MathBase4

Installation

Before installing MathBase4, first uninstall any previous version by using Add or Remove Programs: **Start > Control Panel > Add or Remove Programs > MathBase4 School Edition**.

MathBase4 may be installed on Windows 95 or later. For stand-alone machines, navigate to **My Computer** and double click the CD, which will appear as MathBase4. Double click setup.exe (82KB Application) to begin the installation and follow the on-screen instructions.

By default, the MathBase4 program will be installed at the location **C:\Program Files\ MathBase\ MathBase4.exe**. Note that previous versions of MathBase4 may have been installed at **C:\Program Files\MathBase1\MathBase4.exe**.

The installation will create a MathBase4 shortcut on the start menu and the program can be accessed as follows: **Start > All Programs > MathBase > MathBase4**. To create a shortcut on the desktop, navigate to **C:\Program Files\ MathBase\MathBase4.exe** and right-click, then click **Send To** then click **Desktop (create shortcut).**

To install the software on Windows XP, you will have to log on using an account with administrator's privileges. This will install the program file as before at **C:\Program Files \MathBase\MathBase4.exe** but will only create a MathBase4 shortcut in the Start Menu of this account. Other accounts can access the program directly from **C:\ Program Files\MathBase\ MathBase4.exe** or they can right-click, then click **Send To** then click **Desktop (create shortcut)** to create a shortcut on their own desktop.

This MathBase4 installation is based on msi files. The actual msi file is **MathBase4.msi** and may be used to install MathBase4 on a **network** as required.

Introduction

MathBase4 contains twelve programs dealing with fractions, decimals, percentages and ratios.

> **Program 1: Counting Cells in a Grid.**
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> **Program 2: Naming Fractions.**
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> **Program 3: Equivalent Fractions.**
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> **Program 4: Mixed Numbers.**
>
> **Program 5: Decimals & Percentages.**
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> **Program 6: Counting, Ratios & Fractions.**
>
> **Program 7: Equivalent Ratios.**
>
> **Program 8: Estimating Fractions.**
>
> **Program 9: Fractions of Numbers.**
>
> **Program 10: Decimals Greater Than 1.**

Program 11: Add & Subtract Mixed Numbers.

Program 12: The Four Rules of Fractions.

These operating notes concentrate on program control rather than their educational use. The software is equally suited to individual and whole class teaching and works well with an IWB (interactive whiteboard). Home user versions of the software are available.

1. Counting Cells in a Grid

MathBase4 is controlled by pointing and clicking the mouse - no use is made of the keyboard. We select objects on the **left** and match them with objects on the **right**. Unless otherwise stated **left mouse clicks** are used.

This program starts with 9 blue grids on the left. Select a grid, count its cells, then match with a number on the right. The mouse may be used to highlight cells as they are counted. Repeat this matching procedure till no grids remain. To start a new game click **New**.

The buttons **2 x 2 , 3 x 3 , 4 x 4 , . . .** are used to display grids of different dimensions. For example, clicking **5 x 5** creates grids with either **5 rows** or **5 columns** (i.e. cells are arranged in groups of 5). If **5 x 5** is clicked a second time all grids up to a maximum of 5 rows and 5 columns are allowed.

If a wrong match is made a fault is scored and you must click the flashing message **Click here to continue.** A maximum of 10 faults is allowed - if 11 faults are made click the flashing sign **Faults 11** to start again.

The **Man**(ual) button when clicked changes to **Auto**(matic). In automatic mode objects on the left are selected automatically which speeds up the matching process. The **Zz..** button controls the sound effect produced by a correct match. The **1min** button is used to initiate a timed challenge giving the player one minute to clear the screen before the green disc completes. **Right clicking** this button increases the time allowed up to 5 minutes. Completing a timed challenge without any faults will cause a short piece of music to play - to end this simply click **1min** again.

The four buttons on the left labelled 4, 9, 16 and 25 set the number of objects in each matrix and are common to several programs in MathBase4.

Once a grid is selected, clicking its red border will cause it to enlarge. Clicking the outer edge of this enlarged grid will cause it to reduce again. This is useful when the grids are difficult to see because they are small or because they have a large number of rows or columns.

Once a grid on the left has been selected, clicking any other grid will select that grid instead - this is a common feature throughout MathBase4.

If grids are the chosen option for the right matrix a green square will appear. Clicking this square will give a grid on the right a yellow border - click the border to expand that grid and click the edge of the expanded grid to reduce it again. To return to the matching process click the square again to remove the yellow border.

In this program we follow the convention of describing a grid, specifying its number of rows by its number of columns. Even if a 3 by 2 and a 2 by 3 grid have the same number of cells they are treated as distinct in this program. The 3 by 2 has 3 rows while the 2 by 3 has two rows.

2. Naming Fractions

Before pupils learn about equivalent fractions they must first learn the standard way of naming fractions based on the idea of a selected number of equal parts. This program does not recognise or deal with equivalent fractions.

The program begins with 9 fraction diagrams involving halves. These are matched with fractions on the right. The buttons: **Wholes**, **Halves**, **Thirds**, **Quarters** etc. select different fraction types. Buttons above each matrix give the following choices: fraction diagrams based on circles and squares - fractions in words - fractions in figures - fractions spoken aloud with no visual indication.

If for example the button **Quarters** is clicked twice then fractions shown will be a mixture of wholes, halves, thirds and quarters.

When a fraction diagram is selected it is given a red border - click this border to enlarge - clicking the edge of the enlarged diagram will cause it to reduce again. The mouse can be used to highlight parts in the fraction diagram to aid counting.

If a question mark appears in a red square on the left it will turn green when clicked. This will cause fractions to be spoken as well as seen.

3. Equivalent Fractions

The program begins with 9 fractions on the left. These are matched with equivalent fractions on the right by multiplying top and bottom by 2. Buttons on the top row create other equivalent fractions using higher factors up to 10.

Buttons in the second row set program options. Using the **Divide** option: fractions on the left are cancelled to their lowest form by division. Using the **Either** option: multiply **or** divide. Fractions in their lowest form are matched by multiplication - fractions not in their lowest form are matched by cancellation (i.e. division). Using the **Both** option: fractions on the left are cancelled to their lowest form by division and then matched to an equivalent fraction on the right by multiplication. Using the **H.C.F.** option: fractions are matched with the highest common factor of their numerator and denominator.

4. Mixed Numbers

The program starts with nine orange boxes labelled **Squares**. When clicked they reveal nine other squares divided into halves with a certain number of halves shaded. The number of halves shaded has to be matched with the correct improper fraction on the right. The mouse can be used to highlight the halves as they are counted.

The option buttons above each matrix give the following choices of content: mixed numbers - improper fractions - fraction diagrams based on squares - fraction diagrams based on circles - spoken mixed numbers - spoken improper fractions.

5. Decimals & Percentages

Program 5 starts with 9 shaded fraction diagrams based on tenths. Match each with the correct fraction on the right.

The yellow button alternates between work based on 10ths and 100ths.

For each matrix there are six option buttons. Resting the mouse pointer on each reveals a tool tip describing its purpose.

6. Counting, Ratios and Fractions

The program starts with 9 groups of blue and yellow squares set in green boxes. The first task is simply to count the blue squares (use the mouse pointer to help).

Buttons at the top of the screen select a further seven activities based on: counting - sums - differences - ratios - fractions.

Clicking the edge of a group of squares causes it to enlarge, clicking the edge again will cause it to reduce.

7. Equivalent Ratios

This program begins by matching equivalent ratios that are formed by multiplying both sides by 2.

Using the buttons on the top row we can choose different factors or by clicking twice obtain a range of factors. There are four other related activities.

8. Estimating Fractions

This program begins with 9 bars each with yellow and blue parts. Buttons near the top of the screen require us to estimate: fractions - ratios - decimals - percentages.

Green buttons at the top provide useful guidelines showing halves, thirds, quarters etc. Estimation is to the nearest percent and two decimal places.

9. Fractions of Numbers

The program begins with finding halves of whole numbers to 20. By clicking **1/5** the activity will involve finding 5ths of numbers to 50.

The yellow option button **1/a** when clicked becomes **a/b** and we now have to find other fractions such as 2/5, 3/5 and 4/5 of whole numbers.

Clicking the yellow button **of** replaces it with **x** (multiplication sign) which is then reflected in the appearance of the left matrix.

10. Decimals Greater Than 1

The program begins with 9 mixed numbers on the left to be matched with 9 decimals on the right.

Buttons above each matrix give the following choices of content: improper fractions with 10 or 100 as denominator - mixed numbers with 10 or 100 as denominator of the fractional part - decimals with 1 or 2 decimal places - percentages - mixed numbers with a reduced fractional part - fraction diagrams based on 10ths and 100ths.

The yellow option button **10ths** can be changed to **100ths** to effect the above choices.

11. Add & Subtract Mixed Numbers

The program opens with the addition of whole numbers. Clicking **1/2** at the top of the screen introduces mixed numbers with halves.

If **1/6** is clicked the mixed numbers involve sixths. If **1/6** is clicked again all its related buttons **1**, **1/2**, **1/3** and **1/6** are highlighted in green. If **1/6** is clicked a further time all the buttons **1**, **1/2**, **1/3**, **1/4**, **1/5**, **1/6** are highlighted in yellow.

The **Add** option can be changed to **Subtract** and then to **Add Sub** (giving a mixture of addition and subtraction). All calculations in this program are accessible to simple mental methods - none involve working with products greater than 30.

12. The Four Rules of Fractions

This program involves progressive mental practise in the four operations.   This program is modelled on **Number Bonds** in MathBase1 and should not prove much more difficult.

Addition and subtraction in **row A** involve common denominators.   Addition and subtraction in **row B** involve one denominator that has to be changed to match the other. In **row C** both denominators are multiplied together (if previous simpler techniques are applicable pupils are expected to recognise and use these).

The three rows dealing with multiplication and division use progressively harder multiplication facts.

If the **Unsimplified** option (yellow button) is selected **all calculations** must follow strict calculation methods without simplification of answers.

The **Simplified** (red) option allows short cut methods and requires answers reduced to their lowest form.

The **Mixed Num** (green) option requires answers given as mixed numbers in their lowest form.

A small green rectangle in the bottom right corner enlarges fractions to make them more visible.

These instructions explain program operation. For information about learning objectives and possible teaching methods see the web site below.

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