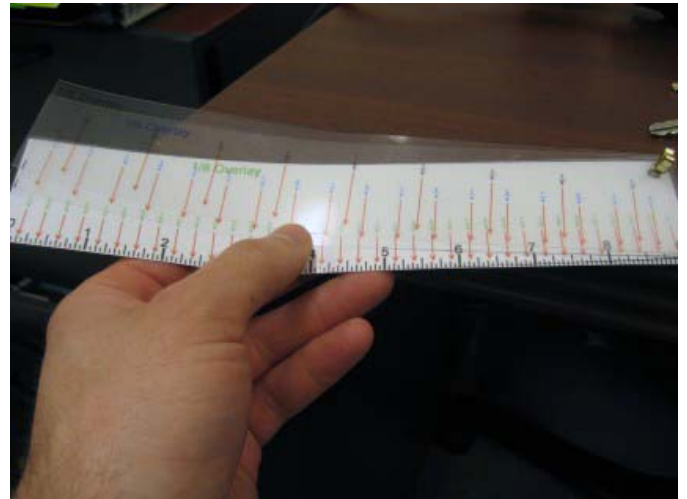# The Fraction Ruler

This tutorial covers how to make a fraction ruler. It contains references to the software program called Silhouette Studio, a free download available at http://www.silhouetteamerica.com/software.aspx. A Silhouette SD fabricator, inkjet printer, and computer are also necessary.

The Fraction Ruler

A fraction ruler like the image on the right is a useful manipulative for helping students understand measurement and the lines on a ruler. This fraction ruler can also serve as a resource for practicing addition and subtraction of fractions.

Needed Supplies

In order to make this fraction ruler, you will need the following supplies* (not including the physical hardware):

1. Card stock (110 lb)- 8 1/2 x 11
2. Inkjet transparencies
3. Brads
4. Tack spray

Click on the words for links to preferred materials that have been tested.


Download Designs

There are three files for this fraction ruler.

1. Ruler Base & Template
2. Ruler Fraction Overlays
3. Ruler Fraction Overlays 2

Download the files to your computer.
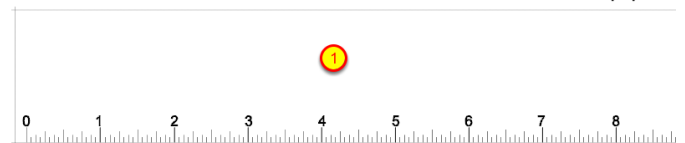
Open "Ruler Base & Template"

Open the "Ruler Base & Template" file using the Silhouette Studio software program. This file contains all of the design instructions (cut lines) for the Silhouette SD fabricator.
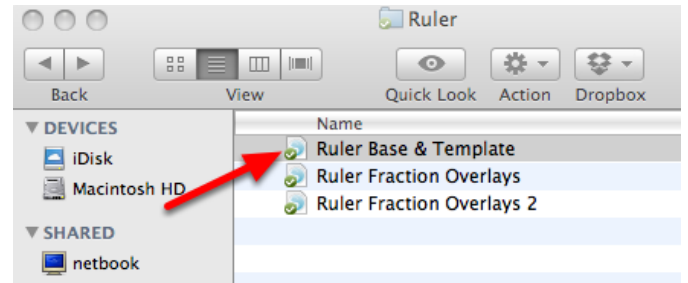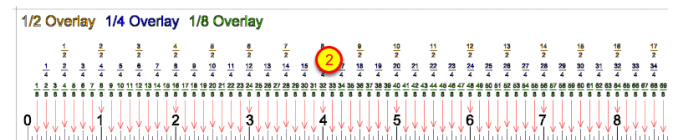
The "Ruler Base & Template" File

The first ruler (marked with a 1) is the base of the fraction ruler. The second ruler (marked with a 2) is a template that can be used for making modifications.
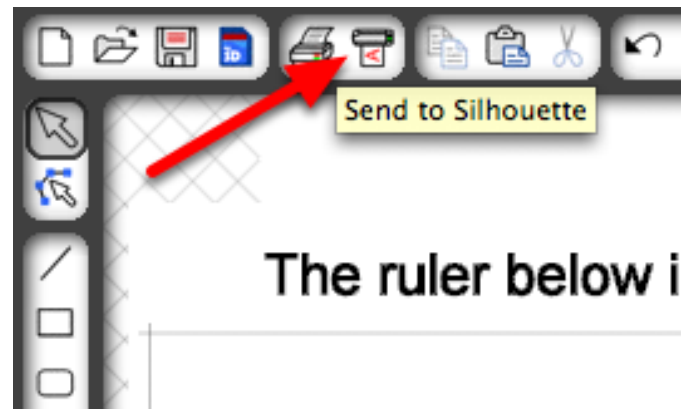
Fabrication Step 1: Send to Silhouette

Make sure that your printer and Silhouette SD is connected to your computer. Click on the "Send to Silhouette" button at the top of the screen. This will initiate the fabrication process that begins with printing.

Fabrication Step 2: Load Card Stock & Print

The base of the fraction ruler is made out of card stock. Load a single sheet of card stock into your printer. Click the "Click here to print" link after you load the card stock into your printer.*

Your computer's print settings can affect the accuracy of the ruler. For example, one inch on the ruler might be smaller if your printer scales or adds a border to the design. Adjusting these settings is computer-specific and not covered in this tutorial.

Print Image   ✕

① You have opted to use Registration Marks for 'Print and Cut' jobs. If you have not already printed your drawing, print it now.

Click here to print.

Click here to skip printing.
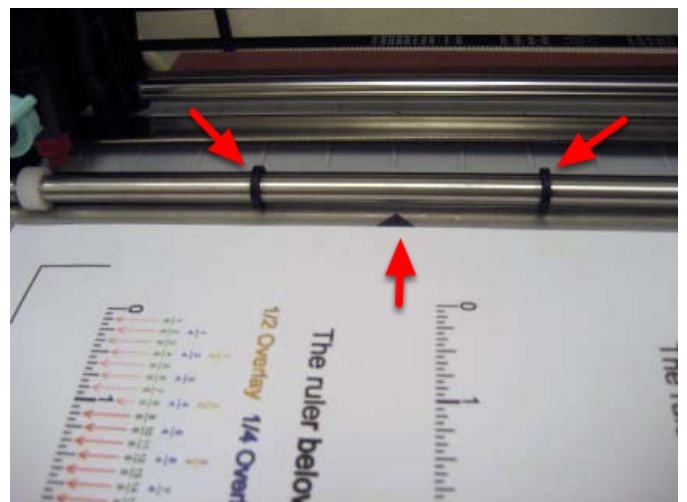
Fabrication Step 3: Carrier Sheet

Place the printed design on the Silhouette carrier sheet (thin, sticky plastic sheet). Make sure that the side of the printed design that has two registration marks* is next to the arrow. Cover up a small portion of the arrow on the carrier sheet as shown.

Registration marks are the small right angles that appear on three corners of the printed design. The Silhouette SD uses an infrared light to scan for registration marks so that it knows what/where to fabricate.
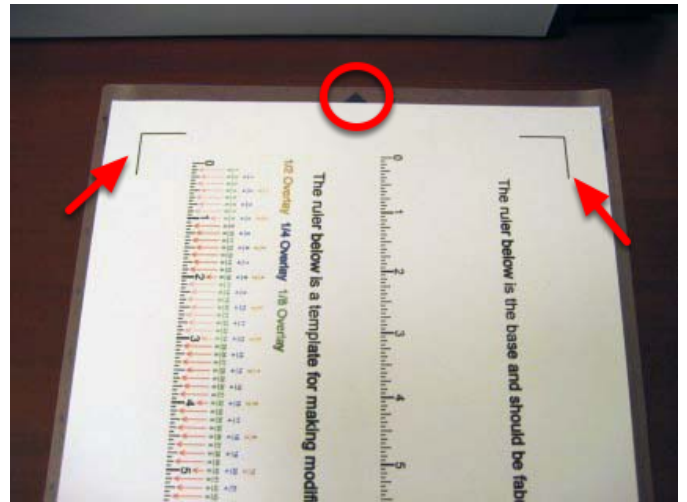
Fabrication Step 4: Position Carrier Sheet

Position the arrow on the carrier sheet between the two black rubber rings until it catches. Hold in place.
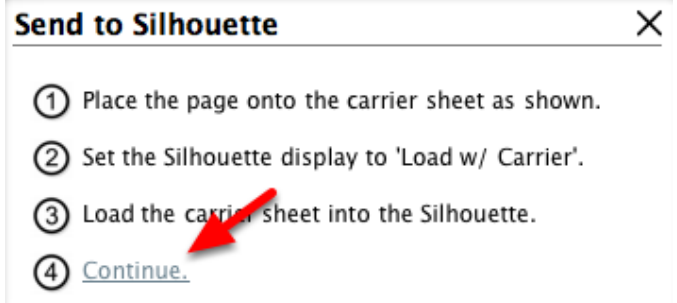
Fabrication Step 5: Load w/ Carrier

While holding the carrier sheet between the two black rubber rings, press the "Enter" button when "Load w/ Carrier" is on the Silhouette SD LCD screen.*

If "Load w/ Carrier" is not on the LCD screen, press either the right or left arrow button to cycle through the menu options.

Fabrication Step 6: Continue

Click on the "Continue" link once the printed design is loaded into the Silhouette SD.

Send to Silhouette ✕

① Place the page onto the carrier sheet as shown.

② Set the Silhouette display to 'Load w/ Carrier'.

③ Load the carrier sheet into the Silhouette.

④ Continue.

Fabrication Step 7: Detect Registration Marks

Click on the "Detect registration marks" link.*

If the Silhouette SD fails to detect the registration marks, reposition the printed design on the carrier sheet and retry the registration mark detection.

Cut Image ✕

① Detect registration marks before cutting?

Detect registration marks

Skip registration mark detection

Fabrication Step 8: Cut Page

Click on the "Cut page" link once the registration marks are detected.

① Detect registration marks before cutting?

Detect registration marks

Skip registration mark detection

Detection of registration marks was successful.

② Current Settings:

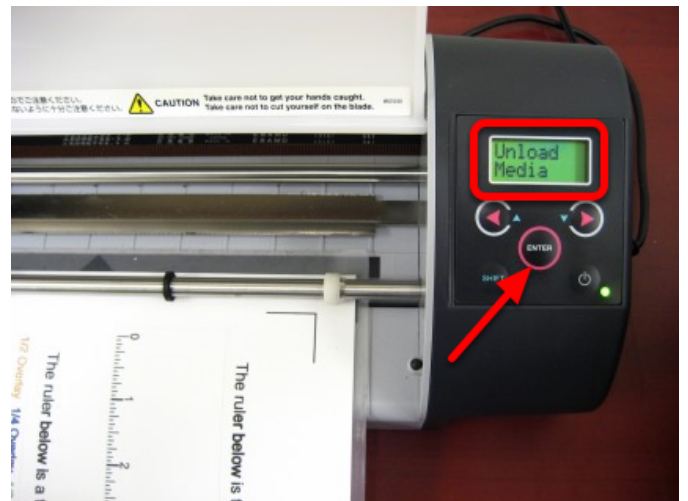Media : **Cardstock**
Speed : **8**
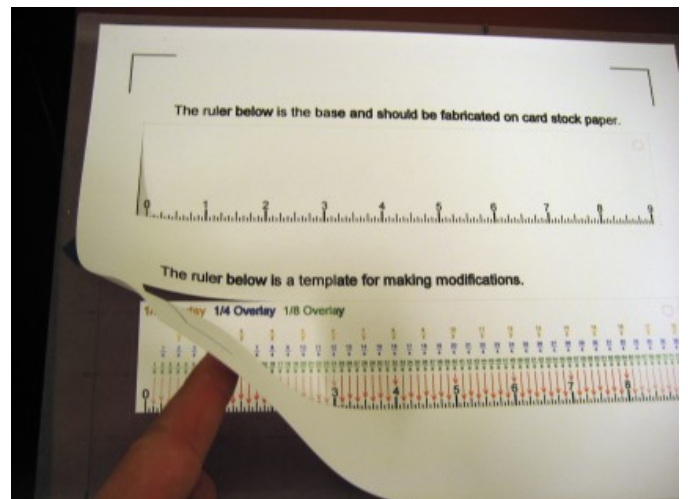Thickness **33**

Change Settings?

③ Cut page

Fabrication Step 9: Unload Media

Press the "Enter" button when the Silhouette SD stops and "Unload Media" appears on the LCD screen.
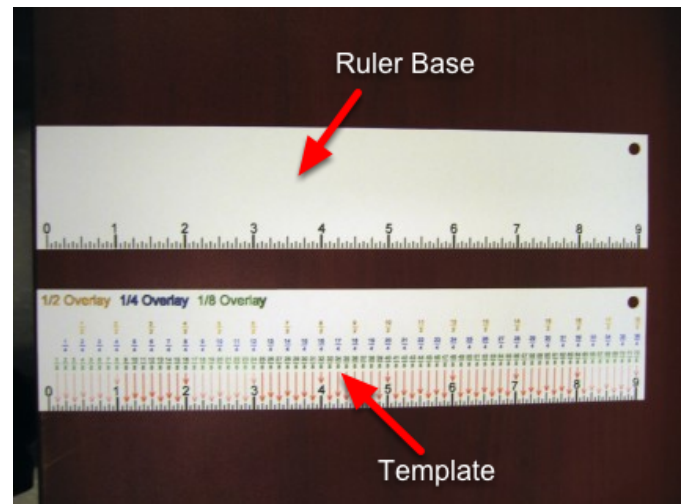

Fabrication Step 10: Remove Ruler Base

Peel the extra card stock from the carrier sheet. Remove the ruler base and template.

Ruler Base

Keep the ruler base and discard the template.

Open "Ruler Fraction Overlays" or "Ruler Fraction Overlays 2"

With the opaque card stock ruler base fabricated, the next step is to fabricate the transparent overlays that will sit on top of the ruler base. There are two overlay variations.

1. Ruler Fraction Overlays- This file contains marked lines and improper fractions.
2. Ruler Fraction Overlays 2- This file contains marked lines that are useful for writing down measurements of objects.*

Choose a fraction overlay variation for use with your ruler base.

*The remainder of this tutorial uses the "Ruler Fraction Overlays 2" file.
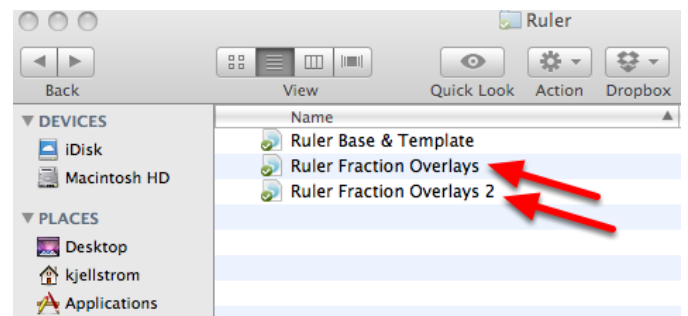
Overlay Fabrication

Fabricating the overlays is exactly the same as the ruler base except for the material that is used: an inkjet transparency. Load one inkjet transparency into your printer before printing the design.

## Overlay Fabrication: Note for Clear Carrier Sheet Users

If you are using a transparent carrier sheet, place a blank sheet of card stock paper down before applying your transparent fraction overlay. Spray the card stock and carrier sheet with some Tack adhesive and then place the transparency on the blank card stock.*

The infrared sensor that looks for the registration marks often fails when both the design and the carrier sheet are transparent.
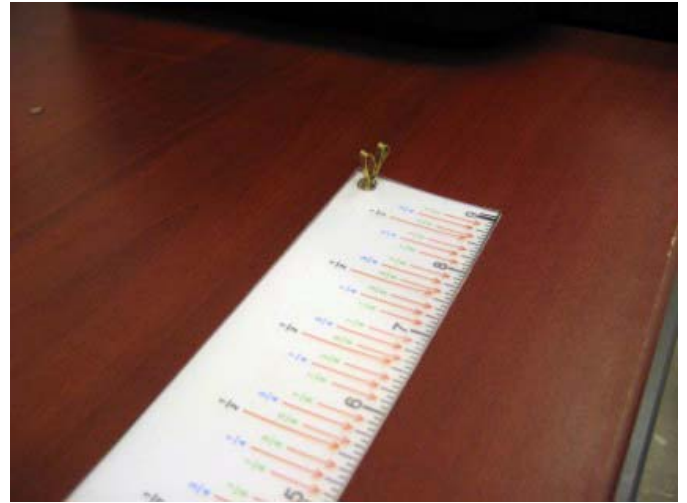

Assembly 1: Ruler Base & Overlays

Lay all of the fabricated pieces out on a table.
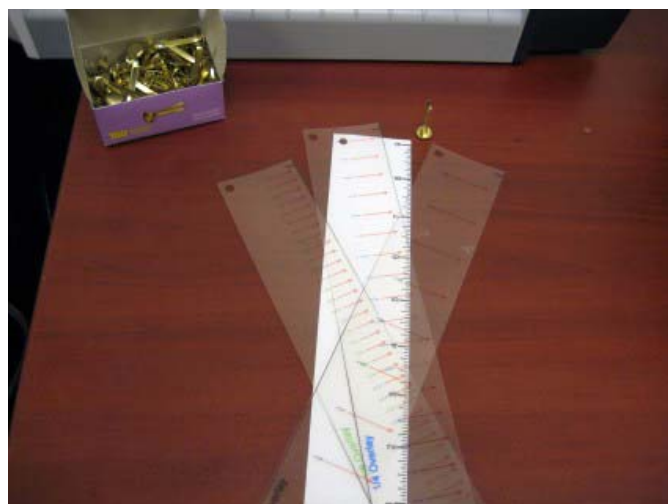
Assembly 2: Brad

Place one brad on its head. Insert the ruler base and then the three fraction overlay transparencies onto the brad. Close the brad.

Completed Fraction Ruler

You now have a completed fraction ruler! Swivel the transparent overlays as needed.