# Grade 3

Exploring Fractions

## Our Plan

Explore Fractions Tasks
Analyze Standards
Explore Measurement Fractions Tasks
Explore Possibilities for Lesson Structures
Look at Resources
Plan a Lesson that you will teach

## Pulse check

- 1) With what concepts have your students done well and shown growth?

- 2) What are some topics that you have spent time on that you know you will have to revisit before the end of the year?

## Warm up

- Write a multi-step equation that includes at least a multiplication sign, an addition sign, and a subtraction sign.
- You must use at least one multiple of 10
- Your equation must equal 354.

- Find multiple answers that work.

## Warm-up

- Strategies?

## Warm-up

- Equations?
- 2x 300 + 20 − 1
- 2x 300 + 21 − 2
- 2x 300 + 22 − 3
- 2x 300 + 23 -4

## Folding Fourths

- Take a paper strip
- Fold the paper strip into 4 equal areas in as many possible ways.
- For each way prove to your neighbor that your sections are equal.
- Record each method on paper.

## Shading Fourths

- Draw a 4x4 array (16 small sections)
- Divide the array into 4 equal areas in as many ways as you can.
- For each new way draw a new array.
- Your shapes do not need to be "normal looking."

## Shading Fourths

- Strategy?

- Solutions?

## Folding vs Shading

- How were these 2 activities different?

- Which would be easier for your students?

- Are there pre-requisite understandings needed for folding?
- Are there pre-requisite understandings needed for shading?

## 3.NF.1

- Jim is planting flowers in a garden. The shaded regions show the parts of the garden that have flowers planted. How much of the garden is left to be planted?
- A) 1/4
- B) 1/3
- C) 2/3
- D) 3/4

## EoG state data from 2012-13

- Jim is planting flowers in a garden. The shaded regions show the parts of the garden that have flowers planted. How much of the garden is left to be planted?
- A) 1/4
- B) 1/3
- C) 2/3
- D) 3/4

A. 55%
B. 4%
C. 1%
D. 40%

- One-fourth of a garden is planted with potatoes. Half is filled with corn. One-fourth is filled with carrots. Which could be the garden?



- One-fourth of a garden is planted with potatoes. Half is filled with corn. One-fourth is filled with carrots. Which could be the garden?

A. 57%
B. 11%
C. 18%
D. 22%



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# 3.NF.2

- Fractions on a number line

- Do students see fractions on a number line before 3rd grade?

- What tends to give students issues with this standard?

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# Standing Long Jump

- Students stand in place and jump straight ahead. The measurements are below:
  - Steve: 1 and 3/4 yards
  - Moses: 1 and 2/3 yards
  - Brittany: 1 and 5/8 yards
  - Rosalie: 1 and 5/6 yards
- Build each fractional value with concrete manipulatives

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# Standing Long Jump

- Manipulatives?

- What worked well?
- Potential struggles or pitfalls?

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# Standing Long Jump

- Students stand in place and jump straight ahead. The measurements are below:
  - Steve: 1 and 3/4 yards
  - Brittany: 1 and 5/8 yards
  - Moses: 1 and 2/3 yards
  - Rosalie: 1 and 5/6 yards
- Plot each landing spot on its own number line

## Standing Long Jump

- Number Line

- What worked well?
- Potential struggles or pitfalls?

3rd grade number line expectations?

## Standing Long Jump

- Students stand in place and jump straight ahead. The measurements are below:
  - Steve: 1 and 3/4 yards
  - Brittany: 1 and 5/8 yards
  - Moses: 1 and 2/3 yards
  - Rosalie: 1 and 5/6 yards
- Order the students from longest jump to shortest jump

## Standing Long Jump

- Talk at your table-
  - In detail what were the steps involved with plotting each fraction?
  - What were the steps involved with putting them in order?

## Standing Long Jump

- One student's reasoning
  - Steve: 1 and 3/4 yards
  - Brittany: 1 and 5/8 yards
  - Moses: 1 and 2/3 yards
  - Rosalie: 1 and 5/6 yards
- "3/4 is 1/4 from the next whole. 2/3 is 1/3 from the next whole. 5/6 is 1/6 from the next whole. So 5/6 is the largest, then 3/4 then 2/3. 5/8 is less than 3/4 but it is greater than 2/3.
- What do you notice?

## Thinking about plotting….

- 3/4, 5/8, 2/3, 5/6

- What denominators are related to each other
- How can related denominators help us?

- Eighths
- Sixths

## Thinking about Length

- Is there that our folding of the paper strip can be similar to the way that we partition a number line?
- If so, how?
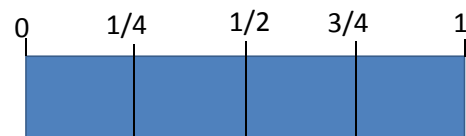
## 3th Grade – 3.NF.2.

6    At which point is $\frac{3}{4}$ located on the number line?

A   P
B   Q
C   R
D   S

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## 3th Grade – 3.NF.2.

6    At which point is $\frac{3}{4}$ located on the number line?

A   P
B   Q
C   R
D   S

A. 4%
B. 34%
C. 45%
D. 17%

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## Thinking about Grade 2 for students who struggle

- Grade 2
  - Partition a circle or rectangle into 2, 3, or 4 parts. Understand that the same amount of equal shares for equal wholes are the same size.

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## Grade 3

- What is the focus of 3.NF.2?

- What do students need to be able to do to demonstrate that they have met the standard?

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## 3.NF.2

- Understand a fraction as a number on the number line; represent fractions on a number line diagram.
- Represent a fraction 1/$b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into $b$ equal parts. Recognize that each part has size 1/$b$ and that the endpoint of the part based at 0 locates the number 1/$b$ on the number line.
- Represent a fraction $a/b$ on a number line diagram by marking off a lengths 1/$b$ from 0. Recognize that the resulting interval has size $a/b$ and that its endpoint locates the number $a/b$ on the number line.

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## Mailboxes

- When Tomas walks to Nelly's house he walks past 6 equally spaced mailboxes. Nelly's mailbox is the 6th mailbox.

- Tomas stops 1/3 of the way to Nelly's mailbox to talk to Steve. Draw a picture.
- Tomas stops 2/3 of the way to Nelly's mailbox to talk to Susan. Draw a picture.

## Mailboxes

- Strategies?

- Where would students struggle?

- How could you support them?

## Silly String

- You need 3/4 of a yard of string but your string is only marked in eighths.
- What can you do?
- Draw a picture.
- Explain how you know that you are correct.

## Ant Walking

- Ant A walked 2/3 of the way across the room and Ant D walked 2/6 of the way. Show the position of each ant on a number line. Who walked further?

- Ant C walked 3/4 of the way across the room and ant D walked 3/8 of the way. Show the position of each ant on a number line. Who walked further?

## Distracting Marks on a Line

- Based on the line below draw:
- 1/8
- 3/4
- 1/2
- 3/8
- 1 whole



## Distracting Marks on a Line

- Based on the line below draw:
- 1/6
- 3/6
- 1/3
- 5/6
- 1 whole



## 3.NF.2

- What is a logical progression of teaching these standards?

- Making a number line and marking fractions versus identifying fractions on a pre-made number line?

## 3.NF.2

- What is a logical progression of teaching these standards?

- Making a number line and marking fractions versus identifying fractions on a pre-made number line?

## Fractions on a Line Plot- 3.MD

- Take a look at the sheet of bugs
- Measure the bugs to the nearest ¼ of an inch

## Fractions on a Line Plot- 3.MD

- Add 3 more data points to 3/4 of an inch
- Add 4 more data points to 2/4 of an inch
- Add 2 more data points to ¼ of an inch.
- Come up with 3 questions that you could ask students based on the line plot.

- How many bugs are greater than ½ but less than 1 and ½? (do we count ½ etc.)
- How long is the largest bug?
- What is the difference in the number of bugs that measure ½ of an inch and ¼ of an inch?
- What fractions have the same number of bugs?
- How many bugs did I measure?
- Where should my line plot end?

## Line Plot Questions

## Cover the Hexagons

- You will need triangles, rhombuses, trapezoids, and hexagons from the pattern blocks kit
- The goal is to cover 4 hexagons with pattern blocks.
- How you play:
  – Pick a triangle, rhombus or trapezoid
  – Place it on a hexagon
  – Look at your shape and trade out for larger pieces (e.g., 2 triangles can be traded for a rhombus)
  – Take turns

## Cover the Hexagons

- What is the math involved?

- How would you modify this for your students?

## Planning a lesson

You will plan a lesson that you will teach- hopefully fractions.
You will bring student work samples back with you to the next workshop.

## Let's consider a lesson on fractions..

What do you notice about how the lesson starts?

What do you notice about the role of the teacher?

What should come next?

## Let's consider a lesson on fractions

What types of activities go on during the explain section?

What types of activities go on during the elaborate section?

When could students be informally assessed?

## What a lesson *could* look like

- Opening ten minute math/number talk- whole class works in pairs/small groups
- Opening discussion about concepts
- Task to explore while the teacher poses questions
- Discussion (explanation from students about strategies), possible teaching by teacher
- Follow up tasks or activities- possible small group instruction or support
- Closing discussion

## Questions?

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