

PD Support Materials

Visual Representations

Directions for Using the Overview Slideshow

Each Instructional Strategy Guide contains an overview slideshow that sets the context for the evidence-based practices that are presented in Teach with Tech and illustrated in the Lesson in Action. It also identifies ways to differentiate instruction based on the Universal Design for Learning (UDL) principles. Discussion questions are embedded in each slideshow.

PD Goals

- ▶ To set a context for delving into Teach with Tech and the Lesson in Action
- ▶ To elicit prior knowledge and build background knowledge

PD Materials

- ▶ The slideshow within the Instructional Strategy Guide
- ▶ Discussion questions (embedded within the slideshow and provided as a handout below)

PD Activity

- ▶ Ask teachers to review the slideshow (either before or during the session)
- ▶ Elicit conversation using discussion questions
- ▶ As a follow up, share key ideas

See the PD Facilitator Guide for related activities to support ongoing professional learning.

Discussion Questions for the Visual Representations in Math Slideshow

DISCUSSION QUESTIONS

1. When you introduce your students to visual representations, what are the key elements that are important to highlight?
2. How can you use visual representations to support your students as they solve problems?
3. How can you use visual representations to support your students' learning and understanding of mathematical concepts?

DISCUSSION QUESTIONS

1. How does the use of visual representations support the CCSS Mathematical Practices and the UDL principles?
2. How have you used technology to differentiate instruction to construct and use visual representations?

DISCUSSION QUESTIONS

1. What challenges have your students had when using visual representations?
2. How do you help your students to determine an appropriate visual representation for a particular problem or situation?
3. How can you use visual representations as a response to student difficulties or misconceptions?

Directions for Using Teach With Tech

Each Instructional Strategy Guide contains a Teach with Tech section, which presents suggestions for differentiating evidence-based practices and personalizing instruction using a range of technology tools.

PD Goals

- ▶ To examine and discuss evidence-based practices in terms of:
 - What they are and how they can be used to differentiate instruction
 - How technology tools can be integrated to further meet the needs of struggling students
- ▶ To generate additional instructional strategies based on the needs of your students and the technology tools that are available in your school

PD Materials

- ▶ Teach with Tech (which is located within the Instructional Strategy Guide). This can be:
 - Distributed as a handout
 - Projected onto a large screen
 - Viewed on laptops, tablets, and other devices
- ▶ A companion chart (below), titled ***Differentiate the Strategy***. The chart is divided into three columns:
 - The left-hand column, “Evidence-Based Practices,” is divided into three sections, one for each of the three headings of evidence-based practices.
 - The middle column, “PowerUp Suggested Strategies,” lists the strategies presented within PowerUp.
 - The right-hand column, “Differentiating Instruction with Technology,” is blank so that it can be used to record ideas brainstormed by the group of teachers in your school.

PD Activity

- ▶ Review Teach with Tech (contained within the Instructional Strategy Guide)
 - Review the strategies under the three evidence-based practice headings
 - Discuss how relevant they are to your students’ needs
 - Compare them with current classroom practices
 - Identify new ideas that could be implemented
 - Discuss the accompanying Quick Views
 - Explore and discuss the identified UDL Guidelines
- ▶ Introduce the companion chart titled ***Differentiate the Strategy***
 - Collaboratively (in small groups or pairs) brainstorm ideas to include in the right hand column (“Differentiating Instruction with Technology”) by:
 - Exploring possible technology tools available in the school
 - Sharing ideas
 - Identify what it would take to implement these ideas in the classroom

See the PD Facilitator Guide for related activities to support ongoing professional learning.

Differentiate the Strategy: Visual Representations in Math

Evidence-based Practice	PowerUp Suggested Strategies	Differentiating Instruction with Technology
Provide Clear Explanations	Check students' understanding of a visual representation to determine a starting point. Ask them about features, including labels and scales when appropriate. Review any features they are unsure of and encourage them to ask questions.	
	As students use a variety of online tools to create visual representations, ask questions about the format of the representation to ensure that students understand all the features.	
	Some representations, such as graphs, use more than one dimension. Highlight for students—or have students tell you—what each dimension represents. When your students first learn how to use a representation, you may need to do this each time they use it. As students become familiar with the representation, you can check in with them to make sure they can interpret the dimensions.	
Give Students Strategies and Models	When possible, include alternative visual representations and discuss the similarities and differences between the representations. This will help your students to move more easily from one representation to an alternative they prefer. It will also help them recognize limitations in one visual representation that may not appear in others.	
	Vary the shapes and orientations of representations so that students focus only on the important features as they learn about the objects and situations represented.	
	When you introduce a visual representation for a task, explain the connection between the problem and the representation. Use the same language with the representation that the problem uses.	
Provide Ongoing Formative Assessment	Show your students a specific representation—a graph or table—that is missing an important feature. Ask them to identify the missing feature. For example, they should be able to identify when a graph has no scale indicated on an axis, or that the quantity represented by the axis is missing.	
	When students get stuck as they try to interpret a visual representation, ask questions that guide their thinking. Questions may help you to discover the source of a student's confusion. Prompt the student to focus on the information the visual representation provides.	
	Consider each student's needs and learning styles when you decide which actions to take to move students closer to the learning goals. Give students time to ask you questions, share their thinking, and respond to the feedback you provide.	

Directions for Using the Lesson in Action

Every Instructional Strategy Guide includes one or more Lessons in Action. Each lesson provides a classroom example of the relevant evidence-based practice. The example illustrates how a teacher aligns instruction with the Common Core State Standards, differentiates instruction to meet the needs of her diverse students, uses technology to personalize learning, and engages in formative assessment.

PD Goals

- ▶ To analyze the Lesson in Action and reflect on current teaching practice
- ▶ To provide teachers with a foundation for their own lesson planning

PD Materials

- ▶ The Lesson in Action you selected from the Instructional Strategy Guide, which can be:
 - Distributed as a handout
 - Projected onto a large screen
 - Viewed on laptops, tablets, and other devices
- ▶ The companion handout (titled **Scavenger Hunt**), which can also be distributed as a handout, projected onto a large screen, or viewed on devices

PD Activity

- ▶ Analyze and discuss the Lesson in Action
- ▶ Use the **Scavenger Hunt** handout to discuss how the teacher is:
 - Aligning the lesson with the Common Core State Standards
 - Employing the strategies suggested in Teach with Tech
 - Using technology to support struggling students
 - Personalizing instruction through differentiation
 - Translating UDL principles into action
- ▶ Compare the Lesson in Action with current practice in your school and classrooms
- ▶ Identify the new ideas the Lesson in Action offers for using:
 - Evidence-based practices
 - Differentiated instruction and UDL
 - Technology tools
- ▶ Use the Lesson at a Glance for lesson planning:
 - Discuss the sequence of the instructional steps: What? Why? How?
 - Discuss how the instructional steps can be used as a basis for lesson planning
 - Create a modified lesson plan to meet student needs by working individually or in collaboration

See the PD Facilitator Guide for related activities to support ongoing professional learning.

Scavenger Hunt



Within the Lesson in Action, can you find an example of how the teacher...

1. Aligns instruction to meet the Common Core State Standards?
2. Uses one of the Teach with Tech suggested practices?
3. Uses technology to support struggling students?
4. Personalizes instruction through differentiation?
5. Translates UDL principles into action?

If you can't find an example, what would you have done?