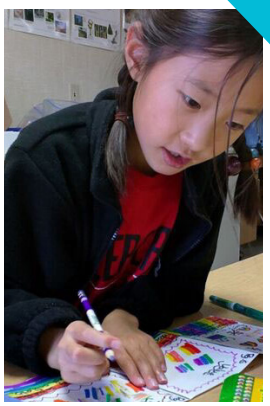
Cut It Out

Math As a Visible Language



Introduction

What if we intentionally look for many right ways instead of focusing on what is wrong? What if we invite children to embrace decisions that may have seemed wrong and learn from their mistakes? How could we help children realize that something discarded might be recycled and turned into something else? This lesson helps children build flexible-thinking skills as well as math and art knowledge as they create a scrap paper collage and address questions such as: *How many ways could we...?, How else could this be used?, and As an artist how could you create something else from this?*

LEARNING OBJECTIVES

Children will:

- cut or tear colorful paper into many shapes;
- explore the part-to-whole math concepts by arranging and rearranging combinations of cut-out shapes;
- make choices about what to create by combining bits and pieces into a collage that is either a realistic or abstract image; and
- present their work including their decision-making process.

Vocabulary

shapes	abstract	arrange	symmetry
free form	realistic	combine	

Essential Questions

- How do artists get ideas? How could looking at shapes help to inform artistic decisions?
- What decisions do artists need to make before and while they create?
- In what ways do artists use both math and art elements to inform their work?
- How can creating art help build understanding of math concepts?

Guiding Questions

- How could using math and art vocabulary while looking around and talking about what is seen help build connections between the two subjects?
- How could the differences and similarities between realistic and abstract art be described?
- In what productive ways could discarded scraps and other rejected ideas be used in the art-making process?
- How does an artist know when an artwork is completed?

Supplies

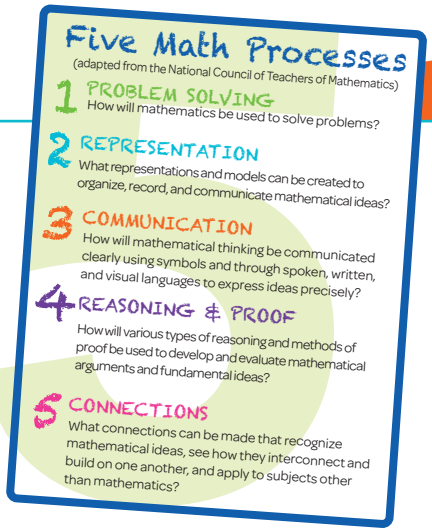
- Recycled cardboard (such as the inside of a cereal box) or firm paper
- Colorful paper scraps (such as recycled gift wrap or construction paper)
- Blunt-Tip Scissors
- Glue
- Optional: Decorative items such as yarn, buttons, beads, or ribbon

Prepare

Select a workspace where children can arrange and rearrange the paper pieces before gluing the collage together.

Applying Math Processes to this Project

Look closely at the art on this page and relate it to the math processes.



PROBLEM SOLVING: What problems were encountered and what many different solutions to them were explored when creating this collage?

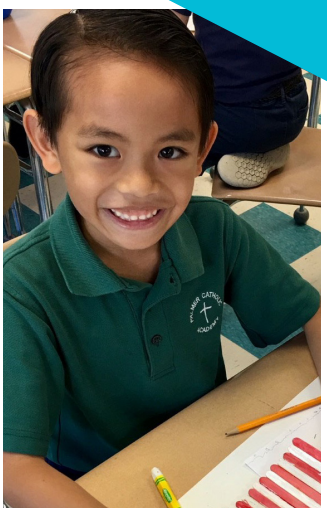
REPRESENTATION: How can paper pieces be arranged and rearranged to create different math representations and models?

COMMUNICATION: What art and math vocabulary can be used to discuss *part and whole, proportion,* and *pattern*?

REASONING & PROOF: What is the reasoning behind the decisions that were made?

CONNECTIONS: How can applying concepts shared by art and math to create a cut-paper image apply to understandings of part and whole within and outside of mathematics?

Have children follow these steps to create their collages.



CREATE

- Cut or tear paper into different shapes of various sizes, colors, and contours. These could be free form, geometric shapes, stripes, or zig-zags.
- Arrange and rearrange the pieces to demonstrate the relationships of the shapes to one another using words such as *over, under, behind, above, below, to the left,* and *to the right*.
- Use the **Five Math Processes** questions to discuss what ideas are being explored, revised, and finalized.
- Create the final collage by gluing the shapes and patterns onto the cardboard. Discuss the math and art concepts demonstrated by the collage that could include *balance, pattern, mid-point, display,* and *symmetry*.

PRESENT

- Prepare a verbal and visual presentation that explains the process used to create the final collage. How can the decision-making process be explained using math and art vocabulary?
- Consider the intended audience(s) for the presentation. If more than one presentation is planned how would you customize each one to meet the needs of a different audience?

RESPOND

- View others' art or serve as an audience for others' presentations.
- Use the **Five Math Processes** questions to organize responses and help find the math and art connections.

CONNECT

- Think about how this lesson applies to what you observe at home or in your community. What collage-like designs are seen? How are geometric shapes combined so the parts form a larger whole?
- What are some real-world examples of how this process helps determine the designs of clothing, décor, stationery, and toys? What others uses are possible?

For Younger Children

- Have children use child-safe scissors for cutting or have them tear paper. Collages made from torn paper have a beautiful, organic aesthetic.
- Young children might enjoy selecting a theme such as *animals, buildings,* or *my family* before arranging their shapes into a collage design. Help them combine geometric shapes such as circles, ovals, squares, rectangles, and triangles to form animals, people, or objects.

For Older Children

The art technique of making shape collages can be applied to cross-curricular topics children are studying. For example, children can research big ideas in science or social studies and demonstrate what they have learned by creating an abstract collage that shows patterns, relationships, priorities, timelines, and perspectives. Or as an in-depth geometry lesson, children could create a collage that shows how they calculate perimeter and area. Children will generate additional ways to create collages that fit their ideas and interests.

Helina Y., Grade 6

Child Reflections

- Which art elements and math concepts were explored while creating the shapes collage?
- How did children decide when the collages were complete?
- What other ways can cut paper collages be used as final projects to show what was learned?

Adult Reflections

- How could this collage project be adapted to encompass other curriculum concepts and skills?
- Which objectives, essential questions, and guiding questions were most helpful?
- How were children able to share their work and ideas? What support was needed?

Standards and Skill Development

Educational standards outline what children should know and be able to do. These recommendations guide what schools focus on as children move through a progression of skills and knowledge. Standards-based activities evolve as children's interests, passion, and curiosity help guide the lesson.

This lesson addresses the following educational standards:

LANGUAGE ARTS

- Integrate and evaluate content presented in diverse media and formats, including visually, quantitatively, and orally.
- Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

MATHEMATICS

- Make sense of problems and persevere in solving them.
- Create models that demonstrate math concepts.
- Use shapes and their attributes to demonstrate math concepts.
- Analyze, compare, create, and compose shapes.

SCIENCE

- Explore similarities and differences in patterns. Use them to sort, classify, communicate, and analyze simple rates of change for natural phenomena and designed products.
- Use relative scales that allow objects and events to be compared and described (e.g., bigger and smaller, hotter and colder, faster and slower).

VISUAL ARTS

- Generate and conceptualize artistic ideas and work.
- Engage in exploration and imaginative play with materials.
- Demonstrate an understanding of the safe and appropriate use of materials, tools, and equipment for a variety of artistic processes.
- Use art vocabulary to describe choices while creating art.