

**MINNESOTA MATHEMATICS TEACHER OBSERVATION FORM (MnMTOI)**  
Fall 2000

Teacher/  
Student Teacher \_\_\_\_\_ Observer Name \_\_\_\_\_

School/Name/District \_\_\_\_\_ University \_\_\_\_\_

Grade \_\_\_\_\_ Subject \_\_\_\_\_ Rm#/Location \_\_\_\_\_ Date of obs. \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Month Day Year

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**OBSERVATIONS**

**I. Knowing Mathematics Content**

**1. What goals and opportunities does the teacher develop so that students attain understanding of the major themes and fundamental concepts of mathematics?**

- Describe the goals and opportunities for students to understand and apply essential mathematical processes of problem solving, mathematical reasoning, communicating, making connections, and modeling and representing (e.g., construct new mathematical knowledge through investigations of problems; apply a variety of effective problem solving strategies to a broad range of situations; analyze, evaluate, extend and generalize results; make and investigate mathematical conjectures; develop and evaluate mathematical arguments and proofs; express mathematical ideas accurately and clearly in oral and written form using appropriate mathematical representations; interpret and construct appropriate models to represent a variety of phenomena; make connections among mathematical ideas and apply mathematics in a variety of contexts.)
- Describe the goals and opportunities the teacher provides students to understand major ideas in mathematics (e.g., number sense and basic number operations patterns, functions and algebra; geometry, spatial sense and measurement; data investigation; randomness and uncertainty; discrete mathematics.)
- Describe the goals and opportunities the teacher provides students to a) understand mathematics as a human endeavor (e.g., develop an understanding of the history of mathematics, the interaction between different cultures and mathematics, a view of mathematics as a dynamic discipline including contemporary mathematical efforts, applications of mathematics in the world beyond the classroom, in their personal lives, in public debates; men and women who have contributed to mathematics; careers and mathematics.)
- Describe the ways in which the mathematical content is either current or of historical importance
- Describe the ways in which the mathematics content is accurate and/or important

**2. What goals & opportunities does the teacher develop so that all students attain understanding of mathematics? (Especially note the highlighted students as indicators of attention to all students.)**

- Describe the ways in which the mathematics content is relevant to the interests of the students

- Describe the ways in which the mathematics content is appropriate to the age of the students
  - Describe ways in which the mathematics content and instruction are modified to meet the needs of the variety of students in the class
- 3. Is the mathematics content that students are expected to learn appropriate?**
- Describe the ways in which the teacher has considered the common misconceptions that students of this age have about the mathematics content
  - Describe the ways in which the prior knowledge of the students is taken into consideration during the planning and implementation of instruction.

## OBSERVATIONS

### II. KNOWING PEDAGOGY

#### 4. In what kinds of mathematics activities does the teacher engage the student?

- Describe the variety of activities in which students engage
- Describe the kinds of mathematics understanding and ability the activities promote (e.g., conceptual understanding, factual recall, problem solving, application, communication)
- Describe how activities are planned (placed in the instructional sequence, time allocated for tasks, use of materials, organization)
- Describe the implementation of the activities (e.g., implementation as planned, rich activities become procedural in nature, activities have potential but are used inappropriately by the teacher, activities get extended based on student interest)

#### 5. In what ways are the activities appropriate for the instructional goals and objectives?

- Describe how the activities enable the students to meet the instructional goals in mathematics (e.g., building towards understanding and ability, disconnected, all similar, don't address objectives)
- Describe how the activities make connections across mathematics (across problem solving, subject matter and human endeavor; across mathematical content strands)
- Describe the content quality of the activities (e.g., clearly communicated, accurate in content, emphasis on important mathematics)
- Describe the ways in which the activities proceed in a logical sequence

#### 6. What kinds of thinking predominate in the oral and written discourse of the classroom?

- Describe the different forms of discourse that are used
- Describe the different kinds of thinking that are encouraged by the discourse
- Describe the extent to which divergent thinking (e.g., different ideas and ways to thinking) is encouraged and valued (e.g., through a focus on different approaches to a problem, the use of an error to further explore a way of thinking, not encouraged--focus is always convergent on one way/on answer, different methods of solution)
- Discuss the role of data, evidence and argument in the classroom, (e.g., to what extent is learning evidence based, with students supporting their assertions, opinion, and ideas with evidence)

## OBSERVATIONS

### **7. What is the teacher's role in fostering the oral and written discourse in the classroom?**

- Describe the teacher's role in fostering discourse in the classroom (e.g., teacher is provider of information, teacher asks factual or open-ended questions, teacher provides answers to questions, teacher responds to questions with questions)
- Describe the questions which the teacher asks that require reasoning, argument, modeling, etc. (Notice tests and assignments as well as spoken discourse.)
- Describe ways in which teacher provides sufficient wait time for students to process and answer questions that require reasoning.
- Describe the teacher's role in fostering discourse with an emphasis on decisions s/he makes about when to provide information, when to clarify an issue, when to model, when to lead, and when to let a student struggle with an issue
- Describe the teacher's use of mathematics and non- mathematics language and representation to support the discourse of the classroom (e.g., metaphors)
- Describe who is allowed to participate (who gets called on, who does and does not talk)
- Describe the teachers non-verbal communication

### **8. In what ways does the teacher assess students' learning?**

- Describe the variety of ways (formal and informal) the teacher uses to gather information/evidence about what students are learning

### **9. In what ways does the teacher communicate about the formal and informal assessments?**

- Describe the extent to which the teachers communicates expectations (e.g., evaluation criteria) to students regarding the assessment
- Describe the ways in which the teacher communicates results of assessment (both formal and informal) to students. (e.g., scores only, right/wrong, grade, questions, explanations)

### **10. Have the students achieved the goals of learning mathematics provided by this instructional sequence?**

- Describe the ways in which students (especially the highlighted students) have or have not achieved the goals of the instructional sequence.

## OBSERVATIONS

### III. KNOWING STUDENTS

#### **11. In what ways are the activities appropriate?**

- Describe the level of challenge presented to the students (e.g., appropriate for students with different abilities, too easy for most; beyond the reach of most)
- Describe the ways in which the activities accommodate the range of ways in which students learn (e.g., hands-on, abstract, visual)
- Describe the ways in which the activities build on student interests and/or experiences

#### **12. What are the students' roles in fostering the discourse in the classroom?**

- Describe the students' roles in fostering discourse in the classroom (e.g., they always respond to the teacher, they ask questions about activities, about content, they challenge, they primarily listen and take notes)
- Describe the level of responsibility that the students take for the discourse in the classroom (e.g., question one another, leave responsibility to the teacher, initiate their own problems and questions, offer alternative solutions)

#### **13. In what ways does the teacher manage the social aspects of the classroom?**

- Describe how the teacher manages the social relations and standards of behavior in the classroom.
- Describe the selection of instructional grouping strategies by the teacher (e.g., large groups, small groups, pairs, recitation, discussion and individual instruction) to promote learning of mathematics
- Describe how these strategies are appropriate for the goals and objectives they are meant to attain
- Describe methods the teacher uses to make the group work promote discourse and understanding
- Describe the ways the teacher encourages the participation of and risk taking by all students (how does the teacher make adjustments for individual students, support and encourage students to take intellectual risks, treat different ways of thinking, speaking, representing, and reasoning)

## OBSERVATIONS

### IV. ESTABLISHING AN ENVIRONMENT

**14. In what ways does the teacher manage the physical aspects of the classroom?**

- Describe how the teacher manages the space of the classroom (e.g., the arrangement of desks, access to materials, work in progress, completed work, presence of mathematics related materials [physical models, displays, posters, computers, calculators])
- Describe how materials (manipulatives, physical models, overhead slides, measurement tools) are used in the classroom
- Describe how computers and other technology are used in the classroom
- Describe how the teacher allocates and manages time within and across lessons (e.g., what is the pacing like, to what extent is time available for students to engage in problem solving, develop mathematical concepts and procedures, and apply concepts and procedures)

**15. In what ways does the teacher promote safety in the mathematics classroom?**

- Describe the guidelines the teacher has established for student use of tools (e.g., geobands, compasses, scissors, and manipulatives as potential projectiles, special accommodations for students with special need.)

### V. PROFESSIONAL DEVELOPMENT

**16. In what ways does the teacher learn from and improve his or her teaching?**

- Describe how the teacher modifies instruction on a daily as well as long-term basis.
- Describe how the teacher analyzes his or her teaching.
- Describe how the teacher uses the self-analysis information to modify instruction (e.g., during class, from day to day, in the larger picture of the year, for next year)

**17. In what ways does the teacher see him/herself as a learner?**

- Describe how the teacher takes advantages of opportunities to improve teaching.
- Describe how the teacher makes opportunities to improve teaching.

**18. In what ways is the teacher a member of a learning community?**

- Describe ways in which parents and other adults are involved in the life of the classroom.
- Describe the number and variety of communities the teacher has joined for support.
- Describe the number and variety of communities to which the teacher contributes.
- Describe how the teacher uses opportunities within communities to improve teaching.

## Mathematics Teacher Observation Instruments (MTOI)

### Observations

### Inferences

#### **I. Knowing Mathematics Content**

- Important mathematics content
- Content for all students
- Accurate and appropriate content

#### **II. Knowing Pedagogy:**

- Activities
  - Kinds of activities
  - Appropriate activities
  - Kinds of thinking
- Discourse
  - Teacher role in discourse
- Assessment
  - Mechanisms to assess learning
  - Communicate learning
  - How students learned

#### **III. Knowing Students**

- Appropriate activities
- Student role in discourse
- Social aspects

#### **IV. Establishing an Environment**

- Physical aspects
- Safety