

How Landmark Teaches Mathematics to Dyslexics

Some people might wonder why dyslexic students would have problems with mathematics, when their disabilities have to do with reading and writing. In fact, dyslexic students have difficulties processing all types of information, no matter if it is English or another type of "language." If a student has difficulties with visual memory, auditory memory, short- or long-term retention, organization, or making transitions from concrete to abstract ideas, he or she will have problems learning mathematical skills. That is why at Landmark, the math department uses the same teaching principles that are used in tutorial and English and study skills classes.

All students are required to take at least one math course while they are at Landmark College. The math department has two tracks: one for students who are planning to go on and study math at the college level and the other for students who wish to concentrate on practical applications of math principles. After Pre-Algebra, those on the first track would take Algebra I, Algebra II, Pre-Calculus, and Calculus I-III (offered for credit), and those on the second track would take Business Math and then Geometry. Students with advanced math skills may take credit math courses even if they are otherwise enrolled in non-credit courses.

Students are placed in math classes according to their performance on a math placement test, which is administered at the beginning of the year. The placement test, designed by the math department, "allows us to place students at a level where they can experience academic success," said math department head Bill Dixon. As with other courses, if a student no longer is achieving at the same level as his or her classmates at any time in the semester, a more appropriate placement would be made.

The depth and complexity of material covered in a math class at Landmark are the same as those in a similar course taught elsewhere. For example, a credit pre-calculus course at Landmark is a one se-

mester course, as it is in most colleges. The difference is in the way the material is presented. According to student Brett Himsworth, "We cover the same amount of material, but we go into a lot more detail in everything. We're able to attack it from different directions."

Two teaching techniques that are used in other courses are also used in math classes. The first is "microuniting" concepts—that is, breaking each concept down into its smallest component (something to which mathematics lends itself well). The second is "spiraling," the practice of reviewing concepts by using them at more difficult levels. Although mathematics is, by nature, a sequential discipline, according to Mr. Dixon, "We return to concepts even more than in a traditional math class. We also return to isolated concepts like areas."

As in other departments, instructors in the math department emphasize organization. Students are encouraged to use graph paper instead of notepaper for drawing graphs and organizing information like columns of numbers; they are required to solve each step of a problem, receiving partial credit for steps performed correctly, to ensure that steps are not overlooked; and they create a "master notebook" for their math class.

The master notebook allows students to practice some of the skills they learn in their study skills classes and apply them to math. In their notes, students write down new concepts, show diagrams if appropriate, and then give some specific examples. According to Mr. Dixon, this practice allows dyslexic students to constantly see the relationship between a formula and examples, between the abstract and the concrete. Students also create a table of contents for their notebooks so that they may easily find material on particular mathematical concepts. They are encouraged to review their notes regularly, for they are quizzed weekly on the material. Some of the quizzes are open-notebook, but this can be a hindrance unless the student knows exactly where the material is located. "As long as I have a nicely-ordered notebook, I can find what I need," said Mr. Himsworth. Students also receive grades on their notebooks, based on the completeness, neatness,



and organization of each page.

Another unique feature of math classes at Landmark College is the individualized attention students receive. After a new concept is presented,

students immediately apply it to other problems. Small classes of four to eight students allow the instructor to circulate to all students, providing clarification and reinforcement on a one-to-one basis. Said Mr. Himsworth, "If I don't understand something, it's easier to get help from the instructor. I like the small classes a lot."

Students in math classes use a number of techniques to help them learn. For instance, students often transfer verbal information into charts, tables, diagrams, and graphs, giving them the opportunity to view the problem in a different format. It is also helpful for those students who are visual learners. Another technique is the use of calculators at all levels of math. According to Mr. Dixon, "All students should have the opportunity to learn the basic operations. However, after ten or twelve years of practicing arithmetic skills, some students may still experience frustration. The use of calculators to perform these functions allows students to explore higher-level skills, such as statistics."

Some math classes also include a one- or two-week unit on computers, either for programming or for using databases and spreadsheets. The computer, said Mr. Dixon, teaches students important skills: "You have to decide what you want to do, get the computer to do it, and then interpret the results."

What the math department is doing, and the way it integrates what it does with other courses, seems to be working. Achievement tests administered at the beginning and end of each year help to determine the progress that students make. "Instructors understand the principles for teaching math as well as the needs of dyslexic students. These qualities have allowed students to make gains of two or three grade levels in an academic year," said Mr. Dixon.

Statistics to Become Part of Math Courses

This summer, math instructor Tom Hinckley began work on developing a non-credit curriculum for teaching statistics to all levels of algebra students. The goal was to present something interesting and relevant to students. Rather than follow a traditional course of study presented in a textbook, Landmark's math department decided to create its own curriculum. The primary reason for doing this was to get students involved, especially by creating their own data by doing such things as rolling dice, flipping coins, and analyzing demographic data.

The three- to four-week statistics unit will cover one to three of the following topics, depending on the level of the class: generating and displaying graphic material, creating frequency diagrams and histograms from given information (e.g., an almanac), and determining the arithmetic mean, mode, and median of a series of numbers. These elementary topics are usually covered in non-credit courses and can be helpful for students who wish to take a college-level course. Next semester, following an instructor training workshop, the statistics unit will be incorporated into most algebra classes. Eventually, the curriculum will be expanded to a semester-long, non-credit course.



Math department head Bill Dixon explains the use of the sextant to Nikki Rose, a pre-calculus student.