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How do fraction strips help

The HTML5 version of this tool was developed in October 2021. There are some differences between the newer HTML5 version and the version available for download from the App Store or Google Play Store but the core functionality remains the same. This support page was developed based on the downloadable App version of the tool so the images and instructions may not match the HTML5 tool perfectly, however, it still contains many useful examples. Description Examples Videos Customizing the Tool Sample Files Features of the Tool Buttons Other Functionality Keyboard Shortcuts PDF supports Use Fraction Strips to represent, compare, order, and operate on fractions. Represent fractions by dragging pieces from the fraction tower into the workspace. Pieces can be placed in a line to form a train. Manipulate the pieces and trains to compare and order fractions or to model fraction operations. Access a wide variety of Annotation tools to communicate thinking. Insert pictures into the tool. Work created in a mathies tool can be saved and opened. A saved file can be shared with peers or submitted to a teacher. The file will contain all solution steps from start to finish. Take a screenshot to use as part of a portfolio, presentation, web page, etc. top Create visual representations that aid in mathematical thinking related to: Understanding part-whole relationships Representing, comparing and ordering fractions Iterating a unit fraction by copying Exploring the relationship between the number of equal partitions in a whole and the fractional unit (denominator) Exploring equivalent fractions Modelling operations with fractions placing pieces beside or between each other, to combine fractions (addition) removing pieces from trains (subtraction) aligning trains to compare fractions with or without using comparison bars, including to find differences (subtraction) copying strips or trains to model repeated addition (multiplication) splitting trains into equal parts to find a fraction of a number (multiplication) top Fundamental Concepts and Skills Fraction Strips Connections Working with numbers: Understanding and using numbers (e.g., being able to read, represent, count, order, estimate, compare, compose, decompose, and recompose numbers). Fraction Strips can be used to: recognize that each whole in the fraction tower has been split into equal parts called unit fractions represent unit fractions, proper fractions and improper fractions, as well as mixed numbers identify and count by unit fractions (e.g., one one-seventh, two one-sevenths, etc.) compose and decompose wholes using unit fractions, e.g., show that 9/4 is the same as two wholes and one-fourth demonstrate and explain the concept of equivalent fractions compare and order fractions with like and unlike denominators, including proper fractions, improper fractions and mixed numbers Recognizing and applying understanding of number properties: Understanding how numbers behave in operations and drawing on that understanding to master math facts and perform calculations. Fraction Strips can be used to: Mastering math facts: Understanding and recalling math facts, using a variety of strategies. Fraction Strips can be used to: apply whole number facts as students compute fractional sums and products practise and understand operations with fractions by manipulating visual representations Developing mental math skills: Doing calculations in the mind, with little or no use of paper and pencil or calculator. Using visual tools when learning to perform mathematical operations allows students to draw on these mental models and visualizations to perform mental calculations. Students will develop their mental math skills with Fraction Strips as they: solve problems involving the addition and subtraction of fractions apply estimation skills to operations with whole numbers and fractions Developing proficiency with operations: Performing calculations with ease, precision, and consistency and with a general understanding of number and operations, number properties, and their appropriate application in problem solving. Fraction Strips can be used to: recognize the inverse relationship between addition and subtraction (e.g., since 1/6 + 1/3 = 1/2, then 1/2 - 1/6 = 1/3). recognize the inverse relationship between multiplication and division (e.g., since 1/2 x 6 = 3, then 3 ÷ 1/2 = 6). demonstrate the relationship between the repeated addition of fractions and the multiplication of that fraction by a whole number solve problems involving fractions Focusing on the Fundamentals of Math - A Teacher's Guide Connecting Fundamental Math Concepts with mathies.ca (Draft) top Represent unit fractions, proper fractions, improper fractions, and mixed numbers. top Align trains using the built-in snapping feature. Zoom in for more precision. Rulers, when shown, will illuminate ticks in red if a piece ends exactly in that spot. Create a vertical comparison bar to track a position between trains. top The equivalence bar in the tower can be dragged to reveal equivalent fractions in the tower. The ruler can be shown, with steppers that change the fractional unit (e.g., from thirds to sixths), to assist with renaming fractions. top Place pieces beside or between each other, to combine fractions and perform addition. Add Fractions On desktop, click on the image above to open this file. top Remove pieces from trains to perform subtraction as take-away. Align trains to compare fractions, with or without using comparison bars, to find the difference. See the Gazette article for more details about representing, ordering, subtracting and adding fractions with Fraction Strips. top Copy strips or trains to model repeated addition. top Division of fractions can be a challenging topic. It is useful for students to understand different ways of thinking about division. One way to approach the division of a fraction by a whole number is to split the fraction into equal pieces as in the example below. Comparing this division example to the multiplication example above, students may recognize that the action of dividing a quantity by 4 is the same as finding one-fourth of that quantity. This is one illustration of the invert and multiply algorithm. When dividing one fraction by another fraction, one way to think about the problem is to ask, "how many of the second quantity fits into the first quantity". In the following example, the student is asked to think about how many one-fourth pieces fit into the one-half piece. Here the answer is 2 which is a whole number. See the Ribbon Problem below for an example where the quotient is not a whole number. See the Gazette article for more details about multiplying and dividing fractions with Fraction Strips. top Watch a video of the following question being solved by using the Fraction Strips The grade 7 class is making decorations. They have 5 meters of ribbon to use. Each decoration takes 2/5 of a meter of ribbon. How many decorations can they make? (Ribbon Problem Image) Note: The video below was created with a previous version of the Fraction Strips Tool. Open the ribbon problem in the most recent version of Fraction Strips from the sample files section. This video was developed by Dave Petro and Gisele Jobin from Windsor Essex Catholic District School Board. Thanks for sharing! This video was developed by Dave Petro and Gisele Jobin from Windsor Essex Catholic District School Board. Thanks for sharing! top The image below shows a Fraction Strips workspace with: the Customize Fraction Tower dialog showing annotations (an arrow and a textbox) an inserted image (green triangles and red trapezoids created using the Pattern Blocks tool) two-sixths and one-half represented with fraction strips The pieces have been made more transparent using the slider accessed from settings . The Customize Fraction Tower dialog has been used to: choose custom colours for the fraction pieces (e.g., the halves have been changed to red to match the pattern blocks) choose which strips appear in the tower top (Note: This feature is NOT available in the HTML5 version of the tool.) To access a sample file: click the link in the Sample column (desktop only), or use the Open WWW button in the Settings dialog and supply the URL, or download the file from the URL column (right-click and save locally on desktop, hard tap on touch screen devices) and use the Open button in the tool, or add the mathies sample files Google drive folder to "My Drive" which allows convenient access on all devices. See the File Operations page for more details. Note: These files were designed on a desktop computer and may not open exactly as shown on other devices. top (Note: The HTML5 version of the tool includes many, but not all of these features and employs a slightly different user interface.) Button Description Toggle between showing: no labels the labels in the tower only labels in the workspace Show the Customize Fraction Tower dialog to: choose a colour palette (Rainbow, Original, or One Colour) include or exclude strips in the tower change the colour of the strips and the related pieces in the workspace restore the tower to its default state Toggle between not showing rulers showing rulers showing rulers and stepper arrows Note: Clicking the stepper arrows changes the number of tick marks in a whole. The ticks are illuminated in red if a piece ends exactly at that position. A comparison bar is a grey, vertical line that is useful to compare fraction strips, especially when the left edges are aligned. Multiple comparison bars can be created. The length of a bar, its colour and its thickness can be modified. Switch between English and French. Use the zoom in button to make the pieces look bigger. This is useful for more precise comparison, especially when working with small fractions. Use the zoom out button to see more of the workspace. The fraction pieces will look smaller. Note: If using a mouse use the mouse wheel to zoom in and out. If pieces are selected the zooming will be centered around the selected pieces. On touch screen devices use the pinch-to-zoom gesture on an empty space to zoom in and out. Zoom the workspace so that all the fraction pieces are visible. Pieces may be resized and/or repositioned as a result. On desktop, use the scroll bars. On touch screen devices, use a two finger slide gesture on an empty space. Drag to highlight equivalent fractions in the tower. To move the tower, drag it by the dark blue area at the very top. Drag to adjust the height of the tower. If the tower is made too small, a scroll bar will be displayed, allowing hidden strips to be revealed. Step backward or forward through the actions with the tool. This feature is not only useful for backtracking when a misstep is made, it enables a student to demonstrate their work from the start to the finish. The student can press Undo until they are at the start of their solution and then press Redo repeatedly, explaining each step. Note: Undo / Redo is not available for annotation objects. Show the Settings dialog to: open a previously saved Fraction Strips file (work will be centered and fitted to the window automatically) save work in a file (see File Operations for more details) restore Defaults to retain the objects in the workspace, while restoring the settings to their defaults including labels, rulers, and colours Alternatively, drag objects to the recycle bin to remove them. To select fraction pieces draw a marquee rectangle around them. Hold down the SHIFT key when drawing a marquee rectangle to add to the previous selection. Click a fraction piece to add or remove it from the selection. Selected fraction pieces can be moved, copied, or recycled as a group. top On the desktop version of this tool, the standard Keyboard Shortcuts have been implemented. Specific keyboard shortcuts for the Fraction Strips tool are as follows: mathies Fraction Strips Learning Tool Tip Sheet Gazette Articles September 2017 - Representing, Comparing and Ordering Fractions, Equivalent Fractions, Addition and Subtraction of Fractions using the Fraction Strips Tool December 2017 - Multiplication and Division of Fractions using the Fraction Strips Tool Connecting to Fundamentals Focusing on the Fundamentals of Math - A Teacher's Guide Connecting Fundamental Math Concepts with mathies.ca (Draft) Other Resources A Fraction Strips Story: Reflections on a Student's Mathematical Exploration (Draft) Fraction Strips and Fraction Towers (Source - EduGAINS | Ministry Developed Resources | Mathematics | Lessons & Supports | Manipulatives)What are they? How do they help students? Usage Recommendations Sample Activities Related Websites Visit EduGAINS for additional Manipulative Sheets. top

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