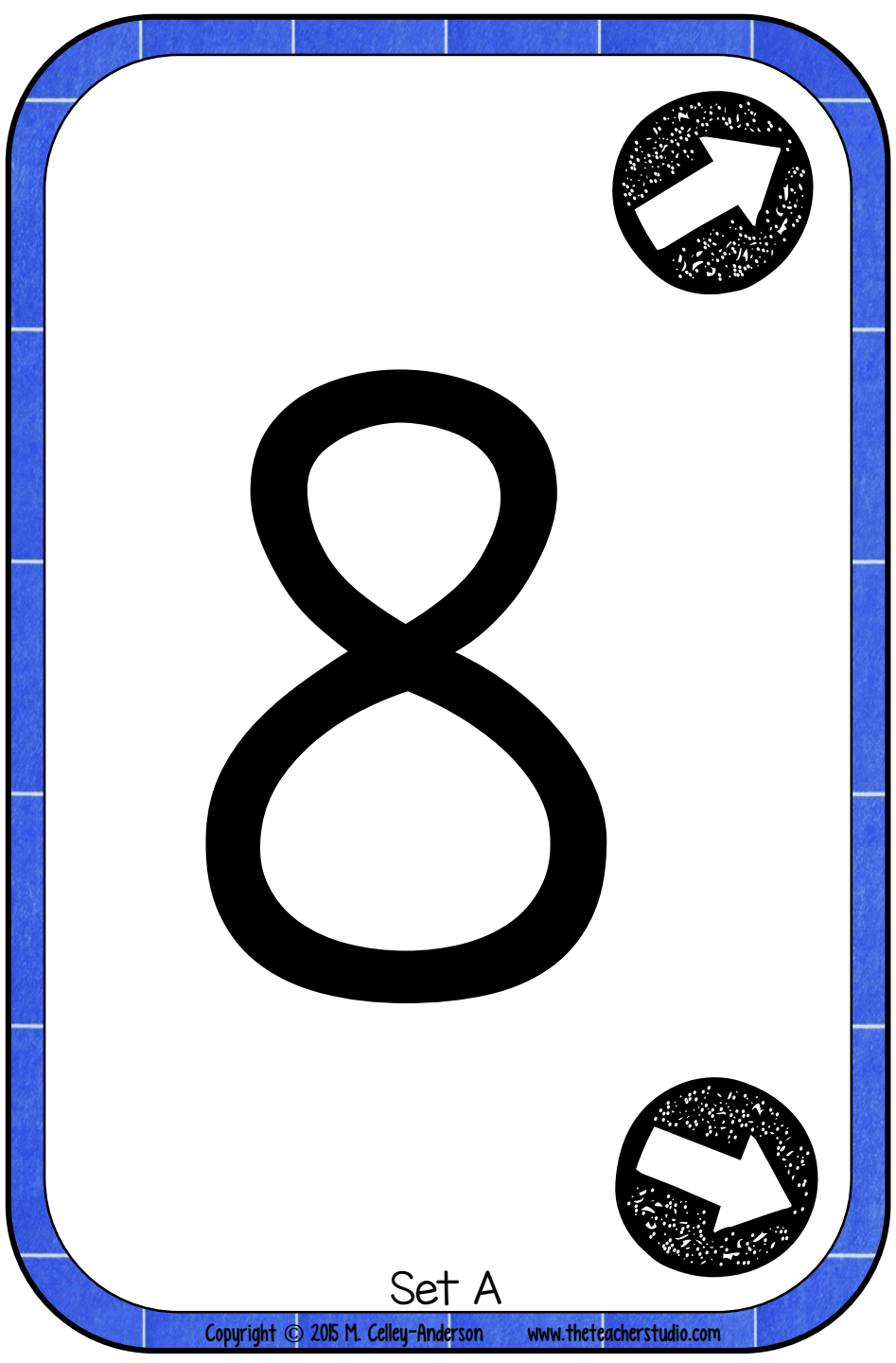


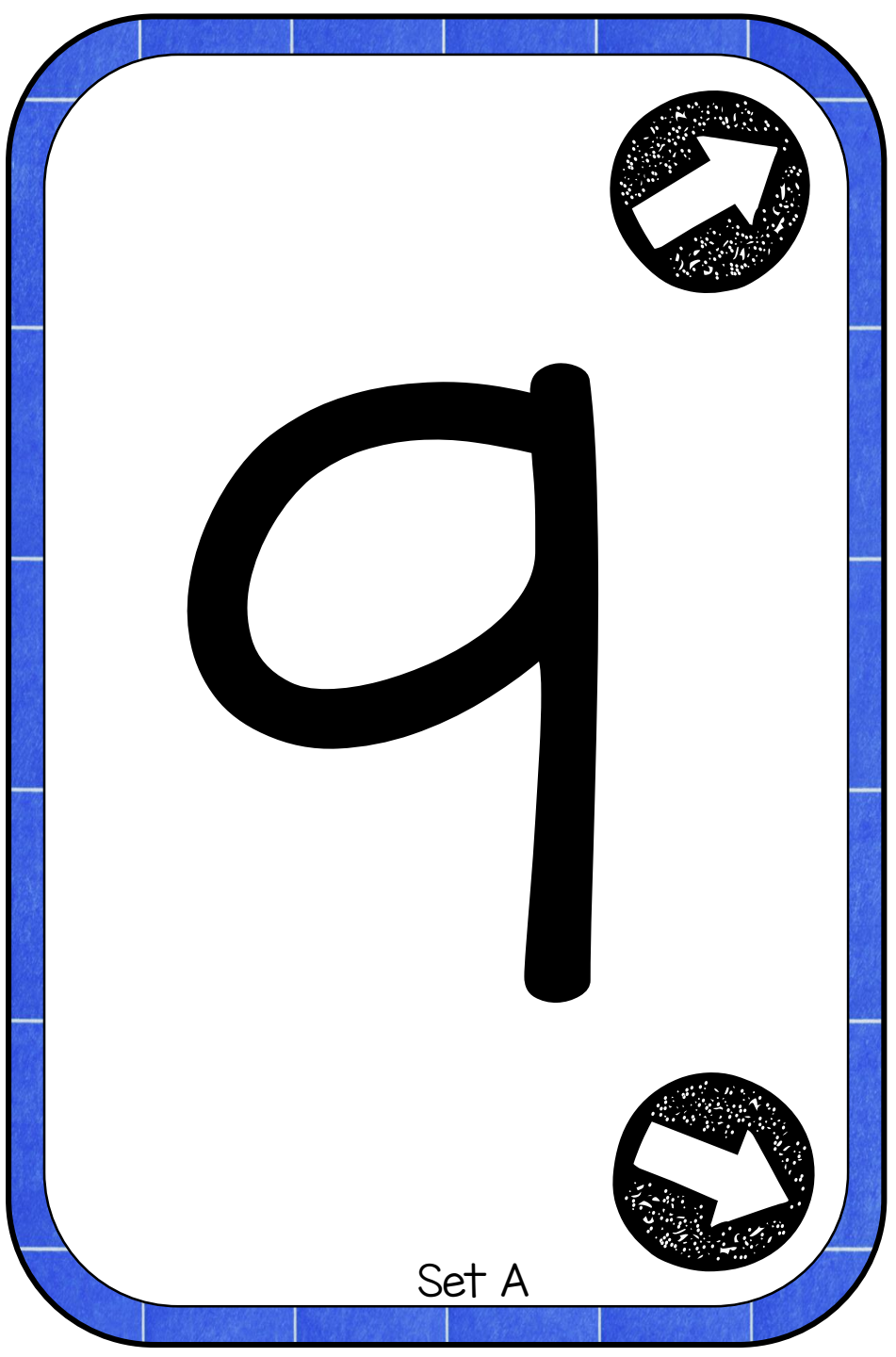


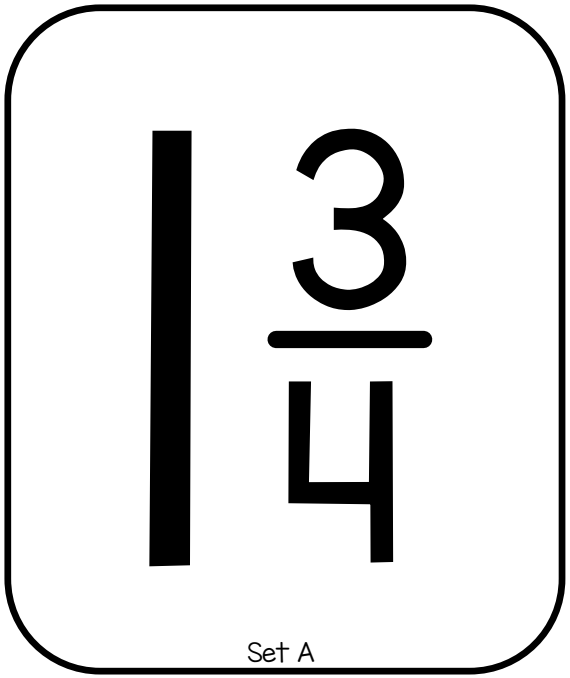


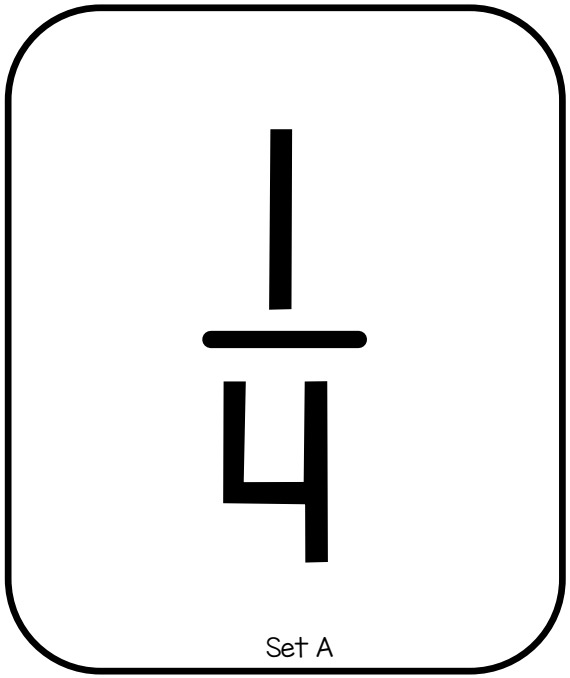


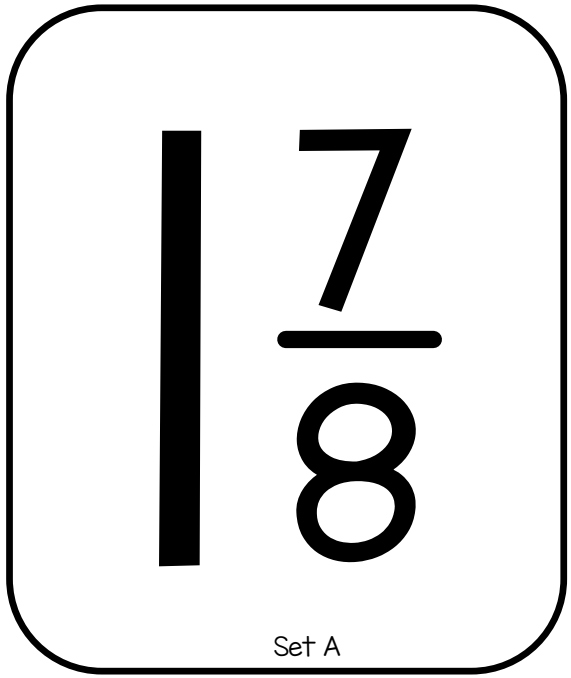


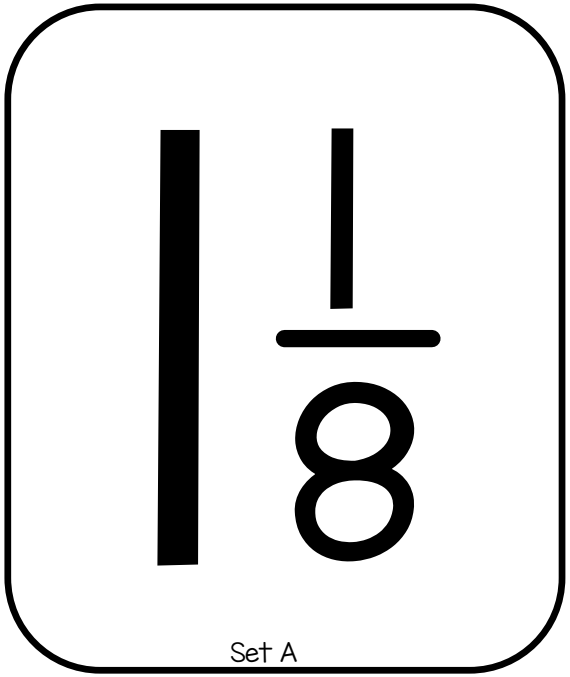


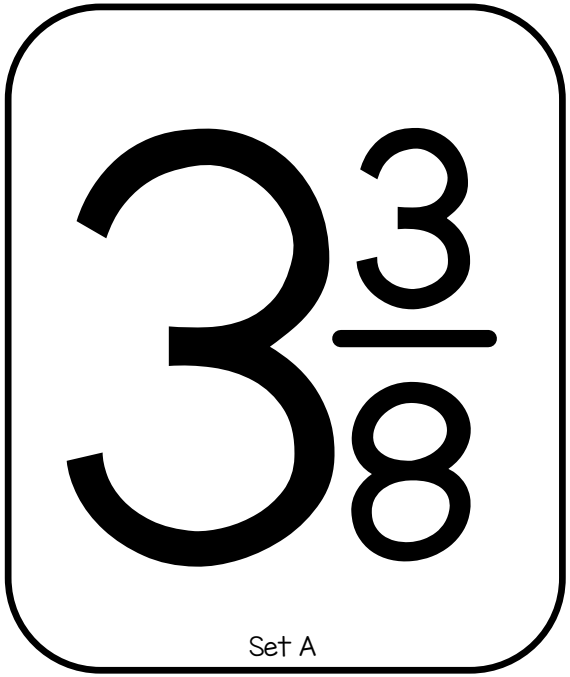


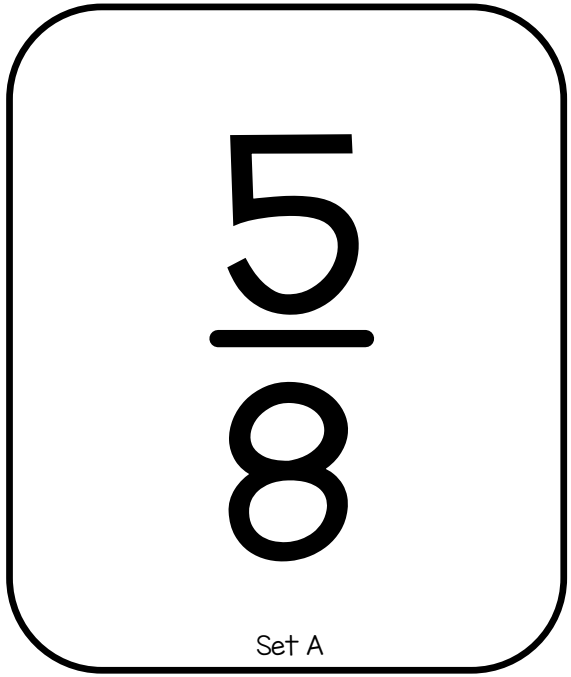


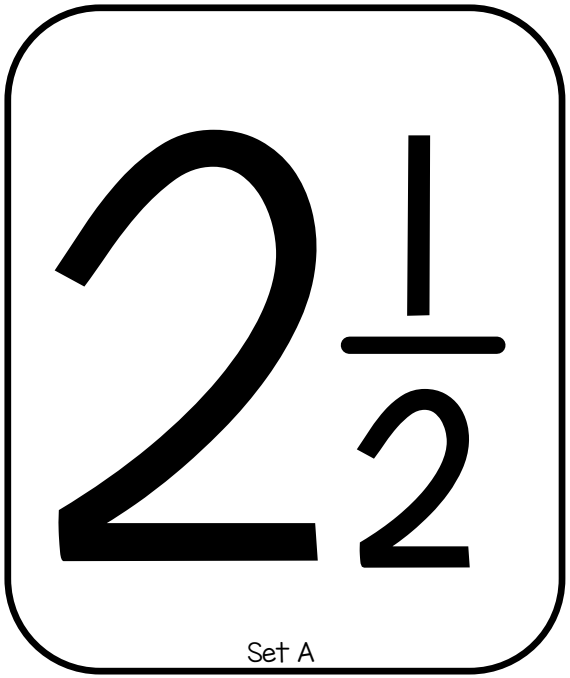


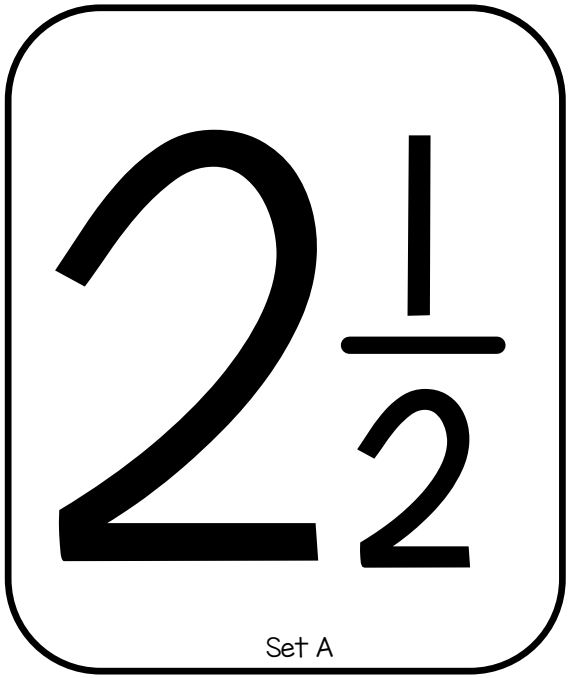


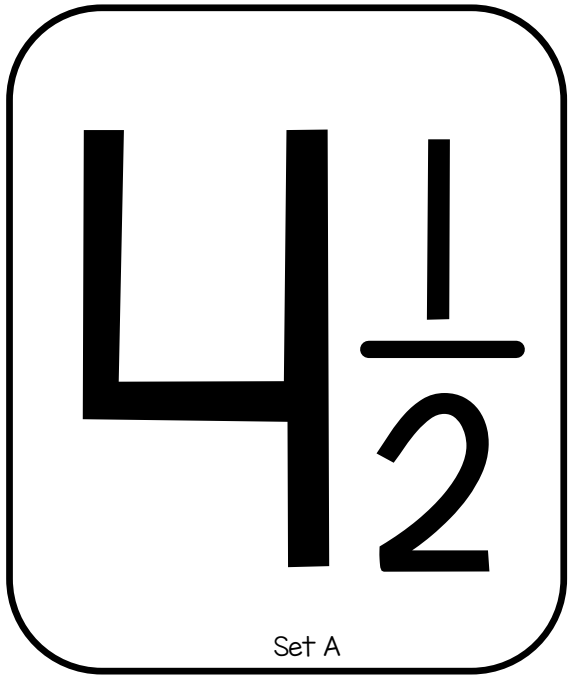


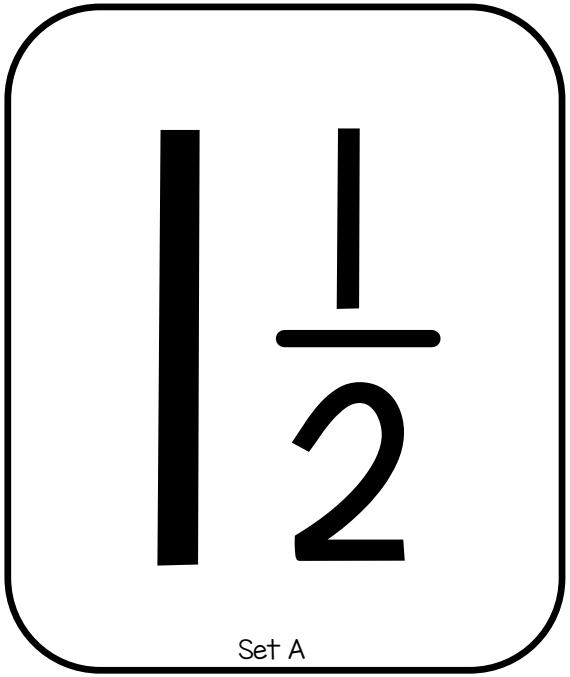


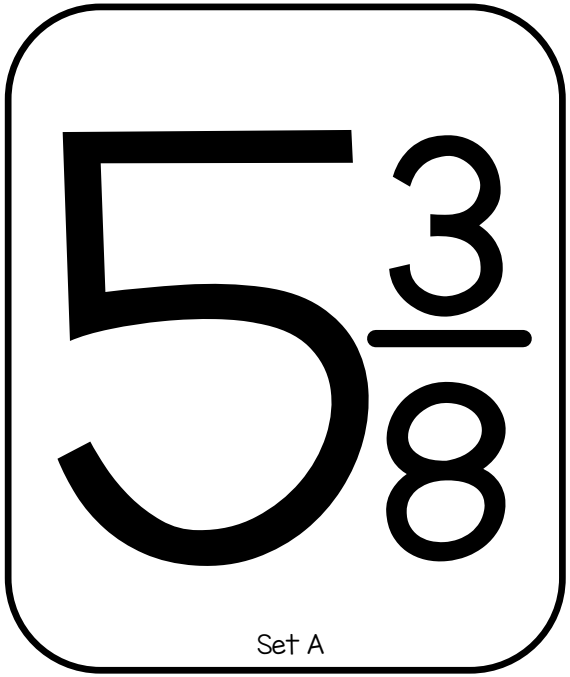


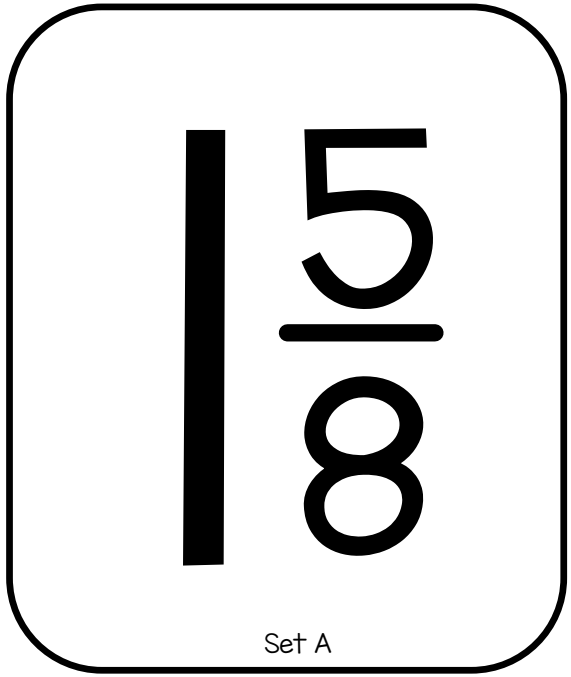












$4\frac{1}{4}$

Set A

$3\frac{3}{4}$

Set A

$6\frac{3}{4}$

Set A

$2\frac{1}{4}$

Set A

Set A Pairs

$1\frac{3}{4} + \frac{1}{4} = 2$

$1\frac{7}{8} + 1\frac{1}{8} = 3$

$\frac{5}{8} + 3\frac{3}{8} = 4$

$2\frac{1}{2} + 2\frac{1}{2} = 5$

$4\frac{1}{2} + 1\frac{1}{2} = 6$

$5\frac{3}{8} + 1\frac{5}{8} = 7$

$4\frac{1}{4} + 3\frac{3}{4} = 8$

$6\frac{3}{4} + 2\frac{1}{4} = 9$

$\frac{1}{4}$

Set B

$\frac{2}{4}$

Set B

$4\frac{3}{4}$

Set B

$2\frac{1}{2}$

Set B

$\frac{2}{8}$

Set B

$\frac{3}{8}$

Set B

$\frac{4}{8}$

Set B

$\frac{5}{8}$

Set B

$\frac{6}{8}$

Set B

$1\frac{6}{8}$

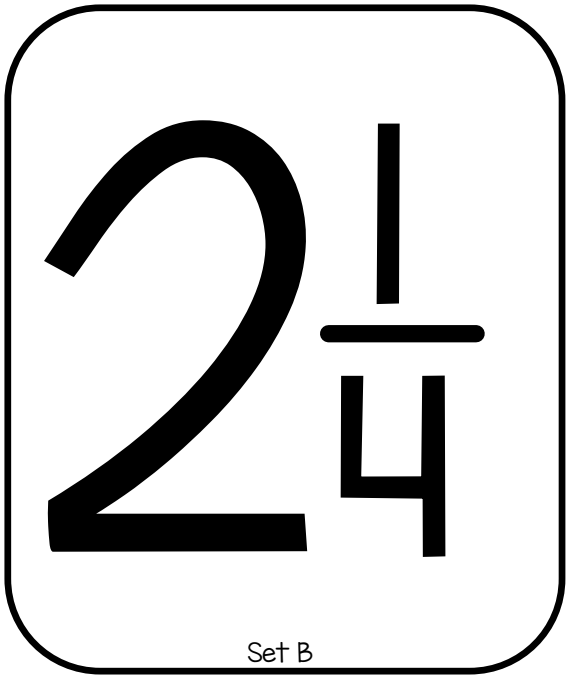
Set B

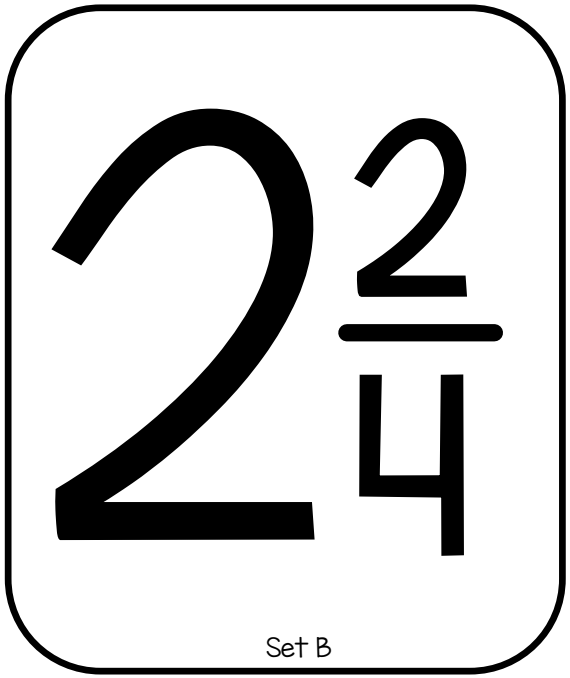
$1\frac{1}{2}$

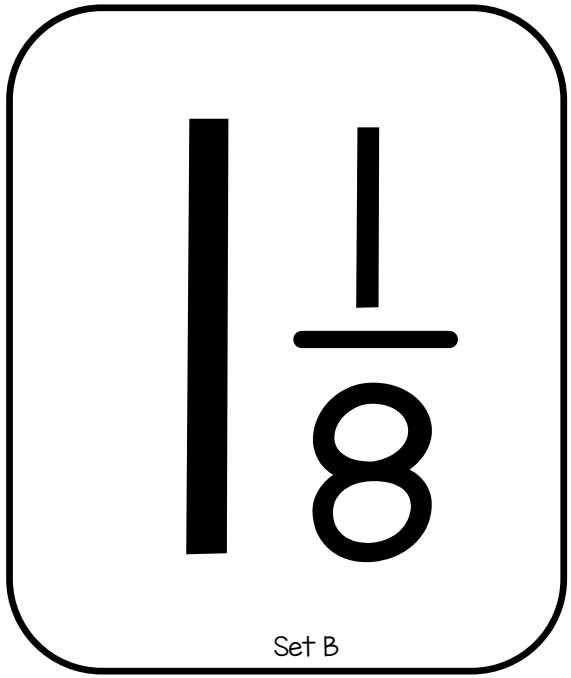
Set B

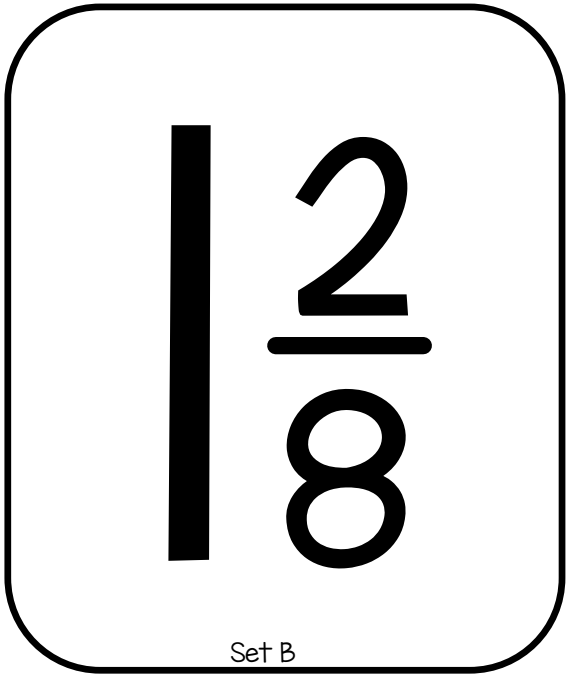
$1\frac{1}{4}$

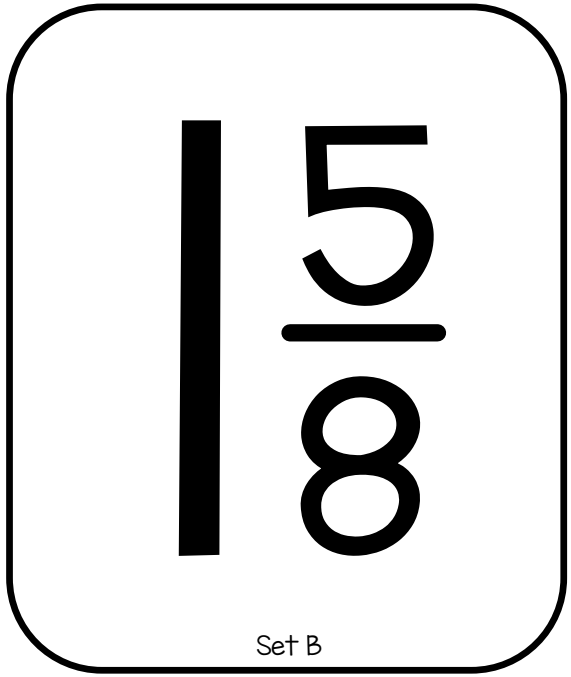
Set B

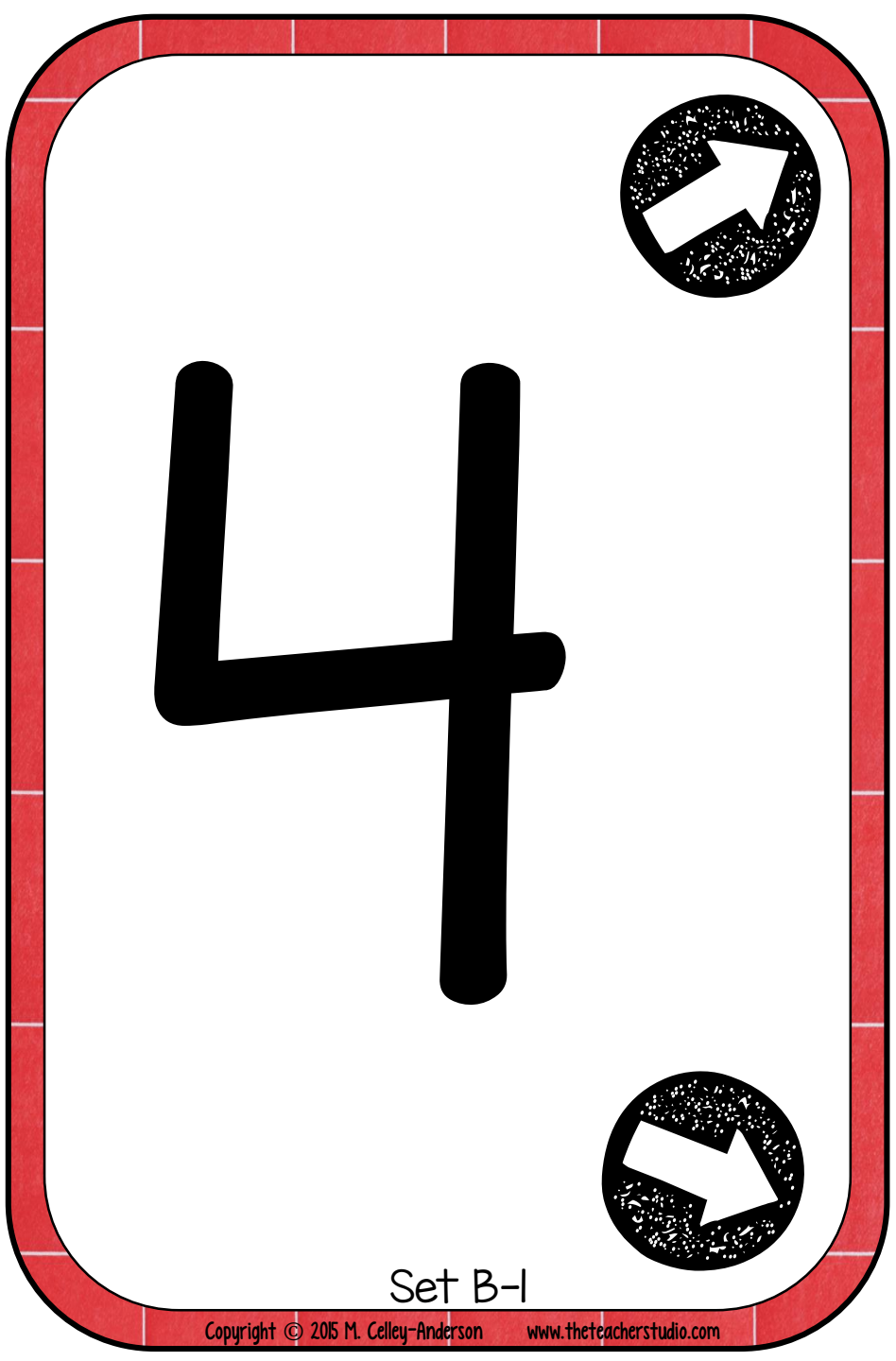


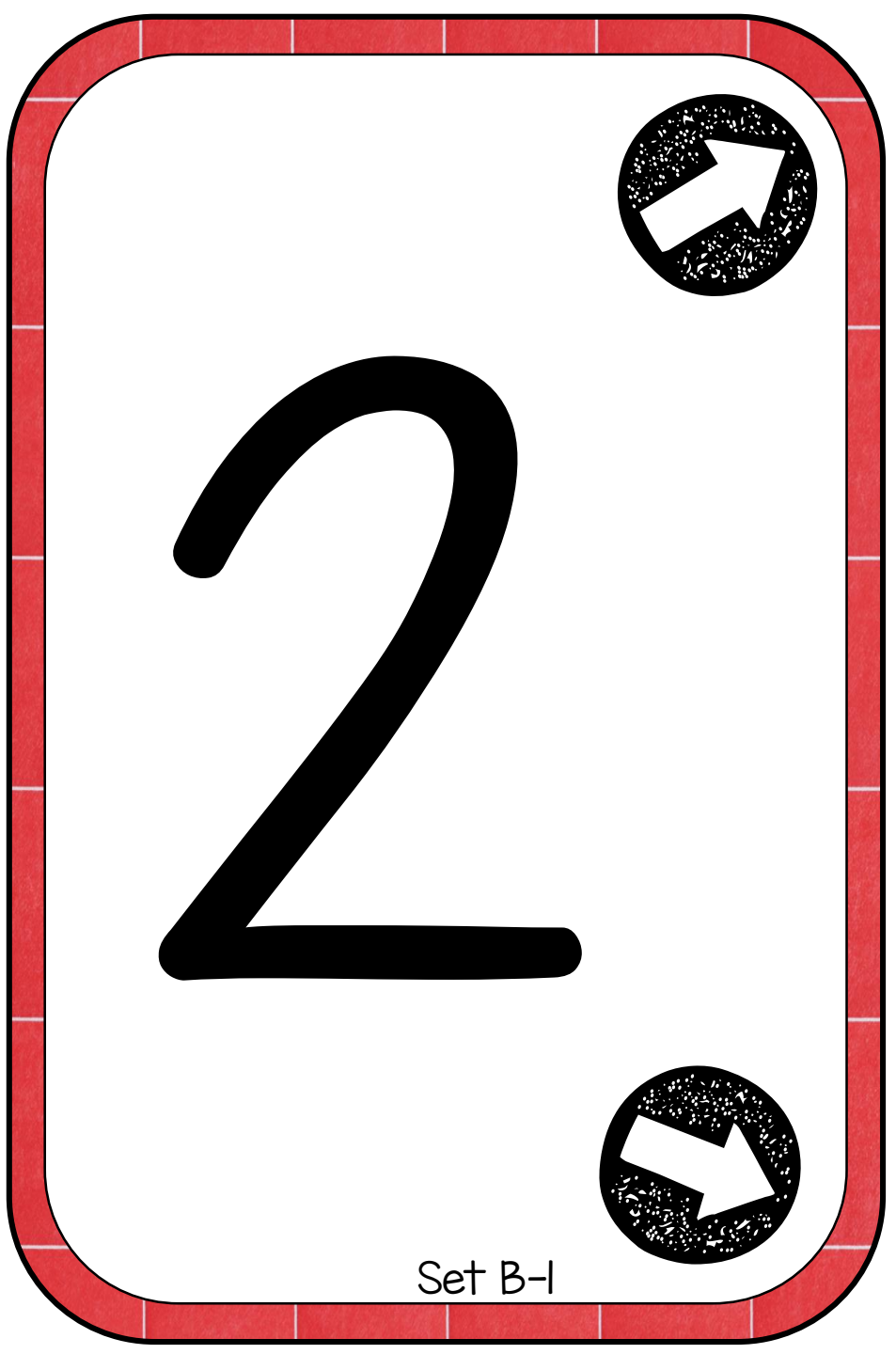










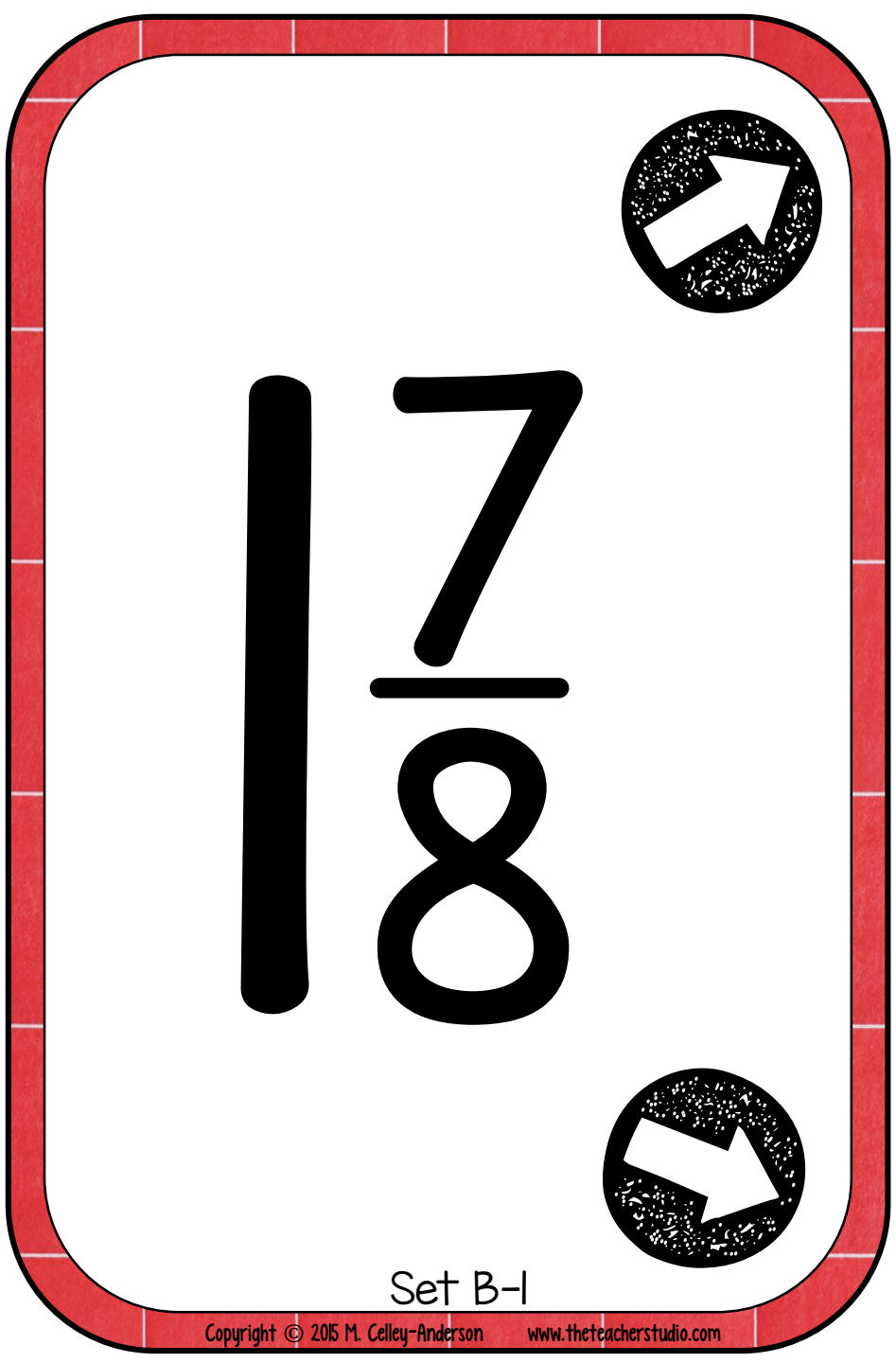


1

Set B-1

5

Set B-1



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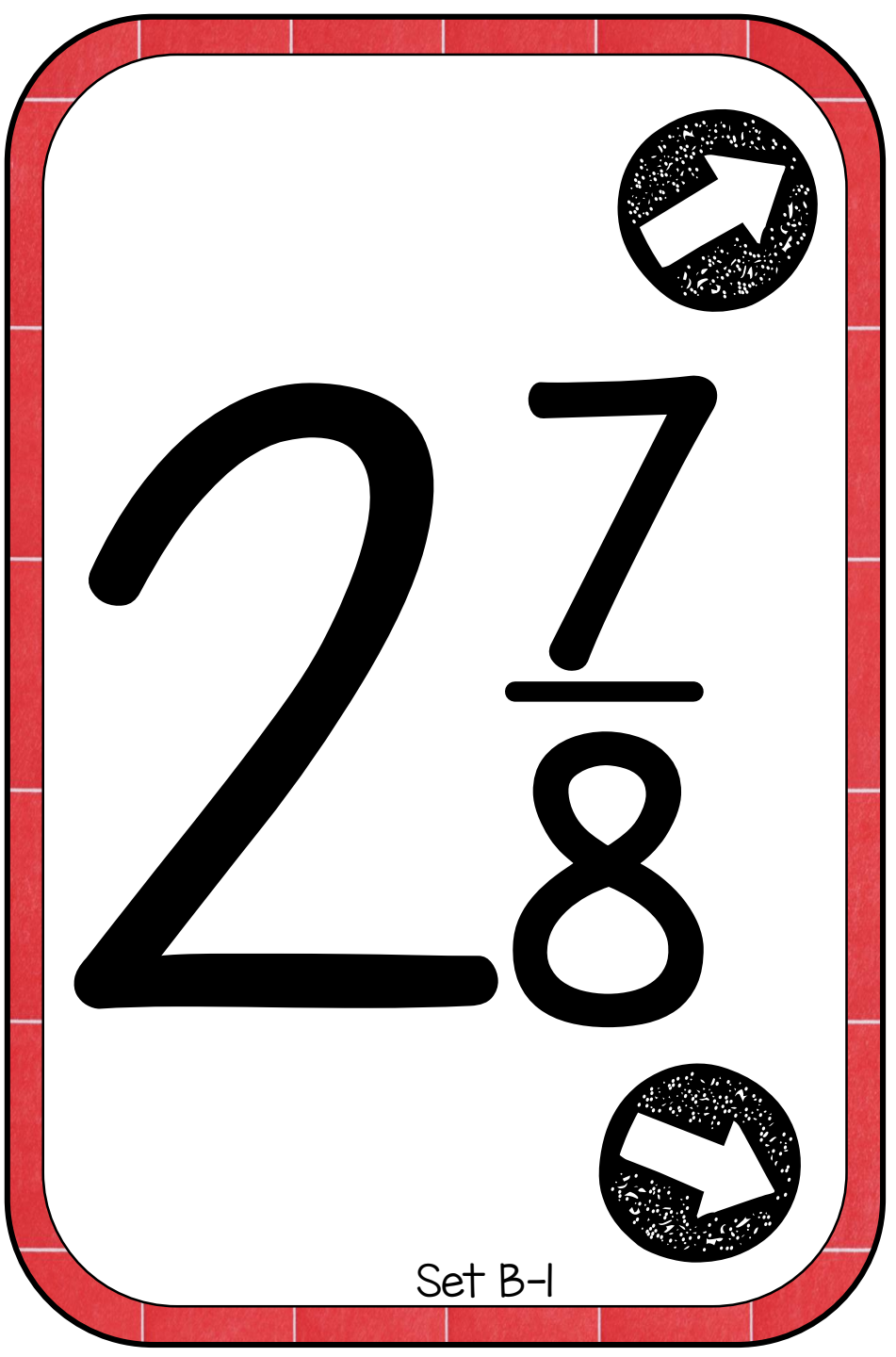

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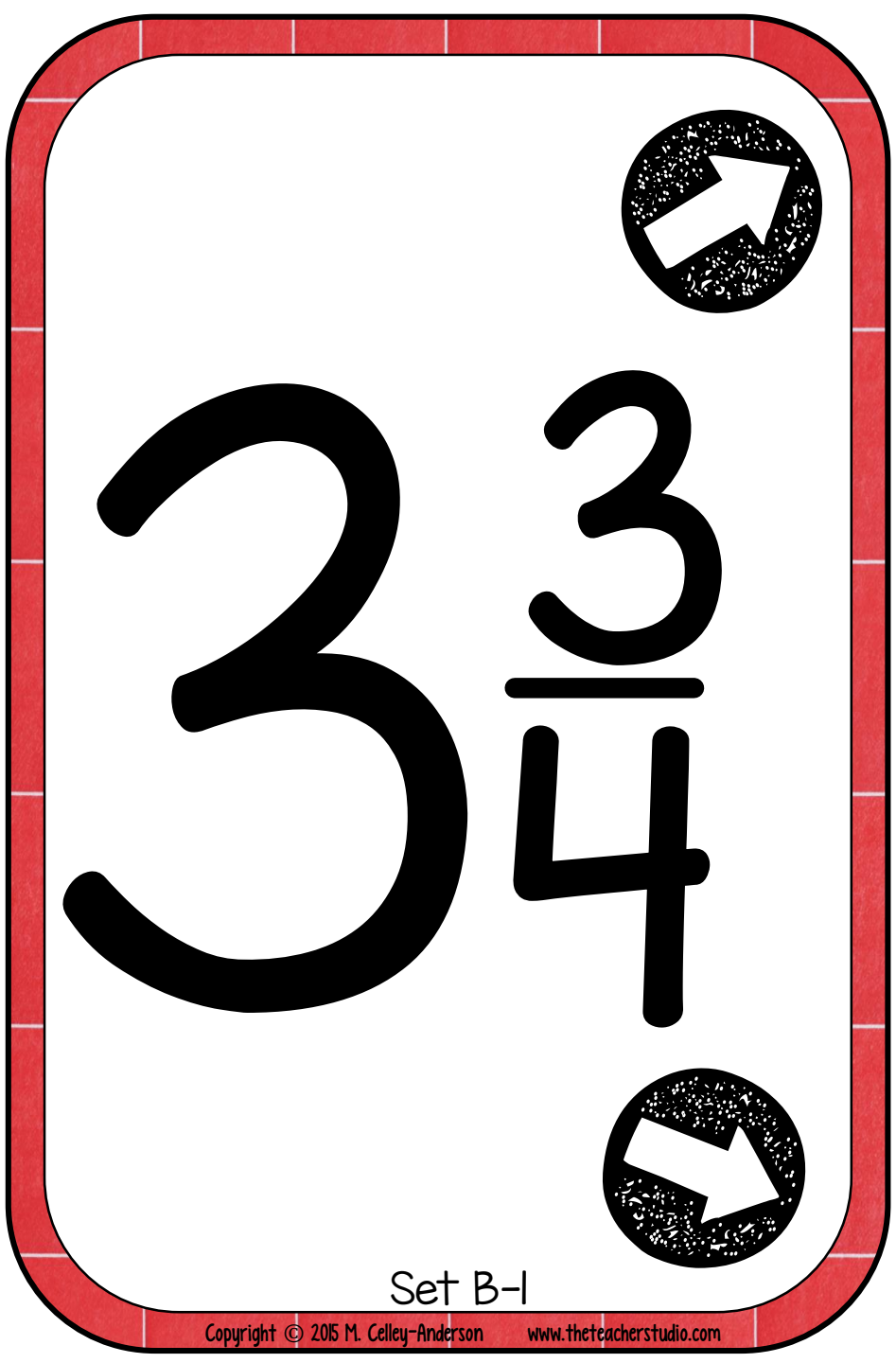
$3\frac{3}{4}$
Set B-1
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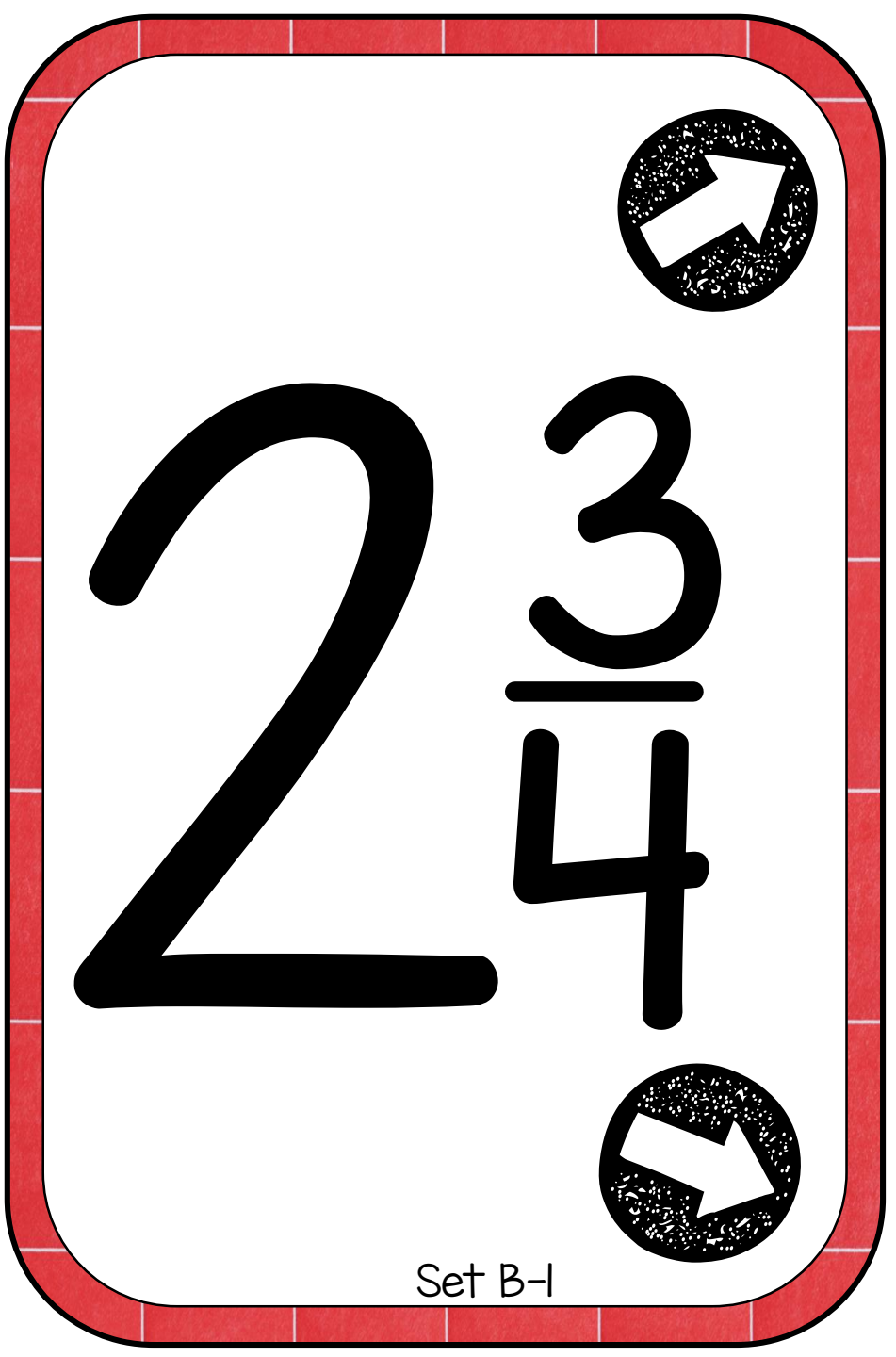
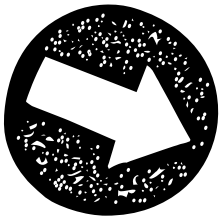

$2\frac{3}{4}$
Set B-1

3



Set B-1

Set B-1

Possible Pairs

$2\frac{1}{2} + 1\frac{1}{2} = 4$

$1\frac{2}{8} + \frac{6}{8} = 2$

$\frac{5}{8} + \frac{3}{8} = 1$

$4\frac{3}{4} + \frac{1}{4} = 5$

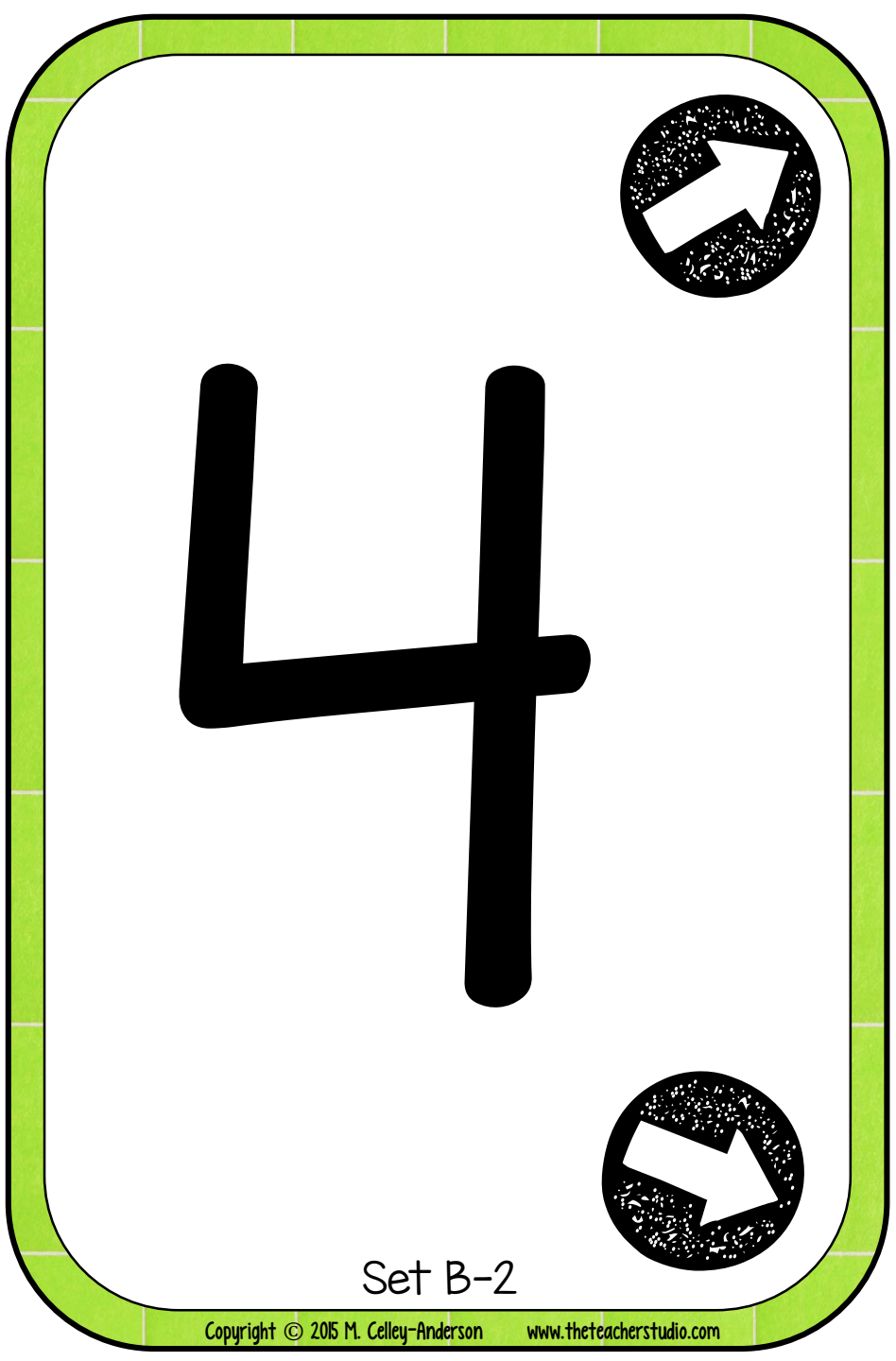
$1\frac{5}{8} + \frac{2}{8} = 1\frac{7}{8}$

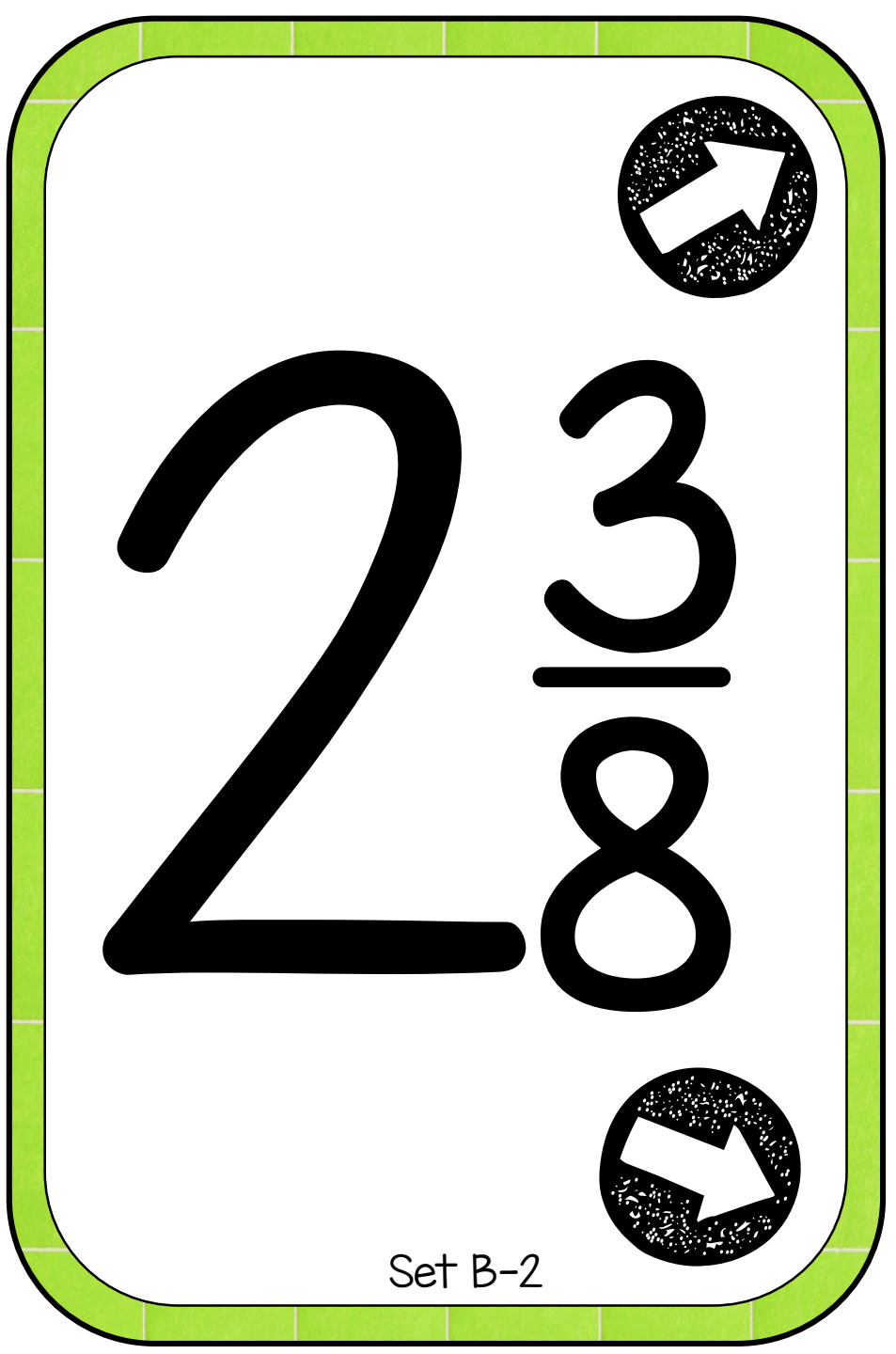
$1\frac{1}{8} + 1\frac{6}{8} = 2\frac{7}{8}$

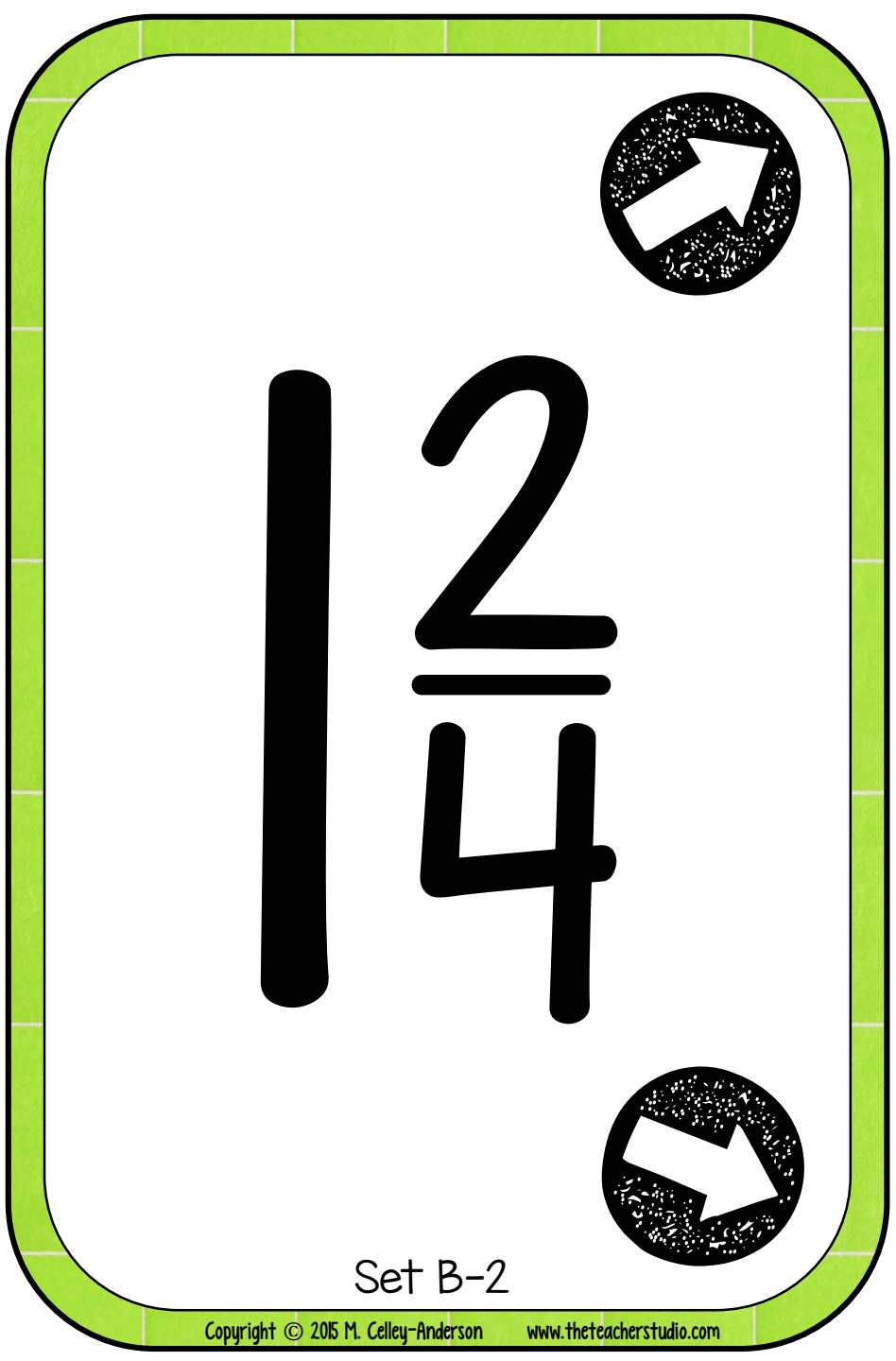
$2\frac{2}{4} + 1\frac{1}{4} = 3\frac{3}{4}$

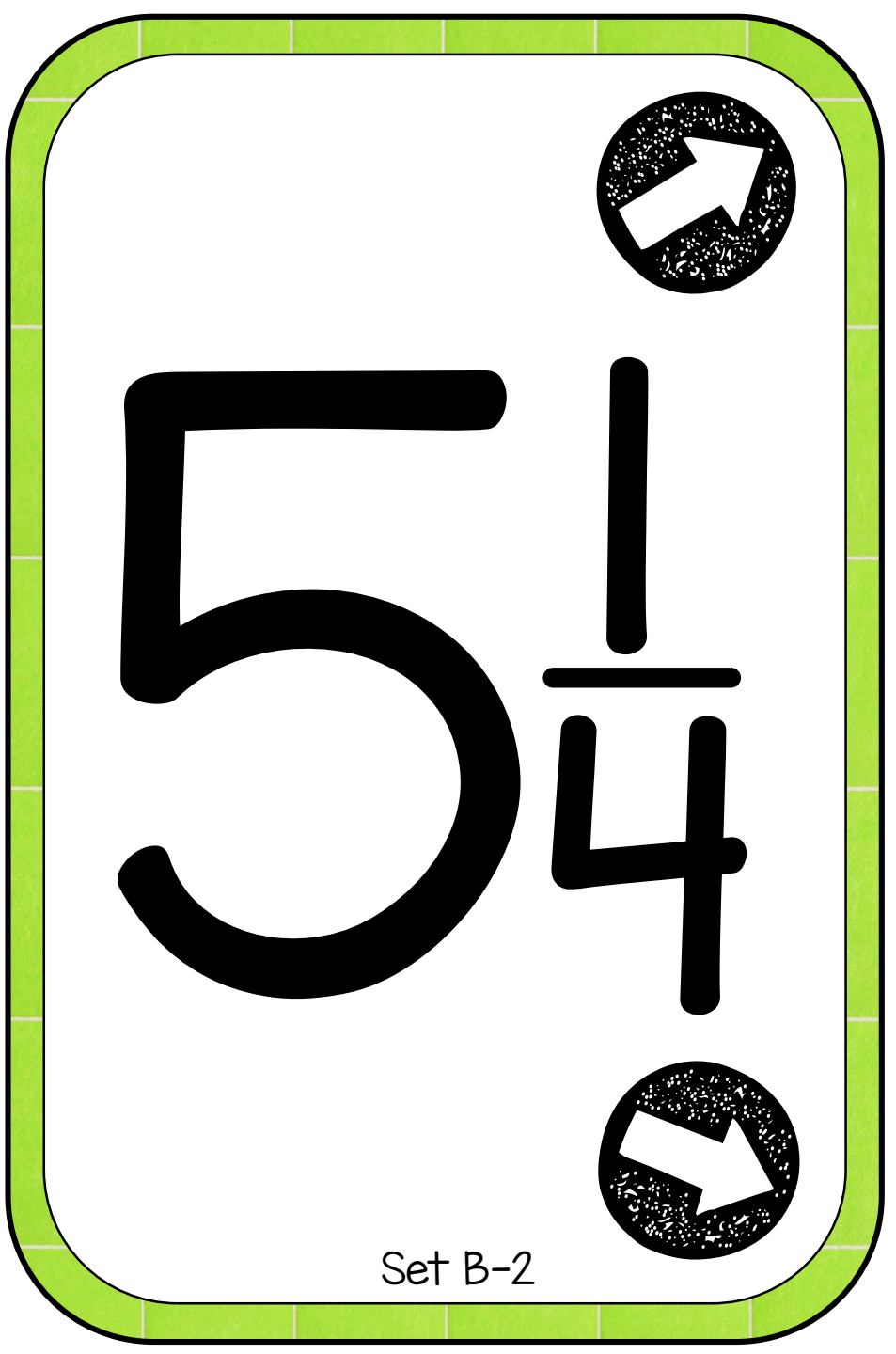
$\frac{2}{4} + 2\frac{1}{4} = 2\frac{3}{4}$

$2\frac{4}{8} + \frac{4}{8} = 3$







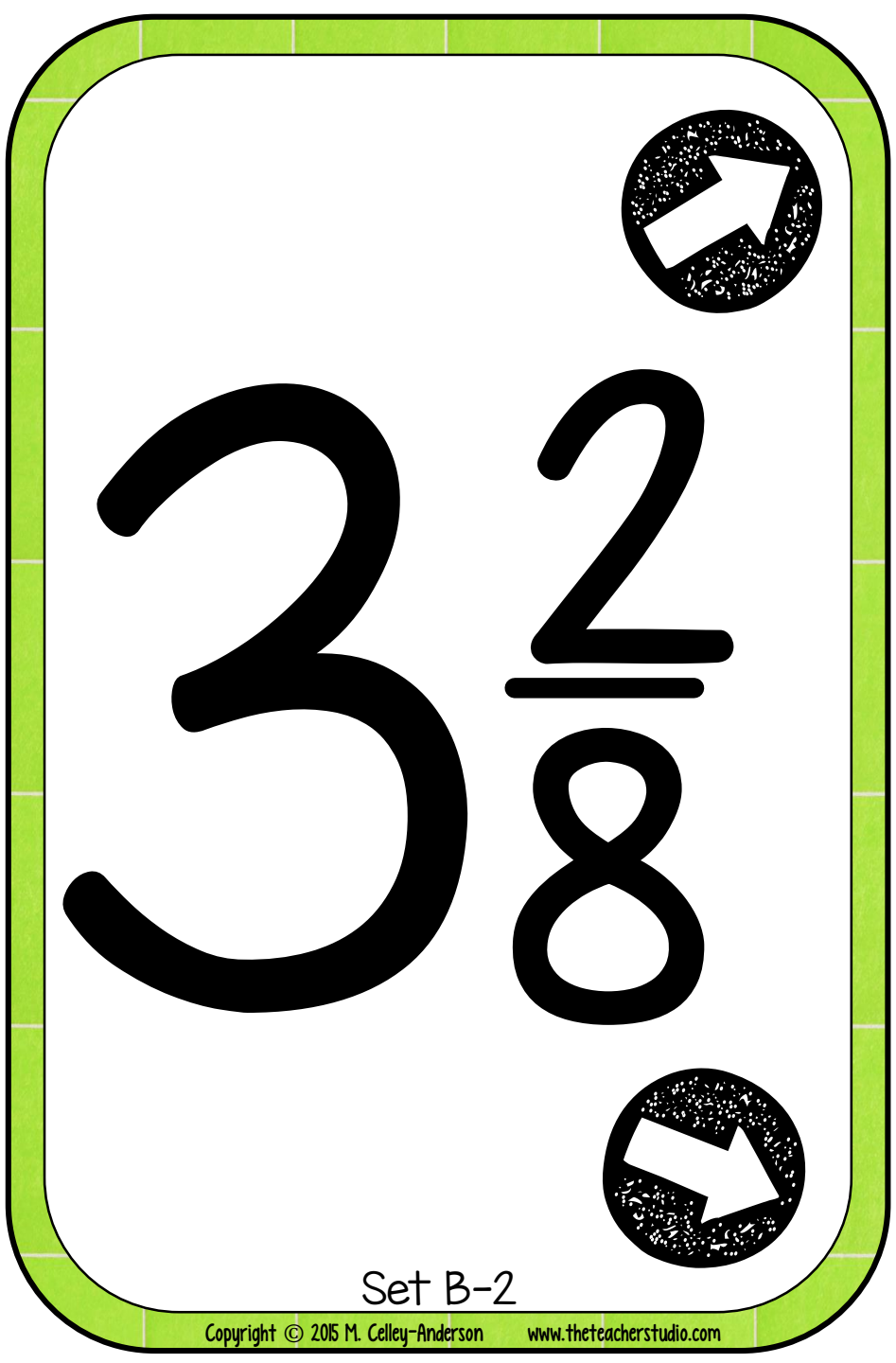


$\frac{9}{8}$

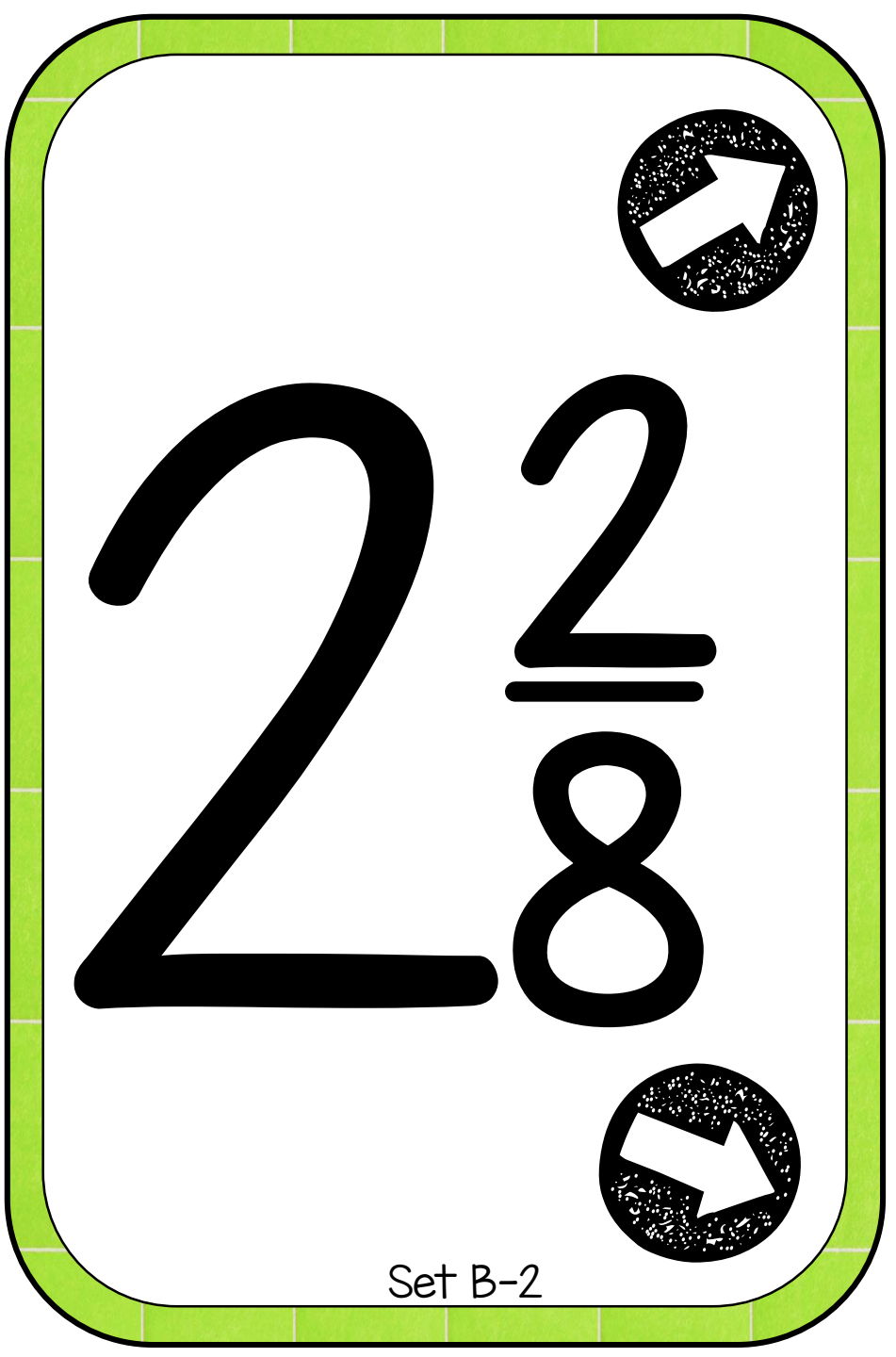
Set B-2

$2\frac{1}{8}$

Set B-2



Set B-2



Set B-2

$4\frac{3}{4}$

Set B-2

Set B-2

Possible Pairs

$2\frac{1}{2} + 1\frac{1}{2} = 4$

$1\frac{2}{8} + 1\frac{1}{8} = 2\frac{3}{8}$

$\frac{4}{8} + \frac{2}{8} = \frac{6}{8}$

$4\frac{3}{4} + \frac{2}{4} = 5\frac{1}{4}$

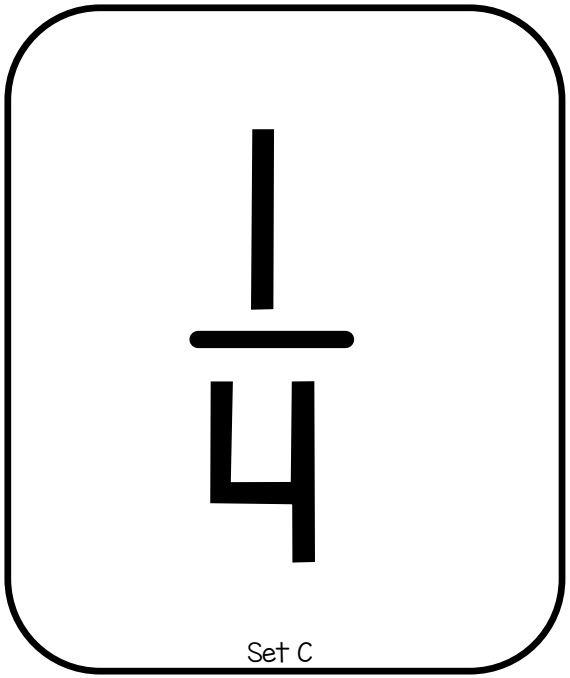
$1\frac{5}{8} + \frac{5}{8} = 2\frac{2}{8}$

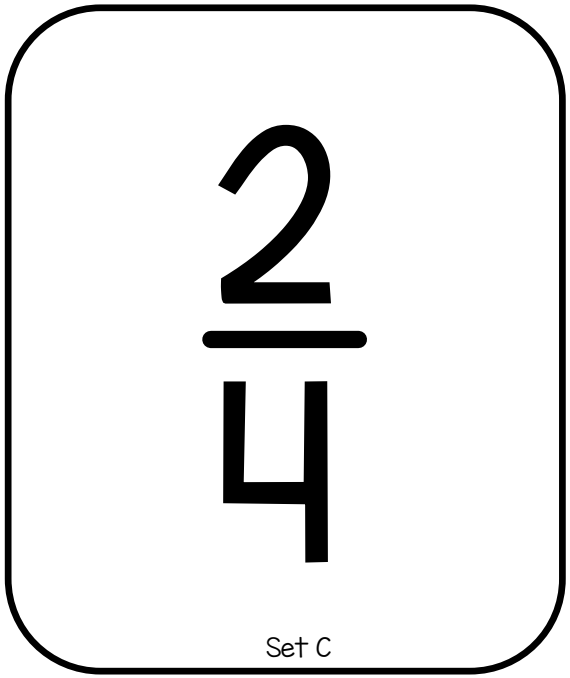
$2\frac{4}{8} + \frac{6}{8} = 3\frac{2}{8}$

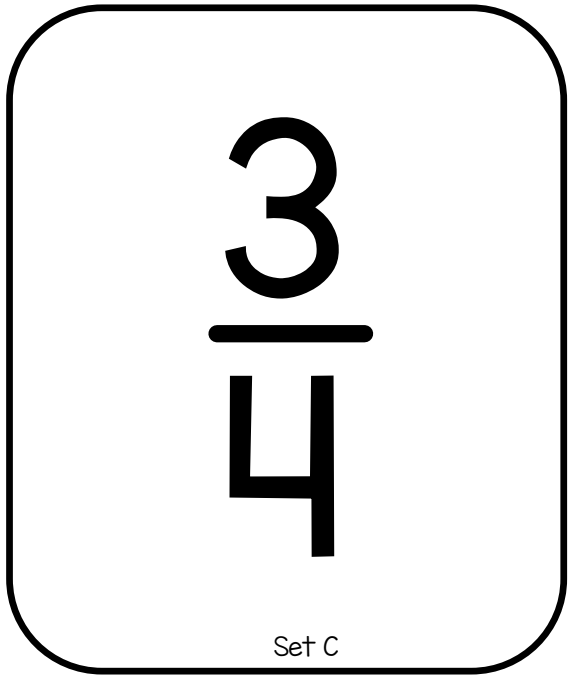
$1\frac{1}{4} + \frac{1}{4} = 1\frac{2}{4}$

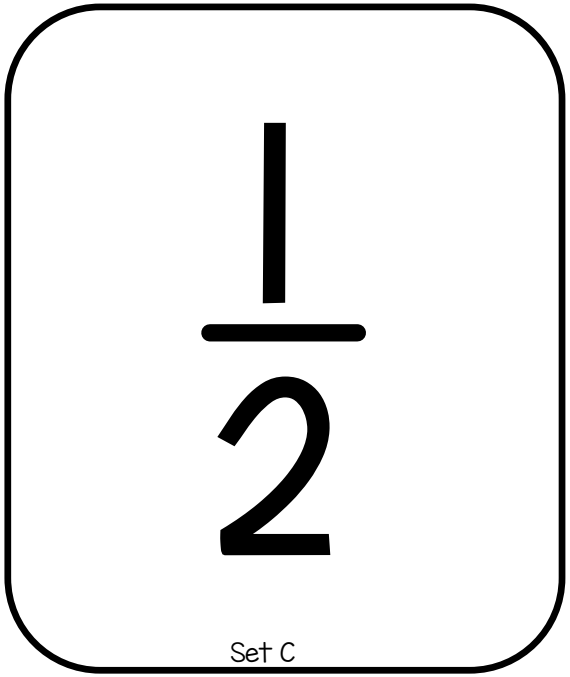
$\frac{3}{8} + 1\frac{6}{8} = 2\frac{1}{8}$

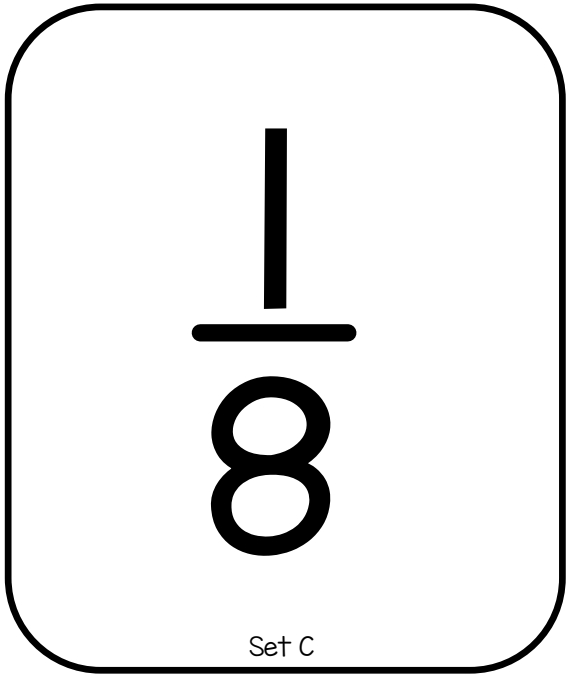
$2\frac{1}{4} + 2\frac{2}{4} = 4\frac{3}{4}$

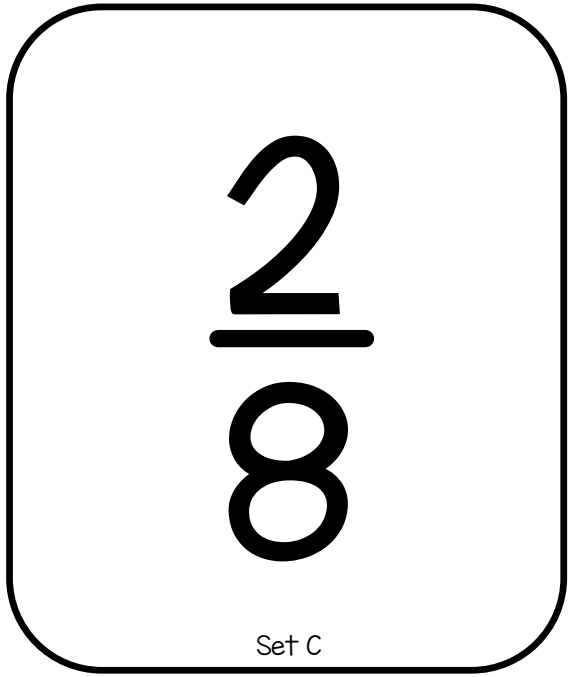












$\frac{3}{8}$

Set C

$\frac{4}{8}$

Set C

$\frac{5}{8}$

Set C

$\frac{6}{8}$

Set C

$\frac{7}{8}$

Set C

$\frac{1}{3}$

Set C

$\frac{2}{3}$

Set C

$\frac{1}{6}$

Set C

$\frac{2}{6}$

Set C

$\frac{3}{6}$

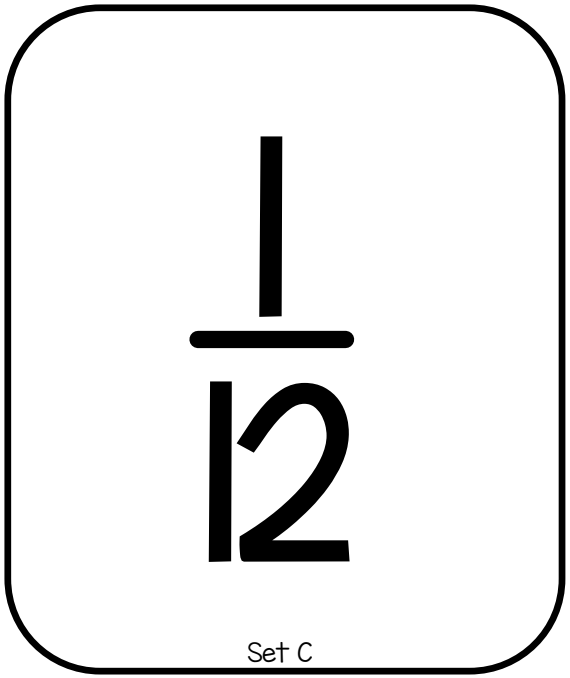
Set C

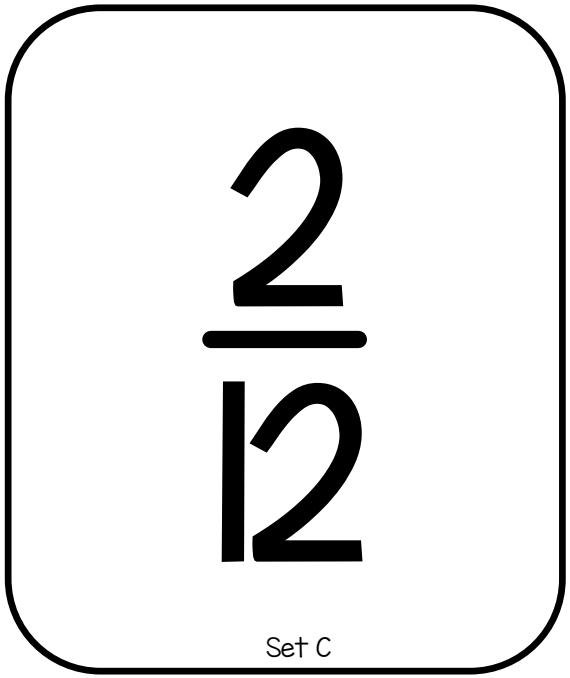
$\frac{4}{6}$

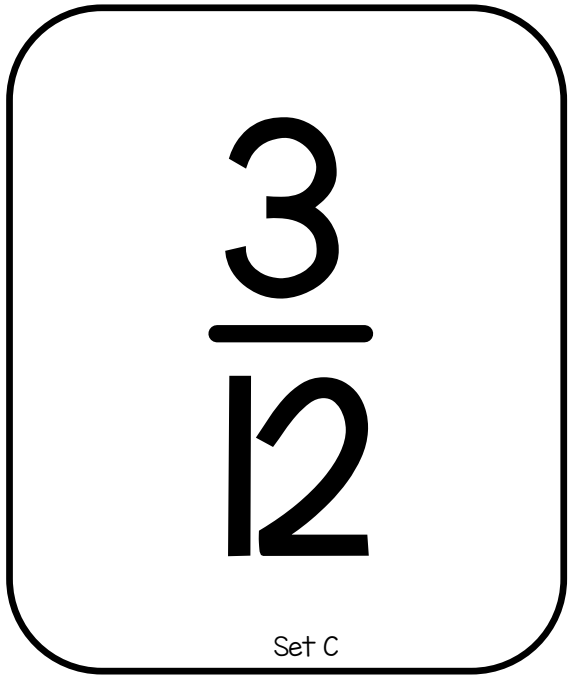
Set C

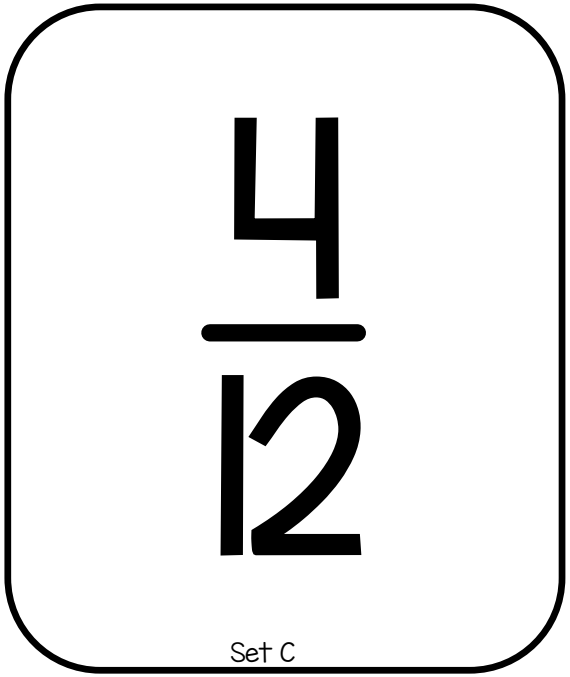
$\frac{5}{6}$

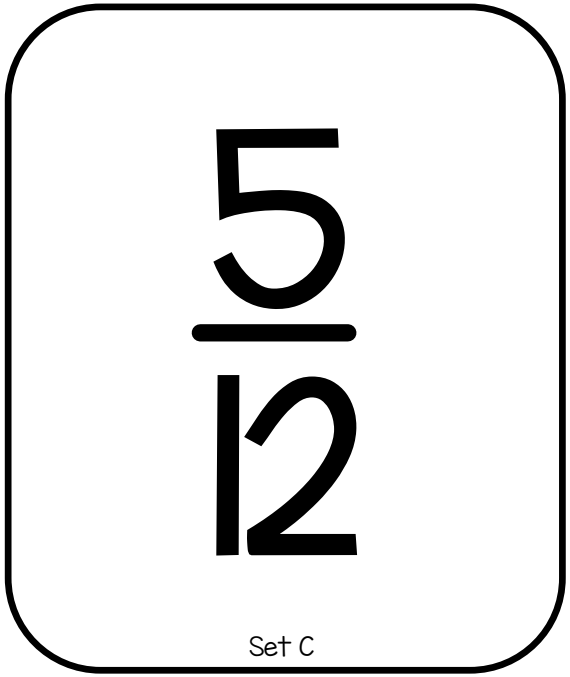
Set C

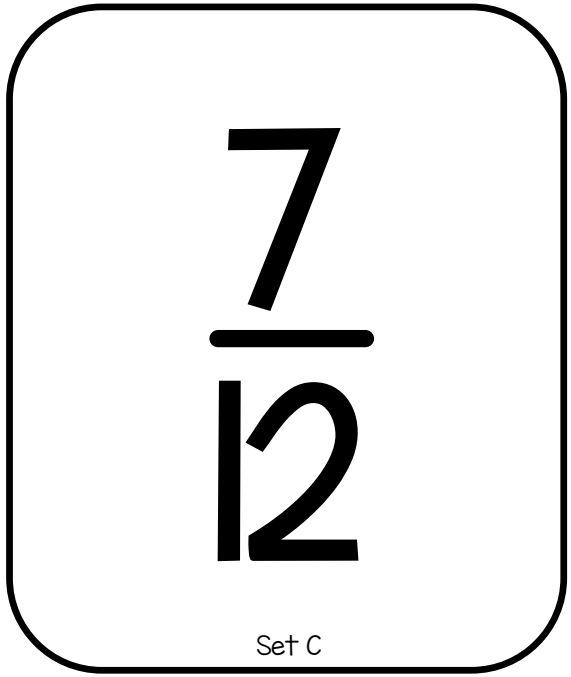


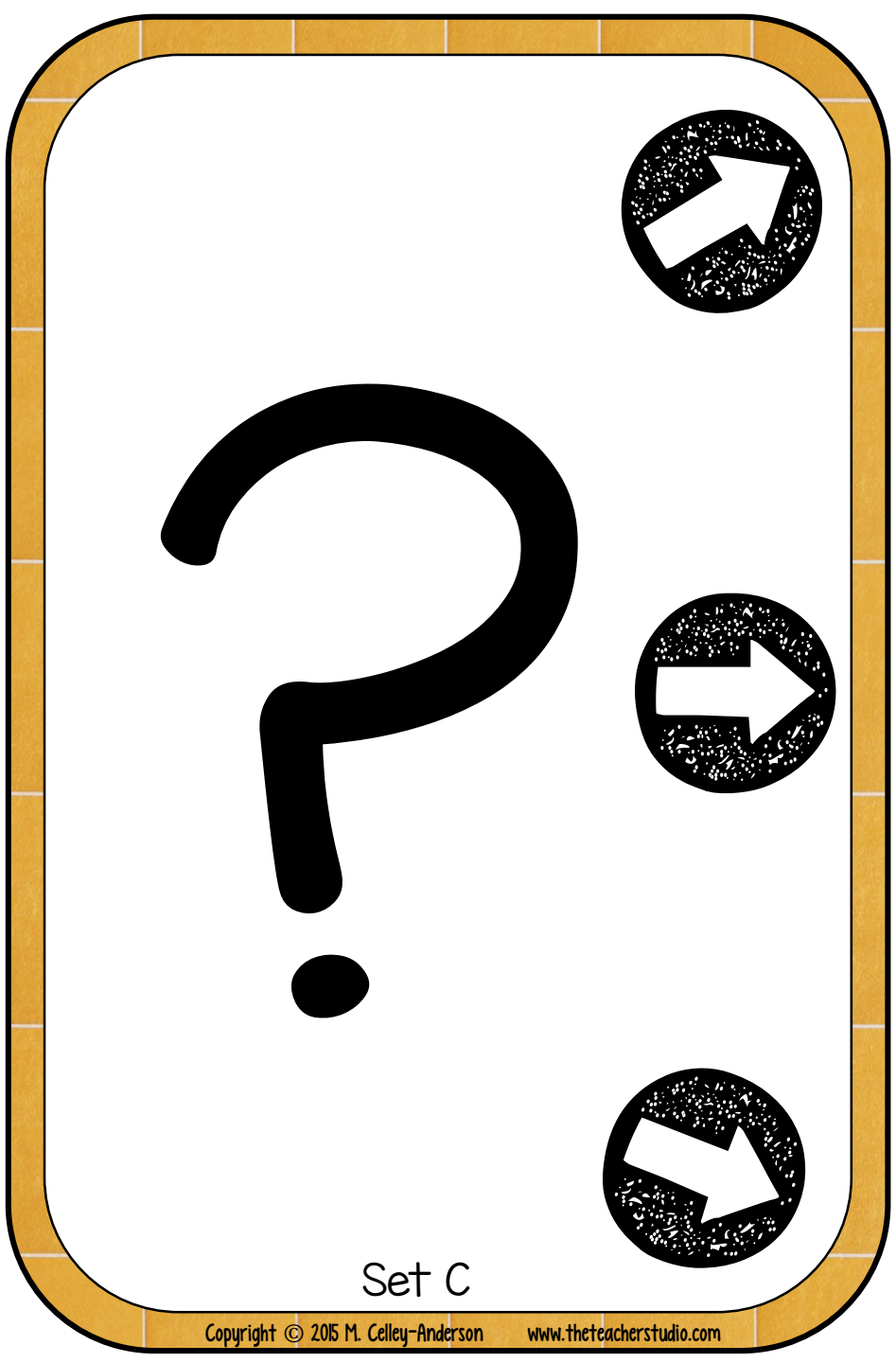


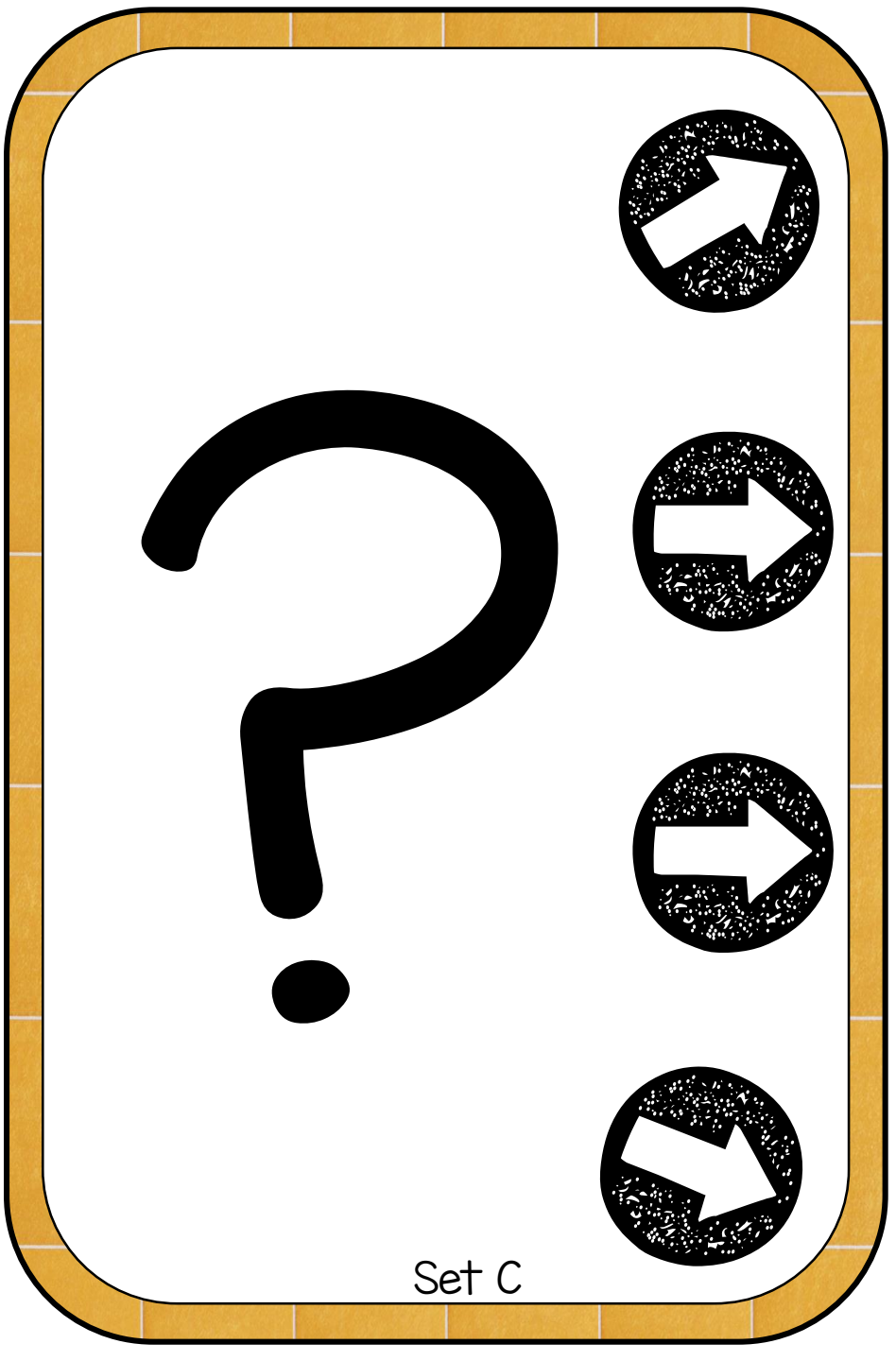








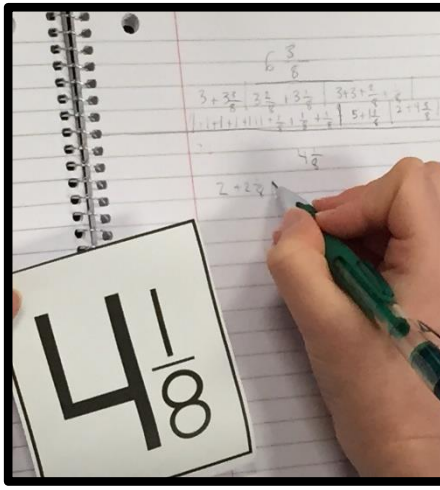


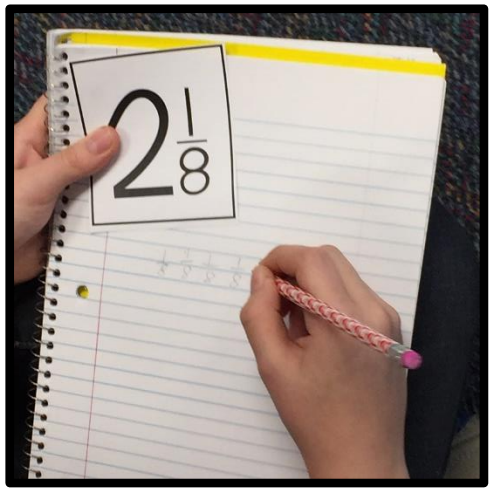


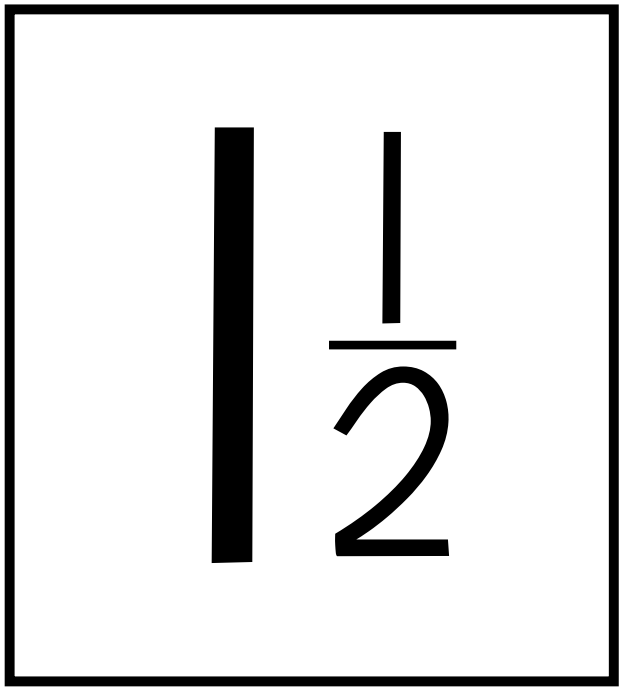
MIXED NUMBER CARDS

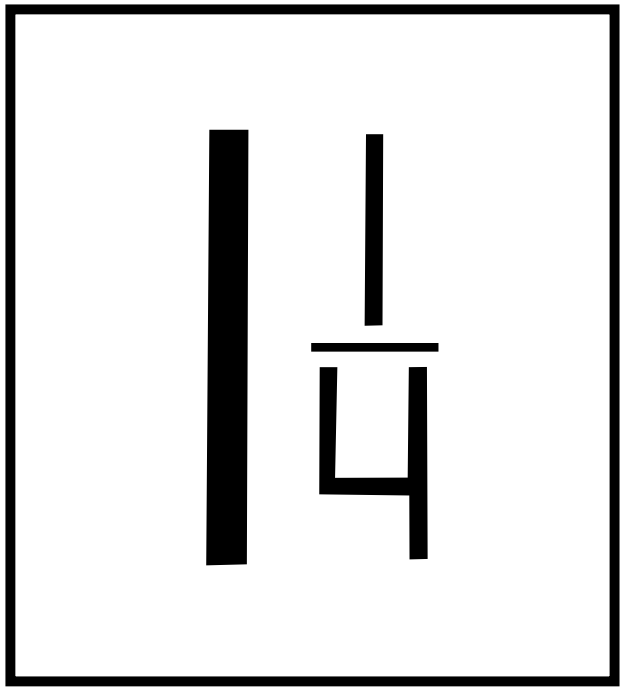
The following pages are mixed number cards that can be used in a number of ways throughout your fraction unit. See the next page for some ideas!

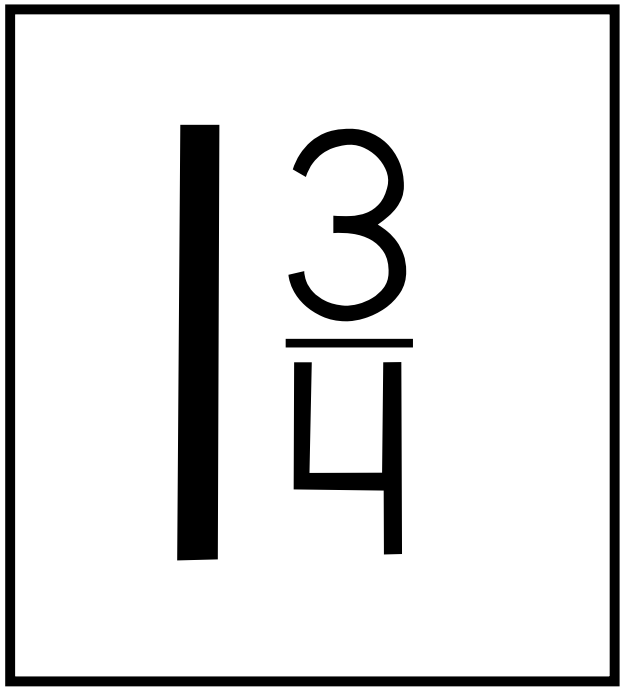
- ✓ Pass out the cards one per student. Have students arrange themselves in smallest to largest order!
- ✓ Have students pair up and add their two cards together. They may need to change denominators.
- ✓ Have students pair up and subtract their two cards.
- ✓ Have the cards at a station. Ask students to find as many pairs of cards that are close to 5 as possible (or 4 or 6, etc)
- ✓ Have students glue a card into their math journal and show different ways to "decompose" it.
- ✓ Have students try "doubling" their card.
- ✓ GET CREATIVE!

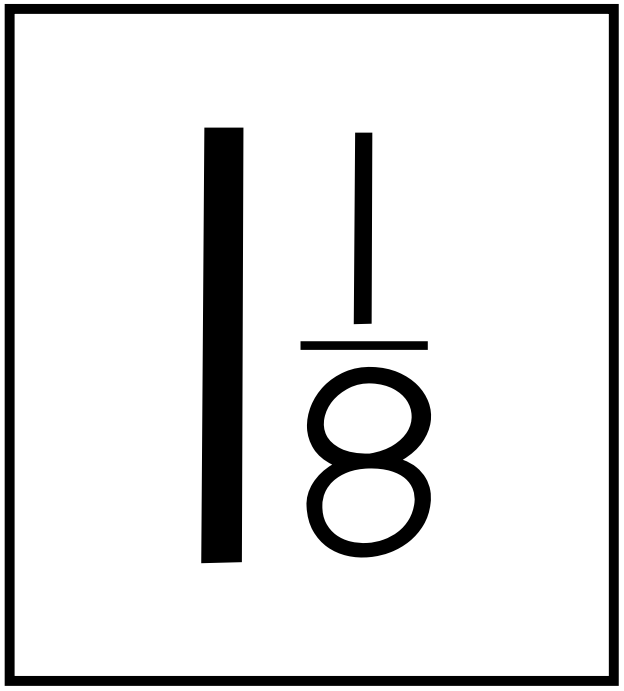


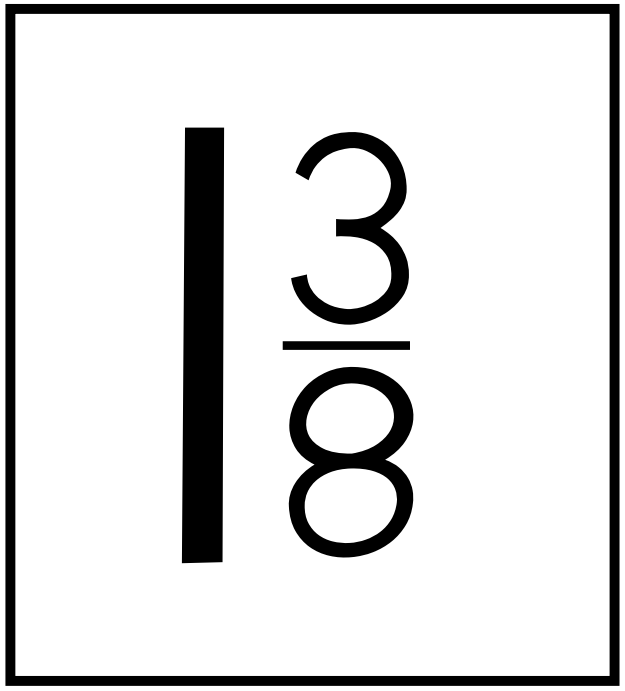


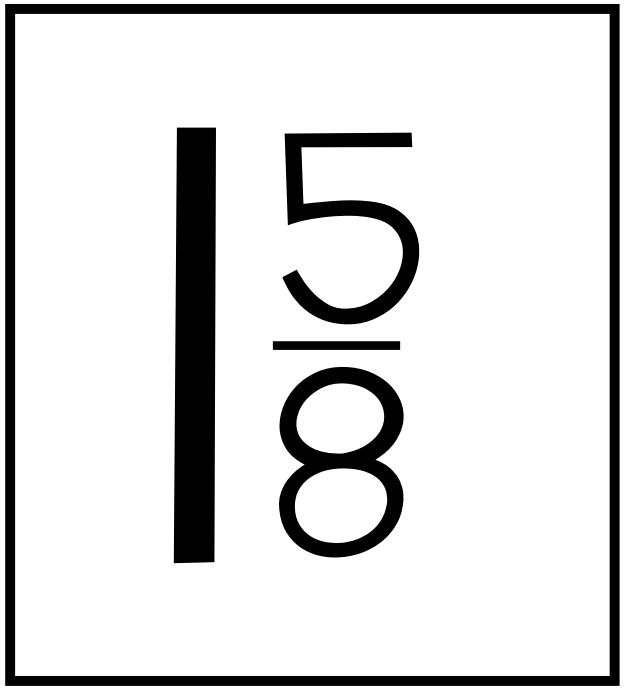


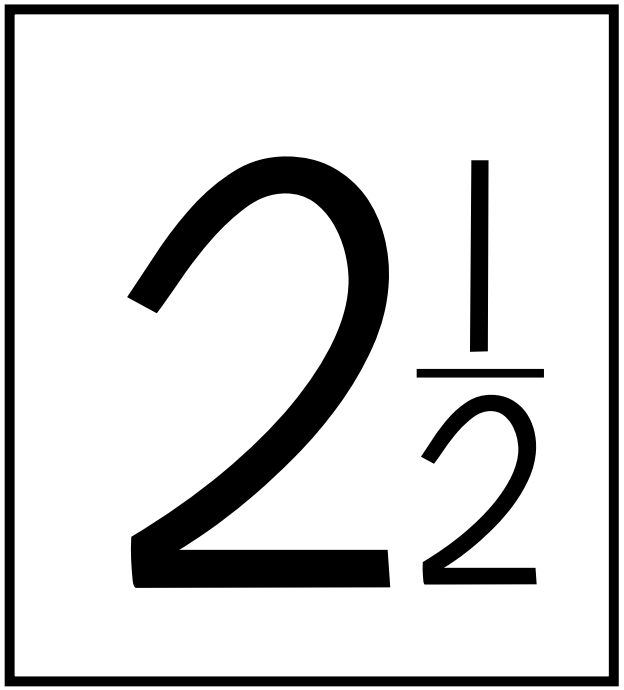


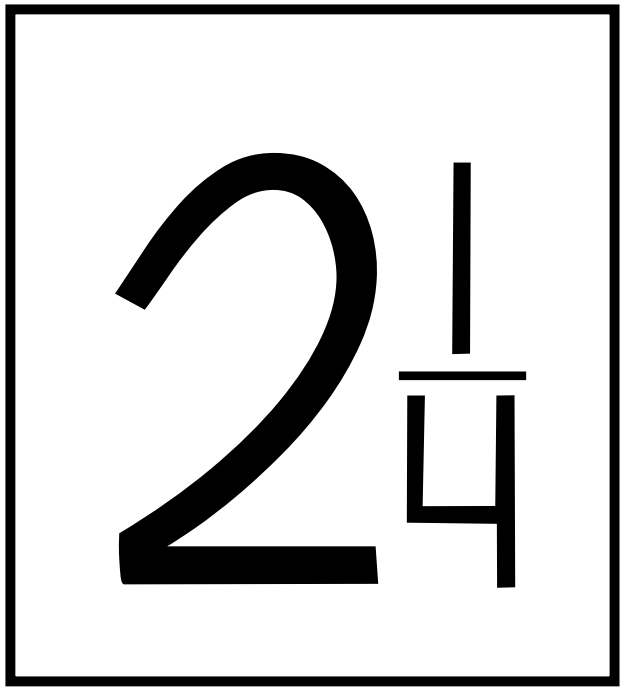


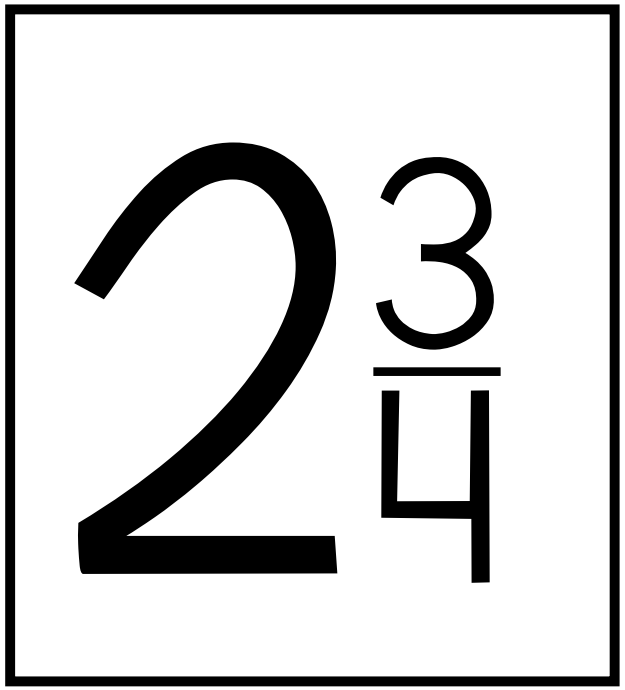


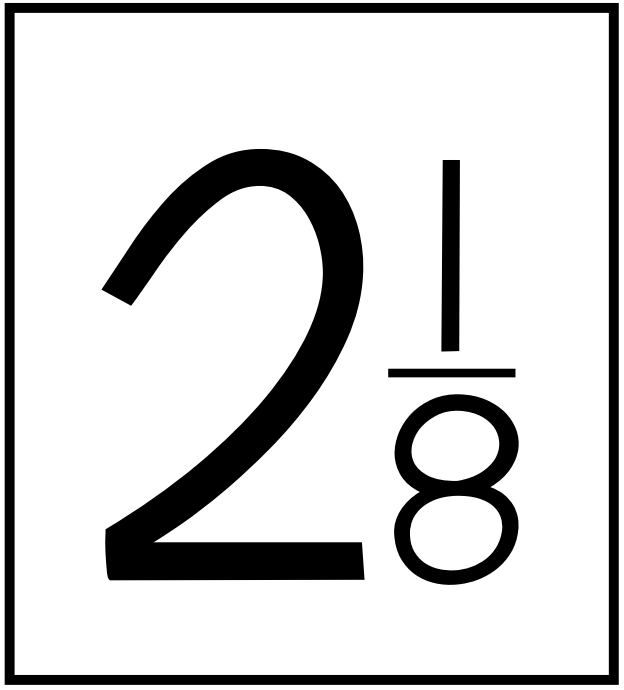


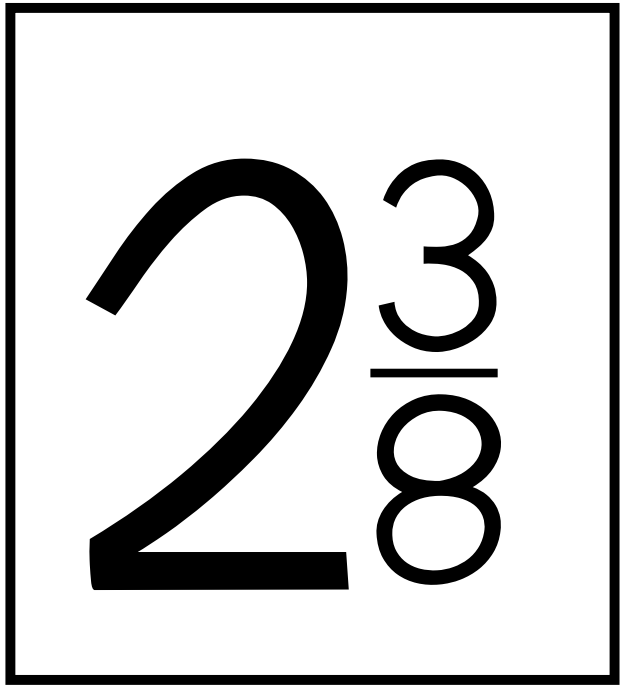


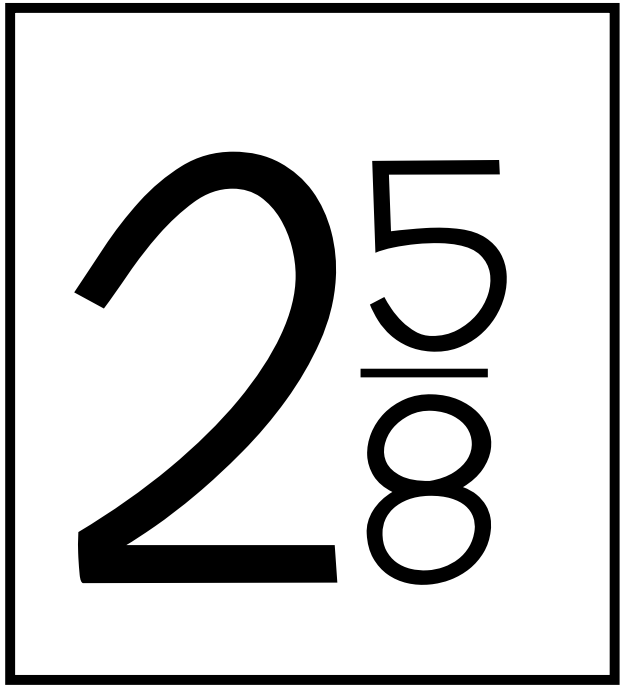


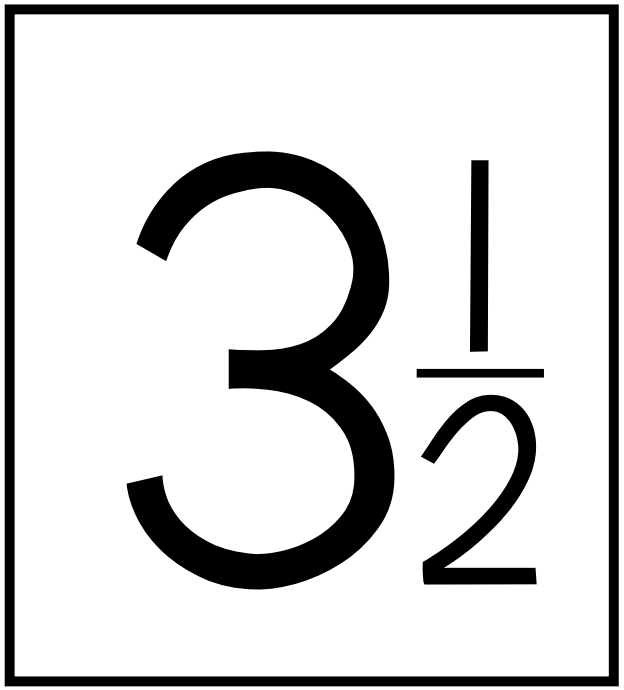


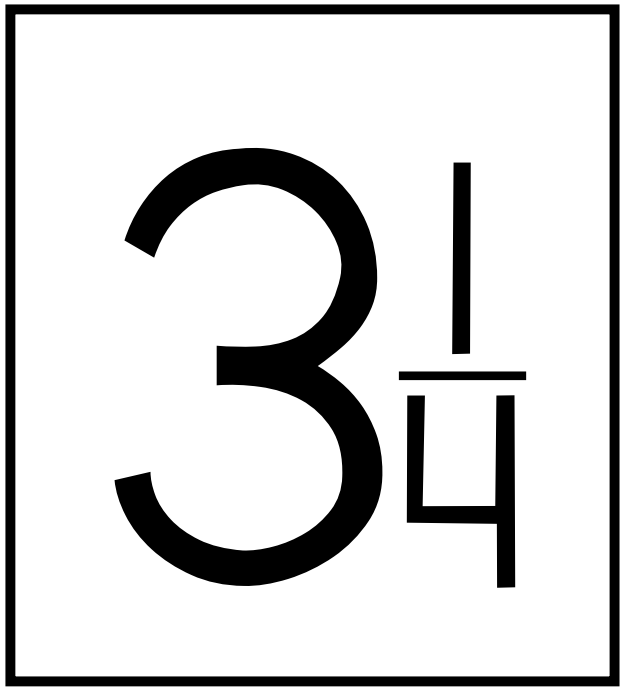


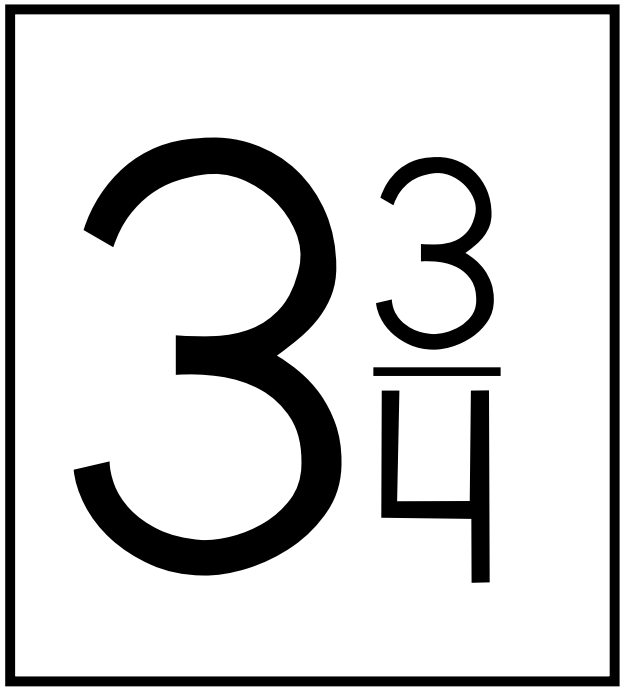


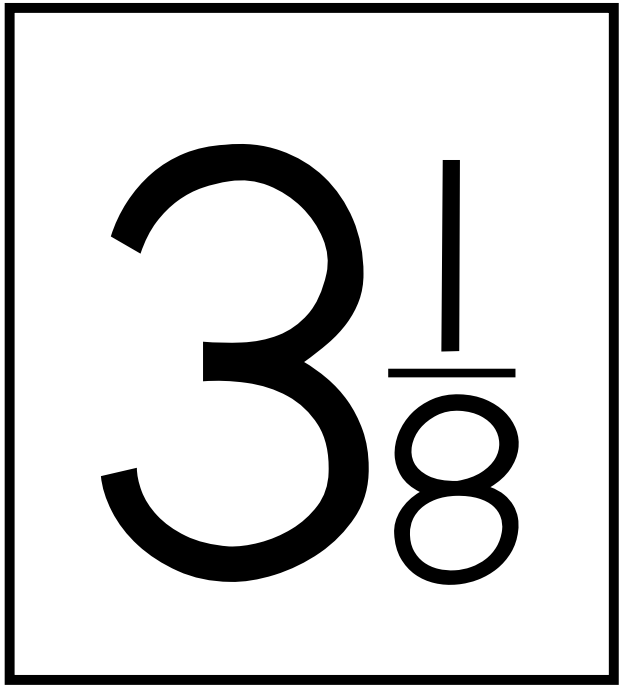


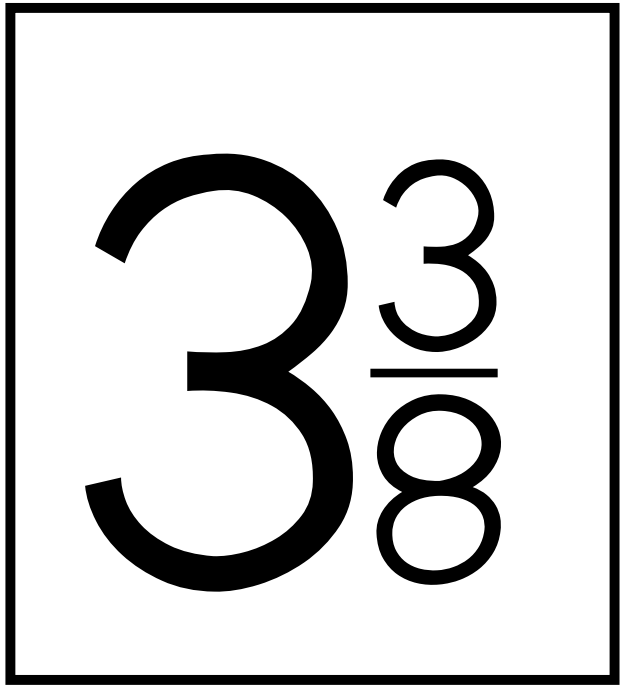


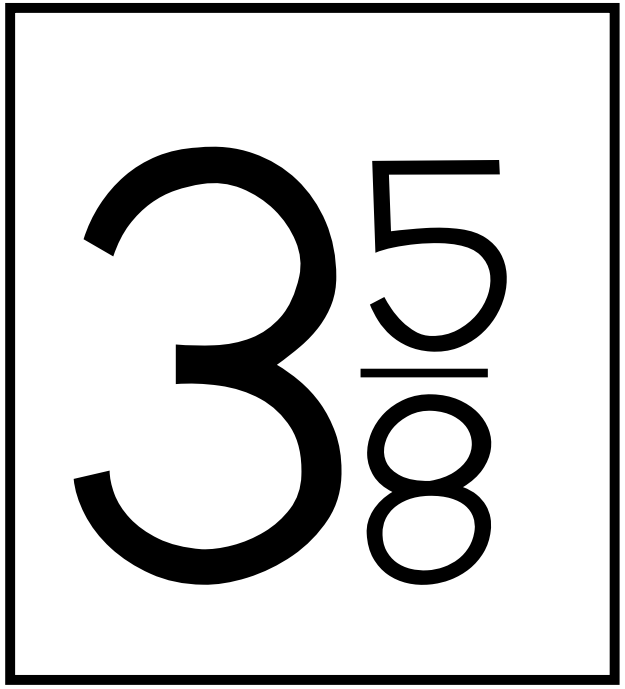


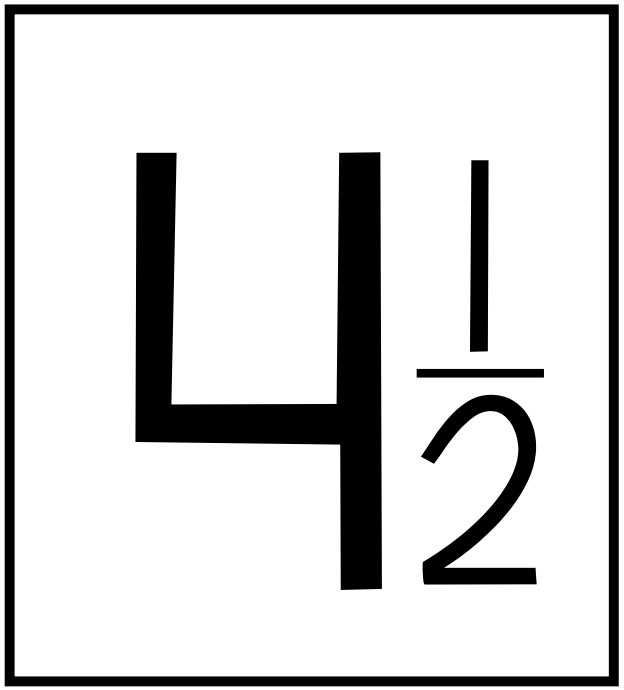


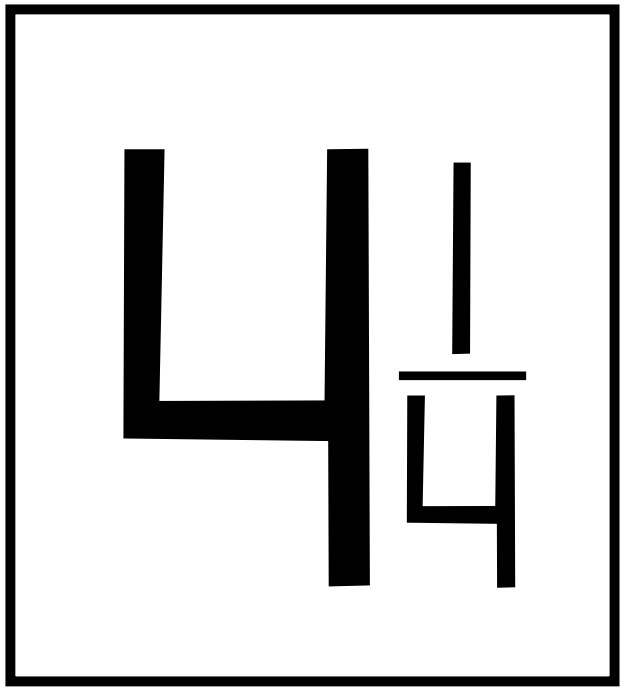


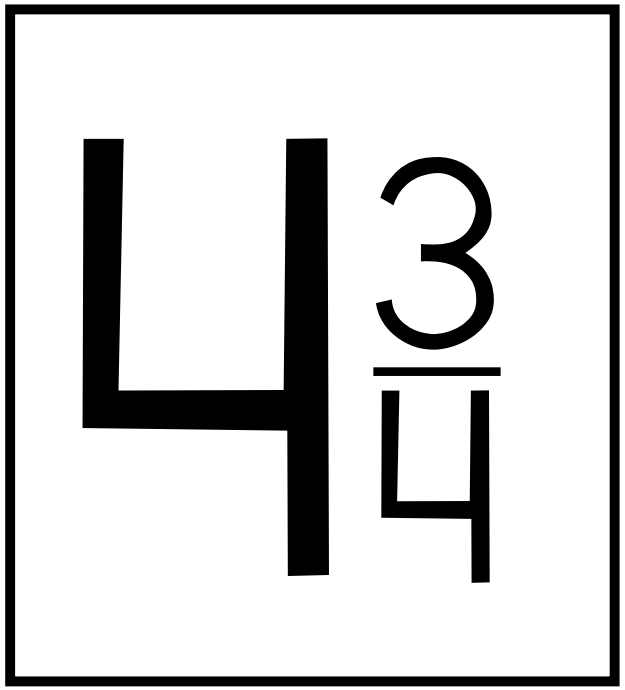


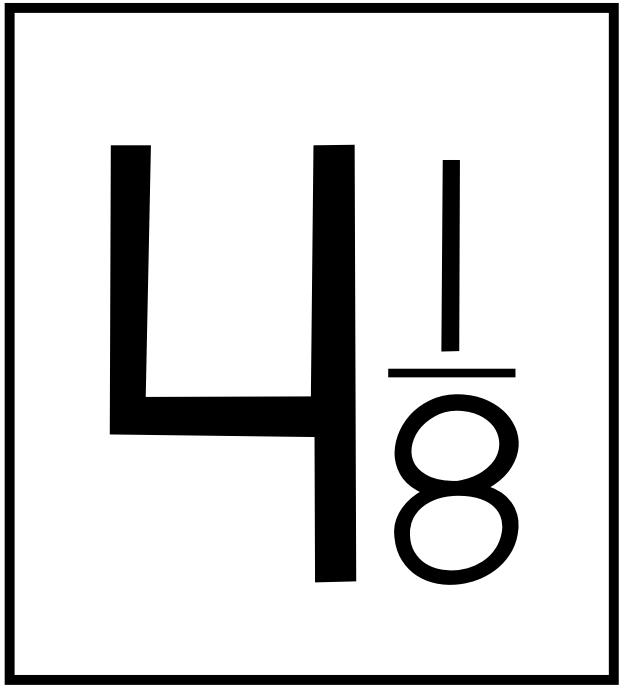


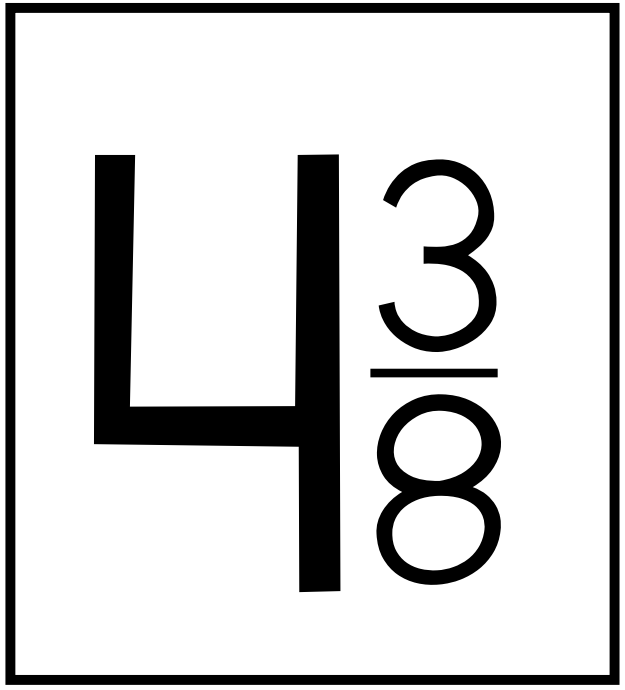


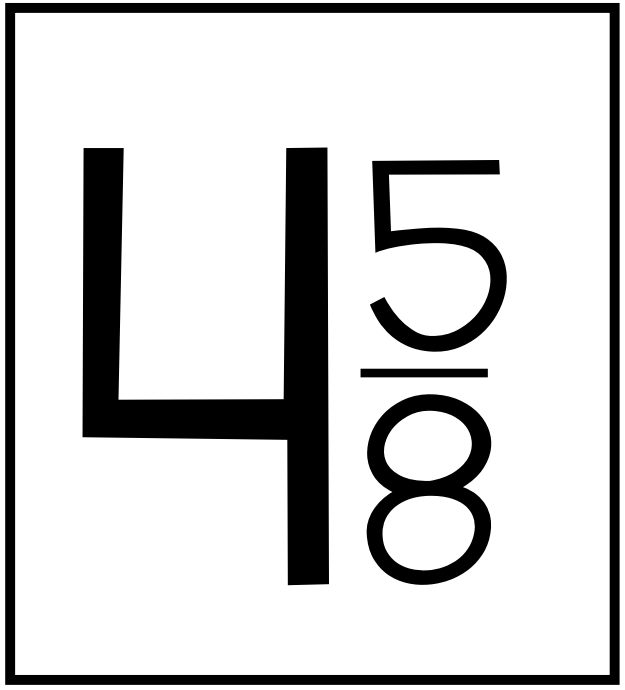


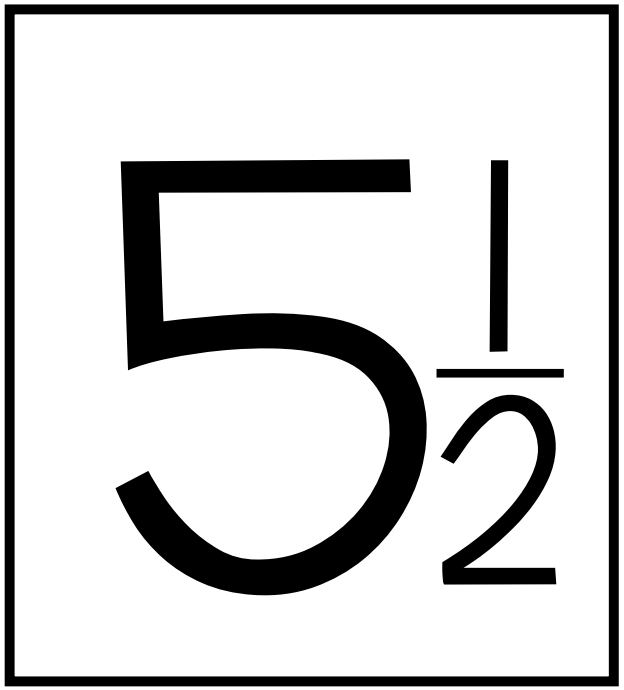


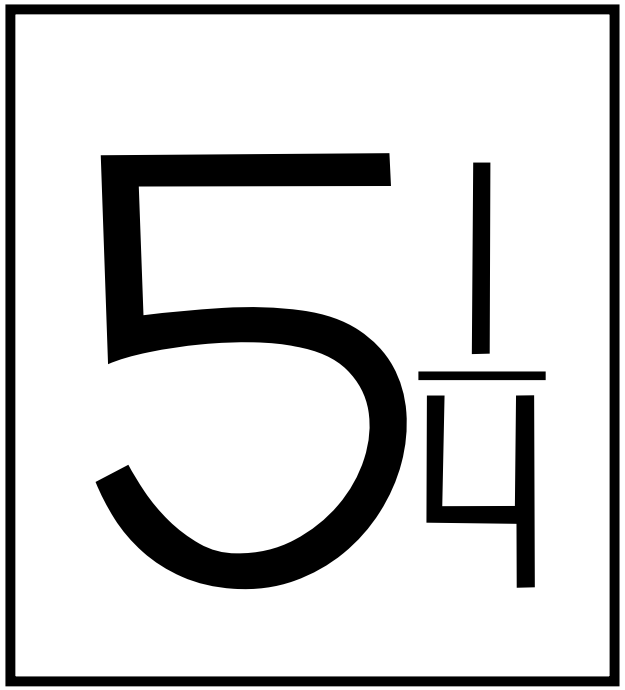


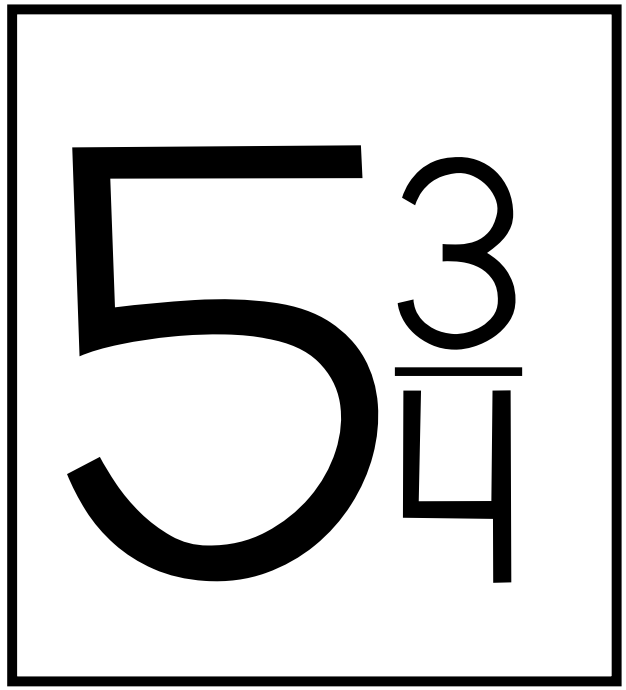


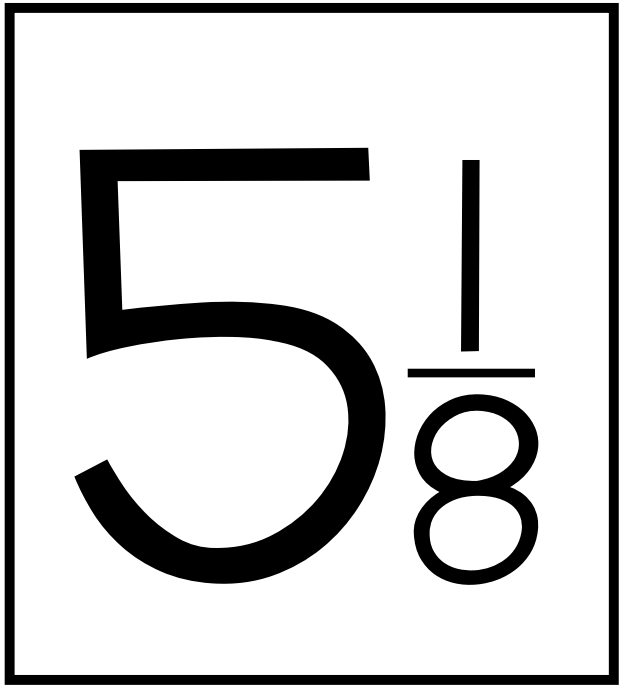


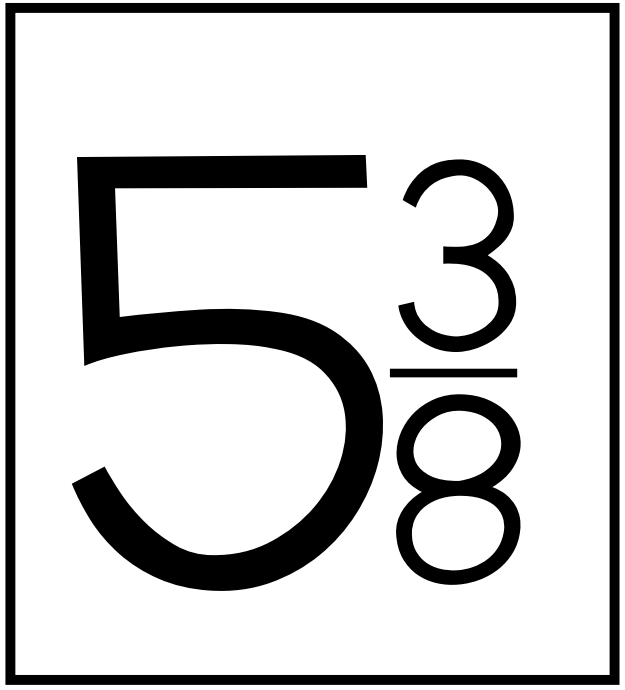


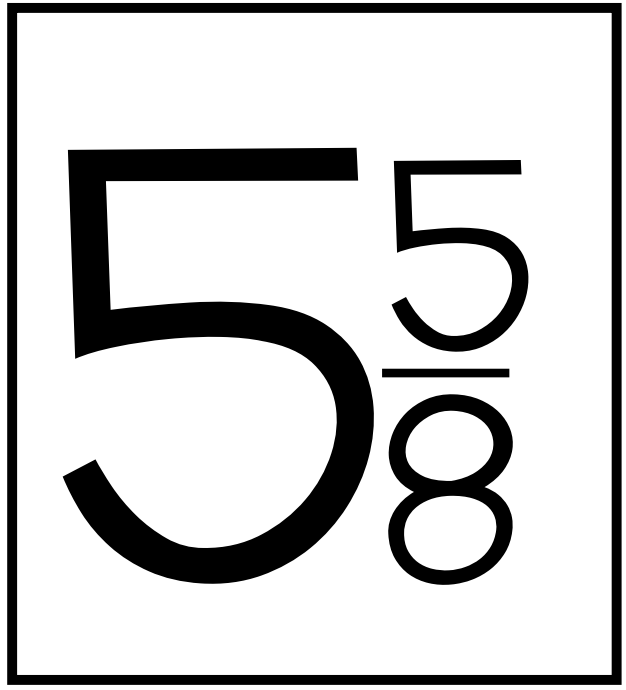












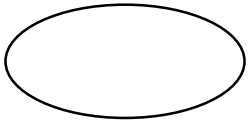
RECORDING SHEETS "PLUS"

The following pages have recording sheet options as well as some formative assessment options. NOTE: The mixed number card activities listed above also make great formative assessment opportunities!

Recording Sheet!

Name _____

Work Space

Set 

My combinations:

SHOW YOU KNOW! Name _____

Pick a card and write the number in the box. After each arrow, show a different way to decompose the number.

$1\frac{5}{8}$

$\frac{4}{8}+\frac{4}{8}+\frac{5}{8}$

$\frac{3}{8}+\frac{4}{8}+\frac{6}{8}$

$3\frac{3}{4}$

$\frac{1}{2}+\frac{1}{4}+1\frac{1}{2}+1\frac{1}{2}$

$3\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$

SHOW YOU KNOW! Name _____

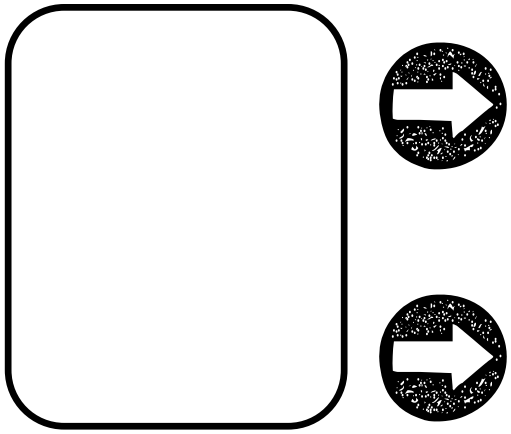
Pick a card and write the number in the box. After each arrow, show a different way to decompose the number.

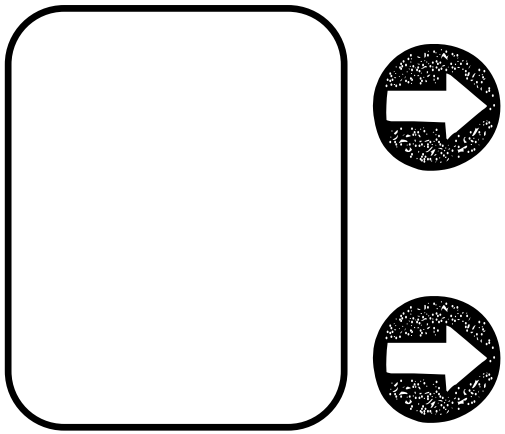
Like This!

You can see students' level of confidence by the way they decompose their mixed numbers!

SHOW YOU KNOW! Name _____

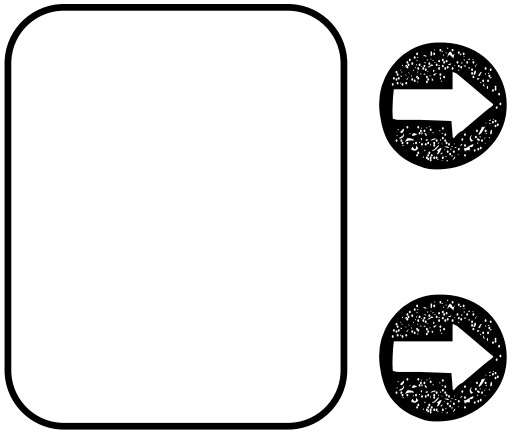
Pick a card and write the number in the box. After each arrow, show a different way to decompose the number.

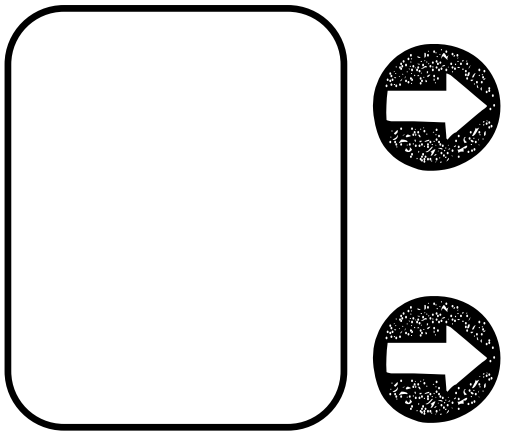




SHOW YOU KNOW! Name _____

Pick a card and write the number in the box. After each arrow, show a different way to decompose the number.





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SHOW YOU KNOW! Name _____

Decompose the following mixed numbers in two different ways.

$1\frac{3}{4}$

$3\frac{1}{8}$

SHOW YOU KNOW! Name _____

Decompose the following mixed numbers in two different ways.

$1\frac{3}{4}$

$3\frac{1}{8}$

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SHOW YOU KNOW! Name _____

Make a list of ways to make "5" without using any whole numbers.

1)

2)

3)

4)

5)

6)

7)

SHOW YOU KNOW! Name _____

Make a list of ways to make "5" without using any whole numbers.

1)

2)

3)

4)

5)

6)

7)

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I have taught grades 1, 2, 3, 4, and 6 for the past twenty years and pride myself on my creativity and ability to engage students in meaningful learning. I have my masters in educational leadership and curriculum and look forward to sharing many of my ideas with all of you!

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