



## How People Make Things

Rich Task Activity

## Assembly

This engaging rich task has been developed by the Education Department at the Children's Museum of Pittsburgh. Rich tasks are open-ended investigations designed for you to work alone or in a group and may be conducted during, before or after your visit to How People Make Things to enhance your experience.

### Bookmaking

**Assembly** is a part of manufacturing that completes a product before it is shipped. Assembly is when **two or more parts are fastened together to make a new shape**. Most manufactured products are made from several parts that are joined together to form a complete product.

In this activity, you will assemble components to make a book and use a simple binding process similar to the way commercial books are manufactured.

#### Suggested Materials

- 4 8 ½"x11" sheets of paper
- 2 5 ½"x9" pieces of matte board
- Piece of thin yarn or string, 30" length
- Large plastic quilting needle
- Glue stick
- Single hole punch
- Ruler
- Construction paper

#### Task Tools

- Pattern (see Rich Task Tool Sheet)
- An inquiring mind!

#### Procedures/Investigation

- Use the pattern to trace the guidelines and dots onto a sheet of 8 ½"x11" paper.
- Stack the page you've traced on top of the other three sheets and align the edges.
- Fold all four sheets in half along the dotted line, leaving the guidelines and dots on the OUTSIDE of the fold.
- Use the hole punch to put five holes in all four sheets of paper along the dots. It's important to keep the sheets aligned so your holes are all in the same place on each sheet.
- Open the folded paper stack and refold along the two solid lines. Use the ruler to make crisp, smooth edges. Your book should now have a thin spine, along which your holes are punched.
- Thread the quilting needle with the yarn or string.
- Begin at the inside top of the book's spine, and loop the needle and string through the first hole, down the spine, and back through the second hole. Your needle should now be inside the book. Repeat this process so you've created a double stitch between the first two holes. Your needle should once again be inside the book.
- Continue binding down the spine by stitching through the third and fourth holes the same way. You will have a double stitch through holes one and two visible from the outside, and three and four also visible from the outside, but the single stitch between holes two and three will only be visible from the inside of your binding.
- By alternating in this manner along the spine, you will have a double stitch in between every other hole on the outside on the spine, and a single stitch in between each hole on the inside.
- When you reach the bottom hole, loop the stitch around the bottom edge of the spine and back through the hole twice before knotting the yarn and cutting off the excess.
- Use the glue stick to put a thin layer of glue on the top page of your bound book.



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- Carefully place one piece of matte board on the glue for a cover. Align and center the edge of the matte board with the fold on the left side, and let the extra hang over the top, bottom, and right sides.
  - Repeat with the second piece of matte board for the back cover.
  - Use construction paper to decorate the matte board and personalize your book's cover.

### Teacher Hints

- Precut the paper for your students to simplify the assembly process.
- Make multiple copies of the Task Tool Sheet so each student has a pattern
- Review the following definitions:
  - **Assembly** is a part of manufacturing that completes a product before it is shipped. Assembly is when two or more parts are fastened together to make a new shape.
  - **Temporary assembly** is when fasteners are used that can be easily put together, taken apart or adjusted, usually by hand. These types of fasteners are screws, bolts, staples, etc.
  - An **assembly line** is used in manufacturing where interchangeable parts are added to a product in a sequential manner to create a finished product.

### Questions to Think About

- How is the book you've made similar to commercially manufactured books? How is it different?
- How many different objects did you use to assemble your book? Was that more than you expected? Why is that? How does that change the way you view other assembled products around you?
- What could you do to make the assembly of your book faster or more efficient? How would you modify the assembly of your book with interchangeable parts to be completed on an assembly line?

### Ways to Extend Your Investigation

- Develop a bookmaking assembly line. Provide students with all the essential components so they can delegate the assembly among multiple participants to improve efficiency.
- Investigate other binding techniques, including Japanese and Coptic stitching.

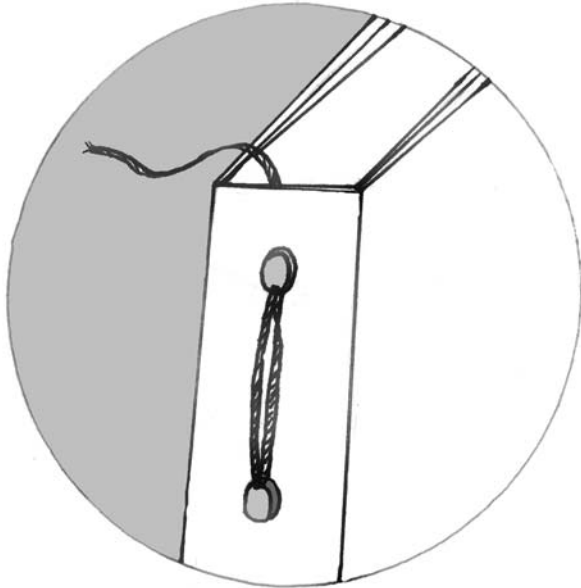
### International Technology Education Association Standards

- ITEA STL The Nature of Technology – 3. Understanding the relationship between technologies and the connection between technology and other fields of study.
- ITEA STL Technology and Society – 6. Understanding the role of society in the development and use of technology.
- ITEA STL Technology and Society – 7. Understanding the influence of technology on history.
- ITEA STL Design – 9. Understanding troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- ITEA STL Abilities for a Technological World – 13. Assess the impact of products and systems.
- ITEA STL The Designed World – 19. Understanding and selection and use of manufacturing technologies.

### National Academic Standards

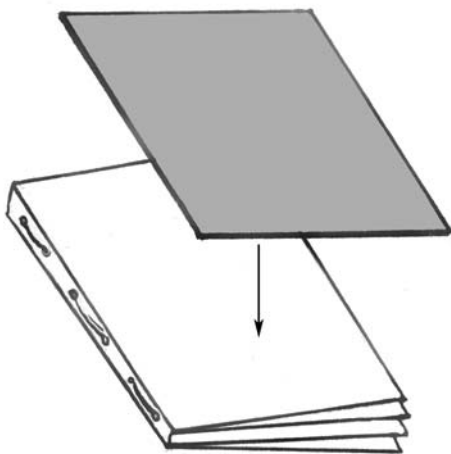
- NA-VA.K-4.1 Understanding and Applying Media, Techniques, and Processes.
- NA-VA.K-4.2 Using knowledge of Structures and Functions
- NA-VA.K-4.4 Making connections between visual art and other disciplines.
  
- NSS-US.H.K-4.3 The History of the United States: Demographic Principles and values and the People from many cultures who contributed to its cultural, economic, and political heritage.

### Bookmaking



Begin at the inside top of the book's spine, and loop the needle and string through the first hole, down the spine, and back through the second hole.

Repeat this process so you've created a double stitch between the first two holes. Your needle should once again be inside the book.



Carefully place one piece of matte board on the glue for a cover.

Align and center the edge of the matte board with the fold on the left side, and let the extra hang over the top, bottom, and right sides.

Use the pattern on the following page to align your folds and create the spine.

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