Conjectures

Big Ideas about Conjectures

Conjectures are an important opportunity for students to make implicit knowledge explicit. Children have a great deal of informal knowledge about fundamental properties of mathematics, but they do not often have the opportunity to articulate and examine those ideas.

It is important that students use precise, accurate language when stating mathematical ideas; however, this will rarely happen when an idea is first articulated.

We want students to make conjectures not just for the sake of making conjectures, but because the ideas they make conjectures about are important mathematical ideas: ideas that provide them power to learn new mathematics, to solve problems, and to understand the mathematics they are learning and using.

True/false and open number sentences are often used to elicit conjectures about important mathematical ideas particularly about the basic properties of number operations. The set of conjectures listed in Table 4.1 are essential properties of number operations that are critical for understanding and justifying the basic operations of arithmetic.

Children will often suggest conjectures that are always true for the numbers they know and understand. If children do not have any basis for recognizing the limitations of a conjecture, they are likely to accept it as valid for all numbers, but the conjecture may only be true for the numbers they have studied. It is probably not a good idea to leave children with the impression that a conjecture is true for all numbers when it actually true only for a limited set of numbers.

Children initially use words to state their conjectures. Mathematicians often use symbols to represent mathematical ideas more precisely. Once students have learned the necessary conventions it is desirable to encourage them to replace words with symbols. Thus zero added to any number equals the same number becomes a + 0 = a.

Types of Conjectures that Students Make:
- Conjectures about fundamental properties of number operations
    - Table 4.1
- Conjectures about classes of numbers
    - A whole number is divisible by 5 if it ends in 0 or 5.
- Descriptions of procedures
    - When you multiply by 10, you can add a zero to the right of the number.
- General descriptions of calculations
    - For numbers greater than zero, when you add two numbers the answer is a larger number.
- Definitions -Definitions should not be considered as conjectures because they are true by definition. When suggested by students a distinction should be made between a definition and a conjecture.
    - The following sentence is an example of a definition that student might suggest as a conjecture. If you have an even number of counters, you can divide them into two equal groups and there won't be any left over. This statement represents the definition of an even number. Definitions are arbitrary and can not be justified.