



Math Workshop in *Investigations*

Found in most units, Math Workshop is a structure that allows individuals, pairs, or small groups of students to work on a set of related activities that focus on similar mathematical content. The activities are not sequential: as students move among them they continually revisit the important concepts and ideas they are learning. By repeatedly playing a game, or solving similar problems, students are able to refine strategies, use different contexts, and bring new knowledge to familiar circumstances. Because Math Workshop is often preceded and followed by whole class activities, students have many opportunities to discuss and synthesize the big ideas of the activities they have been working on. The purpose of Math Workshop is to:

- provide students with repeated experience with the concepts being learned and time to practice important skills and refine strategies
- provide time for the teacher to work with individuals and small groups and to assess students' learning and understanding
- help students develop independence and learn to take responsibility for their own learning.

Repeated Experience

Math Workshop provides students the time and opportunity to: revisit important math ideas that they are learning in whole group activities and discussions; develop a deeper understanding of these concepts through repeated experience, in different contexts; refine their strategies for solving problems; and practice important skills. For example:

In a fairly typical Grade 1 Session, the teacher introduces an addition story problem to the whole class. Individuals solve it and, as they finish, transition into a Math Workshop that includes four games. Two of the games involve combining two numbers and recording or covering that sum on a gameboard; the other two ask students to determine which of two pairs of cards, showing different arrangements of the numbers to 10, shows the larger sum. The Session ends with a whole group discussion about how students solved the story problem. These games (and variations of them) are available over the course of the Investigation, until they are replaced by new activities/games.

In fourth grade, a Math Workshop might have students using their Multiplication Cards to review and practice multiplication combinations, working with rectangular arrays as they play the Array Card game *Factor Pairs*, and playing *Multiple Turn Over* which involves determining whether one number is a factor or multiple of another.

In each of these examples, students are working on a set of activities that focus on related math ideas. In addition to practicing the addition or multiplication combinations in a variety of contexts, they are learning to think strategically as they determine which sum or factor makes the most sense to cover on their gameboard. They are also deepening their understanding of the

operations of addition and multiplication and division—developing visual images of the operations (i.e. addition as the combining of two groups, multiplication as rectangular arrays) and using those images to solve problems (e.g. “I know $6+6$ is 12, so $6+7$ is 1 more, 13.” Or “I know 6×6 is 36 so 6×7 is one more group of 6 and that’s 42.”).

Making Math Workshop activities available at other times during the day – for example, at the beginning or end of the school day, or during indoor recess or choice time – can support teachers in meeting the needs of all students. It can give students more time to finish their work, time for further practice, and/or time to revisit favorite activities or games. Students who are ready for more challenge can work on the extensions or additional problems suggested in the unit. Math Workshop activities can also be assigned for homework, available in the before/after school program, done with a mentor or buddy, or suggested to families as a way to work with their child on the facts.

Time for Assessment and Targeted Teaching

Initially, much of the teacher’s time during Math Workshop is spent circulating around the classroom, helping students get settled into activities, monitoring the process of moving from one choice to another, and generally managing the classroom. Once routines are familiar and well established, students become more independent and responsible for their work during Math Workshop. This allows the teacher to observe and listen to students while they work. It also provides the opportunity to spend time working with individuals, pairs, or small groups to do further assessment, to provide additional support, or to work on a new challenge.

Because students are working on different activities at the same time, the teacher can structure and adapt activities to fit students’ varying needs. Some strategies include:

- Adapting activities in ways that keep the focus on the important math ideas of the activity (e.g. making the numbers smaller or larger, using one more (or fewer) card or dot cube, using manipulatives to represent the quantity or the action of the problem).
- Bringing in games from past investigations or units, to provide extra, targeted practice.
- Assigning specific activities for particular students, based on assessments of their mathematical needs.
- Working with a small group of students who are struggling with a particular activity, concept, or skill.
- Extending activities for students who need more challenge by, for example, asking if they’ve found *all* the ways or whether a strategy would *always* work and how they know
- Varying the amount of work students are expected to complete.

Suggestions like these are embedded in the text of most Sessions, in the section called “Supporting the Range of Learners”.

Developing Responsibility and Independence

Math Workshop supports students in becoming independent learners. Making choices, planning their time and taking responsibility for their learning are important aspects of student school

experiences. During Math Workshop students are expected to choose which activities to work on, plan their time so they can complete more than one activity, keep track of their work, and use and take care of classroom materials. They are also expected to work independently, in pairs, or in a small group and to follow the classroom norms for working successfully in all of these groupings.

Note: This essay is based, in part, on the section of “Using Investigations” that is about Math Workshop. See *Implementing Investigations in Grades X*. It also incorporates ideas from an essay written to answer the following question about the 1st edition - “I’m wondering about the frequency and importance of Choice Time?” by Arusha Hollister. (TERC, 2005.)