Empower Students with Routines Along the Route of Learning

Nancy Nagatani
nnagatani@krhsd.k12.ca.us
@n2mathteach

Christine Roberts
christine.roberts@tcoe.org
@mathschristine
Welcome & Introductions

💡 Introduce yourself:
- Name
- Role
- Grade level

💡 What are you hoping to learn today?
Getting Connected

GoSoapBox Event Code: 543-469-165

◇ app.gosoapbox.com
<table>
<thead>
<tr>
<th>Week of</th>
<th>My Math Talk</th>
<th>Record a (✓) when you complete any of the talk moves.</th>
<th>Partner Talk</th>
<th>Asked a Question</th>
<th>Answered a Question</th>
<th>Keep Trying</th>
<th>Explained your thinking during small/whole class</th>
<th>Repeated someone else's thinking</th>
<th>Added on to someone else's thinking</th>
<th>Agreed/disagreed with someone else's thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 1-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 9-13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 16-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 23-27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CALC!

Rules:

◇ Must use every button (only once)
◇ Can combine numbers to create a 2-digit, 3-digit, etc. number
◇ Must result in the total given
◇ Find multiple solutions
Why Routines?

◇ Develop fluency & deepen understanding
◇ Create interest in the future study of math
◇ Communicate using mathematical models
◇ Develop logical thinking
◇ Apply math to real situations
Routines that Support . . .

1. Number Line Concepts & Number Sense
2. Developing Understanding Over Time
3. Patterns, Patterns, Everywhere!
4. Questioning & Justifying through Writing
How I Use Routines

- Daily
- 7 - 10 minutes
- Cycle of common routines
- Individual work time
- Class discussion
Number Line Concepts & Number Sense

Exploring number concepts through number lines
Number Line Concepts & Number Sense

- Understand relationships between numbers

- Develop fluency
  (efficiency, accuracy, & flexibility)
  - Efficiency - can use strategy easily
  - Accuracy - knows number facts and relationships
  - Flexibility - knows multiple strategies
Number Line

- Explore numbers in multiple forms: fractions, decimals, exponents, etc.
- Place the numbers on a number line correctly
- Variations:
  - Create their own number(s) & add to a class number line
  - Give students an incorrect number line & have them correct the mistakes

Number of the Day

- Choose a number of the day
- Students use that number to do specific tasks such as:
  - Create an +, -, x, ÷ problem with the # as the result
  - Put # on a number line
  - Create a visual representation
  - Find the square root
  - Graph a point with #
  - Create a pattern with # as its growth
Let’s Try It!

Number of the Day is...

1

***Can use Desmos, Padlet, or GoSoapBox
Let's Try It!

**Number Lines**

- Choose 2 different numbers (in different forms - ex: fraction, decimal, mixed number)
- Write each number on a Post-It-Note
- Add your Post-Its to the class number line
### Number of the Day Interesting Tidbit: I was 2 years old when I wrote my

<table>
<thead>
<tr>
<th>Write me as a fraction.</th>
<th>1/2</th>
</tr>
</thead>
</table>

Create a pattern with me as its growth (and label near).

| 0.2468 | 2.4 |

Create a subtraction problem with me as the result.

| 23 - 20 = 2 |

Graph me as part of a point.

| (2, 2) |

Find the square root (and show what it means).

| \( \sqrt{2} \approx 1.41 \) |

Create a multiplication problem with me as the result.

| 1.41 \times 1.41 = 2 |
Developing Understanding Over Time

Desmos Exit Tickets and SBAC Target Cards
Developing Understanding Over Time

◇ Desmos Exit Tickets
◇ SBAC Target Cards
Desmos Exit Tickets

- Given to students at the end of a lesson or 2
- Short assessment (1-4 problems)
-Reviewed the next class if needed
SBAC Target Cards

- Students grouped by area of greatest need
- Groups work together on 1 card at a time
Let’s Try It!

Hey, students!

Go to student.desmos.com and type in:

JYVUJ

You can also share this link with your students:

https://student.desmos.com/?prepopulateCo
Question 1

Read the situation below and state the growth of the tree that occurs every year.

Mark’s tree is 16 feet tall five years after he planted it.

Expression                      Students
-------------------------------------------------------------------
3.2                             Hee Oh, Elana Piscopia, Gotthold Eisenstein, Mary Ross, Frances Kirwan, Mary Cartwright, John Urschel, Augustin Cauchy, Ingrid Daubechies

x = 3.2                         Johannes Kepler, Sun-Yung Alice Chang

3.2 feet                        Shing-Tung Yau, Niels Abel

3 ft                            Peter Dirichlet, Hermann Minkowski

3.2 each year                   Maria Agnesi

You don’t have enough info      Aristotle

3 Feet                           Henri Poincaré
Patterns, Patterns, Everywhere!
Supporting students in looking for, exploring, and describing patterns
Patterns, Patterns, Everywhere!

◇ Visual Patterns
◇ Dot Cards

Visual Patterns
Let’s Try Visual Patterns!

- How many candy corns are in step 1?
- How is the pattern growing?
- How many candy corns does the 6th, 7th, 15th figure have?
- Can you generalize the pattern to figure out the number in any figure of the pattern?
Let's Try Dots!

How many dots do you see?

How do you see them?
Student Work

Dot Cards

Total: 5. Saw 2 dots

Total: 7
Saw a 2 boxes and

Total: 12
I saw a big box.

I see 3 then 2

I see 4, 4, and 1

I see 4, 4, 4

I see 4 + 4 = 8

2 + 2 = 4 + 8 = 12

d a box.
Questioning & Justifying through Writing

Developing students' art of questioning and justifying skills
Questioning & Justifying through Writing
Let’s Try It!

◇ Padlet - What is your favorite routine?
Let’s Try It!

Go Back To Moderation Panel

Event Code

166-936-073

Enter this code at
app.gosoapbox.com
Student Work

Graphs, Tables, Rules, & Patterns

Write a rule for a table, pattern, or graph you find in your book or on the internet. Add the image and your rule to your post. Then describe what the rule means.

Students' work displayed with graphs, tables, and rules for various problems. Examples include:

- Megan: You start with 4 and subtract 2 every time.
- Taylor West: You start off with 14 and subtract 5 every time.
- Mia Gillum: Start with five and add 2 every time.
- Andrew: Rule: \( y = 5x + 3 \)
- Talan: Rule: \( y = 3x + 2 \)

Additional text includes:

- Nathan: I have 50 pens then gave them away.
- I had 7 1/10 pounds of tomatoes then ate one and ate it all up.
- I had a red balloon then a clown stole it.
- Tyrone had 136 boxes of chicken. He ate and dropped them all. How much does poor Tyrone have now?
- Cruz and Shane had movie tickets and then used them as they had 0.
Reflection & Wrap Up
Discuss, Share, and Next Steps
Routines that Support . . .

1. Number Line Concepts & Number Sense
2. Developing Understanding Over Time
3. Patterns, Patterns, Everywhere!
4. Questioning & Justifying through Writing
Developing Mathematical Language

- Students share their ideas and their thinking using the language they have.
- Focus on the math, not just the vocabulary.
- Connect with everyday language.
- Model proper use of vocabulary and clarify misuse.
Looking for Multiple Solutions

- Interact with numbers daily
- Focus on exploration and number sense, not on memorization and algorithms
- Look for connections with multiple representations
Reinforcing Growth Mindset Messages

- Mistakes and challenges grow your brain
- Speed is not an indicator of knowledge
- Visualize and make connections
- Everyone can learn math at high levels
- Questions & discussions deepen your mathematical understanding
Routines as a Formative Assessment Tool

◇ Gauge student understanding and use this understanding to guide routine planning
◇ Uncover misunderstandings and provide opportunities to build understanding
◇ Introduce concepts in a fun and engaging way, connect these experiences to lessons
Discuss

What ideas do you have for using routines to increase student access to and engagement with mathematics?
Next Steps

◇ Identify 1-2 next steps.
◇ Write them down.
◇ Share them with a partner.
Thank you!

Nancy Nagatani
nnagatani@krhsd.k12.ca.us
@n2math.teach

Christine Roberts
christine.roberts@tcoe.org
@mathschrchristine