Differentiated Instruction for Building Blocks

Boston Ready
Professional Development for Teachers
December 12, 2008
Group Norms

- Be on time
- Respect all opinions
- Listen
- No sidebar conversations
- Turn off cell phones
Revisit Work Plans

- Assemble in coaching cohorts.
- Coach will establish time allotted for each teacher to speak.
- Use the Work Plan Sharing Protocol for your discussion.
Session Goals

At the end of this session participants will be able to:

- Use record sheets to inform instruction
- Differentiate instruction by scaffolding for individual learners
- Utilize mixed grouping
- Implement instructional strategies that focus on math as a process
- Maximize instructional partners’ role in Building Blocks implementation
Math continuum

- Line up according to your comfort with math.

phobic

genius
Discuss

How did instruction you received – or didn’t receive – lead to where you are and how you feel about math?

Count off by five - write number on your name tag.
Tangrams

- Work **independently** on a solution - 5 minutes
- Regroup
- Each member explain your answer and how you came to it.
- Avoid cross talk - give each individual the opportunity to share how they approached the problem.
- Come to a consensus about how your group approached the problem
- Report to the large group
Make a rectangle

• A piece of wire 42 cm long is bent into a rectangle whose width is twice its length.
• Find the dimensions of the rectangle.
• Work independently on a solution - 5 minutes
• Regroup
• Come to a consensus about how your group approached the problem
• Report to the large group
Number & Operations
- Numbers can be used to tell us how many, describe order, and measure; they involve numerous relations, and can be represented in various ways.
- Operations with numbers can be used to model a variety of real-world situations and to solve problems; they can be carried out in various ways.

Algebra
- Patterns can be used to recognize relationships and can be extended to make generalizations.

Geometry
- Geometry can be used to understand and to represent the objects, directions, locations in our world and the relationships between them.
- Geometric shapes can be described, analyzed, transformed, and composed and decomposed into other shapes.

Data Analysis
- Data analysis can be used to classify, represent and use information to ask and answer questions.

Measurement
- Comparing and measuring can be used to specify "how much" of an attribute (e.g., length) objects possess.
- Measures can be determined by repeating a unit or using a tool.

Communication

Problem Solving

Connections

Representation

Reasoning
Process Standards

- Problem solving
- Reasoning & Proof
- Communication
- Representation
- Connection
Reflection on Content and Process Standards

• Reflect individually

• Describe the multiple ways you could apply the Process Standards to explain the solution to others.
Differentiated Instruction
What do you take away from this activity?
What Research and Literature Tell Us
How To Teach or Learn Anything 8 Different Ways

- words
- pictures
- numbers or logic
- self-reflection
- a physical experience
- a social experience
- music
- an experience in the natural world
Using Multiple Intelligences to Support Mathematical Learning

- Linguistic
- Logical-mathematical
- Spatial
- Bodily-kinesthetic
- Musical
- Interpersonal
- Intrapersonal
- Naturalistic
“It’s not necessarily how much adults talk to children that makes the difference, it’s how well they talk.”

- David Dickinson
Talking well with children includes…

- Use of decontextualized language (beyond the here-and-now; past and future events, ideas, images, and explanations).
- Exposure to rich vocabulary/rare words
- Content-based instruction
Universal Design for Early Childhood Education

Multiple Means of Representation

Multiple Means of Expression

Multiple Means of Engagement
Grouping
Cooperative Learning

“A group learning activity organized so that learning is dependent on the socially structured exchange of information between the learners in groups, in which each learner is held accountable for his or her own learning and is motivated to increase the learning of others.”

Roger, Olsen & Kagan, 1992
Facilitate Discourse

- Create an environment where students feel secure and comfortable to share beliefs, ask questions, hypothesize, make mistakes
- Ask questions that have no incorrect answers
- Arrange seats in a circle
- Let students discuss ideas with a partner before sharing with entire group
- Give students opportunity to think about problems before sharing with classmates.
Competencies Children Gain Through Play

- Representational competence
- Oral language and narrative understanding
- Positive approaches to learning
- Logic
- Self-regulation and social negotiation

- Problem solving
- Reasoning & proof
- Communication
- Connections
- Representation

NCTM Process Standards
Ways to Observe and Support Math Learning

- Promote problem solving
- Recognize difficulties in mathematical thinking
- Promote use of mathematical language
- Provide a rich variety of materials and support
- Guide and observe children’s play and exploration to take advantage of teachable moments
- Engage children in projects
- Teach intentionally
- Broaden learning opportunities to include outdoor play
10 Key Strategies for Early Childhood Teachers

1. Enhance children’s natural interest in mathematics
2. Build on children’s experience and knowledge
3. Base curriculum and teaching on child development
4. Use curriculum and teaching practices that strengthen problem-solving, reasoning, representing, communicating, and connecting mathematical ideas
5. Ensure that curriculum is coherent and compatible with known mathematical ideas
Key Strategies (cont.)

6. Provide for deep and sustained interaction with key mathematical ideas
7. Integrate mathematics with other activities
8. Provide ample time, materials, support for play
9. Actively introduce math concepts, methods, and language
10. Thoughtfully and continually assess mathematical knowledge, skills, and strategies
Classroom Assessment

- Document, document, document!
- Observe children’s manipulation of objects and use of language in play experiences
- Extend and expand thinking with prompts
- Look for: understanding of addition or subtraction, comparing sizes, creating/extending patterns, one-to-one correspondences, measuring skills, sorting and classifying, concepts of more/less
- Listen to children’s processing
- Provide multiple means of representation
The Role of Instructional Partners in Math Instruction

Ideally, what would your instructional partner know to support math instruction?
The Role of Instructional Partners in Math Instruction

Ideally, what would your instructional partner do to support math instruction?
The Role of Instructional Partners in Math Instruction

Ideally, what would your instructional partner say to support math instruction?
Instructional Partner Professional Development

You will see Instructional Partners:

• Using mathematical language with children throughout the day
• Asking questions that promote children’s problem solving
• Allowing children “wait-time” to process before answering
• Following up on mathematical concepts throughout the day
• Being comfortable doing at least 3 BB activities
Lunch
Using Small Group Record Sheets

• What information is missing about the child?
• What else do you want to know about the child?
• How will you find out?

Cameron
Kyle
Jillian
Differentiated Instruction Worksheet

Big Ideas

Week 14
• Shape identification
• Shape matching
• Shapes in the environment

Week 15
• Shape matching
• Shape identification

Small group activities
• Shape pictures (composing activity)
• Guess my rule with shape sets
• Feely box match and name shapes
Debrief in Small Group

• Share instructional strategies.
• Discuss ideas for extending learning.
• Identify opportunities to revisit prior learning.
• What vocabulary will you model?
• How will you promote understanding, application, reasoning, and engagement?
Language prompts

• Each group work on an activity and develop language prompts for week 14 and 15 based on the Process Standards

• Language prompts should:
  – Build vocabulary
  – Facilitate math concept understanding
  – Promote problem solving
Developing a Work Plan

Coaches will see teachers:

• Using record sheets to inform instruction
• Developing the next learning goal for each child
• Differentiating instruction by scaffolding for individual learners
• Implementing instructional strategies that focus on math as a process
• Developing strategies for maximizing instructional partners’ role in Building Blocks implementation
Using Small Group Record Sheets

Using your Small Group Records Sheets, reflect on and record on your Work Plan:

– What does each student know?
– What is the next step for each child?
– What activity will support achieving each goal?
What will coaches see?

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• Using record sheets to inform instruction
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Classroom books

Math Counts: Shapes by Pluckrose & Choose

Math Counts: Patterns by Pluckrose

Seven Blind Mice by Young