

## How a Book is Made: Signature Sheet Demonstration

*Note: This guide is intended for use with the model signature sheet posted at [www.lynneberry.com/signaturesheet.pdf](http://www.lynneberry.com/signaturesheet.pdf).*

Preparing for this demonstration may seem a bit tedious—but the preparation is worth the outcome. I have never yet presented this demonstration for an audience of the five-to-eight age group, that I have not received an outburst of spontaneous applause! In addition, the demonstration has some mathematical ties, making it a fun cross-curricular project.

First, a bit of background: Books are printed on enormous master sheets called signature sheets. These sheets are printed front and back, eight page of the book on one side, eight pages on the other side. The signature sheet is then folded, bound, and cut, to produce 16 pages of the book.

From my website, you can download a PDF file that will print a model signature sheet, with the numbers 1 to 16. To prepare the signature sheet:

1. Download the PDF.
2. Print page 1 of the PDF. You will need legal (8.5 x 14) paper, which will work in any standard printer. You will probably want to set your printer to "draft" or "low" quality printing; printing that is too dark may show through to the other side, which may be confusing. In addition, prior to printing, you may want to make a small mark on the side of the paper facing UP in the printer's paper feed, at the end of the paper oriented to enter the printer FIRST.
3. After printing page 1, remove the paper and flip it over so that your small mark is now facing DOWN. Place the paper back in the printer's paper feed, keeping the paper oriented so that the small mark will again enter the printer FIRST.
4. Print page 2 of the PDF.
5. If you have done everything right, on one side of the paper, the numbers 10 and 15 should be next to each other at the bottom of the page. On the other side of the paper, the number 9 should be "behind" the number 10, and the number 16 should be "behind" the number 15.

Now for the fun part: the demonstration!

1. I would suggest that you present this demonstration in conjunction with the other components of my "How a Book Is Made" resources (available at [www.lynneberry.com/howabookismade.htm](http://www.lynneberry.com/howabookismade.htm)), specifically, the discussion/demonstration of the printing process. After discussing the printing process, explain that the picture of a single page of a book (used in my "How a Book Is Made" PDF) is a simplification. In fact, each printing plate has EIGHT pages of the book. A large master sheet called a signature sheet is run through the press to print these eight pages. The sheet is then flipped, and run through the press using a second plate, to print an additional EIGHT pages of the book. Ask: What is the total number of book pages now printed on the one signature sheet?
2. Show the sample signature sheet, explaining that this is the first 16 pages of a book that gives the numbers 1 to 16. Ask the students: does this look like a book with 16 pages? Does this look like a book at all? What's wrong with this sheet? (Typical answers: only one sheet, no pages, numbers are not in the right order, some numbers are upside-down.)

3. Ask students: what could we do to this signature sheet to make it into a book of 16 pages? (Typical answers: cut the numbers out and paste into a book, make new printing plates that have the numbers in the right order. You may have to prompt to get to the answer: fold it!)
4. For the folding, your guide will be the number 1, to the right of the number 8, on row two of one side of the paper. For your first fold, fold the paper in half length-wise, folding the 4, 5, 12, and 13 behind, keeping the 1 and 8 facing you. For the second fold, fold the 8 behind the 1, again keeping the 1 facing you. For the third fold, fold the 16 behind the 1, still keeping the 1 facing you. At each fold, you may wish to incorporate some mathematical questions. For example, before folding the first time, ask how many pages of the book you have (two; one sheet, but two pages, in the sense of numbered pages of a book, front and back). After the first fold, count the pages with the students (4). Before folding the paper a second time, ask how many pages a second fold will generate (8). Before folding the paper the third and final time, ask how many pages the third fold will generate (16). Review the increase in number of pages (2, 4, 8, 16), and ask students, what happens to the number of pages each time you fold the paper?
5. Show the students that the pages are now "stuck together," and ask for suggestions about what to do next. Often, students suggest unfolding the paper—which, of course, gets you back where you started! Again, you may have to prompt to get the answers: bind and cut the pages.
6. For the binding, staple along the left side of the "book" (remember that you are still holding the number 1 facing you, so you are stapling along the left side of the page with the number 1). Explain to students that the binding of an actual book is stitched, but that you will use a stapler for your demonstration. You might also wish to remind students at this point (and at other points along the way) that all of these processes—printing, folding, binding, and cutting of pages—are done on machines, in huge quantities, not sheet by sheet by a single person.
7. For the cutting, trim about 1/8" off the top and bottom of the book, to cut away the folds that keep the papers "stuck together."
8. At this point, I ask for votes: who thinks the book will come out right? Who thinks the numbers will still be jumbled up in order, some upside-down and some right-side-up? After taking the vote, page through the book to show the properly formatted pages. (Toward the end, I ask whether any of the cynics would like to change their vote!)
9. Await applause. 😊

Follow-up questions you may wish to discuss:

1. How do you think books of more than 16 pages are made? (multiple signature sheets)
2. Why do you think almost all picture books are exactly 32 pages? ( $16 + 16 = 32$ ; two signature sheets)
3. Compare the size of your finished "book" with a standard book. Show the students an 8.5 x 14 sheet of paper, the size that generated your mini-book. Ask: how big would the starting signature sheet need to be, to generate a standard-size book? (huge!)