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DISSECT: A Framework for Effective Inclusive Instruction in Science

Jenny Sue Flannagan, Regent University
Lucinda S. Spaulding, Liberty University

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A Framework for Effective Inclusive Instruction in Science

Jenny Sue Flannagan, Ed.D., *Regent University*
Lucinda S. Spaulding, Ph.D., *Liberty University*
Significance of this session

- Science instruction is often secondary to improving literacy and math skills (Scruggs, Mastropieri, Okolo, 2008)

- However, NCLB (2001) and IDEA (2004) stipulate that students with disabilities must have access to the general education curriculum, and hold schools responsible for assessment.

- But most importantly . . .
The opportunity to learn!
Essential Questions

- How can special education and general education teachers **collaborate** to effectively include students with disabilities in the general education curriculum?

- How can teachers **effectively plan** to ensure all students succeed in science?

- What are **research based best practices** for teaching science in inclusion classrooms?
K-U-D for Session

- **Know**
  - Strategies for including students with disabilities in the general education science curriculum

- **Understand**
  - What the research says about effective instructional practices

- **Do**
  - Develop lessons that are based on best practices so *all* children learn science
But first…

… let’s do some science!
Properties of Objects

- Using your eyes, what words can we use to describe our crystals?
- Using your ears, do you hear anything?
- Use your nose, do the crystals smell?
- Use your hand, what words can we use to describe how the crystals feel?
Make Observations:

<table>
<thead>
<tr>
<th>See</th>
<th>Hear</th>
<th>Smell</th>
<th>Feel</th>
<th>Taste</th>
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</table>
| What size is it? | Do you hear a sound? | Does it smell/odor? | Does it feel soft/hard? | Does it feel light or heavy? | X  
| What shape is it? |               |               |                |       |
Connections

It reminds me of ____________________
because ____________________________.
What are you curious about?
What happens when we put these crystals in water?

- What steps could we take to find out?

- Think-Pair-Share
What did you find out?

- *Before* we put the crystals in water?
- *After* we put the crystals in water?
Change

- Does change always happen slow or fast?
- What could we change about our materials that might affect how fast or slow the crystal changes?
<table>
<thead>
<tr>
<th>Crystal</th>
<th>Water</th>
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What could we observe?
Did changing the temperature make a difference on how fast the crystals changed?
| Start with how things are the same or similar. | The _____ and the _____ are the same because they both ___________. |
| Add more details as needed. | In addition, they both _______________. |
| Explain how they are different. You can compare the same property or characteristic in the same sentence. Use “and”, “but”, or “whereas” to set up the contrast. | They are different because the _____, but the _____ does not. |
| Add more detail as needed. | Also, the __________, whereas the ________________ does not. |

Betsy Rupp Fulwiler
DIS$_2$ECT

A Framework for Effective Inclusive Instruction in Science
D I S E C T

Design (Backwards)

Individualization

Scaffolding

- Strategies

Experiential learning

Cooperative Learning

Teaming
Backward Design
(Wiggins & McTighe, 2006)

- 1) Identify learners
  - Disabilities/IEPs, SES, learner profiles, interest inventories, student records, etc.

- 2) Identify curricular priorities
  - State and local standards, essential questions/big ideas, assess prior knowledge and skills

- 3) Design assessment framework
  - Performance tasks, oral/written prompts, tests/quizzes, informal assessments, (observations, activities, discussions, questions)

- 4) Create learning activities
  - Design and sequence learning activities
  - Check for integration of accommodations

(See also Childre, Sands, & Pope, 2009)
Individualization: The Centerpiece of Special Education

Characteristics of Students with Disabilities

- Difficulty with inductive and deductive thinking skills (which are associated with scientific reasoning)
- Often reading below grade level (and therefore below the level of the textbook)
- Require significant practice, repetition, feedback, and reinforcement
- Limited independent study strategies

Ways to Individualize/Differentiate

- Differentiating Unit
  - Content
  - Process
  - Product
- By
  - Readiness
  - Interest
  - Learning Profile

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<tr>
<th><strong>Scaffolding</strong></th>
<th><strong>Strategy Instruction</strong></th>
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<tr>
<td>- Text enhancements</td>
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<td>- Graphic organizers</td>
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<td>- Framed outlines</td>
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<td>- Mnemonic illustrations</td>
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<td>- Peer tutoring</td>
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<td>- Cooperative learning</td>
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<td>- Higher order questioning</td>
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<td>- Coached elaborations</td>
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<td>- Word walls</td>
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<td>- Pre-teaching essential vocabulary</td>
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<td>- Strategic tutoring</td>
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<td>- Meta-cognitive strategies</td>
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<td>- Self-monitoring</td>
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<td>- Self-regulation</td>
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<td>- Self-questioning</td>
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<td>- Independent study strategies</td>
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<td>- Summarization strategies</td>
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<td>- Main ideas</td>
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<td>- Lists</td>
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<td>- Sequences</td>
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<td>- Self developed mnemonics</td>
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Moving from Dependence to Independence through Support

Modeled
Interactive
Shared

I Do
You Watch
I Do
You Help
You Do
I Help
You Do
I Watch

I Do
You Help
Guided
Independent

Flannagan, 2006
Autonomy
Experiential learning

- Inquiry based instruction
- Constructivist and student centered
- “hands on” science curriculum
- An emphasis on concrete, meaningful experiences (see Scruggs, Mastropieri, & Okolo, 2008)

“Many students with high-incidence disabilities will perform similarly to normally achieving students on a constructivist science task, even though they are far behind in reading and math achievement”

(Mastropieri et al., 2001, p. 131)
Cooperative Learning

- Types of Grouping
  - Homogeneous
  - Heterogeneous

- Benefits
  - Academic and social

- Activities
  - Think-Pair-Share
  - Jigsaw
  - Numbered Heads Together
  - 3 Minute Interview
  - Round Robin Brainstorming

- Peer tutoring
  - Benefits for both the tutor and tutee
  - Training and monitoring necessary
Teaming

- **Collaborative Teaming:**
  - “Two or more people working together toward a common goal” (Snell & Jannney, 2000, p. 3)

- **Effective collaboration:**
  - is based on *mutual goals*
  - Requires *parity* among participants
  - Depends on *shared responsibility* for *participation* and *decision-making*
  - Requires *shared responsibility for outcomes*
  - Requires that participants *share their resources*
  - Is a *voluntary* relationship
Teaming Strategies

- Complementary instruction
- Team teaching
- Supportive learning activities
- Parallel teaching
- Alternative teaching
- Station teaching
Design (Backwards)
Individualization
Scaffolding
  ▪ Strategies
Experiential learning
Cooperative Learning
Teaming
Research on inclusion

- “Evidence from inclusive classroom ecologies suggests that individualized instruction for students with disabilities is infrequent and often provides more to accommodate teachers than learners” (Crockett & Kauffman, 1999, p. 148)

- Summarizing a meta-analysis (Kavale & Forness, 2000) on inclusion:
  - The inclusion classroom is generally viewed as “a setting essentially devoid of special education” (p. 283).
  - “Given the magnitude of associated effects, it was evident that placement per se had only a modest influence on outcomes” (p. 282).
Inclusion

- Simply placing students with special needs in a general education setting is *not* inclusion.

- Inclusion is *educating* students with special needs in a general education setting.

- Focus should be on *what* not *where*!
Resources


Resources


