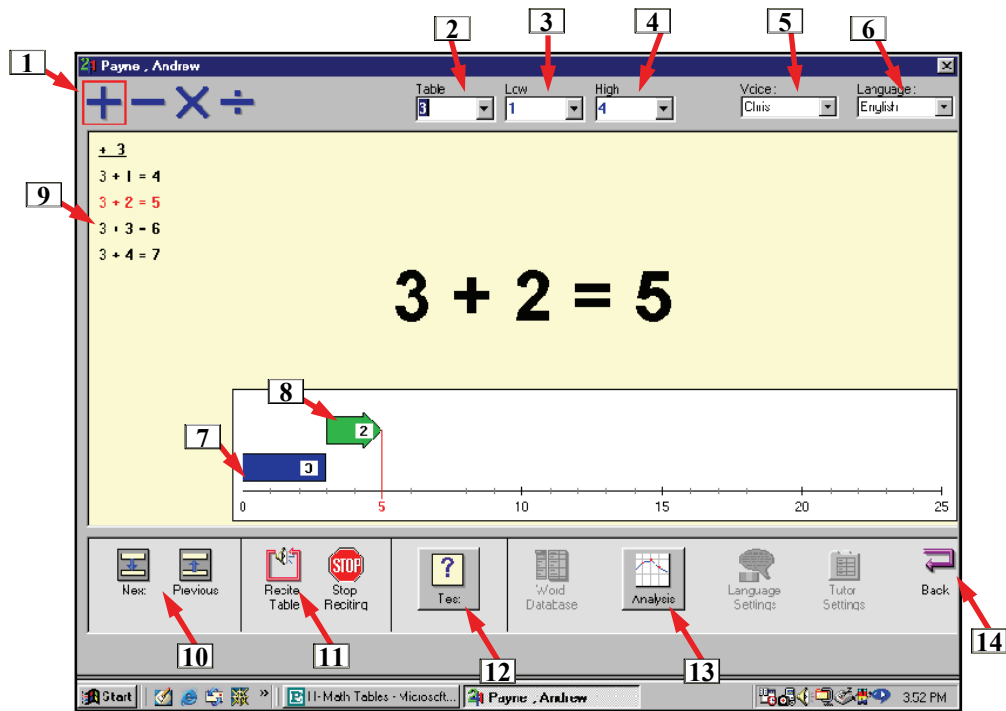


Table of Contents

Math Tables

Math tables, introduction	H2
Addition practice, illustration	H2
Addition practice, description	H3
Subtraction,	H3
Multiplication illustration	H3
Starting a test	H3
Test parameters	H4
Test results	H4-H5
Matrix display of results	H6

Math Tables



Math Tables , Introduction

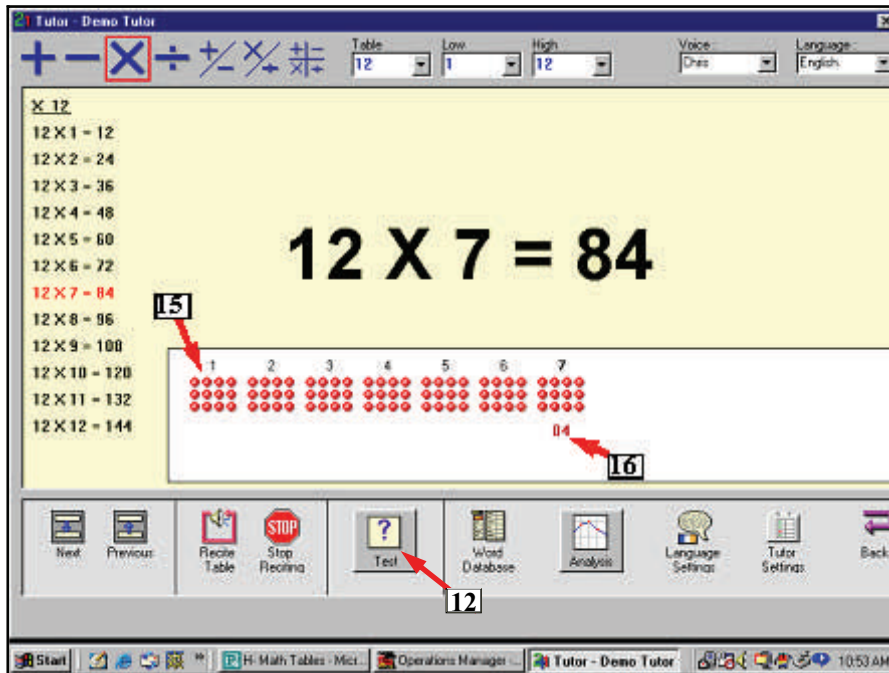
As a bonus to the program, a math table section is offered. One immediate plus is that the same type of sound functions are used for the math tables as is used in the reading sections. The Teaching-Engine system uses a synchronized sound and visual method and continues with the learn, test, score, analyze and re-learn cycle used in other modules. Basic to this system is that if a student test result shows that he knows some of a table, those combinations he knows can be excluded in subsequent practice sessions so the student can concentrate on learning the combinations he doesn't know.

A unique summary chart shows at a glance which combinations the student knows, which take too long to complete, and which have been tested incorrect and need learning. From this chart, the combinations which need practice can be quickly chosen.

The learning technique not only includes sound for every part of the sum, but also includes a dynamic visual representation of the sum and the process for getting the correct answer. This will help the student visualize the mathematical mechanism involved in deriving the answer. Another feature recognizes that students can get a sum correct by various round-about ways, including counting fingers, but a sum isn't really known until the answer is obtained instantly by rote, with no figuring. When a test is taken, the amount of time required to obtain a correct answer is included in the database. The Tutor can set a time, such as 7 seconds, which if exceeded for a correct answer, is reported as too long and although correct, is interpreted as needing more practice.

The Math module is opened from either the Student or Tutor Gateway Grid by clicking the Math icon.

Math Tables



In the illustration on page H2, the addition practice screen is shown. The type of sum to be practiced is selected by clicking one of the math symbols [1]. The table, [2] and the lowest and highest value in the table to be practiced are selected with drop down boxes [3] and [4]. The voice [5] and language [6] are defaulted to Chris and English so that initially the sounds necessary for all the math symbols and numbers will be automatically provided from within the program. Other voices and languages can be specified.

Note that the table number being used [7] and the number being added [8] are shown visually on a graph at the bottom of the screen. The appearance of these components and the result of the sum are shown synchronized with the playing of the sum so the student will have a feel as to how the sum was obtained. The selected table can be recited by clicking icon [11] or individual sums will be sounded by clicking on the list of sums [9].

The subtraction sum selected with the (-) symbol [1] has a nearly identical setup and graphical presentation of the subtraction process.

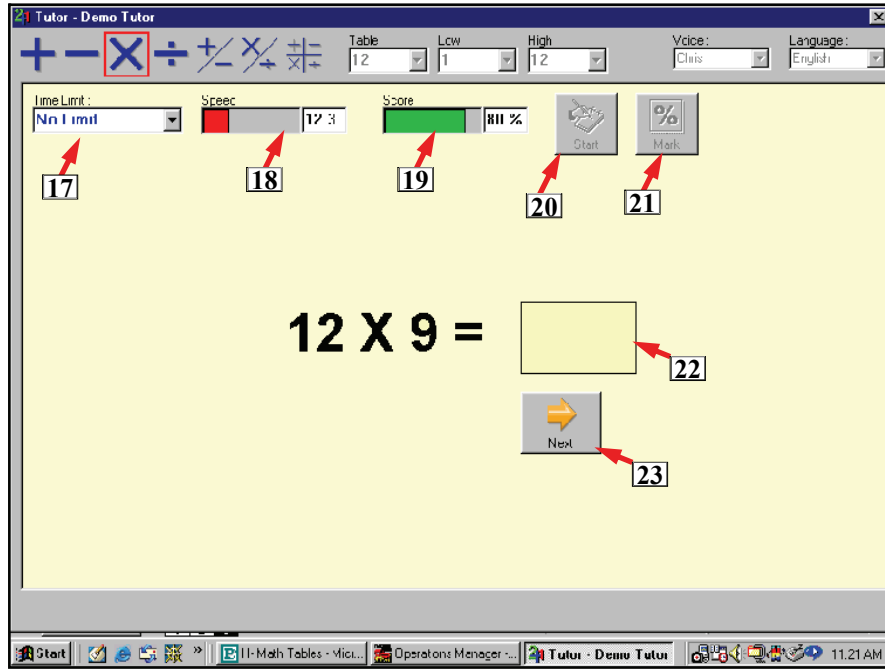
The multiplication practice shown above has the same basic operation as the (+) and (-) except the graphical presentation differs. Here for the sum 12 times 7, clusters of 12 red balls [15] are spread out 7 times to illustrate the principle, and the total is shown at the right end. [16] The activity of the graphic is synchronized as the sum is sounded.

For a test, the icon [12] is clicked and the screen on page H4 appears.

Taking a Test

The arrangement at the top of the screen is similar to the practice screens. When switching from a practice screen to a test screen, the chosen sum, table and limits are setup by default on the test screen. However any of these parameters can be changed.

Math Tables



A time limit can be set for the test, [17] with the default being no limit. During the test the average speed in sums per minute is indicated [18] and the running score [19]. As soon as the *Start* icon is clicked, [20] the test begins. The answer to the sum is entered in the text box [22] and the next icon [23] clicked to obtain the next sum. When the last sum is entered and the next icon clicked, the *Mark* icon [21] becomes ungreyed. Click that icon to go to the *Results* screen.

On page H5, the results screen shows the total score, all the sums as they are marked and the correct answer for the incorrect sums. The student can then click the *Study* the incorrect sums icon [27] and the study screen will be returned showing only the sums which were marked incorrect. A more detailed look at the results and earlier results can be seen by clicking the *Analysis* button [25]

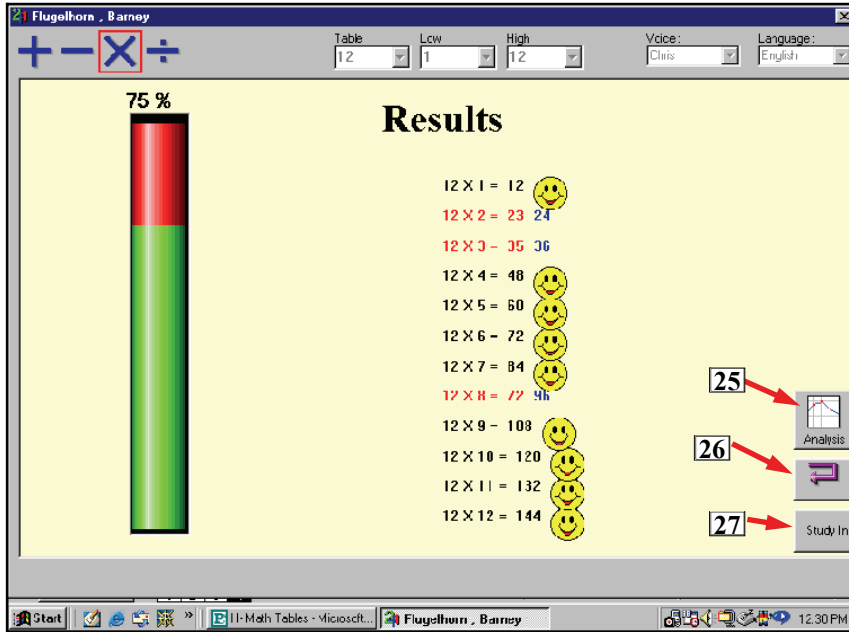
The first analysis screen [28] show the results of the test session in bargraph form. The length of the bars is an indication of the amount of time it took to complete a sum correctly. If the time exceeds a present value, here it is 5 seconds, the excess amount of time is coloured in yellow. Although the sum was answered correctly, excessive time was used, and the sum is considered to need more practice.

A convenient graphical summary of all sums in a category such as multiplication, is available with the matrix display shown on page H6.[29] The number of the table is listed along the left edge and the numbers corresponding to the sums are shown across the top. Thus all sums are represented. The colour red indicates incorrect, yellow correct but excessive time, and green is correct. Thus at a glance, one can see the progress of a particular student and it becomes very clear which sums need work. Typically the students will try very hard to get everything green. The small purple return arrows [30] on the right provide a quick way to return to study particular combinations needing work. One arrow will bring back all the sums for a particular table, and the other will bring back only the sums which were tested wrong or were correct but answered with excessive time.

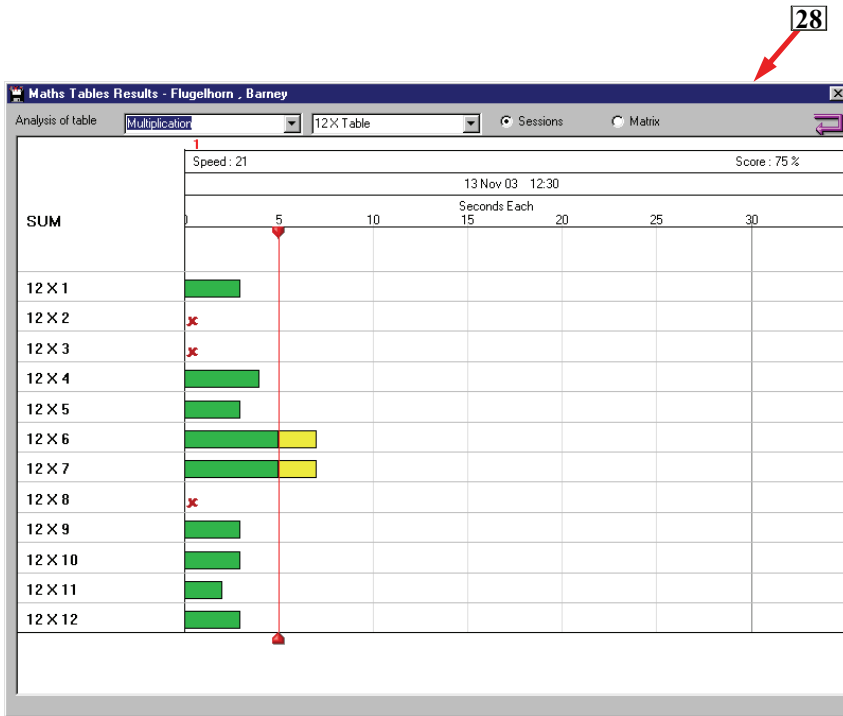
When only the incorrect sums are returned for study, and are used for a test, the results are not shown on either the sessions display or the matrix. A full test of all combinations in a particular table must be taken in order for the results to be shown.

A historical look at the student's progress can be made by clicking through the various sessions [31] or an automatic stepping back or forward in time can be selected with the *Animation* buttons . [32]

Math Tables

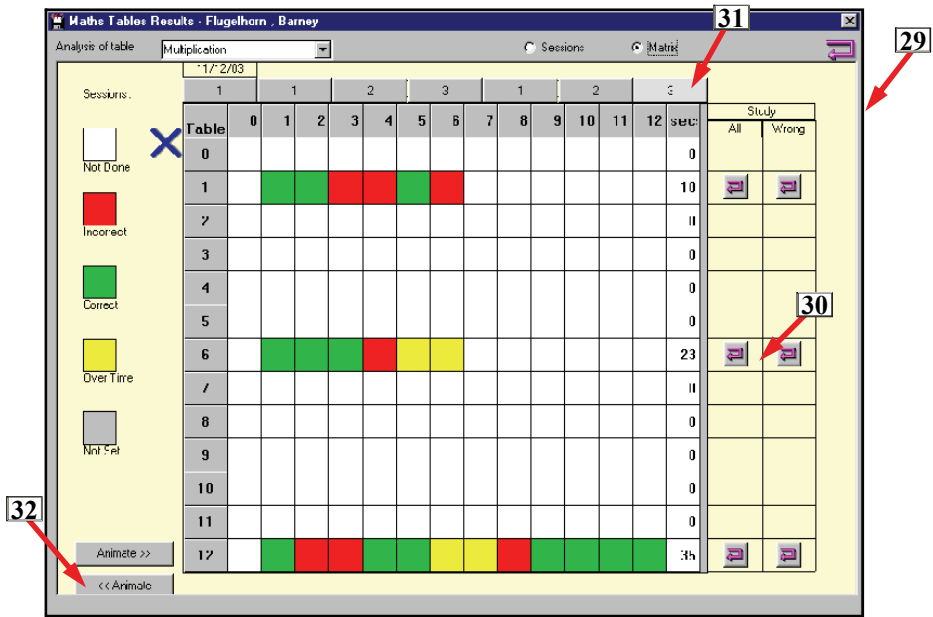


Math Tables Results Screen



Math Tables Sessions Screen

Math Tables



Math Tables Results Matrix