Assessment

Consider the following as you develop an assessment strategy that focuses on your students' mathematical thinking:

Student Assessment

- Develop a system to document formal or informal observations of how your students process, organize and use mathematical information (e.g., portfolios).
- *Informal assessment:* Document your observations of the students at work. Note the strategies they use as they work. Observe how the children work independently and during large or small group activities. Save samples of each child's work. Take photographs of the children at work. The *Mathematics Their Way* observation sheets (Blackline Masters I - IX) can be used by the teacher to record observation of students at work.
- *Formal assessment:* You may want to formally assess each student's understanding of specific concepts at the beginning of the school year. The information you gather can be helpful in planning appropriate mathematics experiences for the students in your class. Individual children may be formally assessed throughout the year when more information is needed. The *Math Their Way Summary Newsletter* (Ch. 3) describes eleven assessments for specific concepts.
- *Student self-evaluation:* It's important for children to have opportunities to self-evaluate their work. Ask the whole class, small groups or individual students to share what they think about a particular experience.

  Examples of comments or questions that might come up during a sharing session (The comments and questions may come from the teacher or students involved in the discussion):

  - Share what you liked about _____.
  - Was there anything you didn't like?
  - What was the easiest part of the experience? …hardest?
  - What did you learn?
  - Would you approach the experience differently another time? … if so, how?
  - Is there anything else about _____ you want to explore?

  The students can write explanations and/or draw pictures about their math experiences. Some students keep mathematics journals. You can also record the comments made by the students.
- *Parent Involvement:* A positive attitude about mathematics is attainable when the school and family work together to develop a meaningful math curriculum for young children. Parents (like teachers) can be facilitators, active participants and observers in their child's mathematics education.

  Start the year with a meeting to discuss how mathematics will be approached in the classroom. Discuss the home assignments.

  Provide parents opportunities throughout the year to evaluate their child's overall mathematical experiences.

  - What do you think your child's attitude is about mathematics?
  - Has it changed over the year?
  - What is you child's overall attitude about the home projects?
  - Do you have any suggestions for future home math projects? …school projects?
  - Does your child talk about mathematics? …and so on.

Mathematics Curriculum Development and Assessment

Curriculum that engages children in authentic learning experiences must be flexible and flowing.

- Develop a list of mathematics concepts, processes and problem solving strategies you would like your children to experience while they are with you. Plan classroom experiences that engage the students in a wide range of overlapping topics at the same time. Be flexible! The list is only a starting point for you to plan appropriate curriculum for your children. It will change during the school year, depending on their needs. A curriculum should be flowing and flexible so it can meet the needs of the children.

- Create a mathematics learning environment in which children view themselves as mathematicians. Provide opportunities for children to develop their problem solving strategies (during the mathematics period, other times in the school day and outside the classroom).
- Create a classroom environment where students can explore concepts and processes within the context of meaningful experiences. Be sure to plan a variety of instructional
  - open-ended exploration of concepts
  - small and large cooperative group activities
  - individual activities
  - activities that require home involvement.
- Provide opportunities for children to communicate their problem solving strategies with each other (verbally, in writing, building models and through drawings). Errors should be viewed as a natural part of the learning process.
- Be sure the learning environment provides opportunities for the students to make connections to how mathematics is used in the "real" world. Children should also be encouraged to use their mathematical knowledge in their "real" world.
- Periodically assess whether the curriculum is meeting the needs of your class. Consider what mathematical content areas have been experienced so far. Make a list of the content areas the children have not experienced and the content area(s) you feel need(s) to be reemphasized through different experiences. Evaluate whether the students are developing an understanding of the mathematical processes you planned.

Assessment / Curriculum Development Resources

California State Department of Education. *Mathematics Framework for California Public Schools K-12*. 721 Capitol Mall, Sacramento, California: Bureau of Publications, California Department of Education, Bureau of Publications, 1985.

Labinowicz, Ed. *The Piaget Primer*. Menlo Park, California: Addison-Wesley Publishing Company, 1980.

National Council of Teachers of Mathematics. *Curriculum and Evaluation Standards for School Mathematics*. 1906 Association Drive, Reston, VA: The Council, 1989.

——. *Professional Standards for Teaching Mathematics*. 1906 Association Drive, Reston, VA: The Council, 1989.

National Research Council. *Everybody Counts — A Report to the Nation on the Future of Mathematics Education*. 2101 Constitution Avenue, N.W., Washington, D.C.: National Academy Press, 1989.

——. *Measuring Up: Prototype for Mathematics Assessment* 2101 Constitution Avenue, N.W., Washington, D.C.: National Academy Press, 1993.

——. *Reshaping School Mathematics: A Framework for Curriculum.* 2101 Constitution Avenue, N.W., Washington, D.C.: National Academy Press, 1990.

Pandey, Tej. *A Sampler of Mathematics Assessment*. 721 Capitol Mall, Sacramento, California, CA: California Department of Education, Bureau of Publications, 1991.

Stenmark, Jean. *Mathematics Assessment*. National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA: The Council, 1989.

Whitin, David & Mills, Heidi & O'Keefe, Timothy. *Living and Learning Mathematics: Stories and Strategies for Supporting Mathematical Literacy*. 361 Hanover Street, Portsmouth, NH: Heinemann Educational Books 1990.

Videos

Kuhs, Therese (ed.). *Mathematics Assessment: Alternative Approaches.* 1906 Association Drive, Reston, VA: National Council of Teachers of Mathematics, 1992.

Richardson, Kathy. *A Look at Thinking Video I: Assessing Beginning Number Concepts*. P.O. Box 1524, Norman, OK: Educational Enrichment, Inc., 1990.

—— . *A Look at Thinking Video II: Assessing Number Combinations and Place Value*. P.O. Box 1524, Norman, OK: Educational Enrichment, Inc., 1990.