Lesson 6 – Problem Solvers vs. Problem Performers

In this lesson, students will define the characteristics of problem solvers and problem performers.

**Resources:**
- Filled, J. (2011 October 31). Ormie the Pig. Retrieved from https://www.youtube.com/watch?v=EUmvAOmV1o

**Materials:**
- Dot card (for Number Talks)
- “Ormie” video
- Problem Solver/Performer Characteristics sort cards
- Are You a Problem Solver or a Problem Performer chart

**Procedure:**

**Part 1 – Number Talk (10 min.)**
- “Good morning, Mathematicians! Once again, we will begin today with a Number Talk. (Transition to the Meeting Area.)
- “Ok, Mathematicians. Get ready!” Show the dot card briefly, then hide it. Ask students to share their initial answers.
- Repeat the procedure, reminding students that it is OK if they want to revise their first answer. That’s a sign that their brain is growing!
- Ask students to share how they saw the dots. Record student ideas in drawings and equations.

**Part 2 – What Problem Solvers Do (and Don’t Do) (20 min.)**
- “Mathematicians, last week we learned several key ideas that will continue to impact our math work this year.” Review your Math Mindset Charter.
- “This week, we are going to focus on a really important part of being a mathematician – problem solving. Think about what you already know about problem solving in math. It could be something you learned in the past about solving math problems, or how you feel when you are solving problems in math.” Give students 20-30 sec. of wait time.
- “Turn and Talk with your partner about what you already know about problem solving.” Allow students to talk for 1-2 minutes, listening closely to their conversations.
- Ask several students to share their experiences, encouraging the rest of the class to be active listeners.
- “Mathematicians, it sounds like you already have a lot of experiences with problem solving, some positive, and some not so positive. As we work this week, I’d like to you to make connections between problem solving and our Math Mindset Charter ideas.”
• “Now, we are going to watch a short video about a pig with a problem. As we watch, I am going to pause the video every so often to ask you questions about what you think about how the pig is acting. Is he being a productive problem solver, or not? Why do you think that?”
• Start the “Ormie” video. Pause after 25 seconds to ask students what Ormie’s problem is and how they think he might solve it.
• Before continuing, remind students of the focus question: Is Ormie being a productive problem solver or not, and why do they think that?
• Continue playing the video, pausing periodically to allow students to talk with a partner about their thoughts.
• After the video is through, ask students to share their thinking about the question.

Part 3 – Problem Solvers vs. Problem Performers (30 min.)
• “Mathematicians, we are now going to do a quick sorting activity to really analyze Ormie’s actions. We are going to sort some ways people approach problems into two categories – Problem Solving and Problem Performing. Problem Solvers believe all of the ideas we learned last week, while Problem Performers just want to get an answer quickly. I will model my thinking for a couple of our sort cards, and then we will do some together. Then you will do the rest with a partner.”
• Choose a card from the sort cards. Read the card aloud, and model for students how to consider whether the action characterizes a Problem Solver or Problem Performer. Make connections to the Math Mindset Charter to help guide your decision-making process.
• After 1 or 2 cards, read aloud a 3rd card and ask students to think about in which category they would place it. Remind them that they need to have reasons for their decision.
• After a couple of more cards, have students turn to their partner and hand each pair a set of the cards. Have them discuss with their partners in which category they would place each card, with reasons. Give students about 10 minutes to work.
• Have students share their thinking and come to agreement on where to place each of the remaining class set of cards. This will create a class-established chart of Problem Solver behaviors vs. Problem Performer behaviors.

Part 4 – Closure (5 min.)
• “Mathematicians, today we did a lot of work together to set expectations for our problem solving work this year. We will often refer back to this chart to remind us about what productive problem solvers do.”
• Share the quote – “Good mathematics isn’t about how many answers you know...it’s about how you behave when you don’t know.”
• Ask students to think about what the quote means to them with regards to the work done so far. Allow several students to share their ideas with the time allowed.
**Problem Solvers**

<table>
<thead>
<tr>
<th>Reasonable or makes sense.</th>
<th>Reasonable or makes sense.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doesn’t think about whether the answer is</td>
<td>Doesn’t think about whether the answer is</td>
</tr>
<tr>
<td>memorized procedures to calculate.</td>
<td>memorized procedures to calculate.</td>
</tr>
<tr>
<td>Doesn’t show any part of their thinking, and uses</td>
<td>Doesn’t show any part of their thinking, and uses</td>
</tr>
<tr>
<td>Erase or destroy work when mistakes are made.</td>
<td>Erase or destroy work when mistakes are made.</td>
</tr>
<tr>
<td>Jump into a math action (operation) without</td>
<td>Jump into a math action (operation) without</td>
</tr>
<tr>
<td>before asking for help.</td>
<td>before asking for help.</td>
</tr>
<tr>
<td>Read the problem once, or doesn’t read it at all,</td>
<td>Read the problem once, or doesn’t read it at all,</td>
</tr>
<tr>
<td>Doubt their ability to solve the problem.</td>
<td>Doubt their ability to solve the problem.</td>
</tr>
</tbody>
</table>

**Problem Performers**

- Listens to or reads other solutions to learn what worked on the solution is the best one.
- EL&Phan their work and justify why their strategy solution is reasonable and makes sense.
- Look back at the problem to make sure their work often.
- Do not erase work when mistakes are made.
- Show all parts of their thinking, and reviews their relationships.
- Use the plan to look for mathematical Work backward.
- Ok the situation.
- Write an equation that matches the situation.
- Create a table or graph.
- Look for and describe a pattern.
- Draw a simple picture representation.
- Act out the problem with objects.
- Create a plan strategically.
- Read or consider a problem carefully several times.
- Believe that they can solve the problem.

**Are You a Problem Solver or a Problem Performer?**
Read or consider a problem carefully several times before, during, and after the solution process.

Believe that any problem can be solved.

Create a plan strategically.

Use the plan to look for patterns, or structures, mathematical relationships.
<table>
<thead>
<tr>
<th>Show all parts of their thinking clearly, and review their work often.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not erase or destroy work when mistakes are made.</td>
</tr>
<tr>
<td>Refer to resources when stuck (ask team members, look in notebooks, charts, etc.).</td>
</tr>
</tbody>
</table>

- Look back at the original problem to make sure the solution is reasonable and makes sense.
<table>
<thead>
<tr>
<th>Doubt their ability to solve problems.</th>
<th>Explain their work and justify why their strategy worked or the solution is the best one.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listen to or read other solutions</td>
<td>Consider different strategies or solutions.</td>
</tr>
<tr>
<td>Consider different strategies or</td>
<td>To be able to do it alone.</td>
</tr>
<tr>
<td>solutions.</td>
<td>Think to be “good” at math means.</td>
</tr>
<tr>
<td></td>
<td>Doubt their ability to solve problems.</td>
</tr>
</tbody>
</table>
Erase or destroy work when mistakes are made.

Ask the teacher for help right away.

Jump into a math action (operation) without reasons or a plan.

Uses memorized procedures to calculate without showing their thinking.

“I just know.”
Doesn't think about whether the answer is reasonable or makes sense.

Ask the teacher if they are right.