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Mathematical Literacy:

What Does It Mean for School Mathematics?

The Board of Directors of the National Council of Teachers of Mathematics (NCTM) in 1986 established the Commission on Standards for School Mathematics to:

- Create a coherent vision of what it means to be mathematically literate both in a world that relies on calculators and computers to carry out mathematical procedures and in a world where mathematics is rapidly growing and is extensively being applied in diverse fields and
- Create a set of standards to guide the revision of the school mathematics curriculum and its associated evaluation toward this vision."[1]

The products of this charge were NCTM's three standards documents published in 1989, 1991,[2] and 1995,[3] and its recently published *Principles and Standards for School Mathematics.*[4]

The Challenge of Literacy

The central tenet underlying this charge is that students will become mathematically literate. The term "literacy" was chosen to emphasize that mathematical knowledge and skills, as defined within the traditional school mathematics curriculum, does not constitute NCTM's primary focus. Instead, the emphasis is on mathematical knowledge put into functional use in a multitude of different situations and contexts in varied, reflective and insight-based ways.
Of course, for such use to be possible and viable, a great deal of fundamental mathematical knowledge and skills are needed.

More broadly the term "literacy" refers to the human use of language.[5] In fact, one's ability to read, write, listen, and speak a language is the most important tool we have through which human social activity is mediated.

Each human language and each human use of language has an intricate design that is tied in complex ways to a variety of functions. For a person to be literate in a language implies that he or she knows many of the design resources of the language and is able to use those resources for several different social functions. Analogously considering mathematics as a language implies that students not only must learn the concepts and procedures of mathematics (its design features), but they must learn to use such ideas to solve non-routine problems and learn to mathematize in a variety of situations (its social functions).

The interplay of "design features" and "functions" can be illustrated by the following example (adapted *from Measuring Student Knowledge and Skills: A New Framework for Assessment*[6]).

The Town Council has decided to construct a streetlight in a small triangular park so that it illuminates the whole park. Where should it be placed? This social problem can be solved following the general strategy used by mathematicians, mathematizing, that can be characterized as having five aspects:

1. Starting with a problem situated in reality (Locating where a street light is to be placed in a park).
2. Organizing it according to mathematical concepts (The park can be represented as a triangle, and equal illumination from a light as a circle with the street light at its center).
3. Gradually trimming away the reality through processes such as making