THE FOCUS OF OBSERVATIONS

The understanding of concepts in mathematics is critical to students' present and future success in mathematics. It is important, therefore, that teachers focus their observation on behaviours and demonstrations that indicate the extent to which students understand fundamental concepts. Having a clear focus when observing students helps teachers watch and listen for evidence of learning, and guides them in providing feedback to students on their learning and on areas for improvement.

QUESTIONS GUIDING OBSERVATION OF STUDENTS' KNOWLEDGE AND UNDERSTANDING OF CONCEPTS

How well does the student:

- demonstrate knowledge of mathematical content (e.g., facts, terms, procedural skills, use of tools)?
- demonstrate understanding of mathematical concepts?
- give examples of a concept?
- show and explain relationships between and among concepts?

Related to students' understanding of important concepts are their competencies in three other categories: thinking and solving problems, communicating mathematically, and applying mathematical procedures.

QUESTIONS GUIDING OBSERVATION OF STUDENTS' THINKING AND PROBLEM-SOLVING SKILLS

How well does the student:

- understand the problem (e.g., retell it in his or her own words)?
- make a plan for solving the problem (e.g., select an appropriate problem-solving strategy)?
- carry out a plan for solving the problem (e.g., test ideas, revise strategies, form conclusions)?
- look back at the solution (e.g., evaluate reasonableness, explain and justify a solution, reflect on the solution)?
- use critical/creative thinking processes (e.g., problem solving, inquiry)?

QUESTIONS GUIDING OBSERVATION OF STUDENTS' MATHEMATICAL COMMUNICATION

How well does the student:

- express mathematical ideas and thinking?
- present ideas in oral, visual, and written forms (e.g., using concrete materials, diagrams, numbers, symbols)?
- communicate mathematical ideas for different audiences (e.g., peers, teachers)?
- communicate for different purposes (e.g., to explain a mathematical idea, to present a solution to a problem, to justify a solution)?
- use appropriate mathematical language and symbols?

QUESTIONS GUIDING OBSERVATION OF STUDENTS' APPLICATION OF MATHEMATICAL PROCEDURES

How well does the student:

- apply knowledge and skills in familiar contexts?
- transfer knowledge and skills to new contexts?
- make connections within and between various contexts (e.g., connections between concepts, connections between mathematics and other subjects, connections between mathematics and the real world)?

TYPES OF OBSERVATIONS: INFORMAL AND FORMAL

Significant observations of students' learning are often informal, occurring as teachers and students interact in the course of everyday classroom activities. Watching and listening to students engaged in learning tasks, and keeping the purpose of the tasks in mind, teachers focus their observations on evidence of students' mathematical learning. This form of observation allows the teacher to provide immediate feedback to learners and helps the teacher determine how learning can be reinforced and extended.

> *"Teachers must assess their own growth as well as children's progress in learning mathematics. To evaluate their teaching behaviors and effectiveness, teachers observe, listen, collect, and document children's learning and use this evidence to consider what is working and what is not."*
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> (Copley, 2000, p. 25)