



How People Make Things

Rich Task Activity

Cutting

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.

Cutting Puzzles

Cutting is when material is removed to form a new shape. It is a very familiar process to children. Cutting paper with scissors is a process that children do frequently at school and home. Cutting is an important manufacturing process that creates multiple identical parts for use in assembly. In manufacturing, cutting is done on a large scale with an industrial die-cut machine. A **die** is a specialized tool used in manufacturing industries to cut, shape and form a wide variety of products.

In this activity, you will use repetitive cutting to create multiple parts for a puzzle.

Suggested Materials

- Die-cut machine
- Puzzle die (Provided in HPMT trunk)
- Crayons, markers, pencils and erasers
- Thin cardboard sheets
- Plastic re-sealable bag
- Commercially-made puzzles

Task Tools

- An inquiring mind!

Procedures/Investigation

- Take a close look at the commercially made puzzles. Think about the steps taken to make the puzzle. Record your observations on the Rich Task Tool Sheet.
- Identify the specific steps and place them in order:
 - Designing the layout
 - Making the background
 - Cutting the puzzles
 - Then, reassembling them
- Use the puzzle die in the die-cut machine to create a puzzle template.
- Decorate your puzzle template with crayons or markers.
- Pull apart the individual puzzle pieces. Share your puzzle with a friend. Can they reassemble the pieces?
- Place the finished pieces in a re-sealable plastic bag

Teacher Hints

- Students should appreciate that each individual piece of the puzzle is essential to create the whole.
- Encourage students to count how many puzzle pieces they have and write the number on the outside of the bag with their name.
- Review with students how, in manufacturing, people use machines to cut material. By using machines, people can cut large amounts of material at one time. Sometimes **die cutters** are used. Die cutters work like cookie cutters to cut exact shapes over and over again.

Questions to Think About

- How is the puzzle die-cut similar to manufacturing dies? How is the cookie cutter similar to an industrial repetitive cutter?
- How would it affect manufacturing if workers could only cut one item out at a time?



Ways to Extend Your Investigation

- Try cutting the puzzle pieces by hand, with scissors. Are you more or less efficient that way? How does the end result differ from your die-cut pieces?
- Look for a puzzle piece cookie cutter at craft or hobby stores to create identical puzzle cookies.

Safety

- **Use the die-cut machine oven with adult supervision only.**

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.

- NM-GEO.3-5.3 Apply Transformations and use symmetry to analyze mathematical situations.
- NM-GEO.3-5.4 Use visualization, spatial reasoning, and geometric modeling to solve problems.