

# CADETTE BOOK ARTIST BADGE – MEETING 1

**Badge Purpose:** When you’ve earned this badge, you’ll know how to make different kinds of books.

**Activity Plan Length:** 1.5 hours

Time	Activity	Materials Needed
5 minutes	Getting Started <ul style="list-style-type: none"> <li>Begin the meeting by reciting the Girl Scout Promise + Law.</li> </ul>	<input type="checkbox"/> (Optional) Girl Scout Promise and Law poster
15 minutes	Parts of a Book <ul style="list-style-type: none"> <li>Explore the differences and similarities in a variety of books and label the many parts of a book.</li> </ul>	<input type="checkbox"/> Three books to examine (one older or antique, children’s board book, mass market paperback book) <input type="checkbox"/> Three discarded hardcover books <input type="checkbox"/> “Parts of the Book” list <input type="checkbox"/> Sticky notes <input type="checkbox"/> Pencils
15 minutes	Bookbinding Through the Years <ul style="list-style-type: none"> <li>Look at the history of bookbinding.</li> </ul>	<input type="checkbox"/> Phone or computer with internet access
15 minutes	Ah, That Old Book Smell <ul style="list-style-type: none"> <li>Enjoy a healthy snack and discuss the science of “old book” smells.</li> </ul>	<input type="checkbox"/> Healthy snack <input type="checkbox"/> “Old Book Smell” infographic
35 minutes	Paper Making <ul style="list-style-type: none"> <li>Make homemade paper.</li> </ul>	<input type="checkbox"/> Picture frames (8” x 10” or smaller, depending on your preferred size of final paper product) <input type="checkbox"/> Fiberglass screen material <input type="checkbox"/> Staple gun <input type="checkbox"/> Paper from recycling bin <input type="checkbox"/> Water <input type="checkbox"/> Tub or bowl <input type="checkbox"/> Blender <input type="checkbox"/> Shallow basin <input type="checkbox"/> Cooling rack <input type="checkbox"/> Towel or sponge <input type="checkbox"/> (Optional) Iron



5 minutes	Wrapping Up	<input type="checkbox"/> (Optional) Make New Friends lyrics poster
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# Getting Started

Time: 5 minutes

Materials Needed: (Optional) Girl Scout Promise and Law poster

Welcome everyone to the meeting, recite the Girl Scout Promise and Law.

# Activity #1: Parts of a Book

Time: 15 minutes

Badge Connection: Step 1 – Explore the art of bookbinding and Step 2 – Get familiar with the insides of a book

Materials Needed: Three books to examine (one older or antique, children’s board book, mass market paperback book); three discarded hardcover books; “Parts of the Book” list; sticky notes; pencils

Prep Needed:

- Print out the “Parts of the Book” list (at the end of the activity plan).
1. Split up into three groups. Hand each group a book to examine, a discarded book, a “Parts of the Book” list, a set of sticky notes, and a pencil.
  2. First, compare the different parts of the two books. What’s similar? What’s different?
  3. Then, work together as a group to take apart the discarded book. As you take it apart, refer to the “Parts of the Book” list and label each part with a sticky note.

# Activity #2: Bookbinding Through the Years

Time: 15 minutes

Badge Connection: Step 1 – Explore the art of bookbinding

Materials Needed: Phone or computer with internet access

1. The earliest version of the book as we know it today was developed by the Romans—these books were known as codices (singular: codex). Before they were developed, people would share information using clay tablets, animal skins, or papyrus scrolls.
2. Look into the history of bookbinding and how it has changed over time: [bit.ly/historyofbookbinding](http://bit.ly/historyofbookbinding)

# Activity #3: Ah, That Old Book Smell

Time: 15 minutes

Badge Connection: Links to multiple steps

Materials Needed: Healthy snack; “Old Book Smell” infographic

Prep Needed:

- Print out the “Old Book Smell” infographic.
1. While enjoying a healthy snack, discuss the interesting science of old books:
    - How many of you have been to a used bookstore or antique store that sells old books?
    - Did you notice that the old books have a particular smell? *You can also pass around the old book from Activity #1 if everyone wants to take a sniff!*
    - What “notes” or aromas can you pinpoint in the smell? For instance, does it smell woody or grassy?
    - Do new books have a different scent than old books?



- Share the infographic with everyone. Now that you know what compounds make up that “old book” smell, can you detect those specific scents?

## Activity #4: Paper Making

Time: 35 minutes

Badge Connection: Step 2 – Get familiar with the insides of a book and Step 5 – Focus on style

Materials Needed: Picture frames (8” x 10” or smaller, depending on your preferred size of final paper product); fiberglass screen material; staple gun; paper from recycling bin; water; tub or bowl; blender; shallow basin; cooling rack; towel or sponge; (optional) iron

Prep Needed:

- You can find fiberglass screen material at hardware stores.
  - Your paper needs to soak for a few hours (preferably overnight). Prep the paper the night before your meeting: Collect paper from your recycling bin. Tear the paper into small pieces and soak them in a tub or bowl of water for a few hours or overnight.
1. Now when we want to read a book, we can download it on our e-reader, check it out from the library, or buy it from a bookstore. But, in the past, books were incredibly expensive and time-consuming to produce, so they were mostly owned and circulated only among the wealthy.
  2. The development of paper and the printing press revolutionized the book world. Try making your own homemade paper:
    - **Create your mold and deckle.** You’ll need two picture frames for each mold and deckle. Remove the glass from both picture frames. Cut a piece of screen about  $\frac{1}{2}$ ” smaller than the full frame size. Use the staple gun to staple the screen to the frame. Make sure the screen is tight across the frame and not sagging in the middle. This is the mold. The other frame will be the deckle.
    - **Make the pulp.** Fill a blender  $\frac{3}{4}$  full with water, then add a handful or two of your wet paper (the paper you soaked overnight). Don’t add too much—if your blender is on the weaker side, you could burn out the motor. Blend until you can’t see large pieces. If the pulp looks really thick, add water to thin it out. Pour the pulp into a shallow basin, then add some more water; the higher the pulp-to-water ratio, the thicker your final sheet of paper will be.
    - **Make the paper.** Give the pulp a good stir. Hold the mold, screen-side up, and put the deckle on top of the mold (the frames should line up). Grasp tightly and lower the mold and deckle vertically into the basin, then immediately bring it up to a horizontal position and lift straight up. The pulp should be covering the screen. Make sure you don’t have too much pulp on the screen—it should be a thin, even layer. Set the frame on the cooling rack to drip-dry for a few minutes. Remove the deckle and turn the mold over onto a towel so that the pulp is directly touching the towel. Use another towel or sponge to blot away as much water as possible. Then, gently remove the mold. Leave the paper on the towel to dry overnight (don’t touch it!). If it’s still not dry the following day, put it between two towels and iron it on a low setting.
  3. You can use this handmade paper for the inside pages of your book, or make it fancier to create endpapers (these are the folded sheets of paper at the beginning or end of a book—one half of the paper is pasted to the inside of the book’s front or back cover, and the other half pasted to the first or last page).
  4. NOTE: Everyone should save one piece of handmade paper to create a notebook in the next meeting.

## Wrapping Up

Time: 5 minutes

Materials Needed: (Optional) Make New Friends song lyrics poster

Close the meeting by singing Make New Friends and doing a friendship circle.



## More to Explore

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- Field Trip Ideas:
  - Visit a book repair shop to see the different methods and ways they bind and restore books.
  - Visit the Minnesota Center for Book Arts ([mnbookarts.org](http://mnbookarts.org)) or find a local book arts class to learn more about the bookbinding craft.
- Speaker Ideas:
  - Invite a book artist to your meeting to talk about how they got involved in book arts and share some tips on creating your own books.
  - Invite a graphic designer to your meeting to talk about the creative process, from idea to final product.



# Parts of a Book

Term	Definition
Spine	The backbone, or back, of the book where the title (if present) is displayed when it is standing upright on a shelf.
Joint	Where the spine joins the sides of the book (exterior). Sometimes referred to as the gutter.
Board	The front and back covers of a hardcover book, today typically a cardboard base covered with cloth, paper, or leather.
Hinge	Where the sides of the binding meet the spine (interior) of a book.
Gutter	Inner margins of two facing pages. Can also refer to the outer indentation that is created by the joining of the boards and spine.
Endpaper	Front and rear blank pages added by the binder.
Jacket	Separate paper covering for the book. Also referred to as the dust jacket or dust wrapper.
Signature	A printed sheet of paper, folded to size and ready for sewing.
Headband	Band of silk or cotton affixed to signatures when bound together to form a text block for strength or, more often, decoration of the spine ends.
Gilt Edge	Page edges cut smooth and gilded (covered with a thin layer of gold leaf).
Deckle Edge	A “deckle edge” is left on hand-made paper when the pulp settles at the edge of the frame. When the pages of a book are printed on such hand-made paper, gathered and bound, but left untrimmed, the book is said to have “deckled edges.” Sometimes it is simulated by binders on regular paper.

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Endpaper	Front and rear blank pages added by the binder.
Jacket	Separate paper covering for the book. Also referred to as the dust jacket or dustwrapper.
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Definitions from: [ioba.org](http://ioba.org)





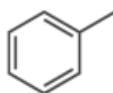
## Aroma Chemistry

# THE AROMA OF BOOKS

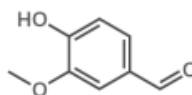


Books, both old and new, give off several hundred volatile compounds, or VOCs. These compounds have a variety of origins - some are products of degradation, whilst others originate from the type of paper, binding adhesive and printing ink used in the book's manufacture.

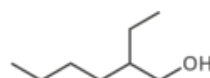
### OLD BOOKS



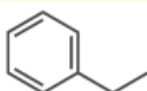
**TOLUENE**  
Sweet odour



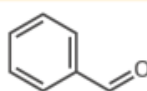
**VANILLIN**  
Vanilla-like



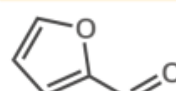
**2-ETHYL HEXANOL**  
Slightly floral



**ETHYL BENZENE**  
Sweet odour



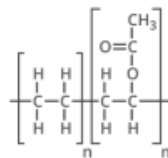
**BENZALDEHYDE**  
Almond-like



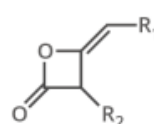
**FURFURAL**  
Almond-like

Over time, gradual breakdown of cellulose and lignin in paper produces a large number of organic compounds. Type of paper and age of the book affect the compounds produced and their concentrations; for instance, very old books contain more lignin than modern books.

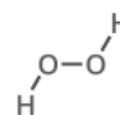
### NEW BOOKS



**VINYL ACETATE ETHYLENE**



**ALKYL KETENE DIMER**  
(aids water resistance)



**HYDROGEN PEROXIDE**  
(bleaching agent)

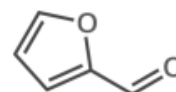
### ADHESIVES

### PAPER & INKS

The aroma of new books is highly variable; the compounds that cause it originate from the adhesive, ink, and the chemicals used for paper treatment.

Modern binding adhesives are often based on co-polymers, such as vinyl acetate ethylene. In the paper-making process, paper is treated with a variety of chemicals, to achieve desired properties. Whilst some of these chemicals are odourless themselves, they can react & contribute to release of VOCs. Petrochemicals used as solvents for inks can also be contributors.

In short, no single chemical causes the odour of books. It's a result of a complex mix of volatile chemicals produced by chemicals used in their manufacture, as well as the gradual degradation of the chemicals within the paper. Some of the compounds produced, such as furfural, can even be used to gauge the age and condition of the book in question.



**FURFURAL**



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