

# DOINGWHATWORKS



## PRESENTATION

5:25 min

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## Coach Talk: Preparing for Problem Solving

Papillion-La Vista School District, Nebraska  
November 2011

**Topic** IMPROVING MATHEMATICAL PROBLEM SOLVING IN GRADES 4 THROUGH 8

**Practice** PREPARE PROBLEMS

- Highlights**
- » Elementary mathematics coaches Jane McGill and Danielle Inserra discuss the importance of problem solving in learning mathematics.
  - » The selection of problems needs to be strategic, centering on content and skills that students need to attain.
  - » Teachers use routine and non-routine problems to determine students' proficiency in replicating or applying mathematics content and skills.
  - » Teachers need to consider students' experiences when planning for problem solving in order to help students develop visual representations for their thinking process. Also, it is important for teachers to analyze the mathematics content in problems.
  - » McGill and Inserra talk about planning questions for classroom discussions to help students understand concepts and to challenge or further their thinking on the problem.
  - » Both coaches comment on various sources to locate suitable or adaptable problems for the classroom.

## About the Sites Papillion-La Vista School District

### Carriage Hill Elementary School Papillion, Nebraska

#### Demographics

- » 78% White
- » 12% Hispanic
- » 5% Black
- » 1% Asian
- » 1% Native American
- » 37% Free or Reduced-Price Lunch

Carriage Hill Elementary School in the Papillion-La Vista School District strives to meet the needs of all students using the district's rigorous math curriculum. Mathematics instruction focuses on:

- » Problem solving;
- » Using math in everyday situations;
- » Communicating mathematical solutions and explaining the reasoning behind these solutions;
- » Hands-on experiences using a variety of manipulatives to build math understanding; and
- » Asking questions and investigating solutions so students explore and discover in problem situations.

### Patriot Elementary School Papillion, Nebraska

#### Demographics

- » 89% White
- » 4% Hispanic
- » 3% Black
- » 1% Asian

- » 1% Native American
- » 5% Free or Reduced-Price Lunch

Patriot Elementary School in the Papillion-La Vista School District strives to meet all students' needs through a rigorous district math curriculum focusing on:

- » Problem solving;
- » Using math in everyday situations;
- » Communicating mathematical solutions and explaining the reasoning behind these solutions;
- » Hands-on experiences using a variety of manipulatives to build math understanding; and
- » Asking questions and investigating solutions so students explore and discover in problem situations.

## Full Transcript



### Slide 1: Welcome

Welcome to Coach Talk: Preparing for Problem Solving.



### Slide 2: Introducing Jane McGill and Danielle Inserra

**Jane McGill**

My name is Jane McGill, and I am a K-6 mathematics coach in the Papillion-La Vista School District at Carriage Hill Elementary.



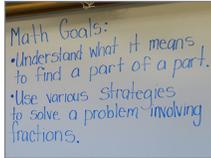
**Danielle Inserra**

And I am Danielle Inserra, a K-6 math coach in the Papillion-La Vista School District at Patriot Elementary in Papillion, Nebraska.



### Slide 3: Importance of problem solving

**Inserra** Problem solving is such an important part of learning mathematics, teaching them to be able to persevere through a problem, to be able to not give up, and if their way of thinking isn't working, to be able to adjust to that and to be able to self-reflect.



### Slide 4: Selecting suitable problems

**Inserra** When selecting problems for students to solve, it's important to carefully select those problems because each problem should have a purpose to it. It should be on the way to reaching a goal. So you have a goal in mind, and you carefully select those problems so that students are able to reach that goal.

**McGill** Selecting the problem needs to be very strategic. You want to be strategic about those skills that you are trying to teach them. It's really important when you are looking for suitable problems, look back at what students might already know and what you want them to reach. So you need to look at skills that they can bring to the problem.



### Slide 5: Routine and non-routine problems

**Inserra** It's critical to have a variety of problems—some routine, some non-routine. If the problem is routine, you have been practicing these strategies and this learning that's developed and you want to be able to see if students are able to apply that learning on their own and be able to solve problems in a similar fashion. Non-routine problems are also important so that students are able to show their current knowledge and maybe apply things that they haven't been specifically taught. You can see their level of understanding and their depth of understanding.



## Slide 6: Content and student experiences

**McGill** As a coach, when I am planning a lesson with a teacher, we do take into consideration their experience as far as the context, the vocabulary knowledge, making sure that teachers have the background: “Where have my students been?” “What are they bringing with them?” “What strategies have I taught them to use?” and “Where is it going?”

I think it’s really important to analyze the mathematic content that a problem has because you want to make sure it reaches all your students. Just knowing your students really well, and knowing their content knowledge, too, and also “Where are their gaps?” If you know your students well enough, you know where their specific content gaps are.



## Slide 7: Represent thinking

**Inserra** We think about how we can make that concept into a concrete concept if it’s not currently, how can we bring out those manipulatives to help create that vision of that concept. It seems that that’s where students struggle, is taking it to the abstract too quickly or too fast and not really having that understanding. And being able to represent their thinking is important, because as teachers, it gives us that insight into their thinking process.



## Slide 8: Questioning and prompts

**McGill** I think as we are planning with teachers it’s really important to talk about the kinds of questions and the questioning that you are going to do with your students: “How are you going to get your students involved? What is it you’re going to say? What kind of talk moves can you use to get those kids into the conversation?” Problem solving is having the discourse and good conversation within the classroom: “Are you going

to re-voice? This would be a good time to re-voice at this point.” Or maybe you have got students that have some misconceptions: “Maybe I need to have some other students agree or disagree.”



## Slide 9: Planning for questions

**Inserra** As I am planning with teachers, if we don't have that discussion on questions, then sometimes you see a discussion with very little questioning if they are not thinking ahead of that. So within your planning time, planning those questions and deciding, “If I have a student who is not understanding this, what kinds of questions am I going to ask to get them to understand the concept?” Or “If I have a student who is showing that they understand, what questions am I going to ask to challenge them or to further their thinking?” But the part of planning the questions is so critical, to have those thought of ahead of time so that when you are in the moment, you don't have to stop and try thinking or you lose your kids at that time.



## Slide 10: Finding suitable problems

**Inserra** You might want to begin with looking at your current curriculum and then looking at other resources.

**McGill** A lot of our professional magazines that we read have lots of good problem solving in them, asking teachers if they have other problems that would be suitable.

**Inserra** Different publishing companies and educational websites offer lots of different problems that you could adapt to fit the needs of your students.



## Slide 11: Learn more

To learn more about Preparing for Problem Solving, please explore the additional resources on the Doing What Works website.

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