Routines Big and Small – moving beyond Turn & Talk

Tamara Smith, Math Coordinator
Kim Weaver, STEM Coordinator

OESD 114
Serving the Kitsap & Olympic Peninsulas
Routines Large and Small: Mechanical to Methodical to Pedagogical

Tamara Smith, Mathematics Coordinator
Kim Weaver, STEM Coordinator

OESD 114
Serving the Kitsap & Olympic Peninsulas
Who’s in the Room

• Introductions – at table
Mathematically Productive Instructional Routines
Mathematically Productive Instructional Routines

- **Routines** – these are activities that students and teachers engage in often enough that the routine itself is learned and can be engaged in quickly and meaningfully.
Mathematically Productive Instructional Routines

• **Instructional** – these routines are focused on learning content, not on management of students, supplies, or behavior
Mathematically Productive Instructional Routines

- **Mathematically Productive** – these instructional routines engage students in making sense of mathematics and having mathematical discussions. They focus on Content Standards and on the Standards for Mathematical Practice
Why routines?

Shifting the culture of what it means to know and do mathematics.

Shifting from

• Initiation – Response – Evaluation (IRE)
• I do – We do – You do – routines for demonstrating and practicing procedures
CCSS Mathematical Practices

**OVERARCHING HABITS OF MIND**
1. Make sense of problems and persevere in solving them
6. Attend to precision

**REASONING AND EXPLAINING**
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others

**MODELING AND USING TOOLS**
4. Model with mathematics
5. Use appropriate tools strategically

**SEEING STRUCTURE AND GENERALIZING**
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning
Effective
Mathematics Teaching Practices

1. Establish mathematics **goals** to focus learning.
2. Implement **tasks** that promote reasoning and problem solving.
3. Use and connect mathematical **representations**.
4. Facilitate meaningful mathematical **discourse**.
5. Pose purposeful **questions**.
6. Build **procedural fluency** from conceptual understanding.
7. Support **productive struggle** in learning mathematics.
8. Elicit and use evidence of student thinking.
Core Practices

- eliciting and responding to students’ ideas,
- orienting students to one another and the content
- positioning all students as competent learners, and
- setting and maintaining high expectations for all students.
Number Talks

• Strategy share
63 - 28
Number Talks

• Strategy share
• Reflect on Core Practices
Which

One

Doesn't

Belong?
Which One Doesn’t Belong
Other SMALL routines

- *Which One Doesn’t Belong*
- *Number Talks*
- Notice and Wonder
- Debate Math
- Splat
- Choral counting
- Estimation clipboard
- Estimation 180
And now for ...  
the REST of the LESSON
Figure 1.1 Diagram that shows the relationship of the practices to each other
Connecting Representations

An Instructional Routine
Prompting Structural Thinking (MP7)
CONNECTING REPRESENTATIONS

WHAT: Connect area models using algebra tiles to quadratic equations

WHY: To “think like mathematicians,” to use mathematical structure to connect two things that look different.
A word about algebra tiles

- RED pieces indicate negative values
- All other colors indicate positive values
- Area Sizes:
  - $X^2$
  - $X$
  - One
CONNECTING REPRESENTATIONS

Think

Make Connections

Share and Study Connections

Create a Representation

Reflect on Learning
Think

Ask yourself...

“How are the ________ similar/different?”

“What are the CHUNKS of these ________”
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x^2 + 6x + 11 = (x + 3)^2 + _)</td>
<td>(x^2 + 8x + 6 = (x + 4)^2 - _)</td>
<td>(x^2 - 6x + 7 = (x - 3)^2 - _)</td>
</tr>
</tbody>
</table>

**1**

![Diagram](image1.png)

**2**

![Diagram](image2.png)
“I saw … so I connected....”
“... matches … because...”
“We saw … so we connected…”
“… matches … because…”

“They paid attention to….”
“Their match works because…”
Create a Representation

THINK

Ask yourself…

“What are the chunks of this ____ (representation) ____”
Create a Representation

PAIR

Share your representation.

Together agree how best to explain your thinking.
They paid attention to …

Their representation matches because…
Reflect on Learning

Paying attention to … in algebra tiles is helpful because...

When interpreting a quadratic equation, I learned to pay attention to…
Identify core practices
Other BIG routines

- *Connecting Representations (MP7)*
- Capturing Quantities (MP2)
- Recognizing repetition (MP8)
- 3-Act Tasks
- Implementing rich tasks using 5 practices for orchestrating mathematical discourse
- MARS formative assessment card sort tasks
Resources

https://tinyurl.com/NWMC-Routines

Tamara Smith, tsmith@oesd114.org
Kim Weaver, kweaver@oesd114.org