

AXEL'S WHIRLED MATH NUMBERS AND EQUATIONS

Mathematics Software

for Macintosh® and Windows™

Grades Pre-K through 3
Ages 3 to 8



EDUCATING MINDS ONE MOUSE AT A TIME™
A Division of Instructional Fair Group
A Tribune Education Company

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Axel's Whirled Math™: Numbers and Equations Manual
First Edition

Axel's Whirled Math™: Numbers and Equations

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Introduction

Welcome to *Axel's Whirled Math*!

This program is designed to teach 18 key number and equation concepts by building understanding, skills and confidence. Students explore numbers, equations and place value in different "worlds of math" with over 33 manipulative activities, while the comprehensive curriculum with 1000+ levels of learning provides continuous progress and mastery.

What will you find in *Axel's Whirled Math*?

Tutorials are narrated by friendly voices to guide students toward independent practice. Step-by-step concept presentation builds a good foundation of understanding. The variety of on-screen action and interesting manipulatives is effective for any learning style. Colorful animated characters promote high interest and positive reinforcement so students stay motivated. At the completion of each main concept, printable certificates are awarded.

How does the program work?

Key concepts are presented for three profile groups. They correlate to typical age and ability, but higher or lower profiles may be appropriate for students based on their needs. Review activities are individualized for each student based on pre-tests. Students work at their own pace and do the amount of practice they need to achieve mastery. The program tracks each student's progress through the activities and keeps statistics automatically. These records for students and classes can be viewed and printed at any time.

Axel's Whirled Math: Numbers and Equations is an interactive program for learning. It can be used in home and school settings for learning and practicing concepts. Because of the individualized curriculum presentation, the program is effective for advanced students as well as those who need additional support.

Program Concepts and How They are Presented

The program concepts are based on National Council of Teachers of Mathematics (NCTM) Curriculum Standards and many state curriculum frameworks. A team of educators with more than 50 years total experience with students of all ages and abilities developed the tutorials and activities.

The key curriculum concepts for understanding numbers and equations covered in the program:

- Number recognition
- Number meaning
- Counting by 1s, 2s, 5s, and 10s
- Place value
- Greater than and less than
- Addition and subtraction with 1- and 2-digit numbers
- Borrowing and carrying
- Missing operands
- Word problems

(For a detailed listing, see the Appendix: List of Curriculum Concepts, page 33.)

When a student starts a new concept, an introductory tutorial is presented. They proceed to an activity that serves as a pre-test to determine where in the concept to start. If they do not achieve a mastery score in the pre-test, they start at the beginning of the concept. If the pre-test is passed at a mastery level, they go to the next pre-test, until their score indicates placement. Note that the pre-test and mastery level tests use regular program activities so students are not aware of the continuum of placement tests, but proceed smoothly through their individualized curriculum.

This method assures that students achieve mastery in each step of the concept, and that students who understand parts of the concept are not required to review what they already know.

Statistics for the pre-tests and mastery level tests are available to parents and teachers in summary and detailed formats. The statistics can be printed for individual students or entire classes (see Student Progress Statistics, page 27).

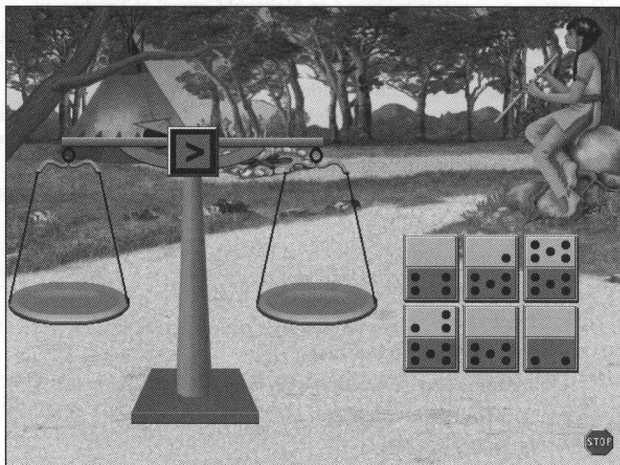


Figure 1
Testing is done with regular program activities

The Profile Levels

Concepts for numbers and equations are presented in three profile levels. The activities, manipulatives, pace and mastery expectations are tailored to the typical range of ability, concept understanding and attention span found in these age ranges:

- **Profile 1: Ages 3 to 4, Pre-Kindergarten to Kindergarten**
- **Profile 2: Ages 5 to 6, Kindergarten to First Grade**
- **Profile 3: Ages 7 to 8, Second to Third Grade**

The goals of *Axel's Whirled Math: Numbers and Equations* are for students to:

- master concepts,
- have a positive attitude toward mathematics, and
- achieve confidence in themselves as learners

Correct placement of students based on their understanding and ability rather than age or grade level is essential to meeting these goals. The section "Interpreting Statistics" on page 29 gives more information on correct profile placement.

About this Manual

This manual contains information for parents and teachers to install *Axel's Whirled Math: Numbers and Equations* and helps students begin and progress through the program. It denotes distinctions between Macintosh and Windows use only when differences exist.

Chapter 1: Quick Start

This chapter gives you step-by-step instructions for installation, signing students on and selecting their profile level.

Chapter 2: How to Use the Program

This chapter gives more detailed descriptions for starting and progressing through the program. Information is given on printing awards, the control options for parents and teachers and how to view, print and interpret student progress statistics.

Appendix

The Appendix has a complete list of program concepts and activities, National Council of Teachers of Mathematics (NCTM) Curriculum Standards and a Glossary of program terms.

Using Axel's Whirled Math at Home: A Message for Parents

It is so important for children to have a good foundation in math skills. It is equally important for them to enjoy learning challenges of math and feel confident in their ability to solve math problems using previously learned skills.

This program divides key concepts into small, understandable steps, and presents interactive tutorials to teach each step. Mastery level tests assure that children understand each part of the concept before moving on. They experience success in learning math!

Pre-tests measure children's previous knowledge to place them in the program. They do not repeat things they already know, and are appropriately and comfortably challenged.

There are animated background scenes and the activities are fun and varied so they hold children's interest. The characters provide continuous positive reinforcement, and printable certificates are awarded at the completion of each concept! This is a product we use with our own children and grandchildren. We hope your family also enjoys learning numbers and equations with Axel.

Using Axel's Whirled Math at School: A Message for Teachers

Each student in your class has individualized needs for math instruction. This program can assist by placing students in tutorials and practice activities based on pre-testing their understanding. Students can work at their own pace and do not repeat concepts they already know. The program gives them extra practice when they need it.

This is a real learning program that teaches key concepts in numbers and equations, not a "drill and practice" program. After your initial profile placement, students progress through the curriculum of 18 concepts. You also have the option to place students in a specific concept being taught in the classroom to supplement your lesson plans. The three ability profiles allow you to place students at their

best learning level without other students knowing if they are placed above or below their actual grade level.

For each student, detailed progress records are kept automatically with statistics on their pre-tests, mastery level tests, and progress through activities. You can view these at any time, and print individual and class reports. The statistical information is not accessible to students. Student files can be set up for multiple classes.

We have designed this program to be a meaningful part of your math curriculum. It is effective as a supplemental activity, or can be used for individualized practice in a specific concept. Adding and placing students can be done quickly, and the student progress statistics are easily accessible and provide information to assess each student's work. These printable reports can also be shared with parents.

After extensive classroom tests, we think you and your students will enjoy using this program and feel it is a good investment of classroom time.

If more than one copy of *Axel's Whirled Math* is needed (more than one computer using the program at the same time), please contact Instructional Fair Group regarding site licensing or lab pack pricing at 1-800-253-5469.

Chapter 1

Quick Start

Installation

Please send in the registration card to receive information about updates and other user information. Complete the registration card during the installation of the program.

For Macintosh Systems:

1. Insert the CD-ROM in your drive. Double-click on the **CD** icon to open it, then double-click on the *Whirled Math N&E Installer* icon.
2. Select the **Install** button to install everything you need to run the program.
3. A window will ask for the name of the folder in which to place the program. Indicate the folder where you want to install *Axel's Whirled Math: Numbers and Equations*.
4. The Installer only installs some parts of the program on the hard disk. The program's animation and speech that enhance the learning experience are too extensive to load on most internal computer hard drives. Keep the CD-ROM in the drive to use the program.

For Windows Systems:

1. Insert the CD-ROM in your drive.
2. If your computer is configured to AutoPlay CDs, press the **Install** button when the *Whirled Math Numbers and Equations* screen comes up.

3. If it is not configured to AutoPlay CDs, from the **Start** menu choose **Run**. On the Command line, type **X:Setup** where "X" is the drive letter of your CD-ROM drive. Press **ENTER**. The setup program creates a group named "Great Wave" in the program section of the Start button. The *Axel's Whirled Math N&E* icon is placed in the Great Wave group.
4. Follow the instructions for completing installation. During the Setup program you may select options as follows:
 - Next** to proceed with the installation
 - Exit** to terminate the installation
 - Back** to return to the previous installation dialog box
 - Cancel** to cancel the Setup program
5. You may need to restart the computer when the installation is finished.
6. The Installer only installs some parts of the program on the hard disk. The program's animation and speech that enhance the learning experience are too extensive to load on most internal computer hard drives. Keep the CD-ROM in the drive to use the program.

**Unauthorized duplication and distribution of
Axel's Whirled Math is theft. Our ability to provide quality
software at reasonable prices is dependent upon customer
respect of the copyright and property laws that protect
Great Wave Software and its products.**

Getting Started

- To get started, select the *Axel's Whirled Math* icon. On Windows '95 or later, if your computer is configured to AutoPlay, press **Run**.
- For new students, click on the **New Student** star icon to add a name. A dialog box will appear. Enter the student's name. If you want them to use a password, enter it (seven spaces maximum). Choose their profile level. Select the most appropriate age, grade and ability profile for that student. The first concept in that profile is automatically selected. (To place students in a specific concept in the curriculum, see Placing Students in a Concept,

page 25.) After placement is completed, click on the **OK** button and the student will be automatically launched into the program.

- The sign-on screen shows a list of student names. If the student's name is on the list, select it and press the **OK** button. If passwords are required in the Program Options (see page 22 for this information), a box to enter their password will appear. Type in the password and press the **OK** button to start the program.
- If a student is starting a new concept, Axel will immediately start an introductory tutorial. If the student is already in a concept, a screen will appear with icons for the student to choose which background to start with in the program (forest, space or dinosaur).
- After an introductory tutorial on the concept, the student will do a series of pre-test activities. The results of these pre-tests will place them in a concept at an appropriate place in their understanding. (For more information, see "Progressing Through the Program," page 16.)
- Students automatically progress through the program. When new activities are encountered, a tutorial will introduce it. Dated statistics are automatically kept on the pre-tests and mastery level tests, and progress through the concept activities.
- To exit the program, press the red **STOP** button in the lower right corner of the screen. It returns you to the sign-on screen. Pressing the **STOP** button there closes the program. All statistics are automatically saved.
- Parents or teachers should review the first one or two session statistics for a new student to determine if the initial profile placement is correct. (See "Interpreting Statistics", page 29.)
- There are default settings for Program Options. If you wish to view and/or change these options, refer to the instructions in the box on page 22 in "Program Options".

**More detailed information is contained in the next chapter,
"How to Use the Program."**

Chapter 2

How to Use the Program

Signing On

A parent or teacher needs to initially start the program with a new student to set their profile level.

To open the program, double-click on the *Axel's Whirled Math* icon, or in Windows, press **Run**. An opening sequence and credits will appear on the screen, followed by the sign-on screen.

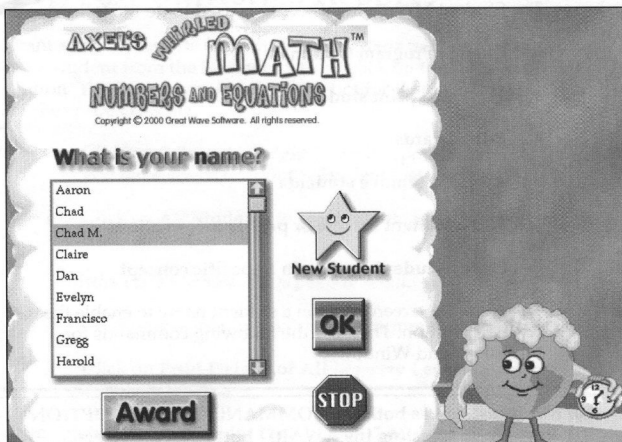


Figure 2
The sign-on screen

Students who are already signed on can select their name from the list in the box, which takes them to a password box. They press the **OK** button and enter their password in the dialog box. Press the **OK** button again to launch the program. The use of passwords is an option the parent or teacher can disable from the Student Management screen. If they are starting a new concept, Axel will give an introductory tutorial. If the student is already in a concept, a screen appears with icons to choose the initial background scene (forest, space or dinosaur). They will then be placed in the program where they ended their last session or at the beginning of the last non-completed activity.

Opening the Student Management Screen

The Student Management screen is used to do the following:

- **Change Program Options**
- **View and print student progress statistics**
- **Print awards**
- **Add and remove students**
- **Edit a student's name or profile information**
- **Place a student or class in a specific concept**

To access the screen, click on a student name to enable the **AWARD** button. Then use the following commands for Macintosh and Windows:

For Macintosh, press both the COMMAND ⌘ and the OPTION keys while selecting the AWARD button on the screen.

For Windows, press both the CTRL (Control) and ALT keys while selecting the AWARD button on the screen.

The Student Management screen will appear. Click on the **DONE** button to return to the sign-on screen.

Adding, Editing or Removing Students

Adding New Students:

To add a new student from the sign-on screen, click on the **New Student** star icon. The Add Student dialog box will appear. (If the star icon does not respond, it may be disabled in the Program Options. Refer to page 22 for information on changing these options.) Enter the student's name. You can enter up to a seven-space password for the student.

Please enter a student name.
You may also enter a password if desired.

Name: **Password:**

Profile for Concepts:

- ☐ Profile 1 (approximate ages 3-4)
- ☐ Profile 2 (approximate ages 5-6)
- ☐ Profile 3 (approximate ages 7-8)

☐ **Focus first on a Specific Concept**

In: ☐ Profile 1 ☐ Profile 2 ☐ Profile 3

Concept:

Cancel **OK**

Figure 3
"Add Student" dialog box

Select the most appropriate profile for that student using the buttons for **Profile 1**, **Profile 2** or **Profile 3**. Refer to the section, "Placing Students in a Concept" on page 25 for further information on appropriate placement.

New students will start at the first concept level in the program. If you want the student to start in a particular concept, select the button **Focus first on a Specific Concept** and choose the concept from the list. When they complete that concept, they will automatically go back to the first concept in the curriculum, but will not repeat the selected concept when they reach it.

When the placement has been completed, click on the **OK** button. The student will automatically be launched into the assigned concept.

You can also add students from the Student Management screen (see page 12 for accessing this screen). From the screen, click on the **Add Student** button. The Add Student dialog box will appear. Enter the student's information as discussed above.

Students will automatically progress through the program. The program conducts pre-tests and mastery level tests to keep each student at his or her most appropriate level of review and practice. Tutorials are built into the program to show how to do an activity the first time the student encounters a new one.

Editing Students:

Edit students using the Student Management screen. To open the screen, see page 12. Click on the **Edit Student** button and a dialog box will appear. The following information can be edited from this box:

- **Changes to the student's name**
- **Changes to the student's password**
- **Changes to the student's profile**

Highlight and change information in the Name and Password boxes. If, after the initial profile placement, your review of their mastery level test scores shows the student is under- or over-placed, edit their profile in this dialog box. You may choose to have them finish

their current concept in the present profile (the new profile will start when they begin a new concept) or immediately start the new profile on the first incomplete concept in their current concept. Buttons with these labels can be clicked on. Click on **OK** to exit the box.

Removing Students:

Click on the **Remove Student** button in the Student Management screen to remove a student from the list. Confirm the removal in the dialog box. Note: Upon removal of a student, all statistics are lost. Print a copy of students' statistics before removing them.

Passwords

The use of passwords when signing on is a default option that parents or teachers can change. However, the use of passwords is recommended for the following reasons:

- Students feel more connected to a program when they are empowered to make choices, such as what name or codeword to use in signing on.
- Passwords reduce the possibility that two students with the same or similar first name might use each other's individualized math program.

Passwords can be entered by the teacher or parent in the "Add Student" dialog box or changed in the "Edit Student" dialog box.

Exiting the Program

Exiting the program is a two-step process. At any time during an activity, the student can press the red **STOP** button in the lower right corner of the screen to return to the sign-on screen. At this point, a different student may sign on or the same student can return to the program after a break by pressing the **OK** button. Pressing the red **STOP** button in the sign-on screen exits the program.

All statistical data on student progress is automatically saved in the program.

Progressing Through the Program

Tutorials

There are over 100 tutorial lessons in the program for the three profiles. Each tutorial is interactive: the student manipulates objects on the screen while friendly human voices teach the lesson. Male and female voices alternate.

The first tutorial in each concept is given by the animated character, Axel.

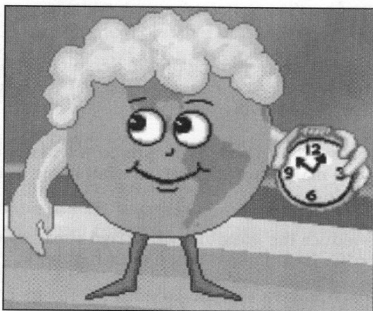


Figure 4
Axel gives the introductory tutorials

Pre-testing

To maintain interest and confidence in learning math, each student needs individualized placement and pacing in the program. This is accomplished through pre-testing and mastery level testing. The "tests" are activities from the program and the student is not aware that it is a testing situation. The placement of students following the testing activities is immediate, so the program progresses smoothly.

After the introductory tutorial, the student completes a pre-test activity from the normal set of program activities. If their score is below the mastery level, the student progresses through the set of tutorials and activities on that portion of the concept, then does a mastery level testing activity. If the mastery test is passed, they go to the next pre-test activity in the concept. The score on pre-test activities determines if they progress to the next pre-test, or complete the set of tutorials and activities for that portion of the concept.

For pre-test activities, the student continues through the activity unless they reach a point where a non-passing score is achieved. Then the activity ends. This avoids the frustration of working through an entire activity when the student doesn't understand the concept. Dates and statistics on the pre-tests are included in the student progress statistics.

Mastery Level Tests

Each concept is divided into incremental steps. Each step has a set of tutorials and activities. When the student has completed the tutorials and activities, a mastery level test activity is given.

Mastery level activities are normal program activities, with the exception that incorrect answers don't "bounce back" for a second try at a correct answer. However, in most of the activities used as mastery level tests, students may change answers by moving objects or tiles with their mouse.

Statistics for the pre-tests and mastery level tests include the following information:

- Date(s) taken
- Concept name
- Number of problems answered correctly and number of problems presented
- Percentage score
- If the score indicates "Passed" or "Needed review"

Activities and Manipulatives

The activities in *Axel's Whirled Math: Numbers and Equations* were developed to combine the special properties of learning with computers with research on how children learn math concepts best.

Research shows that conceptual learning happens in three stages:

- **Manipulation of objects in a way that demonstrates the concept visually and kinesthetically**
- **Representation, in pictures and words, of that manipulation**
- **Recording the representations symbolically, using numbers and math symbols**

In this program, students use the computer mouse to move on-screen objects and tiles with picture representations, numbers or symbols. Here are some examples of the manipulative objects used:

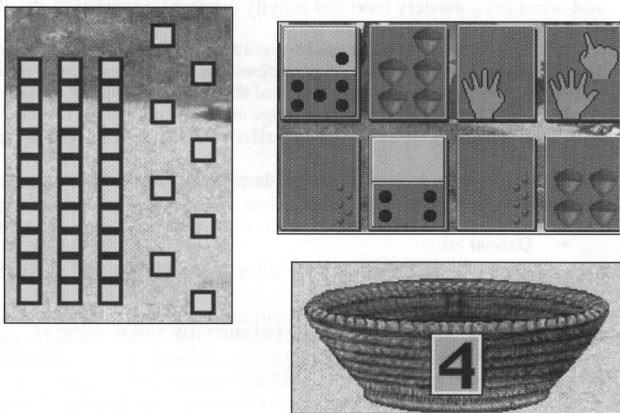


Figure 5
Examples of objects and tiles

Program activities are in the following categories:

- Matching activities
- Flash card activities
- Sorting activities
- Calculator activities
- Pattern activities
- Word problem activities
- "Balance scale" activities
- Activities that use manipulatives for 1- and 2-digit addition and subtraction
- Number grid activities
- Number line activities
- Place value activities with grouping and ungrouping, using objects for tens and ones
- Fact family activities

Over 33 different activities in these categories provide a wide variety of practice. There is a small set of problems in each activity, so students remain interested. These activities have been tested by students with a range of learning abilities and challenges. Because of their highly interactive design, the activities provide visual, auditory and kinesthetic input. The manipulatives are large so younger students will quickly develop the hand-eye coordination to move them with the mouse.

All written text in activities and word problems is read aloud in the program. Students can learn the math concepts independent from their reading skills.

Note for Challenged Students:

Adaptive mice and screen enlargers are effective with physically and visually challenged students. For information on these and other adaptive technology, contact the Alliance for Technology Access, www.ataccess.org or telephone 415-455-4575.

Completing Curriculum Levels

After the last mastery level test is passed in the concept, Axel comes on screen and presents the student an award certificate. The award states the concept they have completed and the date. They have the option of printing the award if it is set in the Program Options. Or the award can be printed later by a parent or teacher. See the following section for more information on printing awards, page 21.

Students can view their last award by clicking on the **Award** button in the sign-on screen.

When students complete a full concept curriculum, they automatically advance to the next level unless they completed that level previously by being placed into it by a parent or teacher using the "Assign Concept" option. In that case, they progress to the concept following that completed one.

Printing Awards

If the **Allow Students to Print Awards** option is checked in the Student Management screen Program Options box, students can click on the **PRINT** button at the bottom of the Axel award screen to print the award. If this is not operational, the parent or teacher can print the awards from the Student Management screen. Select the student from the Student List, and click on the **Print Award** button. In the dialog box, you can use the date the concept was completed or change the date. The concept list will indicate which concepts the student has completed.

Another option in the Student Management screen is **Allow Printing in Color**. This can be turned off if you want the awards printed in black and white.

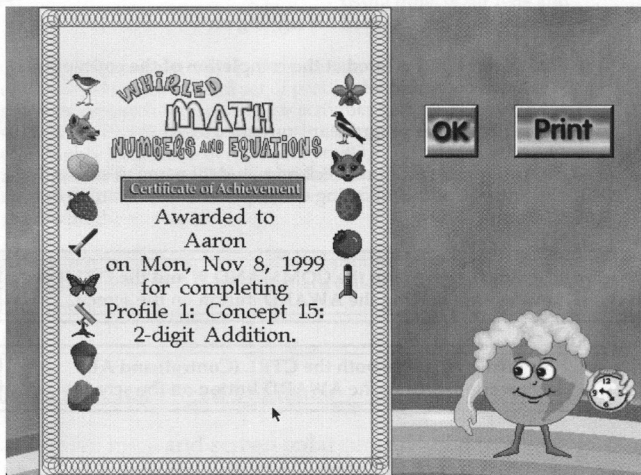


Figure 6
The Whirled Math award screen and certificate

Control Options for Parents and Teachers

Program Options

Parents and teachers have access to Program Options. The default settings are as follows:

- Students are placed in the first concept of the program
- Adding and changing students can be done within the class file, using the "New Student" star button in the sign-on screen
- Passwords are required for signing on
- Awards can be printed at the completion of the concept in color or black and white
- The tiles in the program are animated

To access the Program Options, click on a student name to enable the **AWARD** button. Use the following commands while you are in the sign-on screen:

For Macintosh, press both the **COMMAND** ⌘ and the **OPTION** keys while selecting the **AWARD** button on the screen.

For Windows, press both the **CTRL** (Control) and **ALT** keys while selecting the **AWARD** button on the screen.

This is the full Student Management screen that will appear:

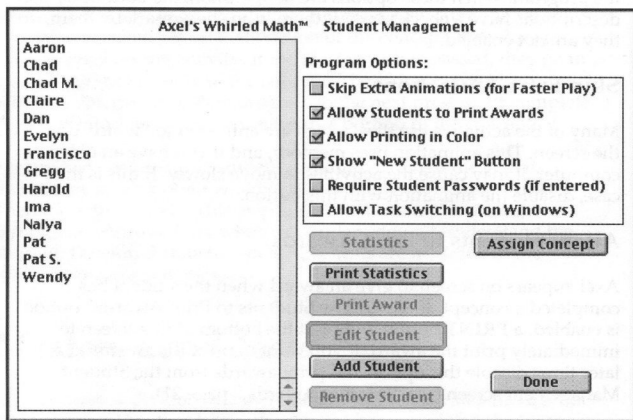


Figure 7
The Student Management Screen

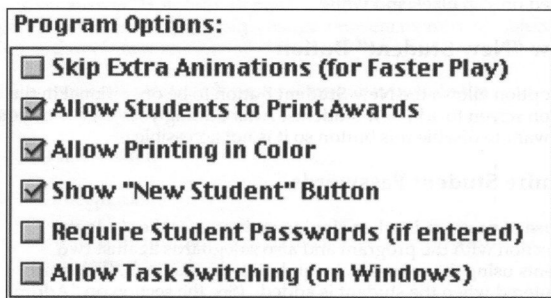


Figure 8
The Program Options box in the Student Management Screen

The "Program Options" box options apply to every student using the program. When these options are in operation, the buttons by the descriptions have a check mark. If there is no check mark by them, they are not enabled.

Skip Extra Animations

Many of the activities use tiles, which are animated to "whirl" onto the screen. This animation uses memory, and if you have an older computer, it may cause the activities to move slowly. If this is the case, disable the animation with this button.

Allow Students to Print Awards

Axel appears on screen to give an award when the student has completed a concept. If the "Allow Students to Print Awards" option is enabled, a **PRINT** button will be at the bottom of this screen to immediately print the award. If you want to print the awards at a later time, disable this option and print awards from the Student Management screen (see "Printing Awards," page 21).

Allow Printing in Color

Enable this option if you want the awards printed in color (or black and white as appropriate for the printer). Disable it if you want them printed only in black and white.

Show "New Student" Button

This option allows the **New Student** button to be operational in the sign-on screen to add new students. After adding your students, you may want to disable this button so it is not accessible.

Require Student Passwords

The use of passwords when signing on increases the students' connection with the program and also safeguards against two students using the same file, invalidating the statistics. Passwords are entered when the student is added. (See the section on "Adding Students" on page 13. Passwords can be edited; see the section on "Editing Students" on page 14.)

Allow Task Switching (on Windows)

This option is specific to Windows programs. If it is enabled, the Alt-Tab key combination allows switching to other programs while this program is running.

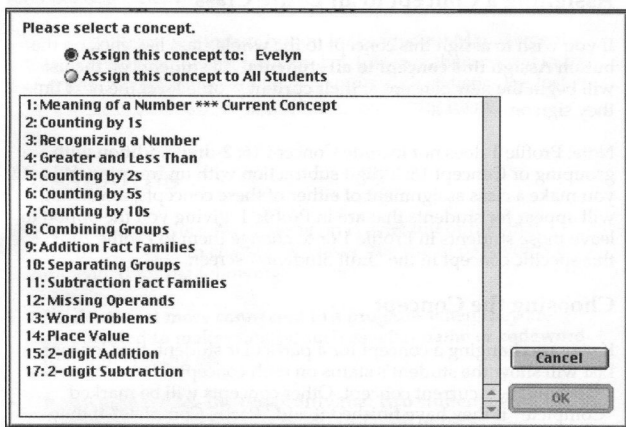


Figure 9
"Assign Concept" dialog box

Placing Students in a Concept

The program is designed to progress through a numbers and equations curriculum of beginning number concepts, counting, place value, addition and subtraction, borrowing and carrying, and word problems. Each concept is self-contained, but many concepts in math build on earlier skills. For example, a student would need to be able to know the meaning of numbers before adding them. The usual placement of a new student is at the beginning of the program, allowing them to proceed through the eighteen concepts at their own pace. However, the program can be used to develop understanding in a specific concept. Parents may wish to place a child in a concept to assist with homework. Teachers may wish to do so to supplement a specific lesson.

Place students in a specific concept from the Student Management screen (to access the screen, see page 12). Select a student from the Student List and click on the **Assign Concept** button. The "Assign Concept" dialog box will appear with the student's name on it.

Assigning a Concept to an Entire Class

If you wish to assign this concept to the whole class list, click on the button **Assign this concept to all students**. All students on the list will begin the new concept at their current profile level the next time they sign on.

Note: Profile 1 does not include Concept 16: 2-digit addition with grouping or Concept 18: 2-digit subtraction with ungrouping. When you make a class assignment of either of these concepts, a warning will appear for students that are in Profile 1, giving you the option to leave those students in Profile 1 or to change them to Profile 2 for this specific concept in the "Edit Students" screen.

Choosing the Concept

If you are changing a concept for a particular student, the Concept List will show the student's status on each concept. Three asterisks (***) show their current concept. Other concepts will be marked "Complete" if they have finished it and "Partly Complete" if they have done some work but not completed the concept. If there is no indication by the concept, the student has done no work in it. No information of this type will appear if you are changing the concept for all students.

Click on the concept from the list. The student (or the entire class) will begin the assigned concept the next time they sign on. After completing the assigned concept, they will return to the concept they were working in before the assignment. No student will repeat a concept that has been completed due to a parent or teacher assignment unless you assign a student to a concept and confirm when asked that you want him or her to repeat that concept.

Changing Individual Profiles for the Assigned Concept

The parent or teacher may feel an individual student needs a Profile above or below their usual placement for a specific assigned concept. To do this, use the **Edit Student** button on the Student Management

screen. Select a new Profile for the student, and then assign them the specific concept from the **Assign Concept** screen.

Student Progress Statistics

In *Axel's Whirled Math: Numbers and Equations*, every students' progress is accurately recorded with meaningful statistics. You will use the first or first few sessions' statistics to check on the Profile placement of the student. After that, you can track their entry-level concept understanding and mastery level scores. Each statistic is dated. Statistics can be viewed in two ways:

Summary

The Summary gives a basic review of the progress the student has made with each concept. It lists the concept name and how many mastery levels out of the total number have been passed as of the last date the student took a mastery test. If the student has done some work in a concept but not yet passed a mastery test, the statistic will show "0" mastery levels completed. If they have not yet worked in the concept, it will be marked, "No work done yet."

Mastery Details

Mastery Details list every mastery level test in each concept by title so you can relate the score to the content of the test. The number correct out of the total number is given, along with a percentage score and the date taken. The mastery test will be labeled "Passed" if the student received a passing score. If the test is labeled "Needed Review" it means that this test served as a pre-test and the student will complete tutorials and activities before retaking the test. Note: If a student does not pass a Mastery Test three times (one Pretest and two Mastery Tests) more than once in a concept, they may need to be placed in a lower profile.

Viewing Statistics Reports

Access student statistics reports from the Student Management screen. Click on a student from the Student List and click on the **Statistics** button. To view Summary Details, click on the **Show Summary** button in the upper right corner of the screen. To view Mastery Details, click on the **Show Mastery Details** button. Click on the **DONE** button to exit either screen.

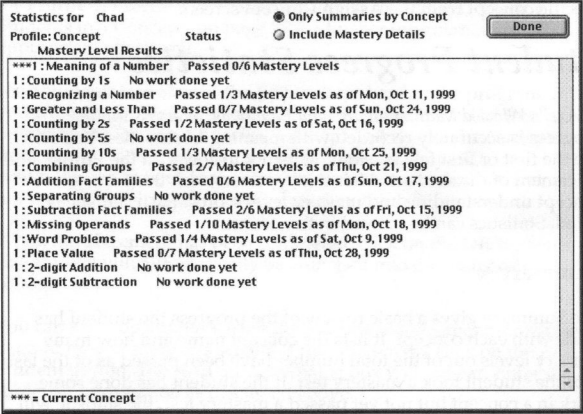


Figure 10
Summary box for student statistics

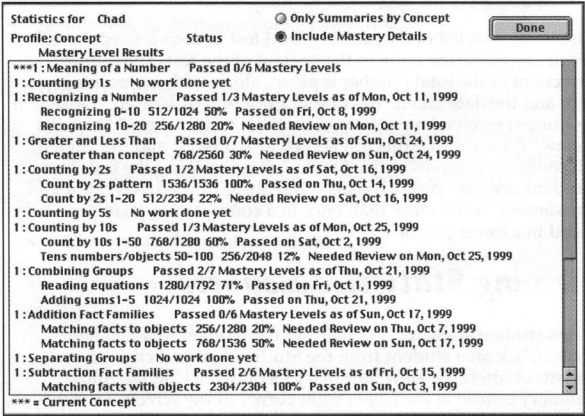
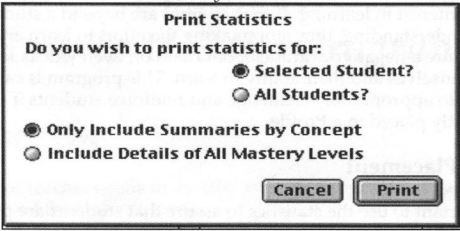


Figure 11

The Mastery Details screenA screenshot of a dialog box titled "Print Statistics". The text inside asks "Do you wish to print statistics for:". Below this are two radio button options: "Selected Student?" (which is selected) and "All Students?". Below these are two more radio button options: "Only Include Summaries by Concept" and "Include Details of All Mastery Levels". At the bottom right are two buttons: "Cancel" and "Print".

Print Statistics

Do you wish to print statistics for:

☒ Selected Student?

☐ All Students?

☒ Only Include Summaries by Concept

☐ Include Details of All Mastery Levels

Cancel Print

Figure 12
The Print Statistics dialog box

Printing Statistics Reports

Print statistics reports from the Student Management screen. Click on a student from the Student List and click on the **Print Statistics** button. You can choose to print statistics for that individual student or the entire class file.

- Click on **Selected Student** to print reports for the student you have selected from the Student List
- Click on **All Students** to print reports for all the students on the Student List

Statistics can be printed in two levels of detail:

- Click on **Print Summary** to print Summary statistics.
- Click on **Print Details of All Mastery Levels** to print detailed statistics.

(See "Statistics Recorded for Each Student" on page 31 for descriptions of these two levels of statistical detail.)

Interpreting Statistics

Axel's Whirled Math: Numbers and Equations is a learning program. An essential component in learning math is having a comfortable level

of challenge. If a student feels the math is "too easy," they get bored and lose interest in learning. If the activities are beyond a student's level of understanding, they stop making the effort to learn and often acquire a negative attitude about math or, even worse, feel bad about themselves and their ability to learn. This program is carefully designed to appropriately challenge and reinforce students if they are correctly placed in a Profile.

Profile Placement

It is important to use the statistics to assure that students are placed in the best profile for them, regardless of their actual grade or age. It is better to be successful at a lower profile than to struggle and get "turned off to math" in a higher profile. The goal of this program is solid acquisition of concept understanding.

Each Mastery Test will reasonably be taken two times: once as a pre-test to find out if the student already knows that part of the concept, and next as a Mastery Test following the tutorials and activities. Students at times will need to repeat the activities for a little more practice. If they regularly are not passing Mastery Levels in three to four attempts, try a lower Profile level. Use the **Edit Student** button from the Student Management screen to change Profiles (see page 14).

If a student completes several concepts taking the Mastery Test only once, as a pre-test, they may benefit from moving to a higher Profile. Before doing this, check with the student to see if they feel the program is "too easy" or if they do not feel challenged. If the student is comfortable in the current Profile, they may be building confidence in their ability to do math and should be allowed to finish the Profile before moving ahead.

Additional Support

The statistics will show you the parts of a concept a student does not understand. The parent or teacher can review that part with the student. Some ideas for additional support include:

- **Provide manipulatives along with the on-screen activities so the student can use objects to better understand the concept.**
- **While the student is doing an activity, ask them questions. What is their understanding about what is being asked? How are they choosing their answers?**

- Make sure the student understands how to do the program activities and that it is important to try to drag the correct answer the first time. The first answers, not corrected answers, are counted for scoring the tests.

Use Statistics Reports for Parent Reporting

Parents appreciate detailed reports on their children's progress. The easily printed reports can be sent home regularly, or attached to report cards. Concepts in *Axel's Whirled Math: Numbers and Equations* are taken from the National Council of Teachers of Mathematics (NCTM) standards and are also representative of state curriculum frameworks for math. For report printing information, see page 29.

Statistics Recorded for Each Student

Summary Report

- Student name
- Profile number
- Concept name
- "Concept Passed," "0 Mastery Tests completed" or "No work done"
- The number of Mastery Tests passed over the total number of Mastery Tests for each concept
- Date of last Mastery Test taken in each concept

Mastery Report

- Student name
- Profile number
- For each concept: list of Mastery Tests by content title

For each Mastery Test:

- The number of correct responses over the total number
- A percentage score
- Mastery Test "Passed" or "Needed Review"
- Date Mastery Test was last taken

Multiple Class Files

Teachers may create many class files with separate student statistics records for each class. Each class file can have up to 50 student names.

For Macintosh Systems:

1. For each class, duplicate the *WhirlN&E Students* document and rename it with the class name.
2. Move the *WhirlN&E Students* document to another location on the hard drive. Or rename the document.
3. Access each class file by selecting it from the dialogue box when you launch the program.
4. Use the Student Management screen Program Options box to set program options for each class. (See page 22 for Program Options.)
5. Add students with the **New Student** button in the sign-on screen or using the **Add Student** button in the Student Management screen (see page 13 for adding new students).
6. To change classes, restart the program and select another class file.

For Windows Systems:

1. For each new class, copy and rename the *WhirlN&E.scl* file, giving it a new .scl extension.
2. Rename the original *WhirlN&E.scl* file.
3. Access each class file by opening it when you start the program.
4. Use the Student Management screen Program Options box to set program options for each class. (See page 22 for Program Options.)
5. Add students with the **New Student** button in the sign-on screen or using the **Add Student** button in the Student Management screen (see page 13 for adding new students).
6. To change classes, restart the program and select another class file.

APPENDIX

List of Curriculum Concepts

<u>Concept</u>	<u>Profile 1</u>	<u>Profile 2</u>	<u>Profile 3</u>
1 Meaning of a number	0 to 20	0 to 50	0 to 100
2 Counting by ones	1 to 20	1 to 50	1 to 100
3 Recognizing a number	0 to 20	0 to 50	0 to 100
4 Greater/Less than	0 to 20	0 to 50	0 to 100
5 Counting by twos	0 to 20	0 to 50	0 to 100
6 Counting by fives	0 to 50	0 to 100	0 to 100
7 Counting by tens	0 to 100	0 to 100	0 to 100
8 Combining groups	to 10	to 18	to 18
9 Addition fact families	to 10	to 18	to 18
10 Separating groups	to 10	to 18	to 18
11 Subtraction fact families	to 10	to 18	to 18
12 Missing operands	to 10	to 10	to 10
13 Word problems	to 10	to 12	to 12
14 Place value	0 to 50	0 to 100	0 to 100
15 2-digit addition, no grouping ones	0 to 30	0 to 50	0 to 99
16 2-digit addition, grouping ones	n/a	0 to 50	0 to 99
17 2-digit subtraction, no ungrouping ten	0 to 30	0 to 50	0 to 99
18 2-digit subtraction, ungrouping ten	n/a	0 to 50	0 to 99

NOTE:

Profile 1 corresponds with typical abilities of Pre-Kindergarten students (ages 3 to 4), Profile 2 with the typical abilities of Kindergarten to First Grade students (ages 5 to 6), Profile 3 with the typical abilities of Second to Third grade students (ages 7 to 8). Please read the sections on "The Profile Levels" (page 4) and "Interpreting Statistics" (page 29) for more information on the levels.

Activities in the Program

Matching Activities:

- Dragging loose objects (1 – 20) to match a tile
- At a voice prompt, click on a tile from a horizontal row
- One to one matching of tiles using two tablets
- One to one matching of tiles using two horizontal rows

Operational Activities:

- Dragging objects to workspaces to combine sets and build an equation
- Dragging objects to workspaces to subtract from a set and build an equation

Place Value Activities:

- Dragging objects to create groups of tens and ones using a "group" button
- Dragging grouped tens and ones to represent 2-digit numbers
- Grouping "2 tens and 14 ones" into "3 tens and 4 ones", using a "group" button
- Ungrouping a ten to take away ones using an "ungroup" button
- 2-digit addition with objects and equation workspaces (*no regrouping of ones*) Variation: Equation only
- 2-digit addition with objects and equation workspaces using a "group" button (*grouping ones into a ten*) Variation: Equation only
- 2-digit subtraction with objects and equation workspaces (*no ungrouping of tens*) Variation: Equation only
- 2-digit subtraction with objects and equation workspace, using an "ungroup" button (*ungrouping a ten into ones*) Variation: Equation only

Pattern Building Activities:

- Horizontal pattern of 8 tiles with tiles to drag to missing spaces
- Grids in rows of ten (1 – 50 and 1 – 100), click on spoken numbers
- Grids in rows of ten (1 – 50 and 1 – 100) with tiles to drag into missing spaces in grid

Number Line Activities

- Number line 0 – 10
- Number lines 0 – 10 and 0 – 18 with equations
- “Continuous” number line 0 – 100 for counting and skip counting
- Number line 0 – 10 and 0 – 18 with missing operand equations

Balancing Activities:

- Scale with loose objects to balance number or equation
- Scale with tiles to balance number or equation
- Scale to balance numbers that are greater than or less than
- Scale to build number sentences for greater than, less than or equal

Sorting Activities:

- Sorting tiles into labeled sets

Word Problem Activities (all word problems read aloud):

- Word problem with 4 pictures to click and match
- Word problem with equation to solve by dragging objects and numbers
- Word problem with equation to solve by dragging objects, “X stampers” and numbers
- Word problem with blank equation to build by dragging numbers and symbols

Fast Facts Activities:

- Calculator with equation
- Addition and subtraction fact families (0 – 10 and 0 – 18) using 2-color block stacks and numbers to drag into vertical equations
- “Flash cards:” Answer clicked on in number bar when an equation comes onto the screen

National Council of Teachers of Mathematics (NCTM) Curriculum Standards

Axel's Whirled Math: Numbers and Equations is designed to meet the following NCTM content standards:

An appropriate K – 3 curriculum must do the following:

- Address the relationship between young children and mathematics.
- Build mathematical beliefs and children's view of themselves as mathematics learners.
- Be conceptually based.
- Actively involve children.
- Emphasize the development of mathematical thinking and reasoning abilities.
- Make appropriate use of calculators and computers.

**The following NCTM curriculum standards for grades K – 3
are used in the program:**

STANDARD 1: MATHEMATICS AS PROBLEM SOLVING

- Use problem-solving approaches to investigate and understand mathematical content.
- Formulate problems from everyday situations.
- Develop and apply strategies to solve problems.
- Acquire confidence in using mathematics meaningfully.

STANDARD 2: MATHEMATICS AS COMMUNICATION

- Reflect on and clarify thinking about mathematical ideas and solutions.
- Relate language to mathematical language and symbols.
- Use representing as a vital part of learning and using mathematics.

STANDARD 3: MATHEMATICS AS REASONING

- Draw logical conclusions about mathematics.
- Justify answers and solution processes.
- Believe that mathematics makes sense.

STANDARD 4: MATHEMATICAL CONNECTIONS

- Use mathematics in daily life.

STANDARD 5: ESTIMATION

(in the next *Axel's Whirled Math* program)

STANDARD 6: NUMBER SENSE AND NUMERATION

- Construct number meanings through the use of manipulatives.
- Understand our numeration system by relating counting, grouping and place value concepts.
- Develop number sense.
- Interpret the multiple uses of numbers.

STANDARD 7: CONCEPTS OF WHOLE NUMBER OPERATIONS

- Develop meaning for operations by modeling a variety of problem situations.
- Relate the mathematical language and symbolism of operations to problem situations and language.
- Recognize that a wide variety of problem structures can be represented.
- Develop operation sense.

STANDARD 8: WHOLE NUMBER COMPUTATION

- Model and develop proficiency with basic facts.
- Use a variety of computation techniques.
- Appropriate use of calculators.
- Select and use computation techniques appropriate to specific problems.

Glossary of Program Terms

Addend: any number being added in an equation

Addition: the operation used to find the total value when putting together two or more quantities. Also called "plus"

Difference: the amount by which one number is greater or less than another number, or the answer to a subtraction problem

Equal: sets with the same number

Equation: a number sentence represented in numerals and mathematical symbols

Explore: to do an activity for the purpose of discovery

Fact family: a set of related addition or subtraction facts (answer range 0 to 18)

Mathematics: the study of relationships among numbers, shapes and patterns. Used to count and measure things, discover similarities and differences, to solve problems and organize data

Math story: a story that contains a math problem that can be solved by one or more basic operations. Also called "word problems"

Minuend: the amount being taken away from in a subtraction equation

Number grid: a table in which consecutive numbers are arranged in rows of 10

Number line: a line on which equidistant points correspond to numbers in order

One-digit number: the numbers 0 to 9

Place value: the relative worth of each digit in a number as determined by its position

Row: a horizontal arrangement of objects or numbers

Subtraction: the operation used to find the amount left after another amount (or zero) is taken away. Also called “minus” or “take away”

Subtrahend: the amount being taken away in a subtraction equation

Sum: the answer to an addition equation

Two-digit number: a number with numerals in the tens and ones places

Zero: no amount or the empty placeholder for a multiple-digit number



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