

Square Shapes
Square Numbers
Square Art

Free Sample



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Hello Teachers,

Thank you for downloading this handout. After decades of teaching, now I am sharing some of the activities I designed for my students and some new ones as well.

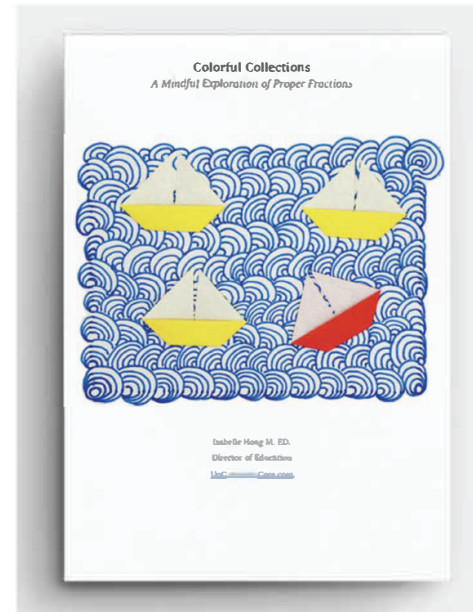
Visit UnCommon-Core.com and sign up for your free copy of *Colorful Collections: A Mindful Exploration of Proper Fractions*. You will also receive Wednesday morning emails with teacher tips, educational ideas, or free copies of products I'm making. You get to use them for free and I get the benefit of your comments and suggestions!

Also, visit my Teachers Pay Teachers store UnCommon-Core dot com.

Thank you again. All the best,

Isabelle

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Square Shapes, Square Numbers, and Square Art - Teacher Tips

- Share images of Frank Stella's early artwork with your students. Fill a shelf in your class library with art and math books.
- Connect with the art teacher if possible.
- Once your students can differentiate cool colors from warm colors, talk about how cool colors seem to recede back from the picture plane, whereas warm colors seem to pop forward toward the viewer.
- Begin simply: give your students the **Square Design Based on Art by Frank Stella** handout. Invite them to decorate the squares using colors and patterns that Frank Stella might have used. Alternatively, let them create art like Frank Stella's on a piece of construction paper or cardstock. They could use highlighters, pastels, crayons, markers, collage, washi tape, chenille sticks, or anything else that comes to mind. (p. 5-6)
- If your students are familiar with finding factors of numbers, dive into the **Factors of Square Numbers** activity. Students with little or no experience finding factors will need some guided practice before they can complete the activity themselves. (p. 7-9 and 21)
- Students will need preparation and support while completing the **Concentric Square Designs Based on Art by Frank Stella** activity. They will also need copies of the activity sheet and the directions. (p. 10-13 and 14-19)
- When the activities have been completed, invite your students to reflect on the experience and record the big ideas that they recall. Start with a class discussion. Then transition to students writing their own reflections.
- Share student art and reflections on a bulletin board or in the hall for everyone to enjoy.

I hope you enjoy this free sample. The complete collection of activities will be on sale in my TPT store as soon as I can make that happen. Please sign up for Wednesday morning emails to receive more freebies, information about my TPT store, and all sorts of stuff connected to teaching math. All the best!

Isabelle

This is an exploration of square shapes, square numbers, and square art by Frank Stella.

Academic Learning Goals

MATH:

- Explore square shapes and square numbers.
- Use Frank Stella's Concentric Square paintings and similar paintings by other artists as a source of inspiration, questions, and ideas.
- Find patterns when looking at Frank Stella's art in colors, tone, and so on.
- Investigate interesting patterns connected with square numbers or multiplication.
- Use academic vocabulary in conversations and writing about these activities.
- Become more familiar with square numbers and their properties (number sense).
- Recognize that some patterns are useful and interesting whereas others are just interesting.
- Question the structure of square numbers based on patterns discovered and investigated.

ART:

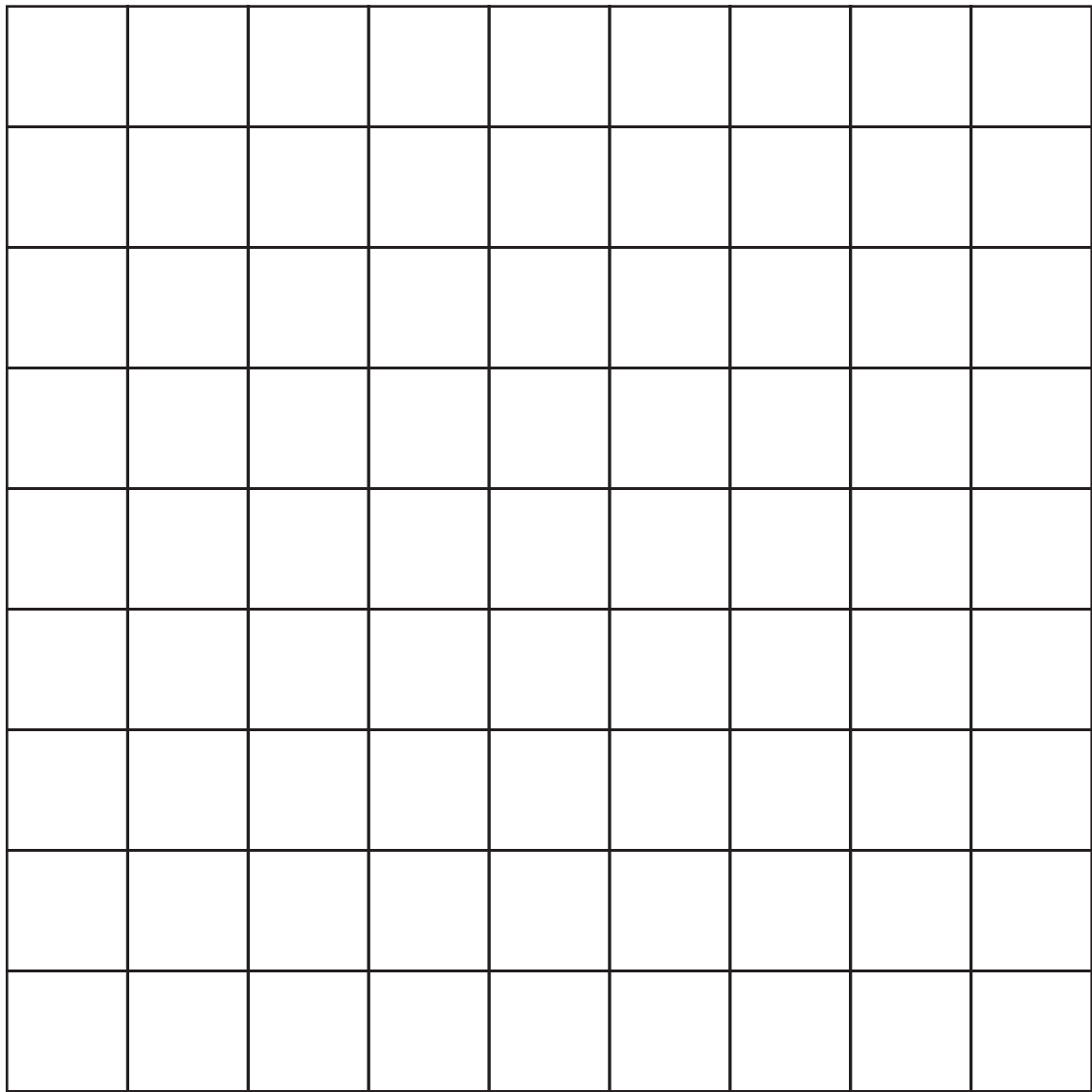
- Explore warm and cool colors and how they seem closer or farther away.
- Discover and explore some early work of Frank Stella.
- Connect art and math, using each to support the other during the investigation of square shapes, square numbers, and square art: for example: think about how Frank Stella used grid paper and planning to create, or use specific artwork to inspire ideas about where to look for numerical patterns in square numbers or shapes or grids.

The purpose of these activities is for students to:

- Collaborate with peers in the context of discovering and investigating mathematical patterns in square numbers.
- Ask questions, share ideas, discover the joy of finding interesting patterns and connections whether or not they are 'useful.'
- Connect art and math as different methods for exploring, sharing, and understanding information about shape, pattern, amount, proportion, space, and worthwhile ideas.
- Use artistic and mathematical vocabulary words meaningfully within the context of questioning or sharing ideas.
- Participate in an engaging and unique artistic mathematical experience.
- Gain a new perspective on what it means to 'do math' or 'make art.'

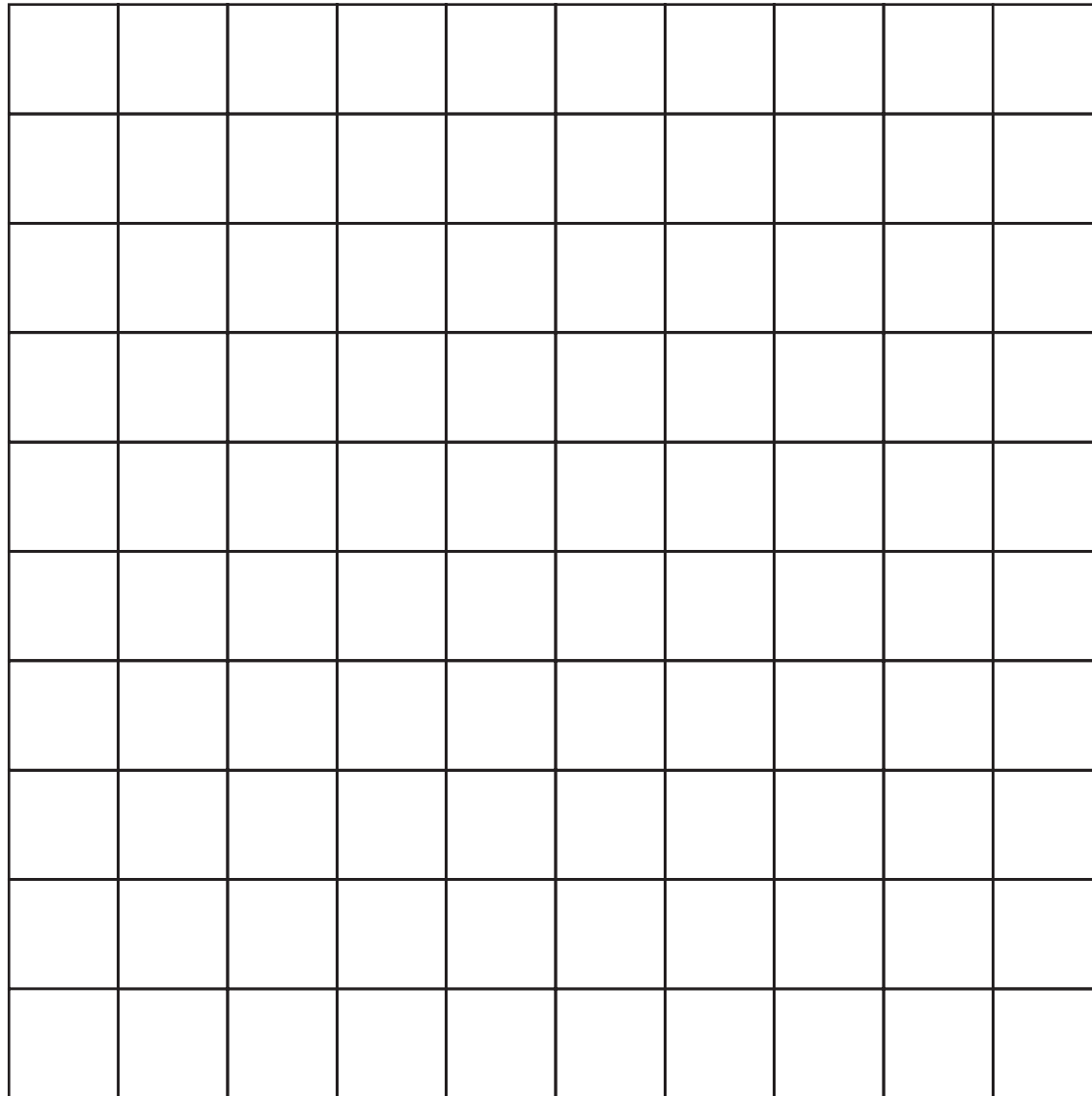
Square Design Based on Art by Frank Stella

Name



Square Design Based on Art by Frank Stella

Name



name

Factors of Square Numbers

Find all the factors of a square number.

Factors of

List each factor once. Share questions, puzzles, or comments about factors of square numbers.

name

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Find all the factors of a square number.

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name

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Factors of Square Numbers

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List each factor once. Share questions, puzzles, or comments about factors of square numbers.

Factors of Square Numbers

1 1×1

4 2×2

9 3×3

16 2×8 4×4

25 5×5

36 2×18 3×12 4×9 6×6

49 7×7

64 2×32 4×16 8×8

81 3×27 9×9

100 2×50 4×25 5×20 10×10

121 11×11

144 2×72 3×48 4×36 6×24 8×18 9×16 12×12

169 13×13

196 2×98 4×49 7×28 14×14

225 3×75 5×45 9×25 15×15

256 2×128 4×64 8×32 16×16

289 17×17

324 2×162 3×108 4×81 6×54 9×36 12×27 18×18

361 19×19

400 2×200 4×100 5×80 8×50 10×40 16×25 20×20

■ Square numbers have a set of square factors; one factor that is multiplied by itself. Only square numbers have an odd number of factors.

■ Square numbers that are even have four as a factor. They are a product of an even number times itself. Each of those roots has two as a factor. Two times itself is four.

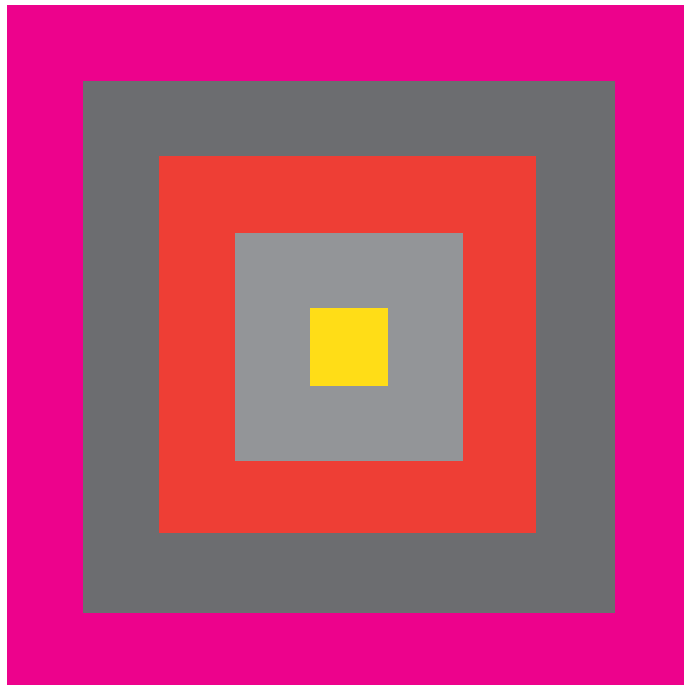
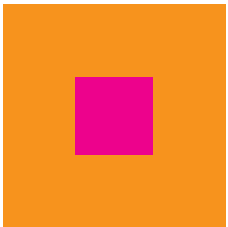
□ Every number has one and itself as a factor.

Concentric Square Designs Based on Art by Frank Stella

Sample

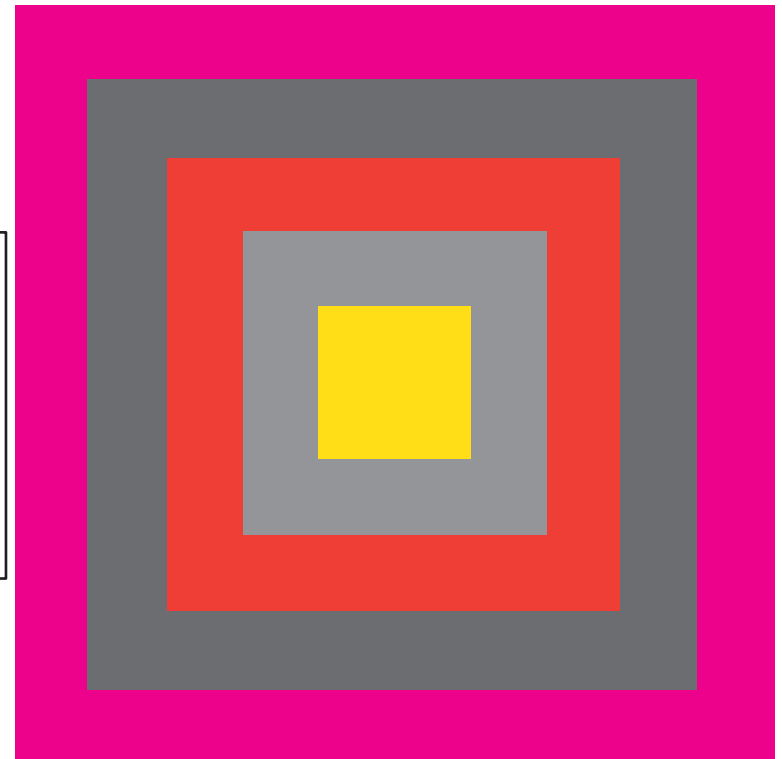
I think Frank Stella painted squares with odd numbers of cells. His Concentric Square paintings were planned on a grid. Each square has the same width as the others. Even number squares have a larger shape in the middle than is seen in Frank Stella's paintings.

I made one square black as a reference to Stella's series of Black Paintings from 1959. For the larger squares I alternated colorful and grey toned concentric squares as a nod to Stella's Letter on the Blind II (1974) in which he used a similar pattern albeit with more concentric squares than I was able to use.



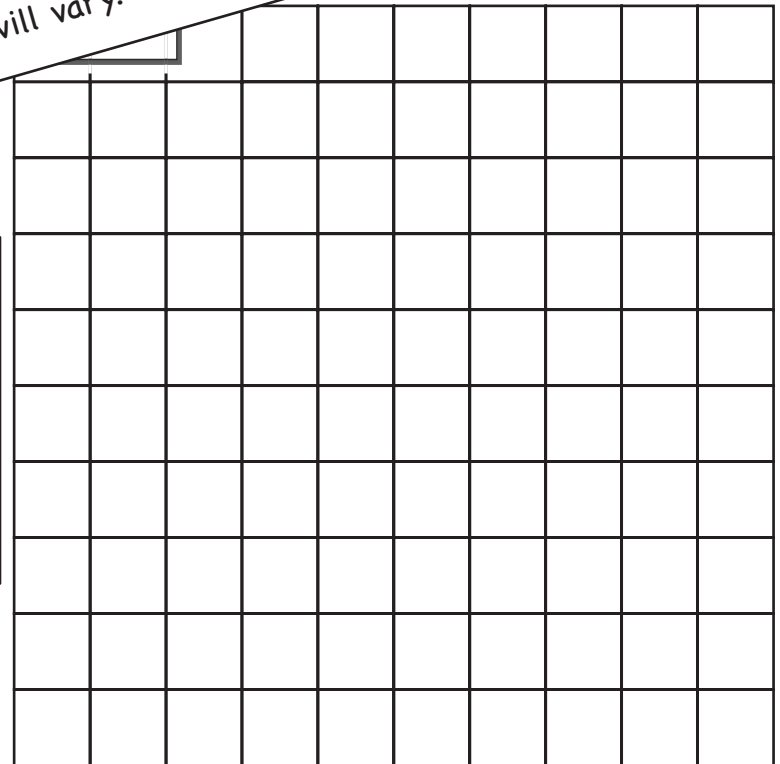
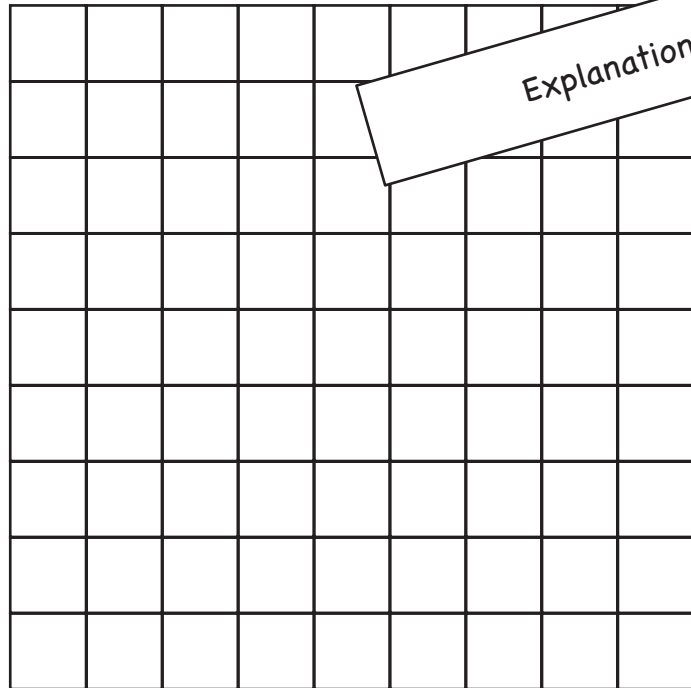
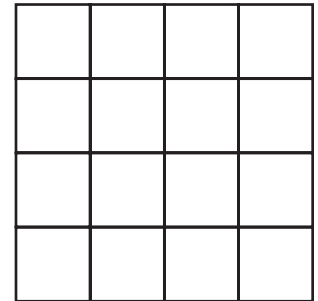
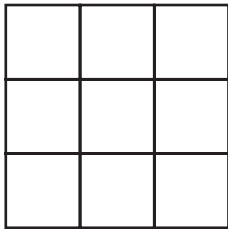
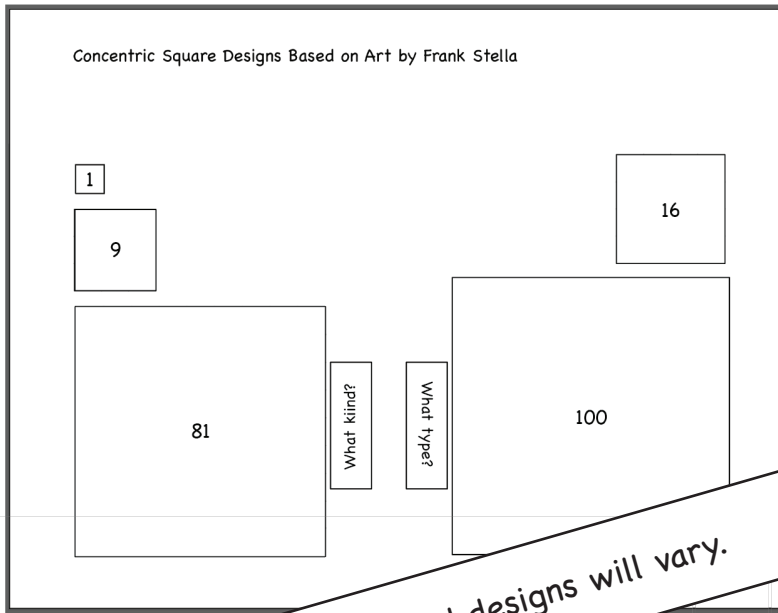
Odd Numbers

Even Numbers



Concentric Square Designs Based on Art by Frank Stella

Name

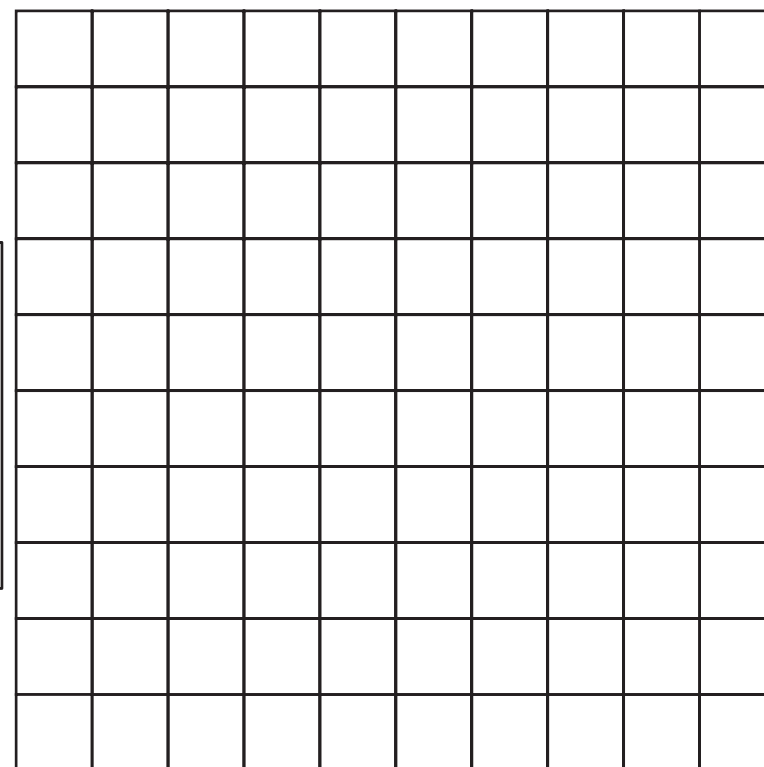
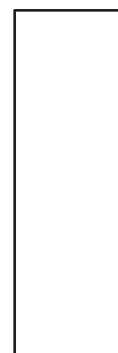
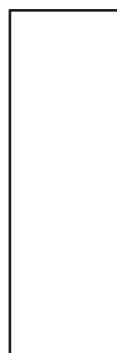
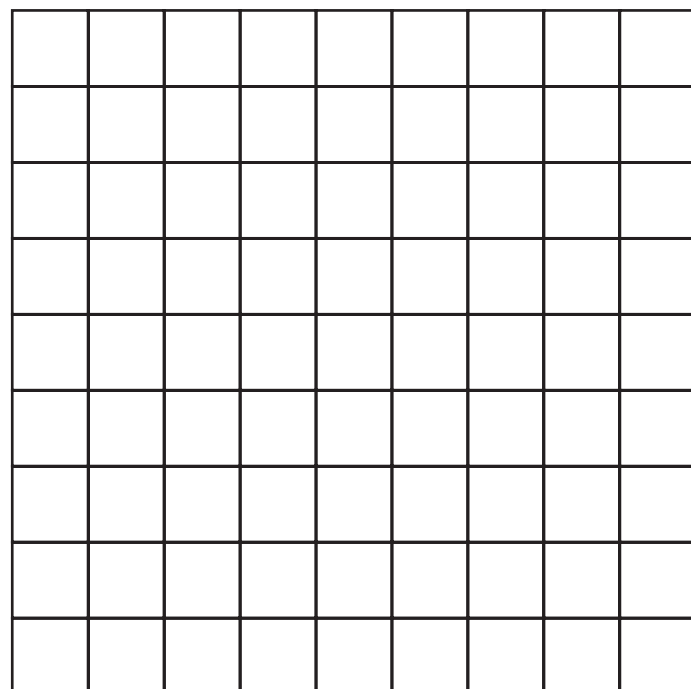
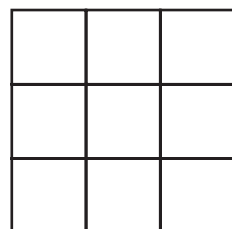
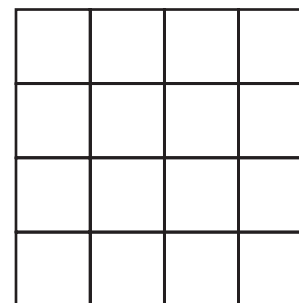
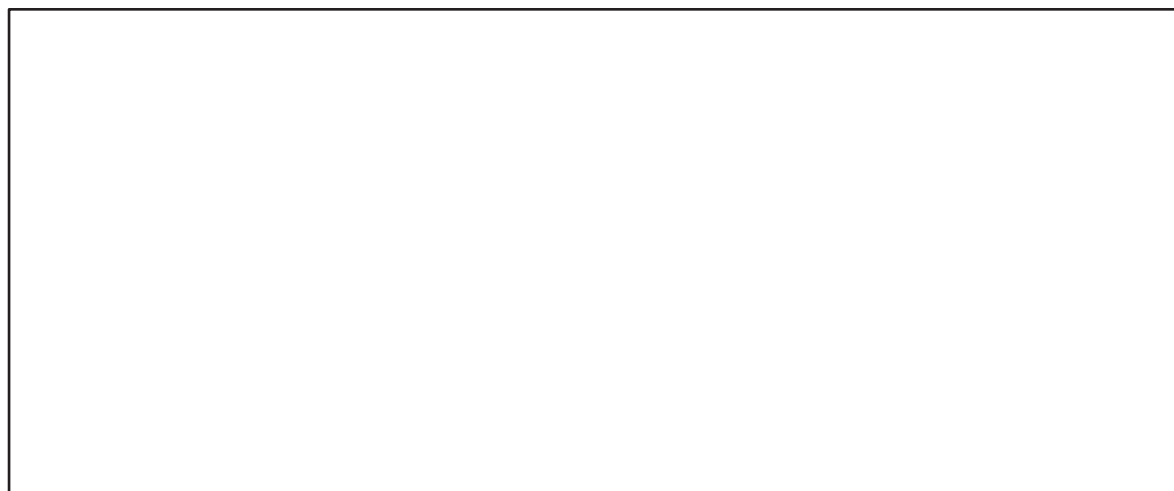
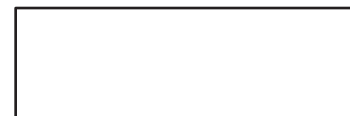


Explanations, colors and designs will vary.

Odd Numbers

Even Numbers

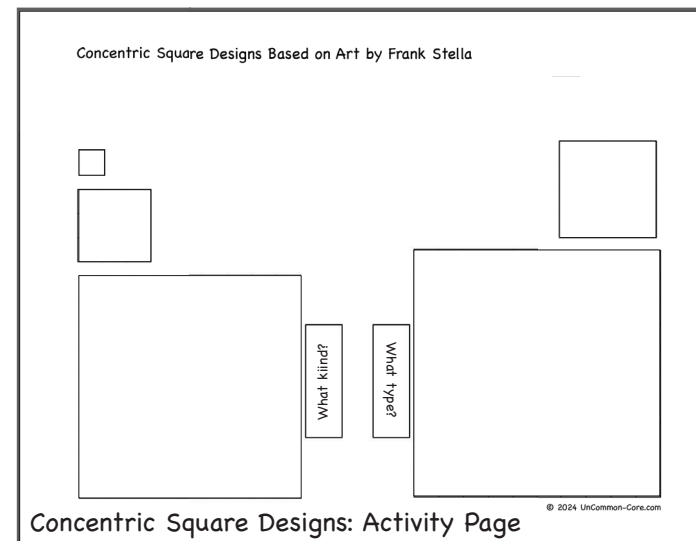
Concentric Square Designs Based on Art by Frank Stella



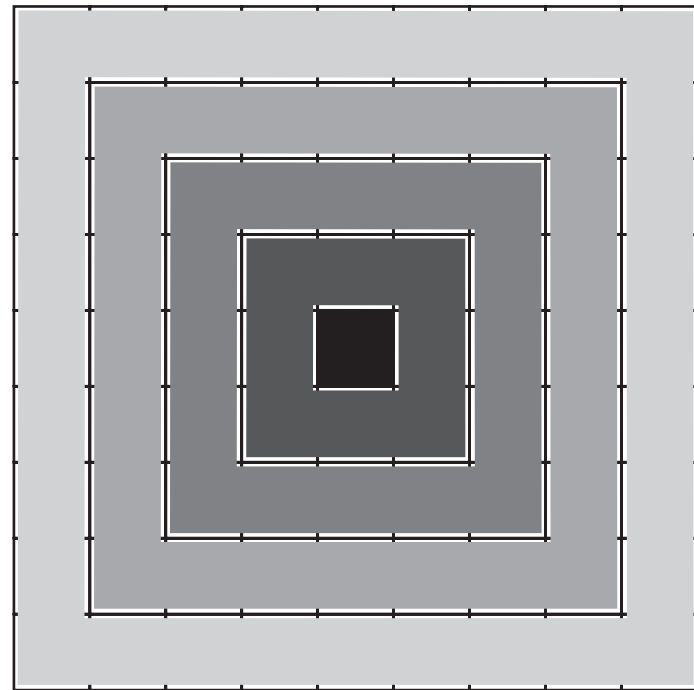
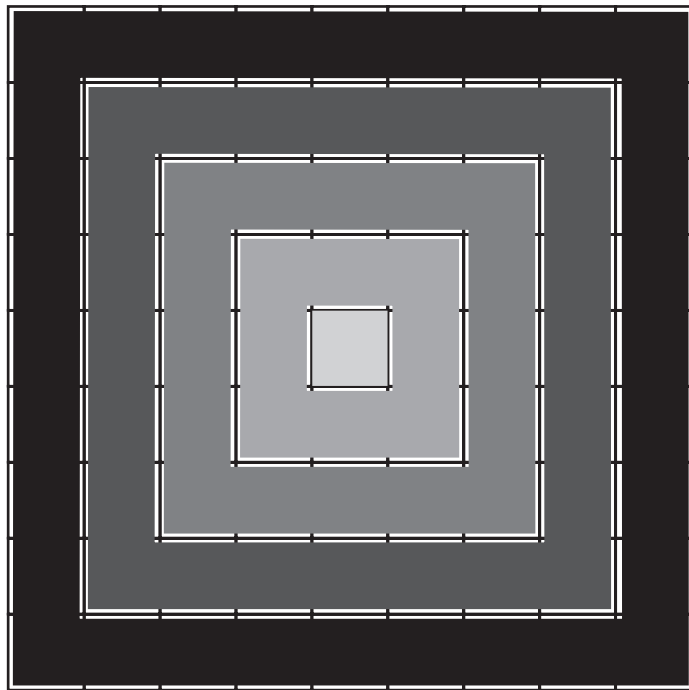
Directions

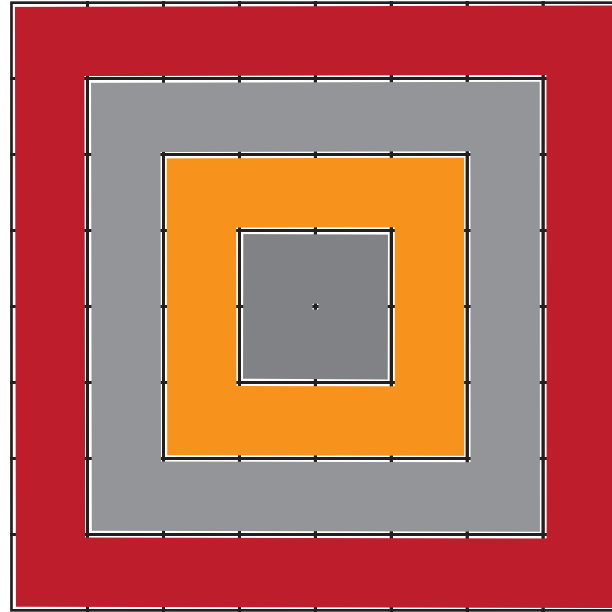
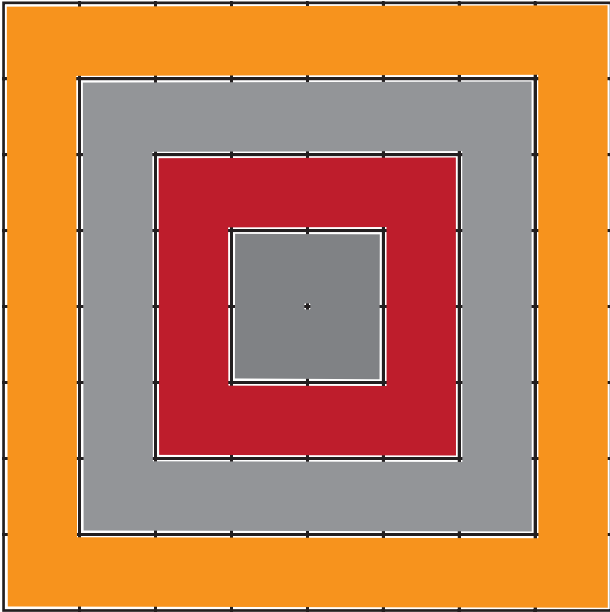
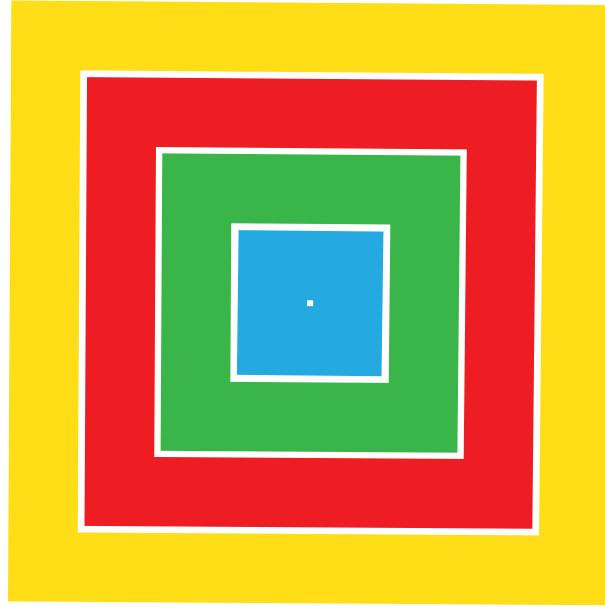
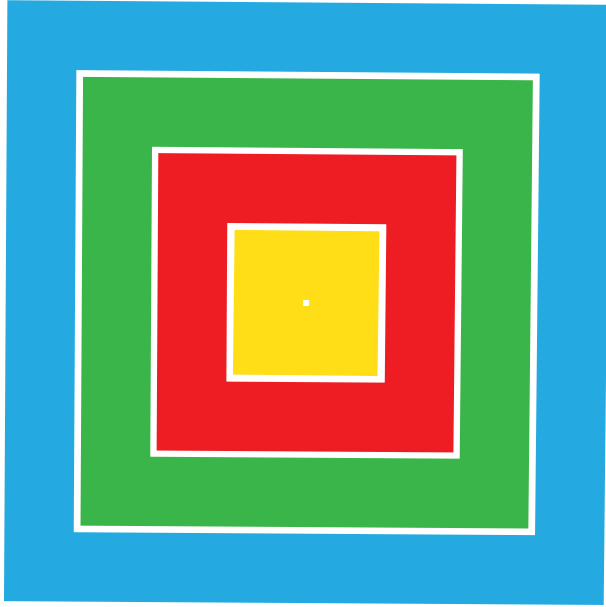
Concentric Square Designs Based on Art by Frank Stella

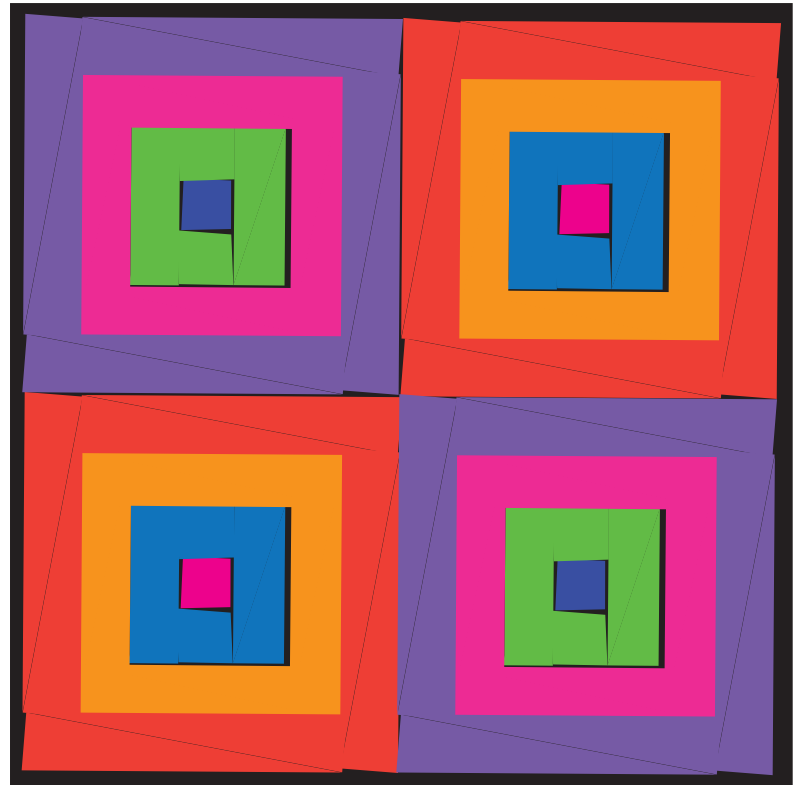
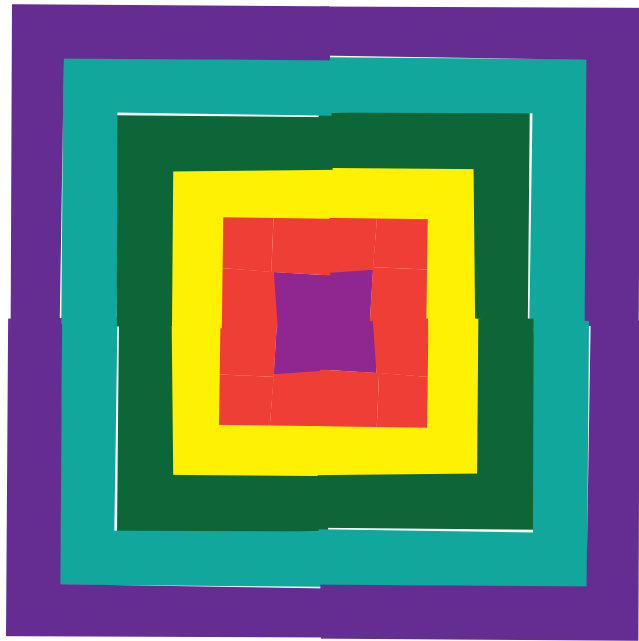
1. Count the number of rows and columns in each shape on the activity page. Multiply to find the total number of cells in each grid.
2. Write the total number of cells in the same box on this page.
3. How are the numbers on the left side of the activity page different than those on the right. What kind of number is on each side?
4. Write your answers sideways in the boxes on the activity page as shown on the right.
5. Think about different ways Frank Stella painted squares.
6. Think of a example of how Frank Stella used warm and cool colors when he painted squares.
7. Picture how he used blacks, greys, and whites in his artwork.
8. Which colors did Frank Stella use in one of his paintings that you like?
9. Use crayons or some other options to decorate the squares on the activity page. Make them look similar to Frank Stella's artwork. Base one or more of your decorations on Frank Stella's Concentric Square series.
10. Explain how your decorations on the activity page are like Frank Stella's artwork. Write a rough draft in the box below:

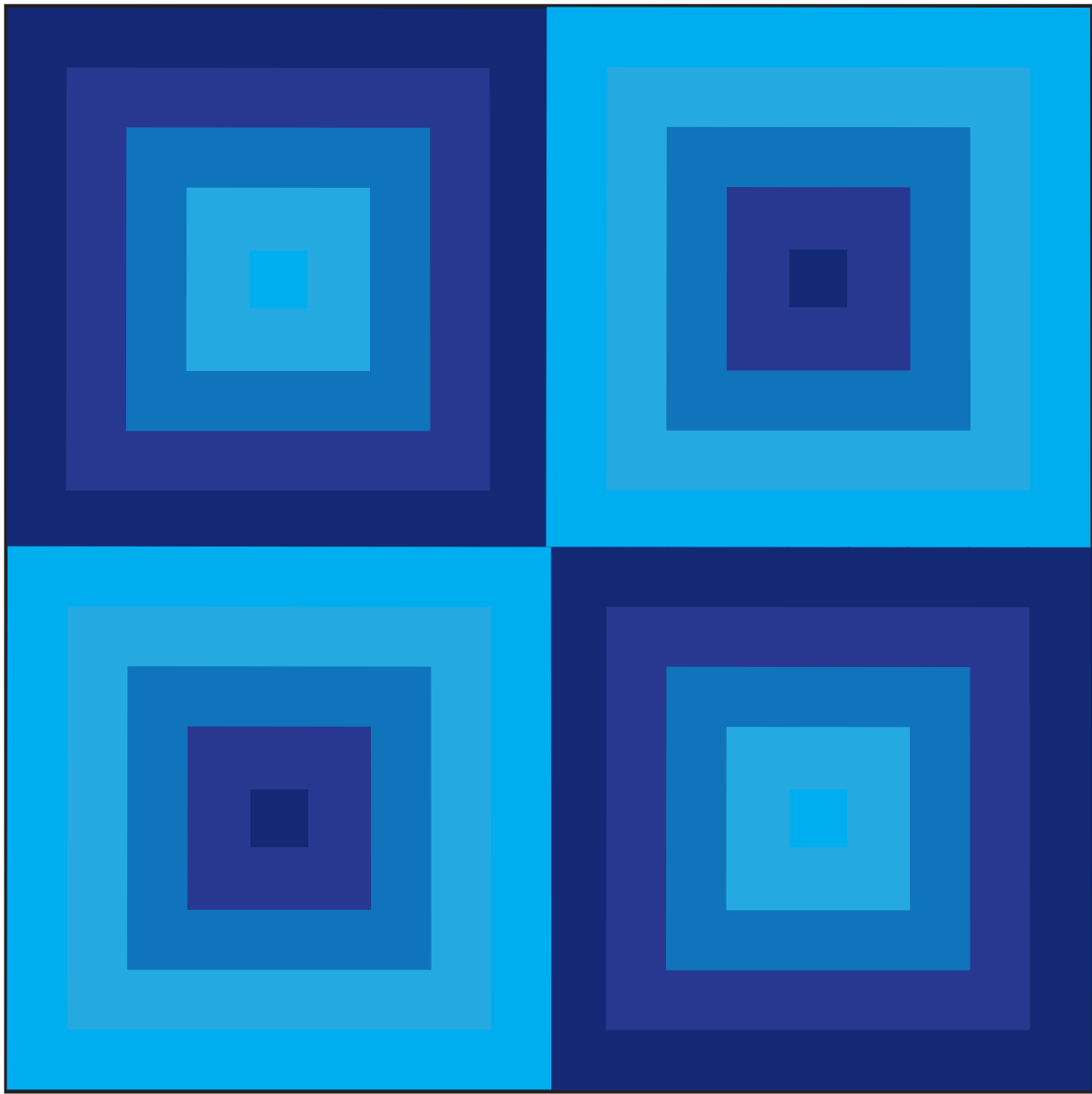


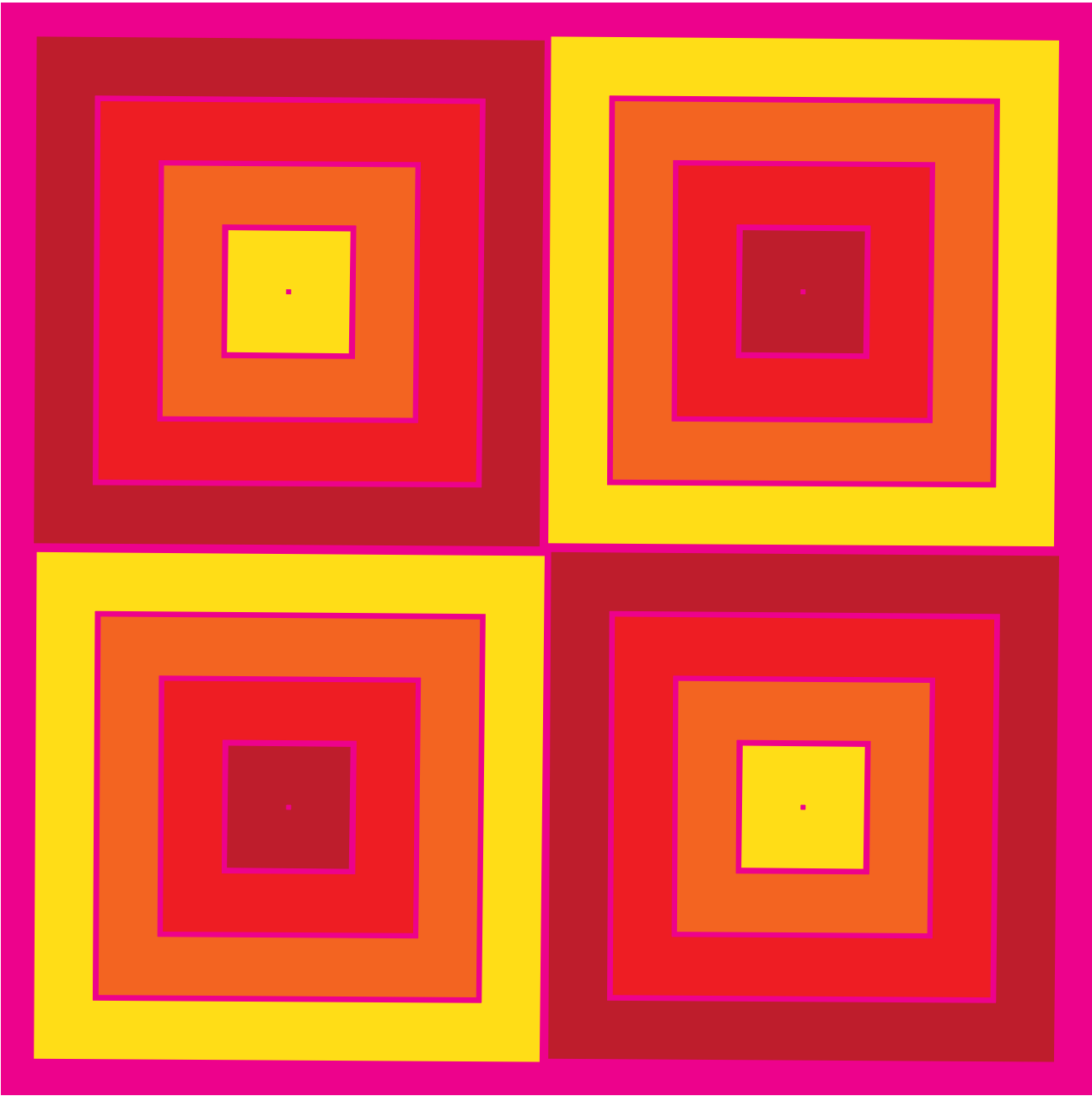
The following pages show square art inspired by Frank Stella's Concentric Squares.

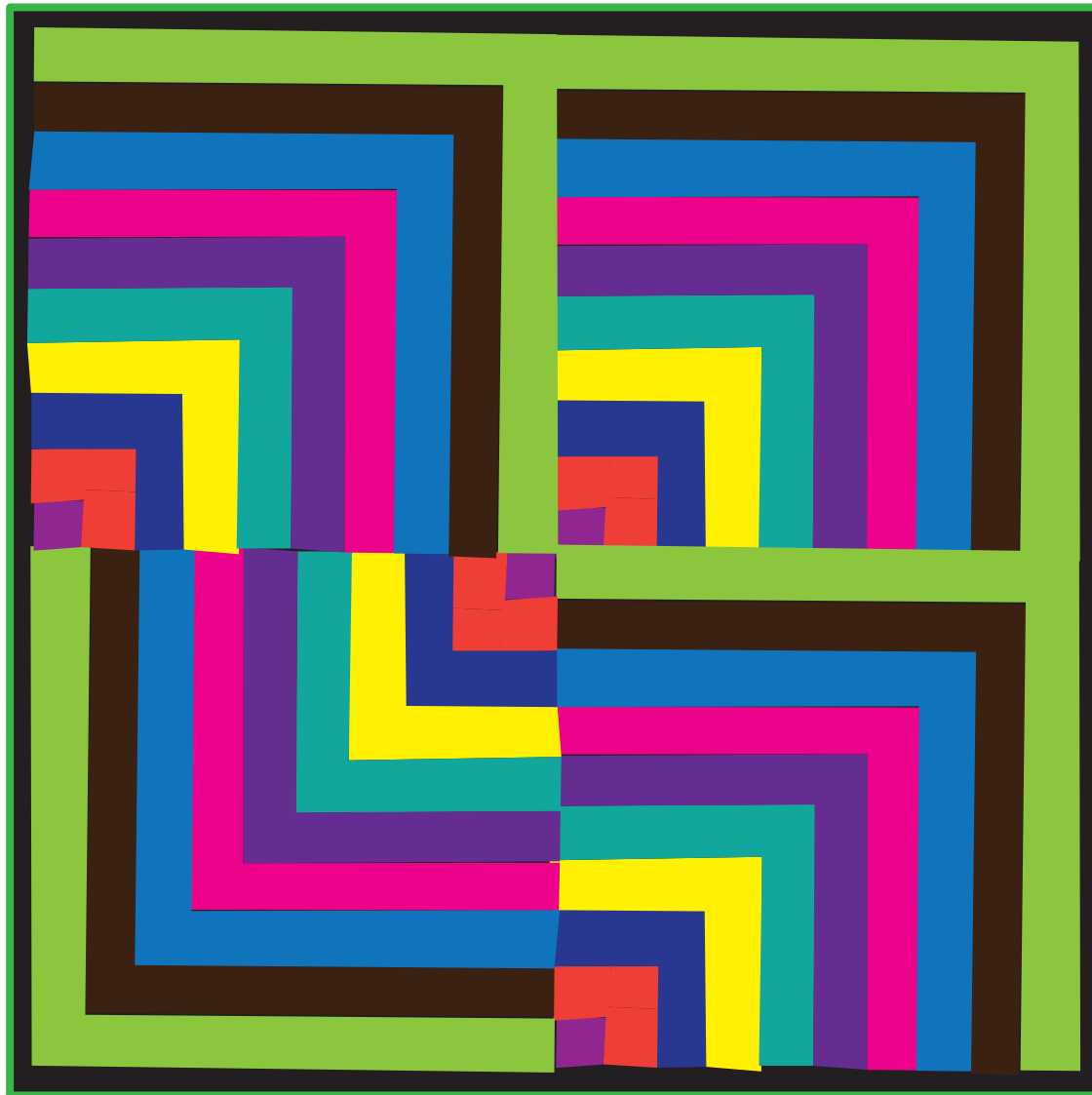








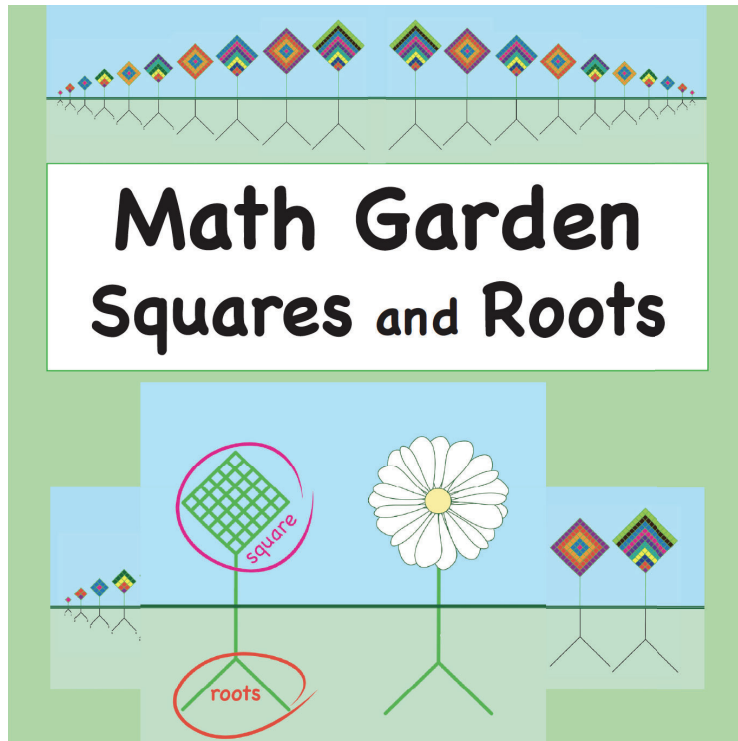




Links to Images of Art by Frank Stella

- [Who is Frank Stella, Tate Kids](#)
- [Frank Stella's choice of colors, Whitney](#)
- [Frank Stella artworks, National Gallery of Art](#)
- [Frank Stella and the Square, Travels with my art](#)
- [Untitled \(1966\), Thyssen-Bornemisza Museo Nacional](#)
- [Frank Stella: Experiment and Change, NSU Art Museum](#)
- [10 Things to know about Frank Stella, Christies](#)
- [Lettre sur les aveugles II \(1974\), Fine Arts Museums of San Francisco](#)
- [Double Concentric Squares, Art Institute Chicago](#)
- [Indestructible Square Video, Sotheby's](#)
- [Concentric Square \(1966\) video, Phillips](#)
- [Hampton Roads \(1971\), National Gallery of Art](#)
- [Letter on the Blind II](#)
- [Grey Scramble, Guggenheim](#)
- [New Madrid, Brooklyn Museum](#)

Free Samples that Support these Activities:



Factor Pairs All the Factors of Numbers up to 100

Factors of Forty-eight

48

$$1 \times 48$$

$$2 \times 24$$

$$3 \times 16$$

$$4 \times 12$$

$$6 \times 8$$

Forty-eight is a composite number with ten factors.

Forty-eight is a multiple of 1, 2, 3, 4, 6, 8, 12, 16, 24, and 48.

1, 2, 3, 4, 6, 8, 12, 16, 24, 48



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