Video Link and Info for Principle 5: Capturing Key Ideas

Creating a strategic public record of key mathematical ideas as they are being discussed helps students understand, summarize, and remember those ideas.

https://vimeopro.com/wested/math-pathways-and-pitfalls-principle-5

Have You Wondered?

What makes some discussions more effective than others? Watch the video segments to see examples of two different math discussions. Consider what is being recorded on the board and how the public record might help student learning.

Using the Principle With *Math Pathways & Pitfalls*

In the video, you will see Ms. Rock prepare her lesson plan with three main goals in mind:

- Use place value understanding to compute mentally.
- Use place value knowledge to increase a three- or four-digit number.
- Understand standard and expanded notation.

The starter problem was

What number is 100 more than 1,357?

Teaching Practice 1: Anticipate student solutions and plan ways to elicit ideas related to the learning goals.

Ms. Rock commented about how she approached the lesson as follows:

> In my lesson plan, I anticipated—and wrote down—solutions that I thought students would generate, including the OK and Pitfall solutions of the fictitious students already given on the lesson page. I focused on solutions that would be fertile ground for accomplishing the learning goals of the lesson.
>
> I also wrote down questions I could ask to elicit ideas and solutions that were critical to the lesson goals but that students might not come up with on their own.

Teaching Practice 2: Elicit, develop, and record key ideas selectively during class discussion.

In two video clips from the lesson, Ms. Rock uses prompts written in her teaching guide and lesson plan to elicit mathematical ideas to put on the board and develop through discussion. She strategically creates a public record of key ideas as they are developed to focus attention on what is important. In the first clip, Ms. Rock elicits ideas from her students. In the second clip, Ms. Rock attempts to help her students develop some of those ideas at the board for the benefit of the whole class.

In the first clip, Ms. Rock introduces the lesson by having students analyze the solution of Ernesto (a fictional student in the *Math Pathways & Pitfalls* lesson). Ms. Rock walks around the room as students work, stopping occasionally, asking questions to elicit solutions and representations that she wants students to put on the board for the class discussion. She also makes a note of which pieces of student work or conversations offer the best opportunities for capturing key ideas at the board during the discussion.

Ms. Rock calls another student to the board to explain her drawing. She asks questions about student work presented on the board and adds emphasis to important ideas by labeling.

Teaching Practice 3: Use recorded ideas to recap and summarize.

Ms. Rock takes time in the middle of the lesson to recap what the class has discussed so far, using the public record of the discussion to emphasize important ideas. Then she asks students to work in pairs to talk about other solutions.

Toward the end of the lesson, Ms. Rock asks students to work with a partner to generate things to remember. She then elicits individual contributions, and she records them on the "Things to Remember" chart.

Using the Principle With District-Adopted Materials

Teaching Practice 1: Anticipate student solutions and plan ways to elicit ideas related to the learning goals.

To prepare for the lesson shown in the video, Ms. Baker identified three lesson goals:

- Practice showing subtraction in different ways, such as part/part/whole, distance on a number line, take away.
- Use other words for subtraction, such as minus, take away, difference.
- Review the meaning of equality.

She selected a subtraction problem from her district-adopted materials as the starter problem:

18 – 8 = __

To apply the Capturing Key Ideas principle, Ms. Baker said,

> I used the lesson goals to map out specific examples of solutions that I want students to generate and put on the board. It really seems important to anticipate solutions that incorporate drawings or materials. Visual representations add a whole other dimension to the discussion. I also write questions to ask related to the lesson goals. I can use these questions to stimulate thinking as I walk around the room while students work on their solution or representation. I find it helpful to make a note of what

might be recorded or labeled to call attention to particular ideas or aspects of the solution or representation.

Teaching Practice 2: Elicit, develop, and record key ideas selectively during class discussion.

Now you will see video segments from a 30-minute subtraction lesson in Ms. Baker's classroom.

In the opening segment, Ms. Baker writes a problem on the board, asks students to solve it individually, and then asks them to discuss their solutions in pairs. As students work, she walks around the room planting seeds for generating the solutions and representations she wants to have presented at the board later. She also notes which students to call on to present their ideas during the whole-class discussion.

To open the whole-class discussion, Ms. Baker asks Kate to read the problem aloud and writes what she says—in words—under the number sentence.

The next segment shows how Ms. Baker elicits, develops, and calls attention to key mathematical ideas presented on the board by students. She begins by asking students to talk about what "equals" means. She invites students to come to the board and explain their solutions.

In the final segment, Ms. Baker asks Kate to explain what she drew. She then labels Kate's drawing with the word "subtract." Notice that Ms. Baker had also previously labeled Juan's and Ajay's solutions.

Teaching Practice 3: Use recorded ideas to recap and summarize.

Ms. Baker takes time in the middle of the lesson to recap what the class has discussed so far, using the public record of the discussion to emphasize important ideas. Then she asks students to work in pairs to talk about other solutions.

Toward the end of the lesson, Ms. Baker again takes time to use students' recorded and labeled ideas to summarize the discussion. She then elicits things to remember from students after having them first talk with a partner. As needed, she prompts students to clarify, elaborate, and articulate the mathematical ideas that are important for the goals in this lesson.