Springboard Educational Software

Fraction Factory®

Instructions

Fraction Factory®

Table of Contents

Available in the following formats:
Apple II +, IIe, IIc
IBM/Tandy & compatibles
Commodore 64

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To the Parents

Fractions can be very confusing to children. FRACTION FACTORY was designed to make it easy and fun to learn about fractions by visually simplifying a complex concept.

Your child will learn to describe fractions, find equal values with different denominators, multiply whole numbers by a fraction, and add and subtract fractions. Colorful graphics and musical sounds help describe what the numbers mean. If your child has difficulty, helpful hints appear, until the right answer has been understood and chosen.

The team of educators and child development specialists at Springboard Software has carefully designed FRACTION FACTORY with a double benefit for your child—enjoyment and educational value. We are confident that you will watch your child's understanding of fractions grow as he or she has fun with FRACTION FACTORY.

1

**Getting Started...
Let's Load
the Program**

Apple

1. Insert the Fraction Factory disk into the disk drive.
2. Turn on the computer and the monitor.

Commodore 64

1. Turn on the disk drive, monitor and computer.
2. Insert the Fraction Factory Math disk into the disk drive.
3. Type **LOAD "FRACTION FACTORY", 8** and press the RETURN key.
4. When READY appears on the screen, type **RUN** and press the RETURN key.
5. Your program will come up soon.

IBM 3½"

Making a working copy

To protect your master disk, it is strongly recommended that you make a working copy. Consult your DOS manual if you are unsure how to copy a disk. After making a copy, put your master disk in a safe place. Please do not give a copy to anyone: that is a violation of copyright laws.

Running the program from a diskette drive

1. Boot your system and get the DOS prompt (A>, for example).
2. Put the working copy of Fraction Factory into a drive.
3. At the prompt, enter the letter of the current drive (the drive where you put Fraction Factory and a colon, and press [Enter].
(For example, if you put the diskette into drive B, enter B: and press [Enter]).
4. To start the program, enter FF and press [Enter].

Making a working copy that is self-booting
You can create a file that will automatically boot the program.

One drive system:
1. Put the program disk into drive A.
2. Enter DISKCOPY A: B: and press [ENTER]
3. The system will prompt you to put the source disk in drive A and later prompt you to put the target or destination disk in drive A.
4. Put the working copy into drive A.
5. Enter COPY CON AUTOEXEC.BAT and press [ENTER].
6. Enter FF and press [ENTER].
7. Press [Control-Z].

Two drive system:
1. First you will need to format a new disk:
Put a blank diskette into drive A and enter
FORMAT A:/S
2. Put the program disk into drive B.
3. Enter COPY B:*.* A: And press [Enter] to copy all the files from the master disk to the new disk.
4. Enter COPY CON AUTOEXEC.BAT and press [Enter].
5. Enter FF and press [Enter].
6. Press [Control-Z].

If you place this diskette into drive A before you boot the system, Fraction Factory will begin automatically.

Installing the program on a hard drive
1. Boot your system and get the DOS prompt (for example: C>).
2. Make sure the current drive is the hard drive. (If the hard drive is drive C then the DOS prompt should be C>.) If you need to change drives, enter the letter of your hard drive and a colon (C:, for example) and press [Enter].

3. Enter MD FF and press [Enter] to make a new directory for all the program files.

4. To copy the files from the diskette to the directory FF, insert the diskette into the source drive and enter the copy command:

Enter COPY A:*.* C:FF and press [Enter].

(In this example, A is the source drive and C is the hard drive. If you are using different drives, insert the appropriate drive letters.)

Running the program from a hard drive

1. Boot your system and get the DOS prompt (for example: C>).

2. Make sure the current drive is the hard drive. If the hard drive is drive C then the DOS prompt should be C>. If you need to change drives, enter the letter of your hard drive and a colon, and press [Enter].

3. Enter CD\FF and press [Enter] to make FF the current directory.

4. Enter FF and press [Enter] to start the program.

Making the program self-booting (hard drive users)

If your computer boots from the hard drive, you probably do not want to change your autoexec.bat file to make it run Fraction Factory every time the system starts up. Most systems will try to boot from diskette drive A before booting from the hard drive. Therefore, when you want to automatically start the program, use the diskette drive. Follow these instructions when making a working copy that will self-boot the program from the hard drive:

1. First format a new disk: Put a blank diskette into drive A and enter FORMAT A:/S

2. Put the program disk into drive B.

3. Enter COPY B:*.* A: and press [Enter] to copy all the files from the master disk to the new disk.

4. Enter COPY CON AUTOEXEC.BAT and press [Enter].
5. Enter C: and press [Enter].
6. Enter CD\FF and press [Enter].
7. Enter FF and press [Enter].
8. Press [Control-Z].

Insert this diskette into drive A before you boot your system.

Quit to DOS

Press [Control-w] from the picture menu to get the word menu. Enter the number shown in the menu.

NOTE: The 3½" disk format of Fraction Factory requires the later versions of DOS that support 3½" disk drives. For IBM, these versions are 3.2 and above. The 5¼" version requires DOS 2.1 or above.

IBM PC 5¼"

This procedure should be used to make a disk which automatically runs when the computer is turned on or the CTRL-ALT-DEL keys are simultaneously pressed. It is assumed that you have already purchased the IBM Disk Operating System (DOS). If you put DOS 2.0 or 2.1 onto the program disk, you will not be able to replace it with DOS 1.1 at a later date.

Directions for preparing the program disk with either one disk drive or two disk drives are as follows:

One Disk Drive Procedure

1. Insert the DOS disk into drive A and turn the power on.
2. Enter the date and time. Wait for the A> prompt.
3. Remove the DOS disk from drive A and insert the program disk.
4. Type B:SETUP and press the RETURN key.
5. Each time the system asks for the drive B disk insert the program disk into drive A. Each time the system asks for the drive A disk, insert the DOS disk into drive A.

After the final A> prompt, the program disk is ready for use as a self-loading disk.

Two Disk Drive Procedure

1. Insert the DOS disk into drive A and the program disk into drive B.
2. Turn the computer on. Enter the date and time and wait for the A> prompt.
3. Type B:SETUP and press the RETURN key. After transfer of files, the program disk will be ready for use as a self-loading disk.

General Instructions

Sound on/off

On the Apple and IBM PC computers, pressing CTRL-S turns the sound on and off.

The Commodore 64 sound comes out of your television and can be adjusted with the volume control.
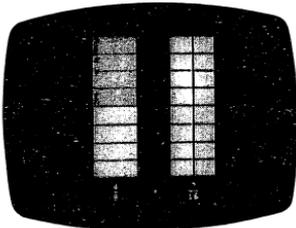
Picture Menu

An important feature of this program is the Picture Menu which enables children to select a game. It consists of a series of pictures representing each game. One at a time, the 5 pictures will come upon the screen. When you see the picture of the game you wish to play, simply press any key! That begins the game.
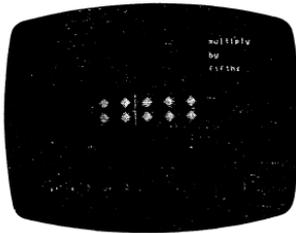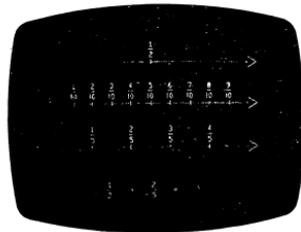
Games in Fraction Factory:

Fractions and Sets

Equivalent Fractions

Fractions of a Number

Adding Fractions

Subtracting Fractions
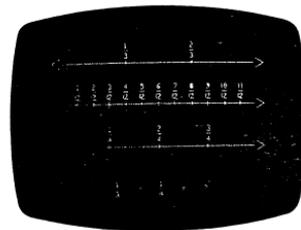
To use a word menu

Press the **CONTROL** key and the **W** key simultaneously while in the Picture Menu. A word menu will appear and you can select the game you want by pressing the appropriate number.

To exit any game and return to the Picture Menu:

Apple
IBM   Press the **ESC**ape key

Commodore–Press any of the four large function keys on the right side of the computer.

To review instructions:

Press the **CONTROL** key and the **I** key simultaneously while in the Picture Menu.

**Overview of Games
Included**

Individual Games	Concepts & Skills Presented
Fractions and Sets	■ Conceptualizing fractions as part of a set ■ Identification of numerator & denominator ■ Visualizing fractions
Equivalent (Equal) Fractions	■ Develops idea that fractions can be expressed in more than one way ■ Visualizing equivalent fractions
Fractions of a Number	■ Finding the number of objects in a set which a fraction represents ■ Reinforces concept of parts of a whole
Adding Fractions	■ Addition of fractions ■ Visualizing fractions on a number line ■ Finding equivalent fractions
Subtracting Fractions	■ Subtraction of fractions ■ Visualizing fractions on a number line ■ Finding equivalent fractions

11

Playing the Games

Fractions and Sets

To Play: Select "Fractions and Sets" from the Picture or Word Menu.

Any number of objects between two and one-hundred will appear on the screen. A box will then be drawn around some of the objects. The game is to describe the objects in the box as a fraction of all the objects.

At first you will be able to do this simply by counting the objects in the box. As the problems become more difficult, however, you will see that the objects are arranged in columns which contain the same number of objects. You will also see that the box is always drawn around a certain number of columns. By understanding this and knowing the total number of columns, you can find a fraction to describe the objects in the box. If you have trouble or become confused, the program will help you.

Note: This game will accept equivalent fractions as long as the numerator is not a double digit (i.e. instead of answering 12/24, you should answer 6/12).

For more ideas, see Additional Activities to extend learning both on and off the computer—pg 17.

Equivalent Fractions

To Play: Select "Equivalent Fractions" from the Picture or Word Menu.

Two fractions are equivalent if they are equal to each other but have different denominators. Knowing how to find equivalent fractions is useful for doing other kinds of fraction problems.

In this game, fractions are represented by colored bars divided in pieces, with some pieces a different color. You will see that the bar on the left side of the screen has as many total pieces as the denominator of the fraction printed under it. You will also see that the number of specially colored pieces is the same as the numerator. At first, the bar on the right side of the screen will not be divided into pieces. How many of its pieces would be specially colored if it had as many pieces as the denominator of the fraction printed under it? The program will help you find the right equivalent fraction if you have trouble.

For more ideas, see Additional Activities to extend learning both on and off the computer—pg 17.

Fractions of a Number

To Play: Select "Fractions of a Number" from the Picture or Word Menu.

Any number of objects from two to one-hundred will appear on the screen. A box will then be drawn around some of the objects. You will be told the total number of objects and that the objects in the box are a certain fraction of the total. You must then say how many objects are in the box.

At first you will be able to answer the problems by counting the number of objects in the box. Soon, however, there will be too many to count without making a mistake. You will be able to figure out the problem, though, by noting the objects are arranged in equal columns. Furthermore, the box is drawn around a number of columns corresponding to the fraction given in the problem. Good game players can do some easy multiplying to get the right answer.

For more ideas, see Additional Activities to extend learning both on and off the computer—pg 17.

Adding Fractions

To Play: Select "Adding Fractions" from the Picture or Word Menu.

In this game two simple fractions between 0 and 1 will be shown. Parts of two number lines on which you can locate the two fractions will also appear on the screen. Between them a third number line will be shown on which you can use equivalent fractions to add the first two fractions together. The answer will always be another fraction less than 1. If things don't add up, the program will show you how the number lines can help you find the answer.

When you get really good at these problems, try reducing your answer to "lowest terms"...see what happens!

For more ideas, see Additional Activities to extend learning both on and off the computer–pg 17.

Subtracting Fractions

To Play: Select "Subtracting Fractions" from the Picture or Word Menu.

In this game two simple fractions between 0 and 1 will be shown. Parts of two number lines on which you can locate the two fractions will also appear on the screen. Between them a third number line will be shown on which you can use equivalent fractions to subtract the smaller fraction from the larger one. The answer will always be another fraction, not 0. If you have trouble, the program will show you how the number lines can help you find the answer.

Some subtraction answers can be reduced to "lower terms." As you get better at using the number lines, try to reduce yours as far as you can. See what happens!

For more ideas, see Additional Activities to extend learning both on and off the computer—pg 17.

Additional Activities to Extend Learning Both On and Off the Computer

Age Range: 8-14

The above age range should be considered a recommendation rather than a rigid timetable. Most children begin to work with fractions in third grade and continue to work with them into junior high school math. Some children will be able to play Fraction Factory before they are eight and others may find it a useful review tool if they are over fourteen. It depends upon your child's individual needs and abilities. Watch your child play Fraction Factory. If the activities seem too simple or too difficult, help choose a more appropriate game in the program. Look at your child's mathematics book from school and find out the types of problems that are or will be covered in the curriculum. This is a good way to complement what is going on at school. Ask your child's math teacher about the types of fraction problems your child could benefit from practicing.

Fractions and Sets

Suggested Activities:

1. Fractional numerals tell about parts of sets. In this game your child will be presented a set of objects like hearts, trees, or diamonds with part of the set in a box. The total number of objects in the set is the denominator and that number is placed on the bottom of the fractional number. The boxed set of objects represents part of the total set. That amount goes on the top of the fraction and is called the numerator. These are words with which your child should become familiar. While your child is playing and you have a visual representation of a fraction, label the numerator and denominator and explain their relationship to each other.

2. When your child enters the fraction into the computer, the numerator is entered first and then the denominator. If the fraction being entered is 3/4, 3 (numerator) is entered and then 4 (denominator) is entered.

3. To reinforce the relationship between the boxed set and the total set, the answer 3/4 can be restated: three of the total four objects are in the box.

4. If your child is having difficulty figuring out the fraction, ask the following questions: How many objects are in the box? (Enter this number into the computer or write it on a piece of paper in the numerator position.) How many objects are on the screen, including the ones in the box? (Enter this number into the computer or write it on a piece of paper in the denominator position.)

5. Find an equivalent fraction with a lower denominator and watch what happens. For an answer like 5/10 the computer will accept 4/8, 3/6, 2/4 and 1/2!

Equivalent Fractions

Suggested Activities:

1. "Equivalent fractions" is another way of saying that the same number can have more than one name. This game clearly illustrates this idea. When the correct answer is entered, tell your child that those two fractions represent the same amount. If an incorrect response is entered, the game will hint at the correct answer.

2. Try to talk about equivalent fractions in everyday situations. If you are cutting food, start with halves and label 2/2, then with each cut, rename the amount. As a piece is taken from the food, label how much was taken and how much is left. Encourage your child to find equivalent fractions for this amount.

3. Draw some fraction bars (like the ones in Fraction Factory) or some fraction pies. Divide and shade an area. Provide your child with an area equal in size divided with an equivalent fraction but without the shading. Ask your child to find both the numerator and the denominator to the equivalent fraction.

Fractions of a Number

Suggested Activities:

1. Finding fractions of a number is another way of saying finding the fractional part of a set. Rather than finding the fraction of all the objects in a set like in "Fractions and Sets," this time your child will be finding the number of objects in a set which a fraction represents. In other words, the child must find the correct numerator given a specific denominator. Reinforce this idea by labeling the denominator and asking him or her to find the numerator.

2. Help your child learn to use the clues which Fractions of a Number provides.

3. Another way of solving the problem is to set it up like a multiplication problem. Let's say you are supposed to find 2/5 of 20. The problem can be restated 2 × 20/5 or 2 times 20, divided by 5 which equals 8. To double check the multiplication and division before you enter the number, count the objects in the boxed set.

4. Watch your child solve problems in this section of Fraction Factory. It is very tempting to count the boxed objects and enter that number without thinking through the reasons why that answer is correct. One reason to find out how your child is solving the problem is to ask, "How do you know that?" or "If you don't count the number of objects in the box, how do you get the right answer?"

5. Reinforce the concept of parts of a whole by restating the answer. For instance, the answer to the example in #3 would be 2/5 of 20 is 8.

6. Challenge the advanced fraction buff by asking them to express the number of objects not in the box as a fraction and then to tell you how many objects that fraction represents.

Adding Fractions and Subtracting Fractions

1. These two games challenge the more advanced student by requiring them to add and subtract fractions with different denominators. Both games offer number lines with the fractions of the numbers to be added or subtracted as well as the number line with fractions of the common denominator. Show your child how the common denominator number line compares to the number lines above and below it. Help your child to identify equivalent fractions using these.

2. If your child is having difficulty finding common denominators in order to perform the appropriate function, show him or her how the program helps solve the problem. During a correction routine, verbalize for your child what the computer is showing them. Then encourage your child to try using these methods to arrive at the answer on their own.

3. Encourage your child to set up the problem and then write down the equivalent fractions on a piece of paper. This might help some children to visualize the conversions that must be made before solution can take place.

4. Problems may be easier if your child points to the equivalent fractions on the number line and then tries to solve the problem.

5. Encourage your child to try to reduce their answer to lowest terms. This means finding the equivalent fraction with the lowest possible denominator. For example, the lowest term of the fraction 9/18 is 1/2. The lowest common denominator may not be represented on the screen's number lines.

Support

If you have any questions or problems, call Queue, Inc. at 1-800-232-2224 (in Connecticut, Alaska and Canada call 203-335-0908). Defective disks will be replaced free of charge up to 90 days after invoice date. Disks damaged after 90 days may be replaced at $10.00 per disk. Mail the damaged disk and appropriate payment to Queue at 338 Commerce Drive, Fairfield, CT 06430, for a prompt replacement.

Backup disks are available for $10.00 per disk. Customers are limited to one backup disk for each disk purchased. **Backup disks are for archival purposes only.**

Never expose any computer software to excessive heat or cold. Do not leave your software near a strong magnetic field such as might be produced by an electric appliance, stereo, or speaker magnet. Always place your software in its sleeve when you are not using it. This will protect it from dust and finger prints. Finally, never touch the exposed parts of the disk which are visible through the holes in the disk cover.

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