

INTEGRATING LITERACY STRATEGIES IN MATH AND SCIENCE

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In My Garden...

- ◎ Jot down concepts and skills...
 - Math
 - Science
 - Language
 - Literacy

- ◎ Make groups of 4.
 - Introduce yourselves!
 - Discuss what you observed and add to your lists.

Big Ideas...

Math, science, and language and literacy are connected and interrelated:

Math skills help us with science,

Science skills help us with math, and

Language and literacy skills help us in all areas.

Building skills and content in any one of these areas naturally builds skills and content in the others.

Top Kindergarten Readiness Skills

- ⦿ Enthusiasm Toward Learning
- ⦿ Solid Oral Language Skills
- ⦿ Ability to Listen
- ⦿ Desire to Be Independent
- ⦿ Ability to Play Well With Others
- ⦿ Strong Fine Motor Skills
- ⦿ Basic Letter and Number Recognition

Literacy Skills

What about
English
Learners?

- ◎ Vocabulary development
- ◎ Conversational skills
- ◎ Knowledge of language structure
- ◎ Phoneme awareness and manipulation
- ◎ Letter recognition
- ◎ Phonics
- ◎ Concepts of print
- ◎ Appreciation and enjoyment of reading and books

10 Reasons to Use Picture Books to Introduce and Teach Math and Science

1. They provide a story context for concept understanding.
2. They suggest manipulatives for a variety of investigations.
3. They pose problems that can be explored using varied strategies.
4. They encourage the use of math and science language (and language in general).
5. Story situations can be modified to develop math and science thinking.

10 Reasons to Use Picture Books to Introduce and Teach Math and Science

6. They enhance phonological awareness through repetitive patterns and rhymes.
7. They introduce complex sentence structures.
8. They engage children in many modalities.
9. They encourage children to deepen concept understanding by recreating and retelling stories in their own way.
10. They help children make sense of their world.

Math Standards

CA Preschool Learning Foundations

- Competencies and skills that most children can be expected to exhibit in a high-quality program as they complete their first (48 months) or second (60 months) years of preschool

CA Kindergarten Standards

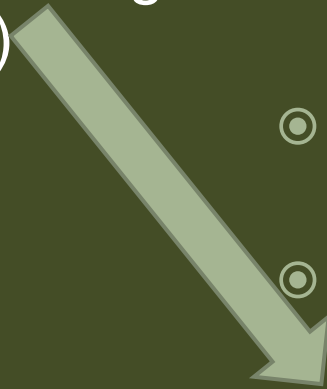
Math Standards

Preschool

- Number Sense
- Algebra and Functions (Patterning & Classification)
- Measurement
- Geometry
- Mathematical Reasoning

Kindergarten

- Number Sense
- Algebra and Functions (Classification)
- Measurement & Geometry
- Statistics, Data Analysis & Probability (Patterns & Graphing)
- Mathematical Reasoning



CA Desired Results Developmental Profile

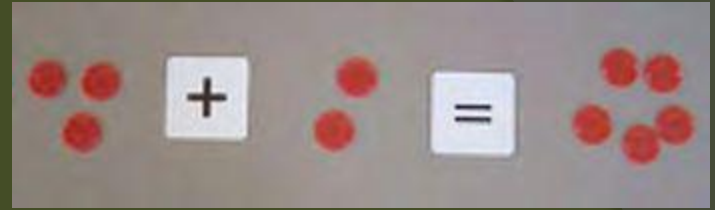
- Preschool, Infant/Toddler and School Age
- A tool for monitoring and supporting student development in mathematical concepts and other developmental areas.
- Web address in resources

Engage!

Questions to ask...

- ⦿ How many of the five senses am I allowing or asking students to use?
- ⦿ How often are students responding and participating actively?
- ⦿ How do I facilitate their use of language in responding?

Number Sense



- ⦿ Counting and meaning of numbers
- ⦿ One-to-one correspondence
- ⦿ Subitizing small amounts
- ⦿ More, less and the same (equal)
- ⦿ Constructing and deconstructing numbers

Number Sense

- ◎ Make numbers part of the daily routine
 - Daily Message
 - Have children “sign in” by moving a nametag or other token from one basket to another. They can count leftover tokens to determine how many are absent.
 - Ask children to set tables with one napkin and one cup per chair.
 - Encourage voting on classroom issues. “Ten people want apples for snack on Friday. Seven want crackers.”

Number Sense

- ◎ Shared writing
- ◎ Individual books
- ◎ Kids create, kids read

- ◎ With your group of four, discuss other number-based books you've made or seen
 - Teacher- or student-created

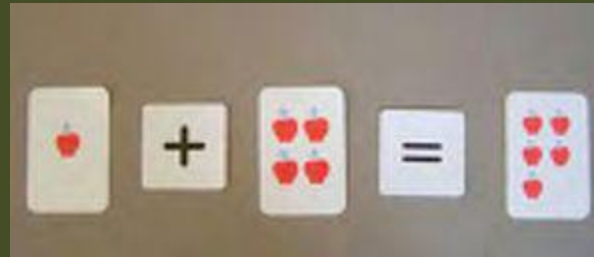
Number Sense

- ◎ Telling number stories
- ◎ Problem solving

- ◎ *Developing Number Sense* series –
Kathy Richardson

Number Sense

- Fingerplays and songs



Patterns and Classifying

- ◎ Recognizing patterns and relationships
- ◎ Using patterns to predict what will come next
- ◎ Vocabulary: *some, all, pair, part, set, category, observe, rule, different, predict*
- ◎ Modeling clear descriptions helps students classify
 - “Is this pillow shiny or fuzzy?”

Pattern Talk

- *Can you copy this pattern? Can you extend this pattern? What comes next?*



- *This pattern is an (AABB) pattern.*

Data and Graphing

- Data from a shape search:
- *What do you notice about our block graph?* I notice _____.
- *Which shape did we find most frequently in our school?*



Graphing Discussion Stems

- ◎ _____ has the most.
- ◎ _____ has the least.
- ◎ _____ has _____ more than _____.
- ◎ Our class chose _____ the most/least.
- ◎ The most frequent response was _____.

Measurement

- ◎ Understand and use words referring to quantities (big, small, heavy, light)
- ◎ Understand and use comparative words (Shorter than, longer than, more than, less than)
- ◎ Imitate use of measuring tools
- ◎ Measure with non-standard units (hands, blocks)
- ◎ Compare objects (Which one is longer?)
- ◎ Begin to use measurement words (inch, pound)

Measurement Activities

- ◎ Class lab book - grow plants and measure, chart and write about how they grow
- ◎ Student growth book – Measure students a few times a year and create a book that includes a chance to record other things about themselves, like favorite foods, activities and new letters they know
- ◎ Recipes – read, cook and eat!

Geometry

- Match, sort, name and describe shapes
- Name and describe shapes in environment
- Combine shapes to make new shapes
- Understand and use location words (over, under, beside, below, near)



Geometry Activities

- ◎ I Spy...
 - Something round on the wall
 - Something with three sides on Tara's shirt
 - Something with four sides that are the same
 - Something shaped like a sphere
- ◎ Play games that involve shapes, spaces and locations
 - Memory/concentration, Beanbag Toss, Tic-Tac-Toe, Hokey-Pokey, Simon Says

Geometry Talk

- ⦿ What other shapes can we make using these shapes?
- ⦿ How can we turn this square sand castle into a rounded one?
- ⦿ How are these two triangles different?

- ⦿ How does the teacher support language development?
- ⦿ How does the teacher support math concept development?

Science Standards

- ◎ What do you notice?
- ◎ Make books
- ◎ Sing songs
- ◎ Seek out literature related to your topic
- ◎ Look for patterns
- ◎ Ask questions and chart the findings

Science

- ◎ Thematic libraries – let librarians help you find books or use booklist links in Resources
- ◎ Observing and writing about the natural world
 - Seasons book – In spring, I see/hear/...
 - Things that roll/Things that don't

More than counting...

Exploring

Creating

Investigating

Questioning

Observing

Comparing

Doing...

This is how we learn!

Resources

- ⦿ Resource Packet for Teachers and Families
- ⦿ Activity calendars
- ⦿ Literacy Environment Checklists
 - Classroom, Family Child Care, Home (Spanish)