
Look-fors in the Mathematics Classroom

Skim the concepts. What would you add/revise? Why?

Learning Environment

- Flexible desk arrangement to allow transition among large group, small group, and independent activities
- Manipulatives/math tools (including the calculator) readily available and used
- Instructional and/or student work displayed

Instructional Delivery

Beginning

- Student objectives based on Learning Outcomes [students able to state what the objective is and why it is relevant]
- Varied drills, warm-ups, and or mental computation
- Efficient homework check

Middle

- Instruction based on objectives
- Evidence of pre-assessments that determine differentiation
- Students actively involved in problem solving, reasoning, communicating and making mathematical connections
- A variety of instructional strategies used to promote learning
- Effective pacing and monitoring of student progress
- Integration of assessment and instruction
- Formative assessments aligned with student objectives

End

- Summary of day's lesson by students (orally or in writing using mathematical language) Note: What student products may be collected to assess student understanding?
- Meaningful homework assigned

Overall Climate

The classroom was positive and well managed. Students were active members of the class by contributing to discussions and asking questions. Students were engaged in rigorous instruction. Students used reflective thinking. Learning was evident.

What To Look For When Observing Elementary Mathematics Classrooms:

(What do the math standards look like in the classroom)

Students are actively engaged in learning with each other and with mathematics.

- Working together in pairs or cooperative groups
- Using manipulatives

Example: Students are working on the assigned mathematics activity, perhaps with partners or in groups. Students are asking questions from other group members. The lesson requires students to depend on each other to complete the project. For example: students checking their homework together or students sitting together in groups completing homework is not cooperative learning.

Teachers inquire of the students understanding. Each student is questioned during the lesson. Higher order questions are asked of all students. If a student answers incorrectly, he/she is asked follow-up question. Wait time is evident.

Appropriate technology is available for student use.

- Calculators
- Computers
- Overhead projector

Example: Technology is a tool just like a protractor or a compass.

Calculators should be used for imbedded problems and projects.

If the teacher is not teaching the fundamentals of calculation, a calculator is an appropriate tool.

The following calculators should be used in the classroom:

- K-2 SchoolMate (red)
- 3-5 Explorer (blue) or Explorer Plus (gray)
- 6-8 TI-73 (graphing), but Explorer or Explorer Plus is alright until all of our middle school teachers are trained on the TI-73.
- HS TI-81, 82, 82 Plus, 83 (any graphing calculator)

Students are communicating about mathematics.

- Answering questions
- Taking notes
- Giving presentations
- Verbally explaining reasoning
- Writing explanations
- Reading mathematics

Example: Students explain the reason(s) for their solution to problems, verbally or in writing.

The classroom has an atmosphere where curiosity and explanations are encouraged.

- Risk free
- Learning partners
- Asking questions

Example: You see no “put downs” by students or teacher. The students and teachers feel free to make mistakes and learn from these mistakes. Teachers guide students through questioning. They do not give them answers.

All types of assessment are used frequently and are used to direct the teaching.

- Observations
- Interviews
- Questioning
- Individual quizzes/tests
- Partner quizzes
- Check for understanding (verbal and written)
- Journals
- Portfolios
- Self assessment

Example: The assessment should have been written first, before teaching begins, so that the teacher covers all the materials on the assessment. There are no “trick” questions.

Students should be aware of the type of assessment being used and should feel very comfortable with the questions.

Throughout the unit, various types of assessments should be used.

You should see more than the test from the back of the book.

Students should be receiving partial credit for problems they worked that do not have the correct answer, but the steps are done correctly.

There is obvious use of real-world connections.

- Graphs
- Newspaper articles
- Jobs

Example: Lessons should relate the mathematical skill to the real world, i.e., baseball scores, stock market, shopping.

Students are frequently asked to demonstrate their thinking skills beyond the knowledge level of Bloom's Taxonomy.

Example: "Writing across the curriculum" is a strategy implemented so students write and explain their problems in detail.

Projects are another way to let the students show their understanding of the content and combine past experience and new information. In the middle school materials, there are two "E-square" problems per unit which are excellent problem based projects.

Rubrics should be used to grade projects.

There is a change in emphasis away from teacher directed learning to student-led learning.

- Partners
- Cooperative learning
- Short and long term projects

Example: The students are helping one another.

If a teacher lectures, they should use the "10-2" rule. For every 10 minutes of instruction, there are 2 minutes of summary by students.

There is a shift in emphasis in the content areas of mathematics. These areas must be included in mathematic instruction:

- Problem solving
- Probability
- Statistics/data analysis
- More geometry
- Number sense
- More estimation
- Patterns

Example: Less drill and practice. It is inappropriate to assign all odd or all even problems for homework every day. Assignments should be tailored for conceptual and individual needs. Students need to apply their mathematical knowledge to problem solving activities, not just the old "drill and kill" routine.

In the K-2 classroom, worksheets are rarely appropriate. They should be doing hands-on activities so that they can feel and touch mathematics. DoDDS has adopted a very traditional series containing worksheets, so some teachers are using worksheets. We need to insure that the traditional textbook does not change the developmentally appropriate practices.

The same is true for the 3-5 series, however at this level, students should be using pencil and paper for calculations along with hands-on activities.