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Students with Special Needs and Whole-Class Discussions

The Accessible Math Project (NSF HRD 0090070) spent 3 years working with teachers to learn more about how to successfully include students with special needs in *Investigations* math classrooms. One of the most common questions discussed by these teachers was how to facilitate meetings in ways that include all students, whatever the range of skills and needs.

Whole class meetings serve different purposes in a classroom. In *Investigations*, they are used:

- to introduce an activity to students
- as an opportunity to do math together
- to discuss and compare students' strategies for solving a problem
- as an opportunity to report back and check work.

Given the critical nature of such discussions, it's important to think through ways to make them productive learning opportunities for all students. What follows are lessons learned from observing and talking with experienced *Investigations* teachers about facilitating inclusive mathematics meetings. Much of what is described is appropriate for the whole class; only a few of the teachers' recommendations are specific to students with learning disabilities.

First and foremost, create a classroom community.

Meetings that are truly inclusive depend on the attitudes and behaviors of the students toward one another. Teachers need to work at building inclusive classroom communities from the beginning of the school year, letting students know how they are expected to support one another as learners. Comfortable classroom communities are based on respect for and acceptance of differences. So, in the project teachers' classrooms, one might hear, "We don't laugh at people in this classroom" or "You can lie down as long as you can pay attention," or "Make sure you listen to Michael. His question may be your question." Mistakes are seen as opportunities to learn and risk-taking is encouraged.

Set specific guidelines and expectations for behavior during meetings.

Students feel safer in classroom communities with clear routines and expectations. So, in addition to setting guidelines for how they treat one another, students also need to know what's expected of them during meeting, so that brief reminders are all that is needed for respectful behavior.

For example, many teachers tell students that they will not call on the first person with an answer, and ask students to show only a thumb up when they are ready to discuss the question. Students need to know how to listen actively, to ask questions of a peer, and to respectfully disagree with an idea (rather than with the sharer of that idea).

In many primary classrooms, students gather on a rug for the class meeting and then return to their places or choose places for work-time. Intermediate students often stay at their own desks for meetings. Some teachers vary the setting, with children staying at their desks when the meeting will be short, and gathering together when a longer time is needed.

To facilitate a smooth transition to meeting on the rug, some teachers assign students places to sit on the rug, changing them every month or so. Others place circles, mats, or white boards to clearly mark the places available for students to sit. Others allow students to sit wherever they want in a circle as long they can see the teacher and all of the other students. They might remind students to make a good choice about sitting where they will be able to pay attention. Some students will sit, others kneel, and others may find they are able to sit more quietly in a chair. The teacher might remind students about "listening behavior" during the course of a meeting.

Keep meetings short and focused.

The *Investigations* curriculum provides Math Focus Points for Discussion, one-to-several bullets at the beginning of each discussion, that point out the most important math idea. Having a mathematical goal in mind when planning and facilitating a whole class conversation can help keep meetings brief and focused on the most important mathematical idea(s).

Support all students in being actively involved in the mathematics.

For many students, it's important not only to hear the question, but to be able to refer to it, in writing, as well. Wait time is critical, as it gives students time to form an answer. Some teachers use quiet signals while others ask students to jot down their answers for her to see before discussing the problem. Wait time is also important when a student is sharing his or her solution. The rest of the class should be expected to stay quiet without their hands up.

Asking two or three students to re-explain a just introduced game or rephrase a story problem into their own words is another strategy for engaging all students in the making sense of the mathematics. Teachers can ask a more hesitant student to share 2nd or 3rd, so that s/he has had one or more chances to hear it before saying it in his/her own way.

It's important to plan ahead when an introduction to a new activity will take a long time. Some teachers have a paraprofessional or student teacher sit near the students who are likely to need extra support. Another strategy is to teach the activity or game to those students, in advance, so that they will be prepared and perhaps ready to help with the introduction to the activity.

Some teachers, particularly those without another adult in the room, have a signal that they use with students who tend to get restless or have difficulty paying attention. The signal tells the student that s/he can move away from the group and start work.
Some teachers provide children who have difficulty sitting still and making sense of what the group is doing with other work they can do while the class meets, and then gives them enough of an introduction so they can join in the day's activity.

Prepare materials and working groups ahead of time.

Dealing with transitions can be challenging, so establishing routines that enable students to get right to work at the end of meetings is important. (Then, teachers are free to work with a small group or circulate among students, instead of taking time to help the class settle in and get started.) These routines should include procedures for choosing or assigning partners. Some teachers keep students with the same partner for a period of time; some alternate the way they pair students, according to the type of activity; others let students choose partners with some adult "guidance" about what makes a suitable partner. Most have a plan in place in advance so that time isn't taken away from doing mathematics.

It's important that materials are easily accessible to students. In some classrooms, students keep generic materials such as pencils, crayons, erasers, scissors, rulers, and paste in baskets in the middle of each table or group of desks. Materials particular to one activity or subject can be prepared and placed in boxes or trays for each group of students who will work together, to fetch as they begin work. If math materials are stored in a particular area of the room, it is easy for students to readily access what they need when they need it. With student help, teachers can distribute student books or papers quickly. It is useful to provide a few extra copies in case a student wants to start over and to make some copies of additional work for students to do quietly when they have extra time. One folder might hold work to provide practice and review, and another to provide more challenging problems.

Provide Extra Help.

Students with learning disabilities need to be included in the regular class meetings and activities in ways that they will be successful. They also need time to work in a small group with a teacher. Some teachers begin each work time with a small group of students, or spend time during Math Workshop meeting with rotating groups of students. In the best of circumstances, a special education teacher or paraprofessional skilled in working with *Investigations* can also work with the teacher during classes and offer extra help to students outside of class. Teachers can use these extra sessions to:

- make the mathematics more explicit to the students;
- provide guided practice and suggest practice students can do at home;
- introduce an activity or game before it is introduced to the whole class;
- rehearse with students how they can write out and explain their methods during class meetings.

Conclusion

Because class discussions are an important part of building a mathematical community, the range of learners in a classroom needs to be taken into account in planning these meetings and sharing sessions, and in encouraging participation. Students with special needs or those who are struggling with mathematics need time to practice doing and thinking mathematics at their own level, yet they also need to understand the tasks at hand and listen to what their classmates are thinking. Balancing the needs of the range of students and providing structures to help them learn are challenges in teaching *Investigations*.

Keeping the discussions brief and focused, and the students actively engaged, will result in more time spent on building mathematical understanding and developing efficient ways to solve problems for all learners.

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