



Using Computers as Tools for Learning

The use of computers is suggested in the 2-D geometry unit at every grade level in *Investigations*. The software *Shapes* (K-2) and *Logopaths* (3-5) provide an environment in which students can explore geometry, patterns, logical thinking, and much more. While listed as optional, the software activities extend and deepen the mathematical ideas that are emphasized in these units. Computers allow students to do things they couldn't otherwise do (e.g. save and retrieve their work, work on projects over a long period of time, resize shapes and move a design they created), and to work with geometric shapes and ideas in ways that they are not able to in the off-computer activities.

How the teacher introduces and incorporates the software into the curriculum depends on the number of computers and the computer technology available. The information in the following sections will help teachers think through the decisions that need to be made in order to help students interact with and get the most out of the software.

Introducing Software Activities There are several ways to think about introducing software activities to students, depending on the technology available.

- **Computer Lab.** With one computer per pair, all students can be introduced to and become familiar with the computer activities at the same time. Once an activity has been introduced, students do it during Math Workshop (if there are computers in the classroom) or during their scheduled lab time.
- **Projection Device and Screen.** In this case, the teacher can introduce the software activities to the whole class, immediately before Math Workshop or at another time of the day.
- **Classroom computers.** If there are a small number of computers in the room, software activities can be introduced to pairs before and/or during Math Workshop. Or, gather as many students as is reasonable around one computer. Then, those students can “teach” the software activity to their peers.

Incorporating Software Activities The use of computers should be built into the daily routines of the class and fit into the Math Workshop model. Teachers with access to a computer lab can work on the activities during their scheduled lab time. Otherwise, pairs can cycle through the activities on the classroom computers, just as they cycle through the other Math Workshop activities. Because computer activities are often quite popular, students may need reassurance that everyone will have the opportunity to do each activity. Some teachers develop a system for assigning and/or keeping track of computer

use, to ensure fair time across the class. For example, some have students check their name off a class list, while others draw names or clothespins from a bin or cycle through a class list.

Organizing the Students Regardless of the number of computers, *Investigations* suggests that students work on the software activities in pairs. This not only maximizes computer resources, but also encourages students to consult, monitor, and teach one another. Generally, more than two students at one computer find it difficult to share. Placing two seats in front of each computer, and setting those stations up in a way that pairs can work together without being a distraction/distracted by others, can facilitate such collaborative work.

Using the Software All Year Although the software is introduced and referenced in particular units, it is recommended that students continue using it throughout the school year. With additional experience, students become more fluent in the mechanics of the software itself and can become more independent as they explore the computer activities. They can also focus more deeply on the math, rather than the “how to” of the software. Once students have gained confidence and expertise, teachers can recede to being observers and facilitators, ready to help when needed.

Computers and software like *Shapes* and *LogoPaths* can be powerful tools for learning. While designated optional, they have tremendous potential to enhance students’ mathematical understandings. To realize this opportunity, students need to interact with the software on a regular basis, over time.