PD Support Materials

Supporting Science

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 Supporting Science Slideshow

DISCUSSION QUESTIONS

1. Do your students already know the necessary math skills for a science lesson, or is it taught during the lesson?

2. What strategies (e.g., thinking aloud, organizing, modeling, visual representations, precise language, peer interaction, and/or solving problems) help students use math in science?

3. In what ways do your students struggle to apply math when doing science?

DISCUSSION QUESTIONS

1. How can you use CCSS Mathematical Practices and the UDL principles to enhance students' application of math to science?

2. How do you build differentiation into teaching students to use math when doing science?

3. How have you used technology to differentiate instruction?

DISCUSSION QUESTIONS

1. What are some methods you have used to effectively expand students' understanding of why and how to use mathematics in science?

2. How do you teach students to analyze and interpret data?

3. What technology tools have you used to support gathering and analyzing data?

Directions for Using Teach With Tech

Each Instructional Strategy Guide contains a Teach with Tech section, which offers 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," which is divided into three sections (one for each of the three evidence-based practice headings)
- The middle column, "PowerUp Suggested Strategies," which lists the strategies presented within PowerUp
- The right-hand column, "Differentiating Instruction with Technology," which has been left 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 each of 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: Supporting Science

Evidence-based Practice	PowerUp Suggested Strategies	Differentiating Instruction with Technology
Provide Clear Explanations	Help students understand that a good scientific question is one where you can investigate phenomena and predict outcomes (answers) based on patterns. Have students consider how mathematics could aid in their investigations.	
	Emphasize big ideas—those that have explanatory power within and across scientific disciplines and can connect to real world problems. Mathematics can help make these connections by describing behavior, using language that can transfer across subjects. (See UDL Checkpoint 7.2: Optimize relevance, value, and authenticity).	
	Tap students' prior knowledge to describe the problem at hand and foster interest. (See UDL Checkpoint 3.1: Activate or supply background knowledge).	
Give Students Strategies and Models	Help students select and use appropriate representations to reveal patterns and make sense of phenomena. (See UDL Checkpoint 2.5: Illustrate through multiple media.)	
	Help students understand that error is a regular part of scientific experimentation. They need to be able to determine why an error might be occurring and how to account for it (e.g., incorrect measurement, limitations in measuring tools, imperfect models).	
	Give students the opportunity to step back and reflect on how using tools to investigate, identify patterns, and develop theories contributes to the accumulation of scientific knowledge. (See UDL Checkpoint 3.4: Maximize transfer and generalization).	
Provide Ongoing Formative Assessment	When providing students with positive and substantive feedback to correct misunderstandings, use language that emphasizes the underlying mathematics. (UDL Checkpoint 8.4: Increase mastery-oriented feedback).	
	Ask questions to guide students' thinking about the use and significance of mathematics in a scientific context. Support their efforts to understand by explicitly asking about the connections between data and concepts.	
	Consider each student's needs and learning styles when you decide which actions to take to move students closer to learning mathematics/science goals. Use technology tools, where appropriate, to assist in giving feedback and to encourage students to ask questions and share thinking.	

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?