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FRACTION ATTRACTION

TEACHER'S GUIDE

Macintosh • Windows
CD-ROM

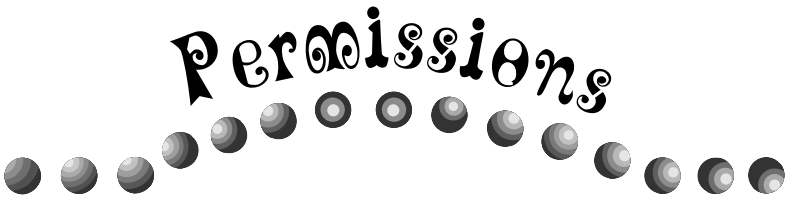
Credits

Project Manager:	Paul Kronmeyer
Concept & Design:	Paul Kronmeyer, Jennifer Simon, Joe Summerhays, Frank Migliorelli
Programming:	Jennifer Simon, Steven Grosmark, Claire Metz, John Mullaney
Programming Tools:	Nicole Diaz, Steven Grosmark, John Mullaney
Artwork:	Joe Summerhays
Original Music & Audio Design:	Frank Migliorelli and Bobby Sabella, *Rave On Productions*
Voice Characterization:	Alicia Genetski
Quality Control:	Frank Lofaro, Greg Sillins
Project Editor:	Karen Schlossberg
Mathematics Education Consultant:	Debbie Slade
Teacher's Guide & Activities:	Karen Schlossberg
Desktop Publisher:	Diane Kronmeyer
Editor:	Emilie Rappoport
Special Thanks To:	Nadine Bezuk, Justin Kronmeyer, Kristy Kronmeyer

For more information or a free software catalog, write:

Sunburst Communications
101 Castleton Street
Pleasantville, NY 10570

Call toll-free: (800) 321-7511
Or call collect: (914) 747-3310



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Introduction

"Seeing the same quantities as fractions, decimals, and percents leads students to a stronger understanding of the relationship between numbers."

Background

The transition from whole numbers to fractions and decimals can be one of the most difficult challenges for mathematics students. This is often due to students' lack of understanding of some of the most fundamental concepts of rational numbers. In light of this, the National Council of Teachers of Mathematics (NCTM) devotes much attention to fractions and decimals in the Curriculum and Evaluation Standards for School Mathematics (Standards). Standard 12 of the K-4 strand states,

> *The K-4 instruction should help students understand fractions and decimals, explore their relationship, and build initial concepts about order and equivalence. It is crucial that teachers use physical materials, diagrams, and real-world situations in conjunction with ongoing efforts to relate their learning experiences to oral language and symbols. This K-4 emphasis on basic ideas will reduce the amount of time currently spent in the upper grades in correcting students' misconceptions and procedural difficulties. (Page 57)*

The Grades 4-8 strand of the Standards adds that students should be able to "understand, represent, and use numbers in a variety of equivalent forms." Seeing the same quantities as fractions, decimals, and percents leads students to a stronger understanding of the relationship between numbers.

Moreover they should develop the ability to "read, use, and appreciate multiple representations of the same quantity…" (p. 87). Experiencing the same quantities in concrete, pictorial, and abstract representations equips students with a wide range of representations necessary to construct a thorough understanding of the concept of "fraction." For example, area models such as "fraction bars," hundreds blocks, and pie charts are good tools for fostering students' conceptualization of equivalence and relative size, while number lines provide a different perspective for building an understanding of relative size.

Why Fraction Attraction?

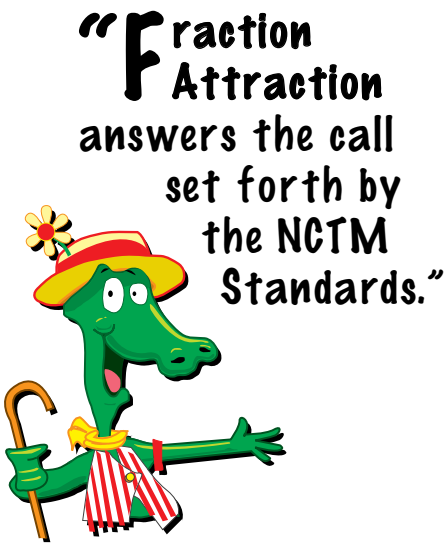
Fraction Attraction answers the call set forth by the NCTM Standards. While reinforcing the concept of multiple representations, it provides a stimulating environment where your students can explore critical fraction concepts including:

- ordering
- equivalence
- relative size
- understanding fractions as representing distance on a number line
- addition and subtraction of fractions
- "counting on" with fractions

The program is designed to help your students acquire an understanding of these concepts through four different games: The Frac Track, The Frac-o-Wheel, Fuzzy Fracs, and Whack-a-Frac.

The Frac Track addresses the concept of a fraction representing a specific distance, as opposed to simply a point, on a number line. It also introduces students to "counting on" incrementally with fractions, decimals, and percents.

The Frac-o-Wheel is designed to provide multiple representations of a fraction, to introduce the concept of equivalence, to foster fraction recognition, and to introduce addition and subtraction with fractions.



Whack-a-Frac addresses equivalence of fractions, decimals, and percents. Finally, Fuzzy Fracs deals with concepts of ordering and relative size of fractions, decimals and percents. Where does one fraction fall in relation to another fraction? Why is one-half larger than one-third?

Each game provides detailed diagnostic help to support students as they learn. The diagnostic help is designed to be specific to the problem the student is experiencing. When the program detects any of a number of possible problems, it provides specific help to address that problem. Not only does it try to diagnose the specific problem, but the help that is provided uses specific fractions, decimals and percents from the actual problem.

Further, the diagnostic help leads students to their own understanding of the fraction concept. Rather than simply providing a list of rules or algorithms to memorize, the help is written to aid students in constructing their own rules for understanding fractions. In this way, *Fraction Attraction* is like no other fraction software product.

Most important is the use of representational models in each game. The Frac-o-Wheel features a pie chart to represent fractions, and The Frac Track uses number lines disguised in the form of race tracks. Fuzzy Fracs uses a number line as well, and Whack-a-Frac features more abstract notations (e.g., written and numeric fractions, decimals, and percents). The diagnostic help for each of these games provides alternate representations of fractions in the form of fraction bars, pie charts, and hundreds blocks.

Fraction Attraction is adaptable to students with different needs and learning styles. Each game has several difficulty levels, allowing the software to continually present new challenges to your students. Moreover, the off-computer activities provided in this teacher's guide can be used as an introduction to, or an extension of, the learning process.

The NCTM Standards set forth a clear message of what the mathematics curriculum should include with regard to fractions, decimals, and percents. *Fraction Attraction* is our response to that message: it provides an exciting and motivating environment for students to construct their own understanding…all while having a good time!

– Paul Kronmeyer, Product Manager

Getting Started

System Requirements and Installation

Gilda's Tip:
For best performance, it is recommended that *Fraction Attraction* is played with a monitor setting of 256 colors.

To use *Fraction Attraction*, you'll need a Macintosh with 25 Mhz, a 68030 processor or better (68040 processor recommended), System 7.0 or higher, 8 MB of RAM, and a 640x480 monitor capable of 256 colors.

Fraction Attraction can be installed in one of three ways. The different methods involve trade-offs between program speed, hard drive space, and requiring the CD at all times. Please read the descriptions below to decide which installation option you wish to use.

Minimal Installation

Requires: 1.6 MB of hard drive space

Minimal installation copies some of the program resources onto your hard drive and creates an alias for *Fraction Attraction*. When you run *Fraction Attraction*, you must have the CD in your CD-ROM drive. This option requires the least hard drive space, but results in the slowest program performance.

Standard Installation

Requires: 8 MB of hard drive space

Standard installation copies the *Fraction Attraction* program onto your hard drive and leaves the program resources on the CD. When you run *Fraction Attraction*, you must have the CD in your CD-ROM drive.

Full Installation

Requires: 20 MB of hard drive space

Full installation copies all of *Fraction Attraction* onto your hard drive. You will not need the CD in the drive, and the program will run at its optimum speed.

To install the software, place the CD in your CD-ROM drive. Double-click the *Fraction Attraction* installer. The Sunburst logo will appear; click CONTINUE. The Install dialog will appear. Click INSTALL for the Minimal installation. If you want one of the other installation options, select Custom Install from the pop-up menu at the top left corner of the dialog. A new dialog will appear. Click the option you want (Standard or Full) and click INSTALL.

Disk Installation

To install from disk you must perform a full installation, which requires 20 MB of free space on your hard drive.

Place “Fraction Attraction Disk 1” in your floppy drive. Double-click the *Fraction Attraction* installer, and follow the on-screen instructions for the remainder of the installation process.

Running the Program

Main Screen

To run the program from your Macintosh, double-click the *Fraction Attraction* icon in the *Fraction Attraction* folder. To run the program from Windows 3.1 or Windows '95, double-click the *Fraction Attraction* icon in the Sunburst Program Group in the Program Manager.

The Sunburst logo will appear briefly, followed by the Title Screen. Click to dismiss the Title Screen or wait a few seconds. The Title Screen will disappear and the Main Screen will appear. Gilda Gator, your guide to *Fraction Attraction*, will walk onto the screen.

Gilda will present a brief audio introduction to the program. You can end the introduction at any time by clicking the screen. To repeat the introduction, click Gilda's button at the bottom left corner of the screen.

To adjust the sound level, choose Sound from the Options menu. A dialog will appear. Click and drag the slider to set the volume.

There are four games students can explore. Race down The Frac Track, take a spin on The Frac-o-Wheel, knock over Fuzzy Fracs, or take a crack at Whack-a-Frac! To start playing, click on a game to enter that feature area or choose a game from the Game menu.

To leave the program, select Quit (Macintosh) or Exit (Windows) from the File menu.

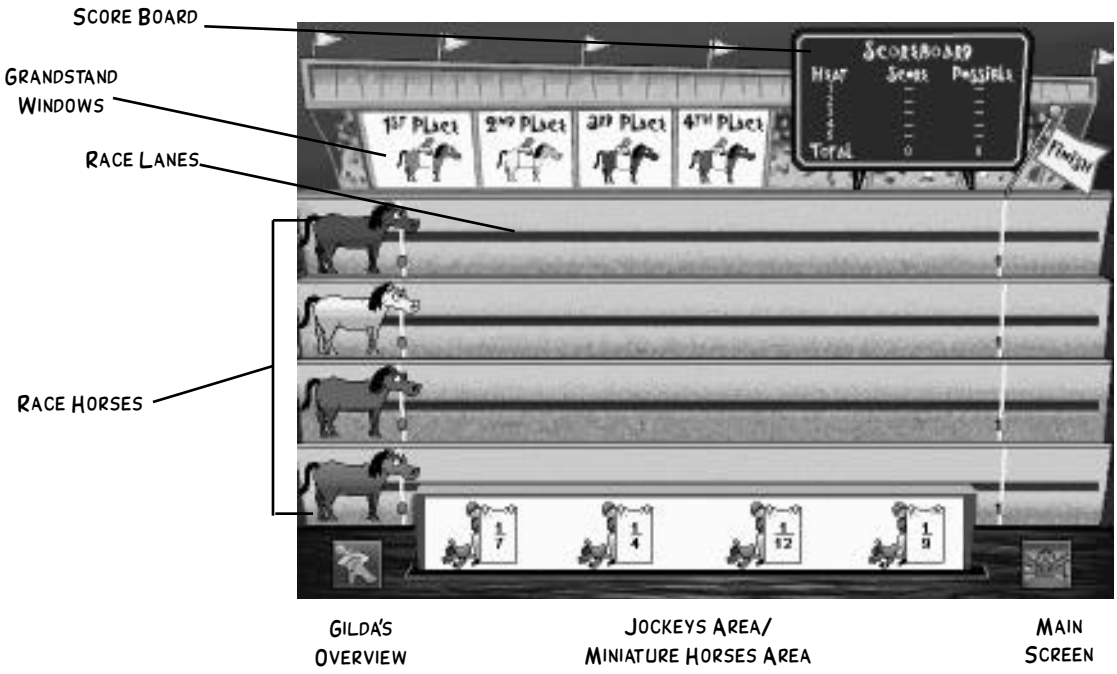
Gilda's Tip:
If your sound is not on (Macintosh) or you do not have an installed sound card (Windows), the introduction will appear in a dialog. If you are reading the introduction, click the close box to close the dialog.

The Frac Track

Overview

The Frac Track is designed to convey two concepts. First, it introduces the notion that fractions represent a quantifiable distance on a number line, not simply a position on a number line. Second, and of equal importance, it helps students develop the ability to "count on" with fractions.

When you enter The Frac Track, you will see the following screen:



Gilda Gator will walk onto the screen and give a brief overview of The Frac Track. You can end the overview at any time by clicking the screen. To repeat the overview, click Gilda's button at the bottom left corner of the screen.

Gilda's Tip:
To adjust the sound level, choose Sound from the Track Options menu. A dialog will appear. Click and drag on the slider to set the volume. If your sound is not on (Macintosh) or you do not have an installed sound card (Windows), the overview will appear in a dialog. If you are reading the overview, click the close box to close the dialog.

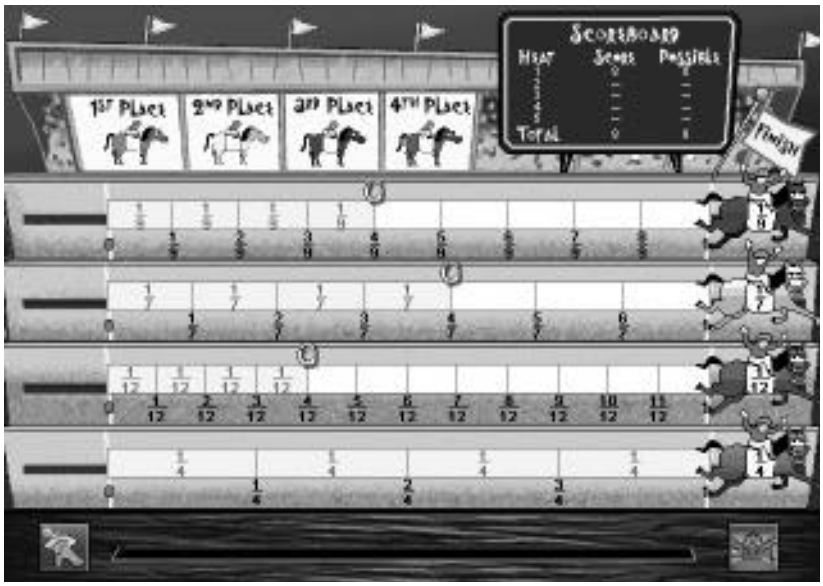
In The Frac Track, four horses race along the lanes to reach the Finish Line. Each horse will have a fraction, decimal, or percent on its blanket. Horses run in increments of their numbers. The larger the number, the faster the horse will move along The Frac Track!

There are two types of races. In Place Jockeys, select jockeys from the Jockeys Area and place them on the horses to make them finish the race in the order shown in the Grandstand Windows. In Place Horses, predict the order the horses will finish by dragging the miniature horses from the Miniature Horses Area into the Grandstand Windows.

When a race begins, number lines will appear behind the horses as they run. A horse's number is marked on its number line each time it advances by that increment. For instance, if the horse has one-third, each unit of the number line will be drawn in thirds as the horse runs.

When one horse reaches the finish line, the race is over! The other horses will stop in place, drop horseshoes to show where they finished, and then slide to the Finish Line. You'll earn a score based on how many horses you got right. The horses you placed correctly will smile and their jockeys will move their hands.

You can look at the number lines in each lane to see how the race ended. The number line of the winning horse will be entirely yellow; the number line for each other horse will be filled in with yellow to the point the horse reached when the race ended, and then will be white the rest of the way to the Finish Line.



When the race is over, click on the screen. If you got all the horses correct, you will go on to the next race. If you missed any of the horses, a sign will appear, "Do you want to review the race?" Click YES to explore why the race ended the way it did, or click NO to go on to the next race. Each game is five races long.

Playing The Frac Track

Gilda's Tip:
If you change any setting except Sound in the course of a game, you will end the game. A dialog will appear to ask if you want to start a new game. Click RESTART to start a new game or CANCEL to keep playing.

The Frac Track Options

You can change The Frac Track game settings to vary the type and difficulty level of the game. Use the Track Options menu to change any of the following settings:

- Game version (Place Jockeys or Place Horses)
- Playing level (1-3)
- Race Type (Fraction, Decimal, or Mixture)
- Sound level

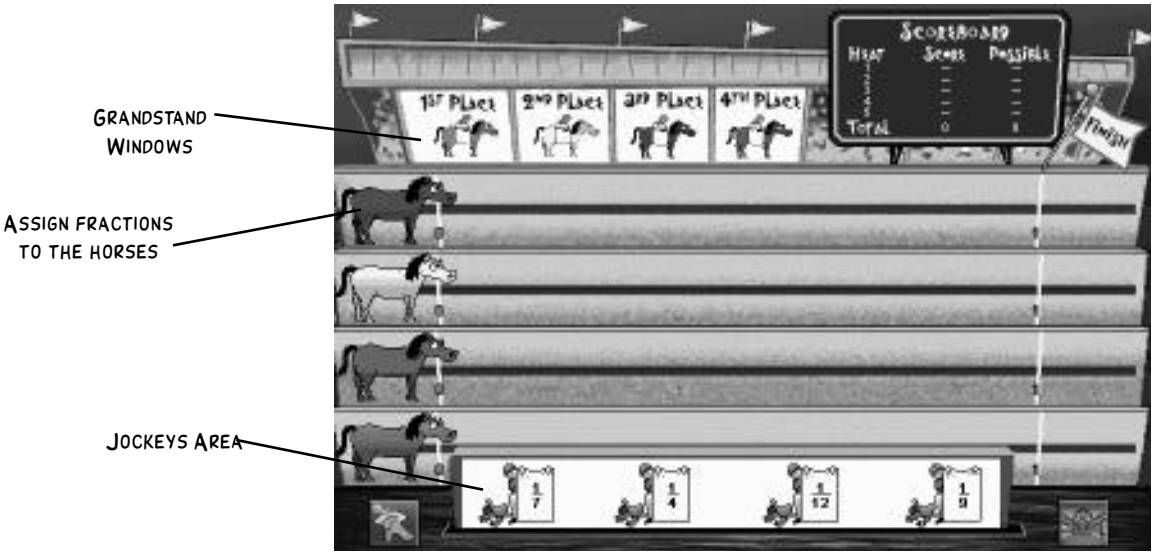
The available options are determined by the Teacher Options for The Frac Track. The default setting is for all options to be available. You can disable options by choosing Teacher Options from the Main Screen and then selecting The Frac Track. For more information on Teacher Options, see page 48.

Choosing a Game

You can choose between two different versions of The Frac Track: Place Jockeys or Place Horses. The active version will have a checkmark next to it in the Track Options menu. The game you choose will use the current Level and Race Type settings from the Track Options menu.

Place Jockeys

If you choose Place Jockeys from the Track Options menu, your goal will be to make the horses finish the race in the order shown in the Grandstand Windows by assigning jockeys to the colored horses.

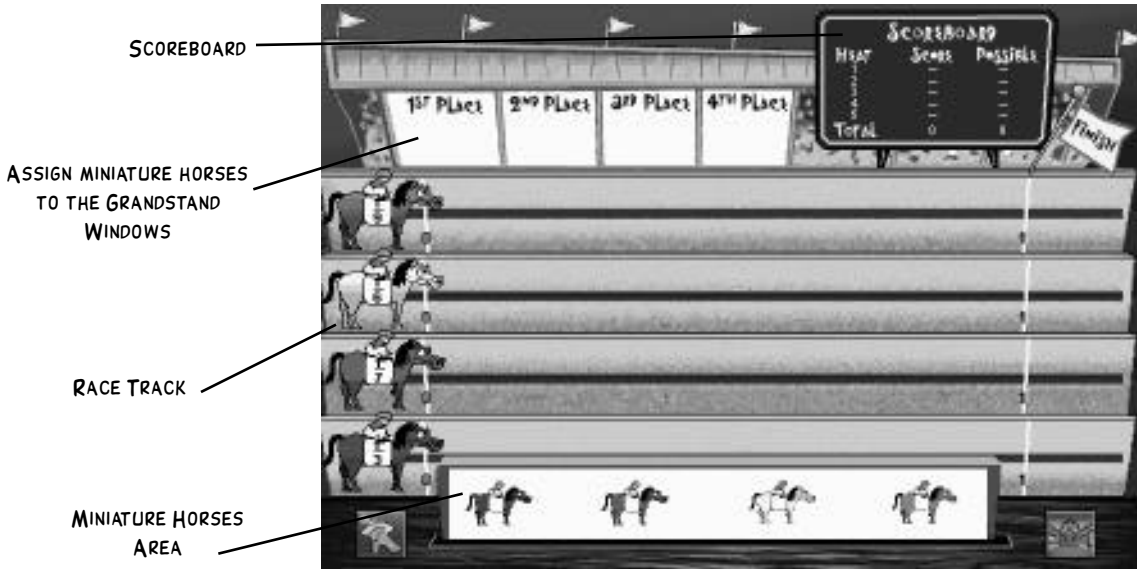


There are four jockeys in the Jockeys Area. Each jockey holds a blanket with a number on it. Compare the numbers to decide which will make a horse finish in first, second, third, or fourth place. Then place jockeys so the horses will finish in the order shown in the Grandstand Windows.

To place a jockey on a horse, click the jockey and then click a horse. If you want to change a jockey that you've placed on a horse, you must do it before you have placed all 4 jockeys. To change a jockey, click the jockey and then click the Jockeys Area. You can then click a new jockey. When all 4 jockeys are in place, the race will begin!

Place Horses

If you choose Place Horses from the Track Options menu, your goal will be to predict the order in which the horses will finish the race. Each horse on the track already has been assigned a jockey and a number. Compare the numbers to predict the place in which each horse will finish.



In the Miniature Horses Area you will see four small pictures, one for each horse. Your goal is to place them correctly in the Grandstand Windows labeled 1st place, 2nd place, 3rd place, and 4th place. Click a horse and then click in the window where you think the horse will place. If you want to change a horse, you must do it before you have placed all 4 horses. To change a

horse, click it and then click the Miniature Horses Area. You can then click a new horse. When you have filled all the windows in the Grandstand, the race will begin!

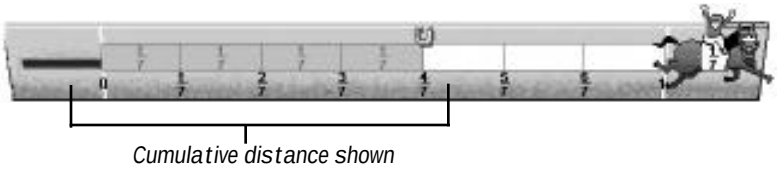
In both versions, a number line will appear behind each horse as it runs down the lane. Horses run in increments of the numbers they are wearing, and a horse's number is indicated on its number line each time it travels that distance. For instance, if the horse is wearing one-third, each unit of the number line will be drawn in thirds as the horse runs.

When one horse reaches the finish line, the race is over! Each of the remaining horses will stop in place, drop a horseshoe to show where it finished, and then slide to the Finish Line.

The number line of the winning horse will be entirely yellow:

Gilda's Tip:
A track is not always only 1 unit. In level 2 the lanes of a track can be up to 5 units long. In level 3 they can be up to 10 units long.

The number line for each other horse will be filled in with yellow to the point the horse reached when the race ended, and then will be white the rest of the way to the Finish Line. The number lines will also be labeled along the bottom to show the cumulative distance traveled by each horse:



Cumulative distance shown

When you answer correctly for a horse's place, the jockey will wave and the horse will smile and whinny when the race is over. If you did not answer correctly, the horse will pass the Finish Line without animation. You'll earn a score based on how many horses you assigned correctly: one horse correct earns one point, two horses correct earns three points, and four horses correct earns eight points.

When the race is over, you will be prompted to click the screen. If you got all the horses right, you will go on to the next race. If you missed any of the horses, a sign will appear, "Do you want to review the race?" Click YES to explore why the race ended the way it did, or click NO to go on to the next race.

Gilda's Tip:
There are 5 heats (races) in a game.

After 5 races, the game is over. Click PLAY AGAIN in the dialog to play another game with the same settings. After you click PLAY AGAIN, you can choose new settings from the Track Options menu. To leave The Frac Track, click the MAIN SCREEN button or choose a different feature area from the Game menu.

Choosing a Playing Level
When you choose a playing level from the Track Options menu, it will have a checkmark next to it.

- ✓ In Level 1, the horses' numbers will be fractions, decimals, or percents that are equivalent to unit fractions (fractions with 1 in the numerator) with 2-12 in the denominator. For instance, the horses' numbers might be 1/2, 1/5, 1/8, and 1/10. The race track is 1 unit long.

- ✓ In Level 2, the horses' numbers will be fractions, decimals, or percents that are equivalent to proper fractions with numerators of 1 or numerators that are factors of the length of the horse's lane (e.g., if the lane is 4 units long, the numerator can be 1, 2, or 4). Denominators will be 2-12. For instance, the horses' numbers might be 1/2, 4/6, 2/6, and 1/10 on a track that is 4 units long. The race track can be 1-5 units long.

- ✓ In Level 3, the horses' numbers will be fractions, decimals, or percents that are equivalent to fractions with denominators 2-12. Denominators cannot exceed 24. For instance, the horses' numbers might be 8/16, 3/18, 6/20, and 2/18. Horses can have improper and mixed fractions. The race track can be 1-10 units long.

Choosing a Race Type

The Race Type affects the number format of horses' numbers (e.g., fractions, decimals, or percents). To choose a number format, select Race Type from the Track Options menu and then choose Fraction, Decimal, or Mixture from the sub-menu.

Gilda's Tip:
The number format produced by Mixture depends on the level that is selected in the Track Options menu.

The number format produced by Mixture depends on the level that is selected in the Track Option menu. In Level 1, the numbers on the horses can be fractions, decimals, or percents. In Level 2 or 3, the numbers on the horses can be fractions, decimals, or percents if the race track is one unit long, or fractions and decimals if the track is two or more units long.

Set the Sound Level

To set the sound level select Sound. A sound volume dialog will appear. Click and drag the slider to set the volume. The slider ranges from 0%, no sound, to 100%, which is the loudest.

Getting Frac Track Help

There are two different kinds of help available for The Frac Track: general help on the rules and options, and detailed diagnostic help to scaffold students into a conceptual understanding of fractions as representing a quantifiable distance as well as how to count on with fractions.

General Help

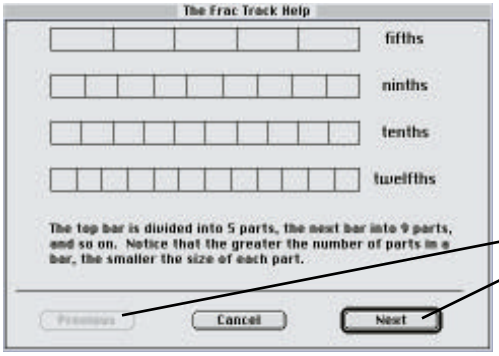
For instructions on how to play The Frac Track, change the game settings, and get mathematical help, choose Index from the Help menu. A list of topics will appear. Click a topic to learn more.

Diagnostic Help

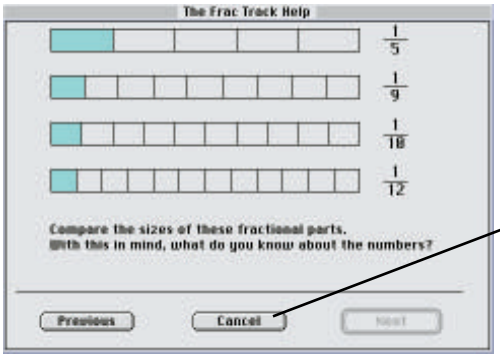
Diagnostic help is only available after a race where you did not get all the horses right. When a race ends, click the screen to continue. If you missed any horses, a sign will appear: "Do you want to review the race?" If you click YES, the Review dialog will appear.

Gilda's Tip:
Diagnostic help provides appropriate models and explanations to help develop students' understanding of fractions.

The diagnostic help is designed to identify the error students made and then provide concrete models and explanations to help develop their understanding of fractions. The help will be based on the actual numbers used in the race. Below is an example of when students make an error because they believe that a larger denominator means a larger fraction.



USE THE NEXT AND PREVIOUS BUTTONS TO SEE ALL THE INFORMATION

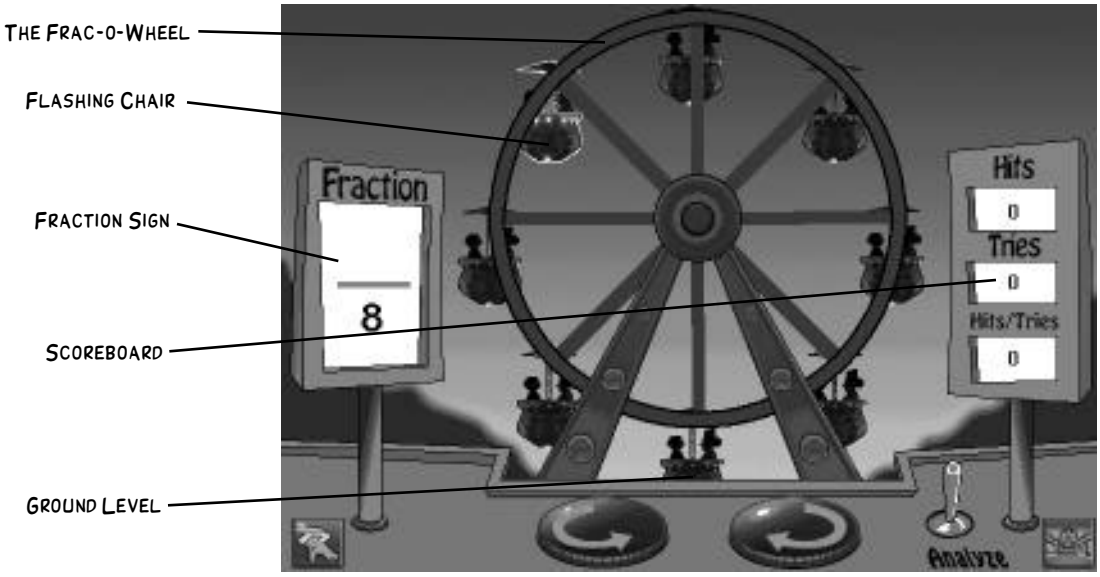


WHEN YOU ARE DONE READING THE HELP IN THE REVIEW WINDOW, CLICK CANCEL TO RETURN TO THE GAME AND START THE NEXT RACE!

The Frac-O-Wheel

Overview

The Frac-o-Wheel provides multiple representations of fractions as students learn to recognize fractions and build an understanding of fraction equivalents. As they run The Frac-o-Wheel, students will also work with equivalence and addition and subtraction of fractions. The Frac-o-Wheel game screen looks like this:



Gilda Gator will walk onto the screen and give a brief overview of The Frac-o-Wheel. You can end the overview at any time by clicking on the screen. To repeat the overview, click Gilda's button  at the bottom left corner of the screen.

To adjust the sound level, choose Sound from the Wheel Options menu. A dialog will appear. Click and drag the slider to set the volume. If your sound is not on (Macintosh) or you do not have an installed sound card (Windows), the overview will appear in a dialog. If you are reading the overview, click the close box to close the dialog.

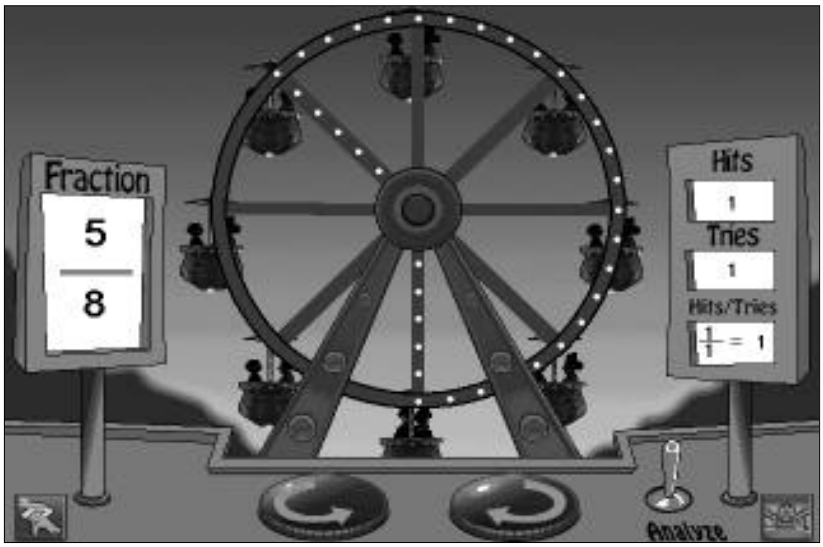
In The Frac-o-Wheel game, you have an important role – you're going to run the ride! There will be between 4 and 12 chairs on the ride, all with passengers ready to exit. You need to unload them one chair at a time. Try to unload all the chairs in as few moves as possible.

Gilda's Tip:
Use the tab key to move between the numerator and the denominator on the Fraction Sign.

When it is time to empty a chair, it will flash. To unload it, figure out the fraction that will move the chair around the wheel to the ground. Click the Fraction Sign and then enter the missing part(s) of the fraction.

When you have completed the fraction, click the Clockwise or Counterclockwise button to rotate the wheel the amount of the fraction you entered.

As a chair moves, lights on the wheel will show its path and the fractional portion of the wheel it is passing through. If the chair reaches the ground, the people will exit.



Click anywhere on the screen to continue and a sign will appear.

Click the sign to investigate how you unloaded the chair, or click the screen to unload the next chair.

Gilda's Tip:
If the chair does not reach the ground or passes it, enter a new fraction to try again from the new location.

If the chair does not reach the ground or passes it, enter a new fraction to try again from the new location. For some mathematical help, click the Analyze switch.

Every time you unload a chair, it counts as a "hit." The Scoreboard shows your hits and tries. When you have unloaded all the chairs, the game is over and the fireworks will begin!

Playing The Frac-o-Wheel

The Frac-o-Wheel Options

You can change The Frac-o-Wheel game settings to vary the difficulty level of the game. Use the Wheel Options menu to change any of the following settings:

- ❖ Playing level (1-4)
- ❖ Missing Component (Numerator, Denominator, Both, or Random)
- ❖ Sound level

The available options are determined by the Teacher Options for The Frac-o-Wheel. The default setting is for all options to be available. You can disable options by choosing Teacher Options from the Main Screen and then selecting The Frac-o-Wheel. For more information on Teacher Options, see page 44.

Gilda's Tip:
If you change any setting except Sound in the course of a game, you will end the game. A dialog will appear to ask if you want to start a new game. Click Restart to start a new game or Cancel to keep playing.)

Choosing a Playing Level

When you choose a playing level from the Wheel Options menu, it will have a checkmark next to it.

- ✓ In Level 1, the number of chairs may be 4 or 8. Given denominators can be 2, 4, or 8 and given numerators require 2, 4, or 8 in the denominator. For example, with 4 chairs on the ride, the Fraction Sign may be ?/8, or 4/?, where ? stands for the missing component.
- ✓ In Level 2, the number of chairs may be 4, 6, 8, 9, or 12. Given denominators can be 2, 3, 4, 6, 8, 9, and 12 and given numerators require 2, 3, 4, 6, 8, 9, or 12 in the denominator. For example, with 9 chairs on the ride, the Fraction Sign may be ?/9 or 3/?, where ? stands for the missing component.
- ✓ In Level 3, the number of chairs may be 4, 5, 6, 8, 9, 10, or 12. Given denominators can be any multiple (less than 50) of 2, 3, 4, 5, 6, 8, 9, 10, and 12 and given numerators require any multiple (less than 50) of 2, 3, 4, 5, 6, 8, 9, 10, or 12 in the denominator. For example, with 10 chairs on the ride, the Fraction Sign may be ?/36 or 5/?, where ? stands for the missing component.
- ✓ In Level 4, the number of chairs may be 4 to 12. Given denominators can be any multiple (less than 100) of 2 to 12 and given numerators require any multiple (less than

100) of 2 to 12 in the denominator. For example, with 7 chairs on the ride, the Fraction Sign may be ?/77 or 10/?, where ? stands for the missing component.

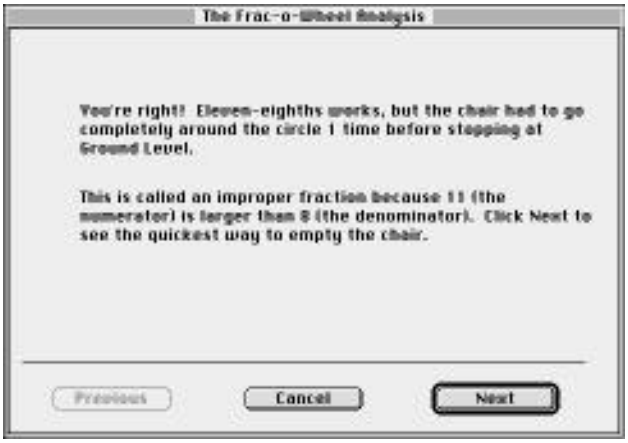
Choosing the Missing Component

You can set the part(s) of fractions that will be missing on the Fraction Sign by selecting Missing Component from the Wheel Options menu, and then selecting Numerator, Denominator, Both, or Random from the sub-menu.

Gilda's Tip:
If you enter a possible improper fraction, the chair will move to its final location on the wheel, never making more than one revolution. For example, if you enter 16/4, the wheel will make one full circle; if you enter 7/4, the chair will move 3/4 of the way around the wheel. You will hear an explanation as to why the wheel moved that way.

If you choose Both, you will have to enter the numerator and denominator for each fraction. If you choose Random, the missing component(s) will change throughout the game.

All numbers you enter for the missing component(s) must be positive and between 1 and 99. Denominators must be multiples or divisors of the number of chairs. For instance, in Level 4 if there are 12 chairs on the wheel, the denominator can be 1, 2, 3, 4, 6, 12, or any multiple of 12 under 100.



Set the Sound Level

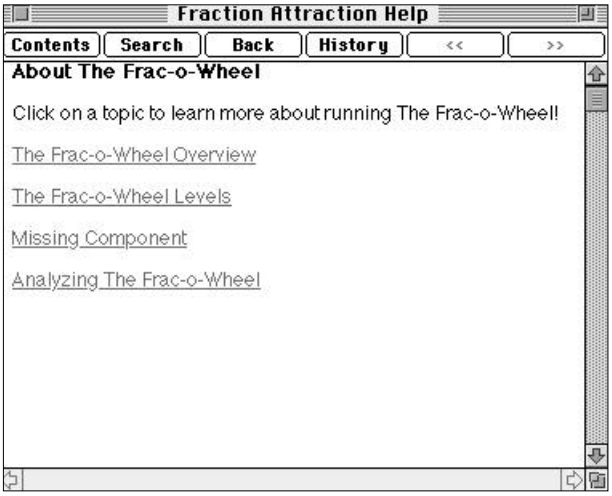
To set the sound level select Sound. A sound volume dialog will appear. Click and drag the slider to set the volume. The slider ranges from 0%, no sound, to 100%, which is the loudest.

Getting Frac-o-Wheel Help

There are two different kinds of help available for the Frac-o-Wheel: general help on the rules and options, and detailed diagnostic help to scaffold students into recognizing multiple representations of fractions and conceptually understanding fraction equivalence.

General Help

For instructions on how to run the Frac-o-Wheel, how to change the game settings, and get mathematical help, choose Index from the Help menu. A list of topics will appear. Click a topic to learn more.



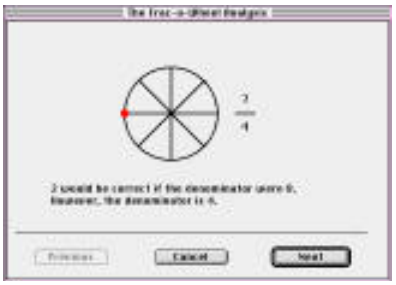
Diagnostic Help

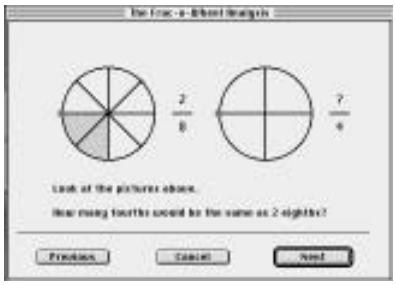
The diagnostic help is designed to identify the error students have made and then provide concrete models and explanations to help develop their understanding of the fraction concept with which they are having difficulty. The help is specific to the chair that is currently being unloaded. Click the Analyze switch and the following dialog appears:

Gilda's Tip:
The help is specific to the chair that is currently being unloaded.

- Choose "help on my last try" from the window for some mathematical help with your last answer. For example, if

within a game with a missing numerator you entered a numerator that did not move the chair to the ground, this help might appear:

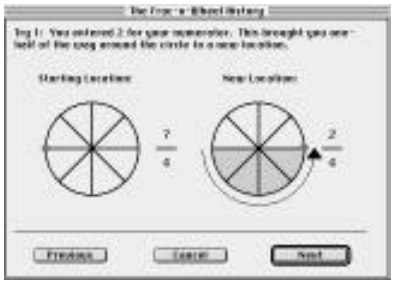


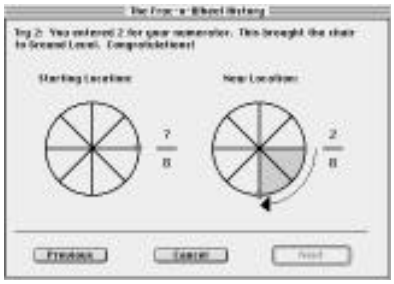


Gilda's Tip:
If you choose "help from where the chair is now" before you have tried to unload the chair, it will cost 2 tries in the game score!

- Choose "help from where the chair is now" from the window for some mathematical help to move the chair to the ground from its new location. Here's an example of a hint:

❖ Choose "a history of tries on this turn" from the window to review everything you have done to unload the chair. This is the same help you will get if you click on the sign "Click here to investigate your last turn" after you have unloaded a chair. For example:





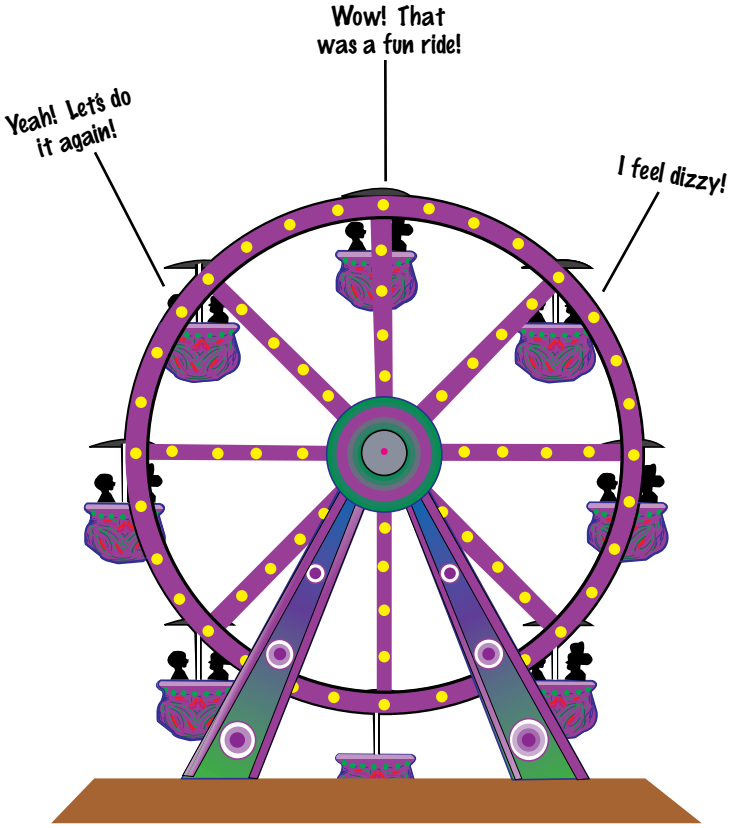
For any of the diagnostic help, use the NEXT and PREVIOUS buttons to see all the information. Click CANCEL when you are done.

End of Game

When all the chairs have been emptied, the game is finished and you still have an opportunity to analyze your last turn before the fireworks go off to celebrate your effort. The Scoreboard will show hits, tries, and a ratio of hits to tries.

A dialog will appear to ask if you want to play again or return to the Main Screen. Click PLAY AGAIN to start a new game.

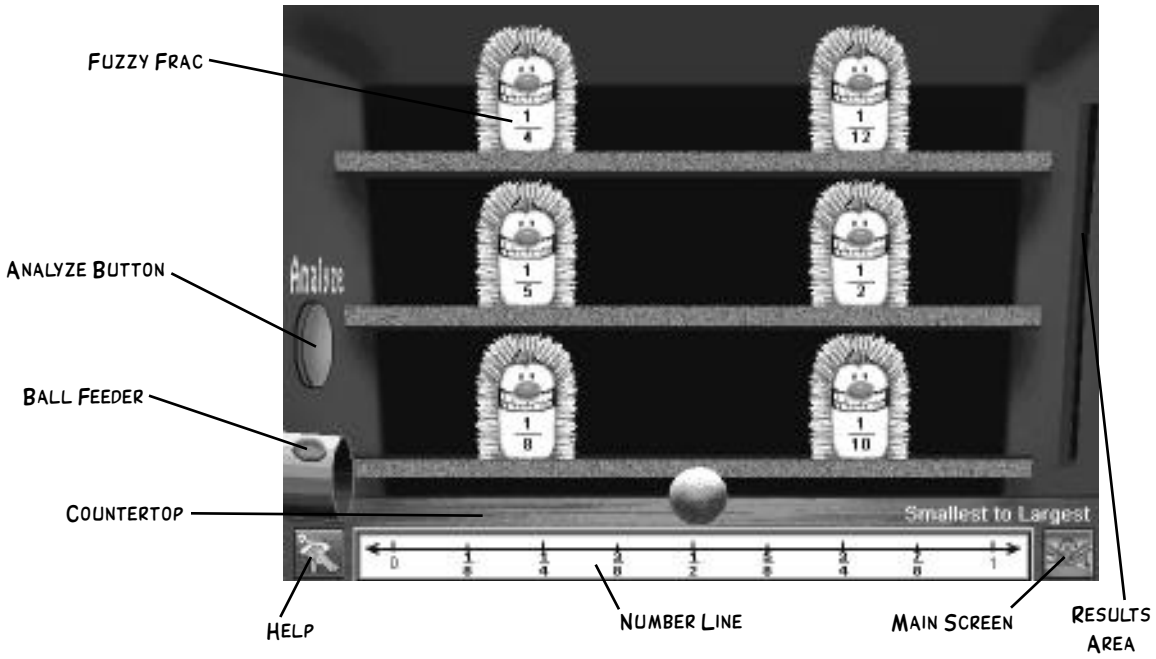
After you click PLAY AGAIN, you can choose a different level or change the Missing Component in the Wheel Options menu. To leave The Frac-o-Wheel, click the MAIN SCREEN button or choose a different feature area from the Game menu.



Fuzzy Fracs

Overview

Students will practice ordering fractions, counting with fractions, and recognizing relative size as they try to knock down Fuzzy Fracs in size order. The Fuzzy Fracs game screen looks like this:



Fuzzy Fracs are arranged in three rows on the Game Board. Each Fuzzy Frac has a number on it (fraction, decimal, or percent). Your goal is to knock over all the Fuzzy Fracs in size order. You can knock them down from smallest to largest or largest to smallest.

At the start of a game, a ball rolls out onto the Countertop. Pick up a ball by clicking it and then click a Fuzzy Frac to throw the ball. Each time you knock over a Fuzzy Frac, its number is marked with a solid black triangle on the Number Line. To continue, click the BALL FEEDER button to get a new ball and then try to hit the Fuzzy Frac that's next in order.

Each correct Fuzzy Frac counts as a "hit." When you've knocked down all possible Fuzzy Fracs, the game is over. A scoreboard will slide out from the Results Area to show your hits and tries. You can then click any Fuzzy Frac you missed and click ANALYZE for more mathematical help.

Gilda's Tip:
If you skip any Fuzzy Fracs, hollow triangles will mark their places on the Number Line and the Fuzzy Fracs will turn gray. You can't knock gray Fuzzy Fracs down. To find out why a Fuzzy Frac turned gray, click on it and then click the Analyze button.

Playing Fuzzy Fracs

Gilda's Tip:
If you change any setting except Sound in the course of a game, you will end the game. A dialog will appear to ask if you want to start a new game. Click Restart to start a new game or Cancel to keep playing.

Fuzzy Fracs Options

You can change the Fuzzy Fracs game settings to create different learning experiences. Use the Fuzzy Options menu to change any of the following settings:

- Game version (Smallest to Largest or Largest to Smallest)
- Playing level (1-5)
- Fuzzy Type (Fraction, Decimal, or Mixture)
- Sound level

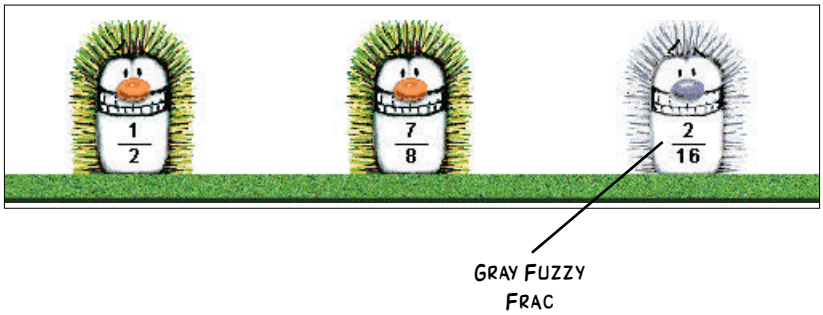
The available options are determined by the Teacher Options for Fuzzy Fracs. The default setting is for all options to be available. You can disable options by choosing Teacher Options from the Main Screen and then selecting Fuzzy Fracs. For more information on Teacher Options, see page 45.

Choosing a Game

You can choose between two different game versions: Smallest to Largest or Largest to Smallest. The active version will have a check-mark next to it in the Fuzzy Options menu. The version you choose will use the current Level and Fuzzy Type settings from the Fuzzy Options menu.

To start either version, click to pick up a ball. If you are playing Smallest to Largest, try to hit the smallest Fuzzy Frac first, and then continue to hit Fuzzy Fracs in increasing size order. If you are playing Largest to Smallest, try to hit the largest Fuzzy Frac first, and then continue to hit Fuzzy Fracs in decreasing size order.

If you skip a Fuzzy Frac, it will turn gray and you won't be able to knock it down.



When you've knocked over all possible Fuzzy Fracs, the game is over and the scoreboard will appear from the Results Area to show you your hits, tries, and total points. Scoring is as follows:

- one Fuzzy Frac hit correctly = 1 point
- two Fuzzy Fracs hit correctly = 2 points
- three Fuzzy Fracs hit correctly = 4 points
- four Fuzzy Fracs hit correctly = 8 points
- n Fuzzy Fracs hit correctly = 2n-1 points

Gilda's Tip:
At the end of a game, you can start a new game of the same version by clicking the Countertop or selecting New Game from the File menu.

If you hit 90-100% of the Fuzzy Fracs, they will reappear and dance at the end of the game because you did such a great job! If you hit 80-90% of the Fuzzy Fracs, they will make funny faces at the end of the game as a reward! If you miss any Fuzzy Fracs, the Fuzzy Fracs will reappear at the end of the game and swing up and down in appreciation of your effort.

At the end of a game, you can start a new game of the same version by clicking the Countertop or selecting New Game from the File menu. You can also choose a different version or change other settings in the Fuzzy Options menu before playing again. To leave Fuzzy Fracs, click the MAIN SCREEN button or choose a different feature area from the Game menu.

Choosing a Playing Level
When you choose a playing level from the Fuzzy Options menu, it will have a checkmark next to it.

✓ In Level 1, there are 6 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions or decimals equal to unit fractions (fractions with 1 in the numerator) with denominators of 2-12. For instance, Fuzzy Fracs can be labeled 1/2, .3, etc. The Number Line goes from 0 to 1.

✓ In Level 2, there are 9 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions or decimals equal to proper fractions with 2, 4, 8, or 16 in the denominator or unit fractions with denominators of 2-12. For instance, Fuzzy Fracs can be labeled 9/16, .188, etc. The Number Line goes from 0 to 1.

Gilda's Tip:
Improper fractions and decimal equivalents are introduced in levels 4 and 5.

- ✓ In Level 3, there are 12 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions or decimals equal to proper fractions with 2, 3, 4, 6, 8, 9, 12, 15 or 16 in the denominator. For instance, Fuzzy Fracs can be labeled 12/15, .83, etc. The Number Line goes from 0 to 1.

- ✓ In Level 4, there are 15 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions, decimals, or percents equal to proper or improper fractions less than 2. Fraction denominators can be 2-16 (except 11 and 13) or multiples of those numbers; fractions can also have denominators 16-99 (excluding primes in the numerator) that are reducible to sixteenths or larger. For instance, Fuzzy Fracs can be labeled 99/90, 1.5, etc. The Number Line goes from 0 to 2.

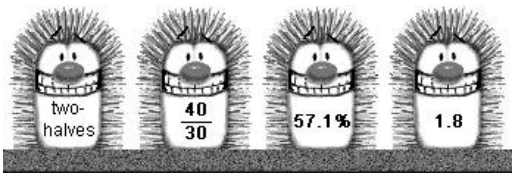
Gilda's Tip:
In level 5, fractions can be represented in textual form.

- ✓ In Level 5, there are 18 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions, decimals, or percents equal to proper or improper fractions less than 5. Fractions can also be displayed in textual format. Fraction denominators can be 2 to 16 (except 11 and 13) or multiples of those numbers; fractions can also have denominators 16-99 (excluding primes in the numerator) that are reducible to sixteenths or larger. For instance, Fuzzy Fracs can be labeled 75/18, 28.6%, etc. The Number Line stretches from 0 to the whole number after the largest fraction used in the game.

Choosing a Fuzzy Type

To choose the number format of the Fuzzy Fracs, select Fuzzy Type from the Fuzzy Options menu and choose a format from the sub-menu: Fractions, Decimals, or Mixture.

If you choose Mixture, the kinds of numbers depend on the Level setting. Levels 1, 2, and 3 will have some Fuzzy Fracs with fractions and some with decimals. Level 4 will have some Fuzzy Fracs with fractions, some with decimals, and some with percents. Level 5 will have some Fuzzy Fracs with fractions, some with decimals, some with percents, and some with written fractions (like "one-third") as shown below:



Set the Sound Level

To set the sound level select Sound. A sound volume dialog will appear. Click and drag the slider to set the volume. The slider ranges from 0%, no sound, to 100%, which is the loudest.

Getting Fuzzy Fracs Help

There are two different kinds of help available for Fuzzy Fracs: general help providing the rules and options, and detailed diagnostic help to scaffold students into a conceptual understanding of ordering fractions and recognizing relative size of fractions.

General Help

For instructions on how to play Fuzzy Fracs, how to change the game settings, and how to get mathematical help, choose Index from the Help menu. A list of topics will appear. Click a topic to learn more.

Diagnostic Help

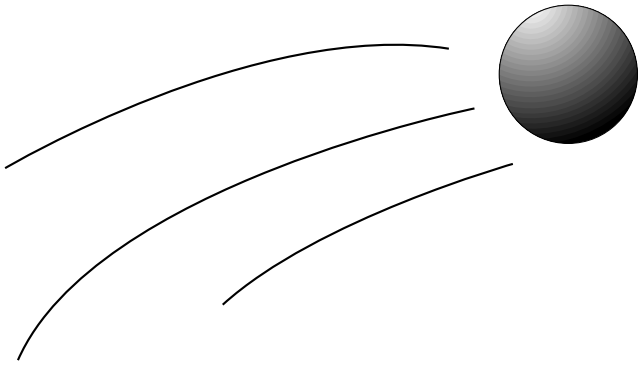
At any point during a game, a student can investigate the gray Fuzzy Fracs and get help with ordering. By clicking a gray Fuzzy Frac during a game, a red box will appear around it and a flashing red marker will show its location on the Number Line. Students can also click a hollow triangle on the number line to make it turn red and select its gray Fuzzy Frac. To explore why that Fuzzy Frac should have been next in order, click Analyze. A dialog will appear with explanations correlated to the type of error the student made. It provides students with a visual model for understanding the concept of relative size.

Gilda's Tip:
You can also click a hollow triangle on the number line to make it turn red and select its gray Fuzzy Frac.

In most cases, the diagnostic help will compare the missed Fuzzy Frac to the next correctly hit Fuzzy Frac. The help will be based on the actual numbers used in the game. For example, if a student hit 1/5 before 1/8 in the Smallest to Largest game, they would see:

Gilda's Tip:
You are not restricted to analyzing fractions during a game. At the end of the game, you can also click ANALYZE to compare Fuzzy Fracs you missed with Fuzzy Fracs you hit.

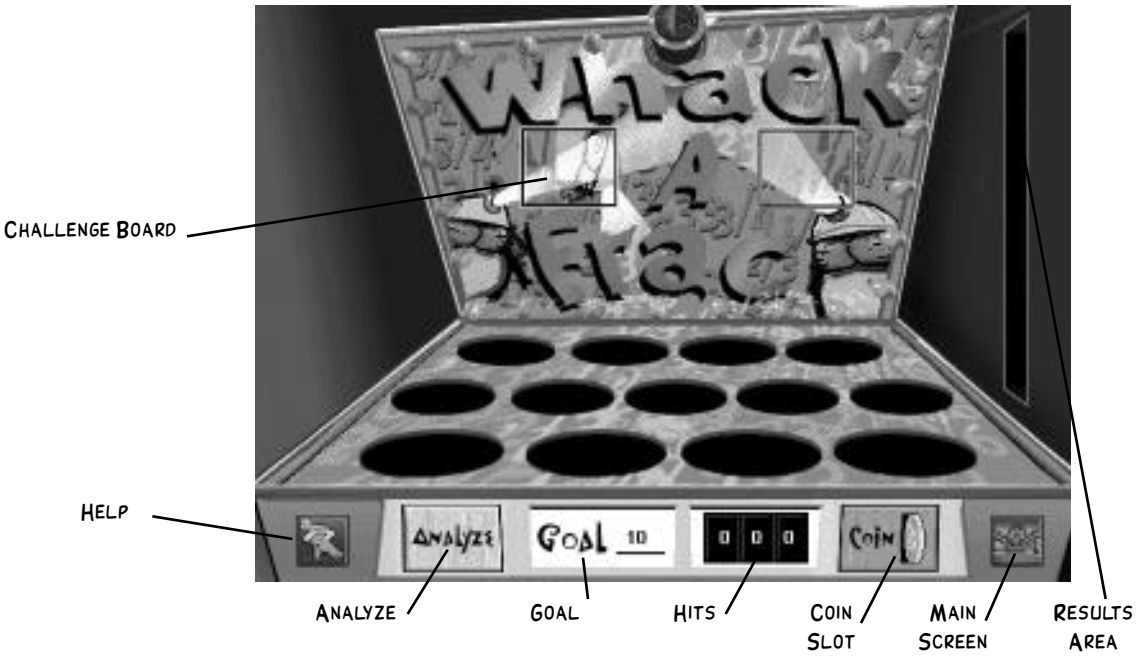
Use the NEXT and PREVIOUS buttons to see all the information, and click CANCEL when you are done.



Whack-A-Frac

Overview

Whack-a-Frac is designed to help students build an understanding of equivalence of fractions, decimals, and percents. The Whack-a-Frac game screen looks like this:



Gilda's Tip:
Keep an eye on the Target because it changes during the game! If the sound is on, you'll hear a bell when the Target changes.

At the start of a game, the mouse cursor is a coin. Click on the Coin Slot near the bottom right of the Game Board to begin. The cursor will change to a mallet, a Target number will appear on the left side of the Challenge Board, and three Frac-Moles will pop out of holes on the Game Board.

Each Frac-Mole bears a number and holds two signs, Yes and No. If a Frac-Mole's number is equal to the Target, click Yes to whack it! If it is not equal, click the No sign. Each correct answer counts as a "hit." You can see how many hits you have by looking at the Hits counter.

If you whack a Frac-Mole incorrectly, you can get immediate mathematical help by clicking ANALYZE. At the end of the game, a scoreboard will slide out from the Results Area to show you how you did.

Playing Whack-a-Frac

Whack-a-Frac Options

While the basic rules of Whack-a-Frac are always the same (click the Yes sign if the Frac-Mole is equal to the Target, or the No sign if it is not), you can change game settings to create a variety of different experiences. Use the Whack Options menu to change the following settings:

- Game version (Untimed Game, Timed Game, or Timed Frac-Moles)
- Playing level (1-4)
- Goal number
- Target number format (Fraction, Decimal, Percent, Text, or Random)
- Sound level

The available options are determined by the Teacher Options for Whack-a-Frac. The default setting is for all options to be available. You can disable options by choosing Teacher Options from the Main Screen and then selecting Whack-a-Frac. For more information on Teacher Options, see page 46.

Gilda's Tip:
If you change any setting except Sound in the course of a game, you will end the game. A dialog will appear to ask if you want to start a new game. Click Restart to start a new game or Cancel to keep playing.

Choosing a Game

You can choose from three different game versions: Untimed Game, Timed Game, or Timed Frac-Moles. The active version will have a checkmark next to it in the Whack Options menu. The version you choose will use the current Level and Target settings from the Whack Options menu.

To start any version, click on the Coin Slot. A Target will appear in the Challenge Area and Frac-Moles will pop out of holes on the Game Board. There can be a maximum of three Frac-Moles on the Game Board at any time. As you play, remember to watch for the changing Target! If your sound is on, a warning bell will ring when the Target is changing.

If you get 90-100% right, the Frac-Moles will jump up and down out of their holes in recognition of your hard work!

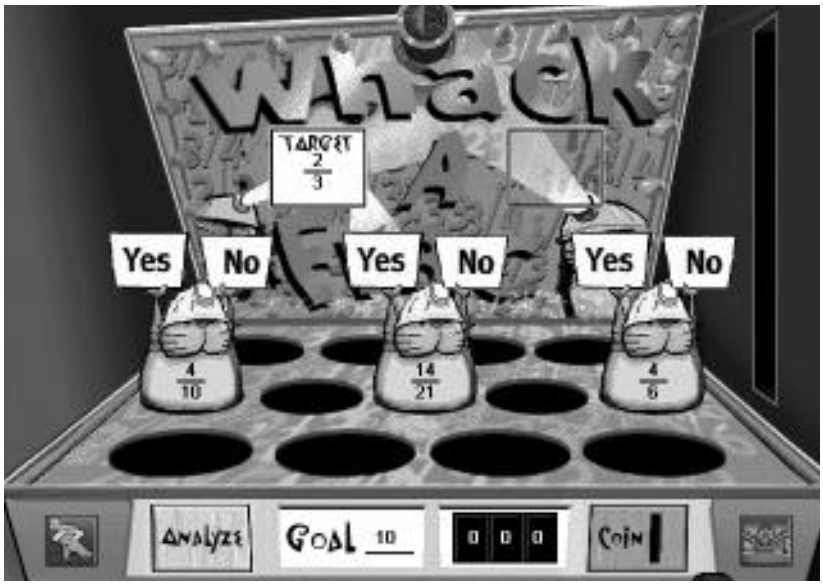
The scoreboard will pop out of the Results Area to show you your hits, tries, ratio of hits to tries, and time (when appropriate). You can then start

a new game of the same version by clicking the Coin Slot or by selecting New Game from the File menu. You can also choose a different version of Whack-a-Frac or change other settings in the Whack Options menu before playing again. To leave Whack-a-Frac, click the MAIN SCREEN button or choose a different area from the Game menu.

Gilda's Tip:
If you plan for students to use the diagnostic help extensively, encourage them to play the Untimed Game.

Untimed Game

In the Untimed Game, there are no time constraints so you can take as long as you like to explore and experiment. Each Frac-Mole will stay out of its hole until you click its Yes or No sign. Each correct answer counts as a "hit."



You must earn enough hits to reach the Goal in order to end the game.

Gilda's Tip:
Use Teacher Options to limit the goal range available to the student.

You can pick a Goal for the game by choosing Set Goal from the Whack Options menu. A dialog will appear to let you enter a Goal. The default range is 1 to 999, but the Goal range can be limited with the Teacher Options (see page 46).

Enter a Goal within the range specified and click OK. If you start a game without setting a Goal, the program will choose a default Goal. If the range is under 10, the Goal will be the highest number in the range; if the range is over 10, the Goal will default to the the lowest number in the range.

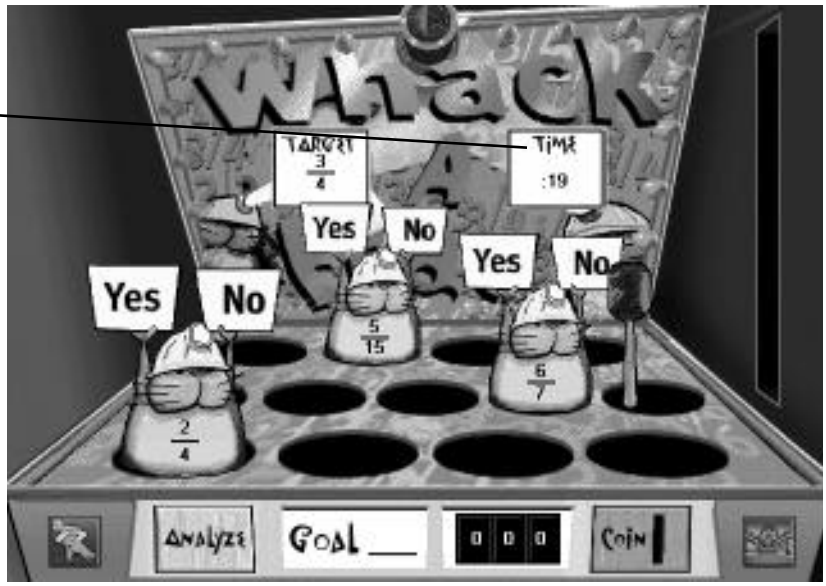
Gilda's Tip:
If you don't set a Goal, then *Fraction Attraction* will select a default goal for you.

Timed Game

If you choose Timed Game, you'll see a sub-menu with a choice of game lengths: 30 seconds, 1 minute, 2 minutes, or 4 minutes. Select a time.

When the game starts, a Timer will appear to the right of the Target on the Challenge Board. The Timer will count up from 0 seconds. Frac-Moles will stay on the screen until you click their Yes or No signs. There is no Goal number – just try to see how many hits you can get before the time is up!

Gilda's Tip:
In Timed Games, whack as many Frac-Moles as you can in a limited amount of time. Note the Time Window.



Timed Frac-Moles

If you choose Timed Frac-Moles, you will need to work fast to outsmart the Frac-Moles! Frac-Moles will stay on the screen for only a few seconds. Each Frac-Mole that disappears before you can whack it counts as a "try" in your final score. Each correct

whack counts as a "hit." The more hits you get, the faster the Frac-Moles will move!

In order to end the game, you must earn enough hits to reach the Goal. At the end of the game, the Scoreboard will slide out from the Results Area to show your hits and tries, and how long it took to reach the Goal.

You can pick a Goal for the game by choosing Set Goal from the Whack Options menu. A dialog will appear to let you enter a Goal. The default range is 1 to 999, but the Goal range can be limited with the Teacher Options (see page 46). Enter a Goal within the range specified and click OK. If you start a game without setting a Goal, the program will choose the Goal. If the range is under 10, the Goal will be the highest number in the range; if the range is over 10, the Goal will be the lowest number in the range.

Choosing a Playing Level
When you choose a playing level from the Whack Options menu, it will have a checkmark next to it.

- ✓ In Level 1, Targets will be equivalents (fractions, decimals, or percents) to reduced fractions with denominators from 2 to 4. Frac-Moles will always wear fractions; either equivalents or inequivalents of the Targets with denominators up to 24 or prime denominators less than 11.

- ✓ In Level 2, Targets will be equivalents of fractions with denominators from 2 to 5 and 10. Frac-Moles will always wear fractions; either equivalents of the Targets with denominators up to 50, or inequivalents of the Targets with denominators up to 50 or prime denominators less than 11.

- ✓ In Level 3, Targets will be equivalents of fractions with denominators from 2 to 16, excluding 7, 11, and 13. Frac-Moles can wear fractions, decimals, percents, or written fractions; either equivalents of the Targets with denominators up to 50, or inequivalents of the Targets with denominators up to 50 or prime denominators less than 11.

✓ In Level 4, Targets will be equivalents of fractions with denominators from 2 to 16, excluding 13. Frac-Moles can bear fractions, decimals, percents or written fractions; with denominators up to 99 (excluding primes), which are reducible to sixteenths or larger up to 99 or prime denominators less than 11.

Choosing Target Numbers

To choose the number format of the Target, select Target from the Whack Options menu and choose a format from the sub-menu: Fractions, Decimals, Percents, Text (fractions in textual format), or Random (a mix of Fractions, Decimals, Percents, and Text). The current selection will have a checkmark.

Set the Sound Level

To set the sound level select Sound. A sound volume dialog will appear. Click and drag the slider to set the volume. The slider ranges from 0%, no sound, to 100%, which is the loudest.

Getting Whack-a-Frac Help

There are two different kinds of help provided for Whack-a-Frac: general help on the rules and options, and detailed diagnostic help to scaffold students into a conceptual understanding of equivalence.

General Help

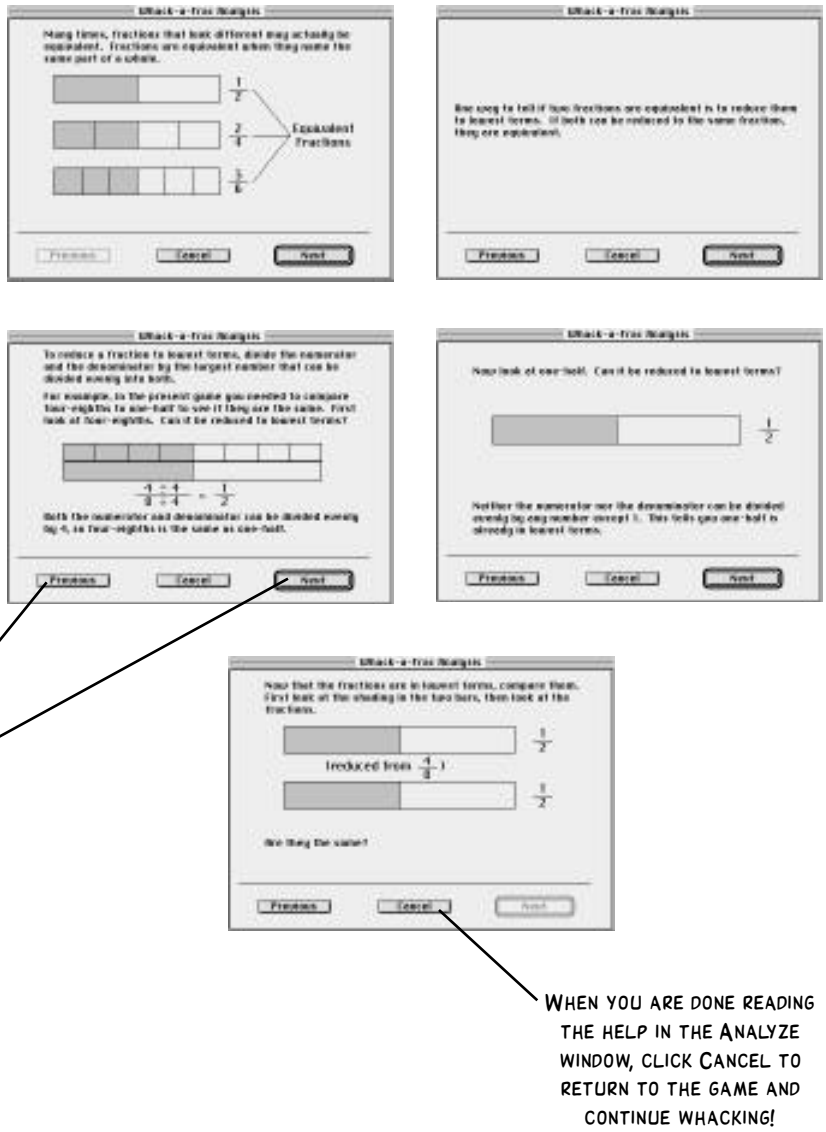
For instructions on how to play Whack-a-Frac, change the game settings, and get mathematical help, choose Index from the Help menu. A list of topics will appear. Click a topic to learn more.

Diagnostic Help

At any point during a game, you can click ANALYZE to investigate your last answer. When you click ANALYZE, you "freeze" the game. You won't be able to see numbers on any Frac-Moles, and the time you spend reading the Analyze dialog won't count for the overall game time.

The Analyze window will provide explanations based on the error that was made by the student, as well as provide concrete models to help compare the incorrectly hit Frac-Mole to the Target. For example, if students do not recognize fractions as

equivalent when one fraction is not reduced to its lowest terms, they will see the following:

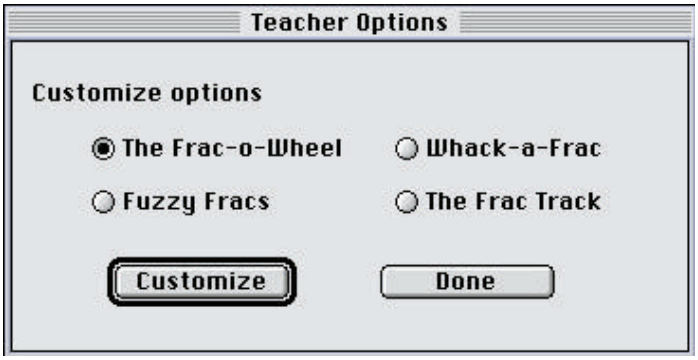


USE THE NEXT AND PREVIOUS BUTTONS TO SEE ALL THE INFORMATION.

WHEN YOU ARE DONE READING THE HELP IN THE ANALYZE WINDOW, CLICK CANCEL TO RETURN TO THE GAME AND CONTINUE WHACKING!

Setting Teacher Options

Teacher Options are available only from the Main Screen. Press Command-T (⌘-T, Macintosh) or Control-T (Windows) to bring up the Teacher Options dialog.



Click the radio button for the game you want to modify and then click CUSTOMIZE. A dialog will appear for that game. Click to select or deselect boxes for specific options. The default settings for every game are for all options to be available to students and for sound to be on.

Gilda's Tip:
In each area, to save your changes as the new default settings, click the box by Save settings as default.

In each area, to save your changes as the new default settings, click the box by Save settings as default. If you do not select this option, the program will keep these settings for the current session only. It will revert to the original defaults when you exit *Fraction Attraction* and run the software again.

When you have finished making changes, click OK to exit the dialog and save your settings, or click CANCEL to exit without saving changes.

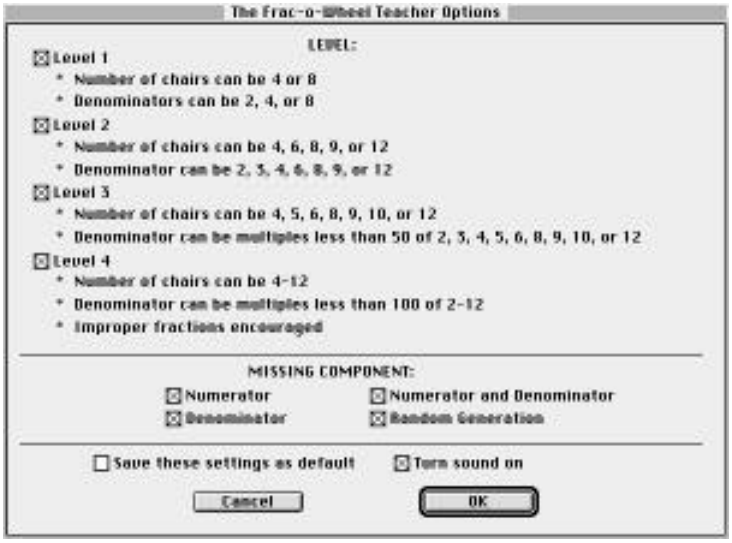
Each time you finish modifying a game, you will return to the main Teacher Options dialog and can choose to customize another game or to return to the Main Screen.

When you have finished setting Teacher Options, click DONE to return to the Main Screen.

The Frac-o-Wheel Teacher Options

In The Frac-o-Wheel students learn to recognize multiple representations of fractions and develop an understanding of fraction equivalence. You can use the Teacher Options to ensure that students work with the type of fractions and missing fraction component best suited to their level of understanding.

If you choose The Frac-o-Wheel from the Teacher Options dialog, a dialog specific to The Frac-o-Wheel will appear. The options you set will affect what is available in the Wheel Options menu for the game.



Set the problem level by choosing one or more levels. The default setting is for all levels to be available to students. You must choose at least one level; if no level is selected, you will not be able to save your changes.

Set the missing component by choosing Numerator, Denominator, Numerator and Denominator, or Random Generation. The default setting is for all missing component options to be available to students. At least one missing component must be selected in order for you to save your changes.

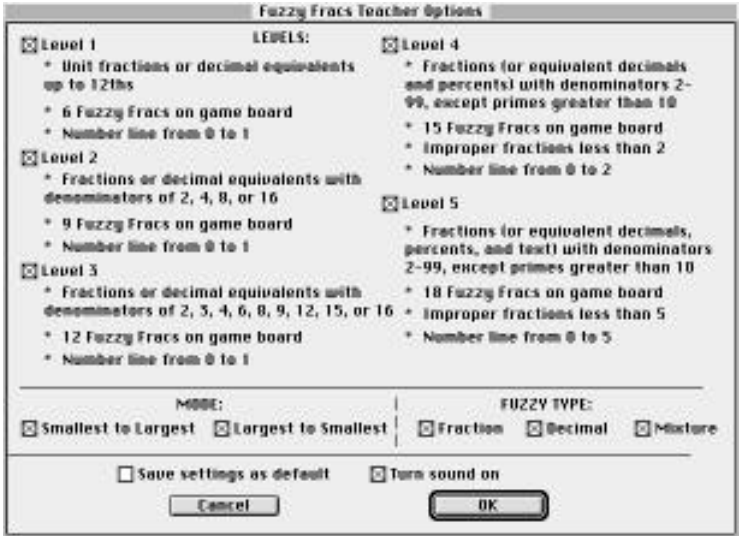
Sound is controlled by the Turn sound on option, which is selected by default. Deselect this option to turn off sound for The Frac-o-Wheel portion of *Fraction Attraction*.

Gilda's Tip:
If you don't want to save your settings as the new default settings for the current session of *Fraction Attraction*, click CANCEL to exit without saving changes.

Fuzzy Fracs Teacher Options

In Fuzzy Fracs, students order fractions, count with fractions, and recognize relative size of fractions. You can use the Teacher Options to ensure that students work with the type of fractions, number format, and game version that will present an appropriate challenge given their level of understanding.

If you choose Fuzzy Fracs from the Teacher Options dialog, a dialog specific to Fuzzy Fracs will appear. The options you set will affect what is available in the Fuzzy Options menu for the game.



Set the problem level by choosing one or more levels. The default setting is for all levels to be available to students. You must choose at least one level; if no level is selected, you will not be able to save your changes.

There are two versions: Smallest to Largest and Largest to Smallest. Set the version (Mode) by choosing Smallest to Largest or Largest to Smallest. The default setting is for both versions to be available to students. At least one version must be selected for you to save your changes.

Gilda's Tip:
Don't forget to save your changes as the new default settings by clicking the box marked "Save settings as default." Otherwise, your settings will be for the current session only.

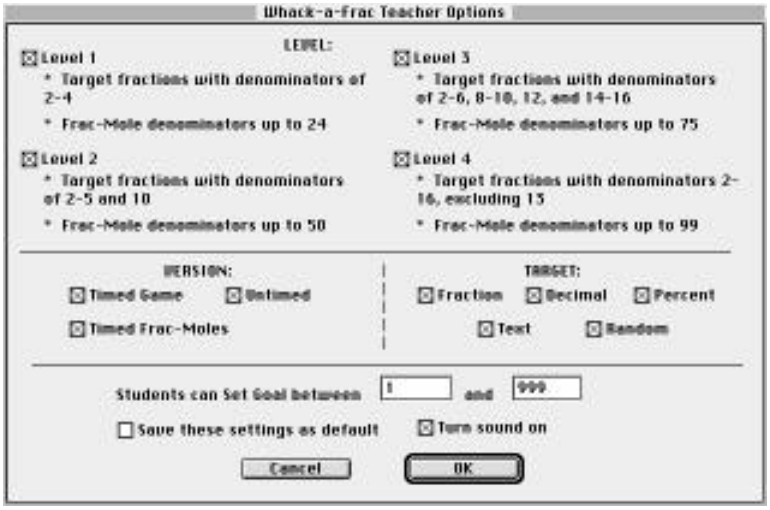
Set the Fuzzy Type by choosing one or more formats for the Fuzzy Fracs (Fraction, Decimal, and Mixed). The default setting is for all formats to be available to the students. At least one format must be selected for you to save your changes.

Sound is controlled by the Turn sound on option, which is selected by default. Deselect this option to turn off sound for Fuzzy Fracs.

Whack-a-Frac Teacher Options

In Whack-a-Frac, students learn to recognize equivalent numbers. You can use the Teacher Options to ensure that students work with the type of fractions, number format, and game version that will help them enhance and move beyond their current level of understanding.

If you choose Whack-a-Frac from the Teacher Options dialog, a dialog will appear. The options you set will affect what is available in the Whack Options menu for the game.



Set the problem level by choosing one or more levels. The default setting is for all levels to be available to students. You must choose at least one level; if no level is selected, you will not be able to save your changes.

Set the game version according to your teaching preference by choosing Untimed Game, Timed Game, or Timed Frac-Moles. The default setting is for all game modes to be available. At least one version must be selected in order for you to save your changes.

Set the format for the Target that will be available to the students by choosing one or more formats (Fraction, Decimal, Percent, Text, and Random). The default setting is for all formats to be available to students. At least one format must be selected in order for you to save your changes.

Gilda's Tip:
If you don't set a Goal, then *Fraction Attraction* will select a default goal for you.

The default range for the Goal is from 1 to 999. To limit the Goal students can set for a game, enter numbers in the text boxes. To create a fixed Goal, enter the same number in both text boxes. If you set a fixed Goal, the Set Goal option will be grayed out in the Whack Options menu.

Sound is controlled by the Turn sound on option, which is selected by default. Deselect this option to turn off sound for Whack-a-Frac.

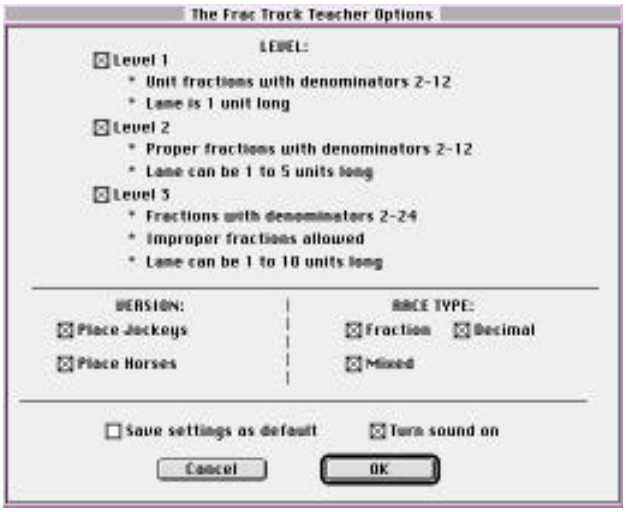
A Final Reminder
To save your changes as the new default settings for any game, click the box by Save settings as default. If you do not select this option, the program will keep these settings for the current session only. It will revert to the original defaults when you exit *Fraction Attraction* and run the software again.

When you have finished making changes, click OK to exit the dialog and save your settings, or click CANCEL to exit without saving changes.

The Frac Track Teacher Options

The Frac Track helps students to recognize fractions as quantifiable distances on a number line and to develop the ability to "count on" with fractions. You can use the Teacher Options to ensure that students work with the number format, type of fractions, and game version most appropriate for their level of understanding.

If you choose The Frac Track from the Teacher Options dialog, a dialog specific to The Frac Track will appear. The options you set will affect what is available in the Track Options menu for the game.



Set the problem level by choosing one or more levels. The default setting is for all levels to be available. You must choose at least one level; if no level is selected, you will not be able to save your changes.

There are two versions of The Frac Track. Set the game version (Mode) by choosing Place Jockeys, Place Horses, or both. The default setting is for both game versions to be available to students. At least one version must be selected in order to save your changes.

Gilda's Tip:
At least one option in each area of The Frac Track Teacher Options must be selected in order to save changes.

Set the Race Type (Format) by choosing one or more formats for the horses' numbers (Fraction, Decimal, and Mixed). The default setting is for all formats to be available. At least one format must be selected in order to save your changes.

Sound is controlled by the Turn sound on option, which is selected by default. Deselect this option to turn off sound for The Frac Track.

Fraction Attraction Menus

File Menu

The File menu has two commands:

- **New Game** – begins a new game with the current settings in any of the four games; this option is not active at the Main Screen.
- **Quit** (Macintosh) or **Exit** (Windows) – brings up a dialog so you can exit the program.

Options Menu

The Options menu, available only at the Main Screen, has one command:

- **Sound** – brings up a dialog to let you control the volume. Drag the slider to set the volume from 0% (no sound) to 100% (the loudest).

Track Options Menu

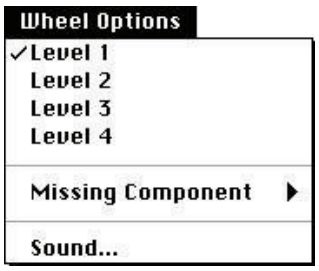
The Track Options menu, available only in The Frac Track, has the following commands:

- **Place Jockeys** – sets the game mode to Place Jockeys.
- **Place Horses** – sets the game mode to Place Horses.
- **Level 1** – sets the difficulty level to Level 1. Horses' numbers will be fractions, decimals, or percents equivalent to unit fractions (fractions with 1 in the numerator) with 2-12 (except 7) in the denominator. The race track is 1 unit long.

- **Level 2** – sets the difficulty level to Level 2. Horses' numbers will be fractions, decimals, or percents equivalent to proper fractions with numerators of 1 or factors of the length of the lane and denominators of 2-12, except 7. The race track can be 1 - 5 units long.
- **Level 3** – sets the difficulty level to Level 3. Horses' numbers will be fractions, decimals, or percents equivalent to fractions with denominators 2- 12, except 7. Denominators cannot exceed 24. Horses can have improper and mixed fractions. The race track can be 1 - 10 units long.
- **Race Type** – Lets you choose a format for the horses' numbers from the sub-menu: Fraction, Decimal, or Mixed.
- **Sound** – brings up a dialog to let you control the volume.

Wheel Options Menu

The Wheel Options menu, available only in The Frac-o-Wheel, has the following commands:



- **Level 1** – sets the difficulty level to Level 1. The number of chairs may be 4 or 8. Given denominators can be 2, 4, or 8.
- **Level 2** – sets the difficulty level to Level 2. The number of chairs may be 4, 6, 8, 9, or 12. Given denominators can be 2, 3, 4, 6, 8, 9, and 12.
- **Level 3** – sets the difficulty level to Level 3. The number of chairs may be 4, 5, 6, 8, 9, 10, or 12. Given denominators can be any multiple (less than 50) of 2, 3, 4, 5, 6, 8, 9, 10, and 12.
- **Level 4** – sets the difficulty level to Level 4. The number of chairs may be 4-12. Given denominators can be any multiple (less than 100) of 2-12.

- **Missing Component** – Lets you choose what part(s) of the Fraction sign you will have to complete. Use the sub-menu to choose Numerator, Denominator, Both, or Random.
- **Sound** – brings up a dialog to let you control the volume.

Fuzzy Options Menu

The Fuzzy Options menu, available only in Fuzzy Fracs, has the following commands:

- **Smallest to Largest (Mode)** – sets the game version to Smallest to Largest.
- **Largest to Smallest (Mode)** – sets the game version to Largest to Smallest.
- **Level 1** – sets the difficulty level to Level 1. There are 6 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions, decimals, or percents equal to unit fractions (fractions with 1 in the numerator) with denominators of 2-12. The Number Line goes from 0 to 1.
- **Level 2** – sets the difficulty level to Level 2. There are 9 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions, decimals, or percents equal to proper fractions with 2, 4, 8, or 16 in the denominator. The Number Line goes from 0 to 1.
- **Level 3** – sets the difficulty level to Level 3. There are 12 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions, decimals, or percents equal to proper fractions with 2, 3, 4, 6, 8, 9, 12, 15 or 16 in the denominator. The Number Line goes from 0 to 1.
- **Level 4** – sets the difficulty level to Level 4. There are 15 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions, decimals, or percents equal to proper or improper fractions less than 2. Fraction denominators can be 2-16 (except 11 and 13) or multiples of those numbers; fractions can also have denominators 16-99 (excluding primes in the numerator) that are reducible to sixteenths or larger. The Number Line goes from 0 to 2.

- **Level 5** – sets the difficulty level to Level 5. There are 18 Fuzzy Fracs. The numbers on the Fuzzy Fracs are fractions, decimals, or percents equal to proper or improper fractions less than 5. Fractions equal to or smaller than twelfths can also be displayed in textual format. Fraction denominators can be 2-16 (except 11 and 13) or multiples of those numbers; fractions can also have denominators 16-99 (excluding primes in the numerator) that are reducible to sixteenths or larger. The Number Line goes from 0 to the whole number after the largest fraction used in the game.
- **Fuzzy Type** – Lets you choose the number format of the Fuzzy Fracs. Use the sub-menu to choose Fraction, Decimal, or Mixture.
- **Sound** – brings up a dialog to let you control the volume.

Whack Options Menu

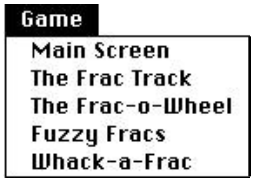
The Whack Options menu, available only in Whack-a-Frac, has the following commands:

- **Untimed Game** – sets the game version to Untimed Game.
- **Timed Game** – sets the game version to Timed Game. If you choose Timed Game, choose a game length from the sub-menu: 30 seconds, 1 minute, 2 minute, or 4 minutes.
- **Timed Frac-Moles** – sets the game version to Timed Frac-Moles.
- **Level 1** – sets the difficulty level to Level 1. Targets will be equivalents (fractions, decimals, or percents) of reduced fractions with denominators from 2 to 4. Frac-Moles will always wear fractions; either equivalents of the Targets with denominators up to 24, or inequivalents of the Targets with denominators up to 24 or prime denominators less than 11.

- **Level 2** – sets the difficulty level to Level 2. Targets will be equivalents of fractions with denominators from 2 to 5 and 10. Frac-Moles will always wear fractions; either equivalents of the Targets with denominators up to 50, or inequivalents of the Targets with denominators up to 50 or prime denominators less than 11.
- **Level 3** – sets the difficulty level to Level 3. Targets will be equivalents of fractions with denominators from 2 to 16, excluding 7, 11, and 13. Frac-Moles can wear fractions, decimals, percents or written fractions; either equivalents of the Targets with denominators up to 75, or inequivalents of the Targets with denominators up to 75 or prime denominators less than 11.
- **Level 4** – sets the difficulty level to Level 4. Targets will be equivalents of fractions with denominators from 2 to 16, excluding 13. Frac-Moles can bear fractions, decimals, percents or written fractions; either equivalents of the Target Numbers with denominators up to 99, or inequivalents of the Target Numbers with denominators up to 99 or prime denominators less than 11.
- **Set Goal** – brings up a dialog to allow you to enter a new Goal number.
- **Target** – Lets you choose the number format of the Target. Use the sub-menu to choose Fractions, Decimals, Percents, Text, or Random.
- **Sound** – brings up a dialog to let you control the volume.

Game Menu

The Game menu lets you navigate through the program. The game screen you are currently in will be grayed out. The Game menu contains the following commands:



- **Main Screen** – takes you to the Main Screen.
- **The Frac Track** – takes you to The Frac Track.
- **The Frac-o-Wheel** – takes you to The Frac-o-Wheel.
- **Fuzzy Fracs** – takes you to Fuzzy Fracs.
- **Whack-a-Frac** – takes you to Whack-a-Frac.

If you select a different game or area from the Main Screen, a dialog will appear asking you to confirm that you want to leave. Click LEAVE to exit that game screen, or DON'T LEAVE to stay in that game.

Help Menu

The Help menu contains two commands:

- **Index** – takes you to the Help screen, which offers help on operating *Fraction Attraction*.

- **Using Help** – explains how to use the on-line Help.