



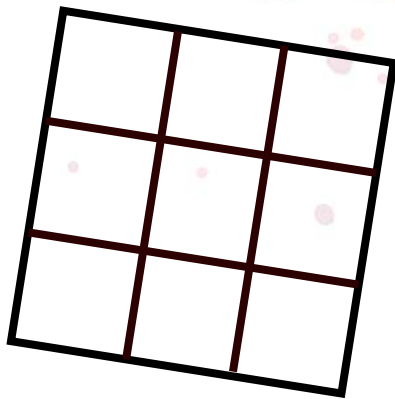
# Teacher Resource Packet

Grade Level: 4th Grade

A lesson about composition, design, and how art can be described mathematically

## Rule of Thirds: finding fractions in art

By breaking works of art into a grid, art and math meld together. In this lesson, create fractions to describe paintings and sculptures at the CMA, and then make your own math-sterpiece!



Cloud Man by Jack Earl  
37" x 19" x 13" 2007

*The Museum To Go program and these educational materials are made possible by the generous funding of the Ohio Arts Council, Arts in Stark, and The Hoover Foundation.*



This document, companion artwork images, virtual tour of the exhibit: "Salon Style: Works from the Permanent Collection Vault," and many other resources are available through the Canton Museum of Art website at:

[www.cantonart.org/learn/museum-to-go](http://www.cantonart.org/learn/museum-to-go)

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## Overview: Rule of Thirds: Finding Fractions in Art

### Lesson Goal:

This lesson will introduce students to the “rule of thirds,” a compositional principle used by many artists, especially in photography. By breaking works of art into a grid, students can meld art and math, creating fractions to describe the contents of a painting or work of art. Students will then create their own “rule of thirds” puzzle piece, which will combine with others in the class. Each tile, if designed around the rule of thirds lines will work interchangeably with the rest of the tiles to create an abstract class work of art. Students can later mix and match, or rotate tiles to create their favorite overall compositions. The grid on each tile can be used to create fractions, as can be the grid of the class’s combined tiles as well.

### Lesson Duration: 1-1.5 hours, 1 visit.

A museum to go instructor will come to your class for one visit (Stark County), or you will be able to download and utilize the lessons to your classroom (In or out of Stark County). You may choose to bring your students to the Canton Museum of Art after the lesson if you are able to take a field trip as well. Follow up visits to the Museum can be arranged through the CMA Education Manager, Erica Emmerson, at [erica@canonart.org](mailto:erica@canonart.org)

### Materials and Learning Tools:

#### Teaching Materials:

Fire and Water Google Tour

“Rule of Thirds” slideshow

Giant Wikki Stix (combines multiple Wikki Stix into one large strand, or can use dry erase markers)

Board or final designated space for displaying the puzzle pieces

#### Activity Materials ( Per Kid):

4 Wikki Stix (wax string) per participant

Laminated Cellophane (different colors, to create a stained glass effect)

Cut each 8.5x11 sheet into 6 parts, 1 part/participant

Ruler

Colorful Sharpies

Glue Dots (could substitute Velcro or magnets, depending on desired final display)

(Optional) Template (attached sheet, may be laminated and distributed to help with setup)

#### Learning Materials:

- 1) Information about works of art and artists.
- 2) Printable/presentable images
- 3) Activities to use before/ after MTG visit.



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### Standards Correlation:

#### Math:

##### Numbers and Operations: Fractions:

Extend understanding of fraction equivalence and ordering.

1. Explain why a fraction  $a/b$  is equivalent to a fraction  $(n \times a)/(n \times b)$  by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

3. Understand a fraction  $a/b$  with  $a > 1$  as a sum of fractions  $1/b$ .

- a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples:  $3/8 = 1/8 + 1/8 + 1/8$ ;  $3/8 = 1/8 + 2/8$ ;  $2 \frac{1}{8} = 1 + 1/8 = 8/8 + 1/8$ .
- d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

##### Measurement and Data:

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
4. Make a line plot to display a data set of measurements in fractions of a unit ( $1/2$ ,  $1/4$ ,  $1/8$ ). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

#### Visual Art:

6PE Identify and name the sources for art making ideas (e.g., self, environment and other people)

1PR Identify, select and vary art materials, tools and processes to achieve desired results in their artwork.

6PR Demonstrate technical skill through the integration of common processes and topics from other subject areas.

1RE Identify qualities that contribute to the design and meaning of their artworks and the works of others.

#### Works of Art/Object Focus:

This lesson correlates with the Fire and Water exhibition, a Canton Museum of Art Permanent Collection Exhibition on display winter 2018, and online (Google 360) @ <https://www.cantonart.org/learn/Museum-To-Go>

1) **Tonalization** by Carolyn Brady (1937-2005). Watercolor on paper. Painted in 1984. 44.5"x65.5"

[http://www.cantonartcollection.com/itemdetail.php?work\\_id=1888&gallery\\_id=5](http://www.cantonartcollection.com/itemdetail.php?work_id=1888&gallery_id=5)





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2) **Lionel 200 E Blue Comet** by Merv Corning (1927-2006). Watercolor on paper. Painted in 1989.

28"x40.5" [http://www.cantonartcollection.com/itemdetail.php?work\\_id=2326&gallery\\_id=5](http://www.cantonartcollection.com/itemdetail.php?work_id=2326&gallery_id=5)



3) **Waldoboro** by Janet Fish (1938- ). Watercolor on paper. Painted in 2004. 31"x42"

[http://www.cantonartcollection.com/itemdetail.php?work\\_id=1956&gallery\\_id=5](http://www.cantonartcollection.com/itemdetail.php?work_id=1956&gallery_id=5)



4) **Lace** by Nancy Hagin (1940- ). Watercolor on paper. Painted in 2014. 30"x42"

[http://www.cantonartcollection.com/itemdetail.php?work\\_id=2126&gallery\\_id=5work\\_id=1956&gallery\\_id=5](http://www.cantonartcollection.com/itemdetail.php?work_id=2126&gallery_id=5work_id=1956&gallery_id=5)



5) **Cloud Man** by Jack Earl (1934- ). Whie-ware (ceramics). Made 2007. 37"x19"x13"

[http://www.cantonartcollection.com/itemdetail.php?work\\_id=2040&gallery\\_id=7](http://www.cantonartcollection.com/itemdetail.php?work_id=2040&gallery_id=7)





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## Overview: Rule of Thirds: Finding Fractions in Art

### Vocabulary:

**Rule of Thirds:** By dividing a composition into thirds, an artist can align their subject with the guide lines and their intersection points to create a more dynamic composition. In a landscape, one might place the horizon on the top or bottom line, or allowing linear features in the image to flow from section to section of the grid lines. This “rule” is often used in photography, but can be seen in many works of art of all media.

**Composition:** Parts of a whole: a framework, setup, or structure; the way in which a whole mixture is made up. Composition in art typically refers to the way a piece of artwork is organized or designed. The Rule of Thirds is a compositional building tool!

**Rectilinear:** Straight line(s)

**Curvilinear:** Curved line(s)

**Numerator:** In a fraction, the number that is on top. This is a portion of units of a whole.

**Denominator:** In a fraction, the number on the bottom. This represents the total number of units in a whole.

### Key Ideas/Background:

- 1) Artists think carefully about the ways they create their works of art. We call those design choices the “composition.” There are composition choices made for both 2D and 3D works of art.
- 2) One can divide a composition into smaller, equal sized units that make up a whole. The total number of units can be counted to describe the denominator. The composition can be analyzed, and similar units can be calculated together to create a numerator.
- 3) One can use math, especially fractions, to express and describe various components of an artwork’s composition. Visual components can be calculated to better understand math, and the artwork.
- 4) Each student, in creating their own string art tiles, will create an individual part that adds value to the class’s community composition when assembled. They are individually part of a whole, with their own identity and special qualities that add to the group’s composition. The individual tiles are what make the community composition so exciting. Every tile is important, but the composition becomes more exciting when all of the tiles are grouped together!



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## Overview: Rule of Thirds: Finding Fractions in Art

### PROCEDURES:

#### Introduction and Setup (5 mins)

- Connect projector to the MTG tablet, slideshow and tour are loaded.
- Pass out papers (Pre/Post), (Rule of Thirds), (Calculate the Composition and Math-sterpiece), (Template) \*wait to hand out activity materials\*
- Introduce self, MTG, transition into pre assessment (side with #1 on it).

#### Pre-Assessment: half sheets (5 mins)

- Find the numerator, find the rectilinear line, create a sentence that describes a fraction in the composition drawing, how they are feeling, what subjects can the art museum teach.

#### MTG Virtual Tour: (10-15 mins)

- Students will enjoy a walkthrough of the Fire and Water (ceramics and watercolors) exhibition from the permanent collections.
- Main talking points in walk through:
  - Last time MTG came to the classroom, you saw a “**Salon Style**” show. This time, we are looking at a setup that is more commonly used in museums to show artwork. You will notice there is **room around each painting on the wall**. This allows the viewer to focus in on the singular artwork, and not be distracted by crowding and distracting works.
  - The **3D ceramics** works are clumped and clustered together. You will notice that the **groupings** often match, sometimes thematically, other times by artist, or by artists with similar shapes and forms.
  - **Teacher note:** in each scene there is a piece or theme to talk about. Here are some suggestions: (you may also highlight your favorite works... all permanent collection items are catalogued with descriptions online at <http://www.cantonartcollection.com/index.php> )
    - Scene 1: Fire and water (the sign) Do those usually go together? Why might the museum show opposites? How are some ways opposites attract (peanut butter & jelly rough and smooth, hair with highlights or fun unexpected colors, someone might wear jewelry that stands out from their t-shirt or normal clothes)
      - Man with his head in the clouds: Ohio artist!
    - Scene 2: Master Watercolors: This wall highlights the works of the most important watercolor artists owned by the Museum. Though this exhibit is made of mostly modern or contemporary work, this wall could be considered the wall that has the most historical significance.
    - Scene 3: Compare and contrast the 2 ceramics forms in the foreground (with the 2 holes in each, half glazed). Do you think the same or different artist made them? What are some clues that helped you decide?



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- Good way to open conversations about math in art: Can we describe artwork in terms of mathematics? How might we describe these two sculptures with math and numbers:
  - Both are made from three parts: a cone shape on the bottom, a rectangular shape in the middle, with two holes on top.
  - If we break the sculptures into thirds, how many sections of the sculptures have glaze on them?
  - Right now, they each follow the same formula in our description! So how would we describe mathematically the difference between the two?
    - One could be described as positive, with the holes coming up out of the piece, and the other as negative, with the holes going down into the piece.
- Scene 4: Every time an artist creates a painting or a sculpture, they think about what is called the composition. A lot of times we can discover what is most important in a painting by its placement, size, and color. There is a rule called the rule of thirds, where artwork is divided up into mathematical sections. We will test out this rule later with a grid made with rulers, but for now, let's look with our eyes and see if we can figure out what is most important based on those clues.
  - Hearts: made of a grid, 2 blue, 2 yellow, 2 red. All the same size. All equally important. Colors are spread around to make the work more exciting.
  - Train: takes up the entire middle section.
- Scene 5: Hammer Head ceramics sculpture. Emphasis shown by making the hammer head larger than life. Also, think about the function of a hammer... and think about if you used china plates to try to nail a picture to the wall! It would NOT work and your poor plates would be toast! So this sculpture becomes humorous.
  - Paintings on the wall- notice the circular quality of the composition. It's like the artist is drawing our eyes around, showing us what is important in a circle. We will check some out on a grid later, and see if there is any other math behind it as well!
- Scene 6: Plates on the wall- look at how they are hanging. What is similar? What is different? Do you think the same artist made each plate? What are your clues?
  - Great story: The same artist made all of the plate forms, but the one in the middle; he then gave to his wife. She carved it, creating the flower pattern. The work is attributed to her as a collaborative piece with her husband.
    - The circular works on either side are made by her husband. It is cool to see how his style is very different. If he did not share and work together with her, he could never make the beautiful carving of the flower. His work style is much more abstract, while hers is realistic. And without her husband, she would not be able to make the form of the plate, because it takes years of practice for a ceramicist to be able to make a plate that size.



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### Discussion Power Point: (5-10 mins)

- **Power Point Presentation** allows teacher to present 3-5 pieces from the Fire and Water Exhibit with the rule of thirds grid over top of the images. Teacher will use this time to talk about the works, and to create math fractions with the class based on the grids.
  - Numerator: the number on top. This represents parts of a whole.
  - Denominator: the number on bottom. This represents the whole (total number of parts).
  - For this slide show, and with the rule of thirds, all denominators will start at 9 units as the whole.
- End on the blank grid, and keep it projected on the board for the next activity if desired.

### Activity 1: (15-20 mins)

- **The Scribble Game:**
  - The teacher draws or projects a grid on the whiteboard, like the Rule of Thirds grid.
  - The teacher calls on a student to use **giant Wikki Stix** to “draw” a scribble across the composition. The teacher must then take that crazy scribble to finish a picture. The students should challenge the teacher to be creative with increasingly complex scribbles.
  - This can be done about 2-3 times, or as time allows.
  - Be sure to stress that the pictures in this and all activities should be *positive* and school *appropriate!*
- **The Scribble Game/ Reversed:** This time it is payback for making such complicated scribbles for the teacher!
  - The teacher gets to ask a student volunteer to come up. This time, the teacher gets to draw the scribble, and the student must finish the image!
  - This can be done 1-2 times, or as time allows.
- **The Scribble Game/ Seated:** This time the whole class will play the scribble game!
  - Have each kid write their names on their **Rule of Thirds (with the dog) worksheet**. They will then challenge their classmates to a game of scribbles. They will have just a moment to draw a scribble in the grid. They can use their **Wikki Stix** or use a **pencil**.
  - The teacher will then ask them to pass their sheets to the person on their left, or clockwise (if in tables). They will now have one minute to create a picture from the scribble.
  - **Bonus Round(s):** The teacher will ask the students to pass the sheet **ONE MORE TIME** to the person on their left, or clockwise. This next person has the chance to add detail to the picture. The pictures can get more and more silly or detailed with each passing.
  - After all rounds of passing are complete, the teacher will ask that papers be passed back to their original owners. The original owners can later use these pictures to create fractions describing the silly scribble scenes created!



Scribble Game Examples:





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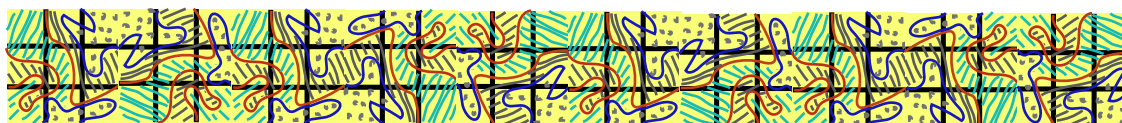
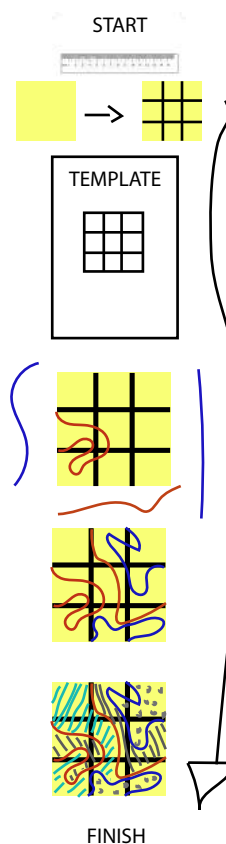
### Activity 2: (10-15 mins)

- **Rule of Thirds Individual Compositions**

- All students receive a **tile** (laminated cellophane), **4 wiki sticks**, a **template** (optional), colorful **sharpie** marker, and **ruler**.
- Using the template, or premeasured dots, students can **draw 4 lines** (rule of thirds) across the square on the template, which will create their rule of thirds layouts. They may choose to use sharpie or pencil to practice, but the sharpie is permanent.
- Now, students can choose if they wish to draw the lines on the cellophane as well. Tell them that the cellophane with sharpie on it can look like stained glass windows.
- Students will take their 4 Wikki Sticks and **connect the lines** from their grid. Each Wikki Stix stick must end and start at the grid's edge. They may use **RECTILINEAR** or **CURVILINEAR** lines, the lines can overlap, or not touch... this is up to the students.
- If time allows, the students may use the sharpies to **embellish** their tiles. They should write their **name** on the corner.
  - Teacher can demonstrate ways of embellishing the cells that the Wikki Stix creates... Sharpies can be employed to stipple, swirl, pattern, and more.
- Optional: students may use scissors to cut and shorten their Wikki Stix. The one rule is that all eight edge points for the grid must have a Wikki Stix connecting it to another!

- **Tessellating Tiles:**

- Students break into groups of 4-6 and work together to create their puzzle.
- Each group is given glue dots to put on the back of each tile. Each tile should tessellate into the other, fitting together in infinite ways. Give students 2-3 mins to create their favorite composition. Encourage them to turn the tiles, and try them in different ways based on color, and the larger overall shapes the Wikki Stix start to form.
- The instructor should call on the group leaders to bring their group's composition to the front when complete. The teacher will help the group leader install the piece at the front of the class, on the white board.
  - As each group comes up, the composition grows, but continues to fit together at the grid points with the Wikki Stix!
- Discuss: If we look at art like a composition, and divide a piece into units which describe a whole... what are some ways we could do that here?
  - Individual tiles- number of students in a class
  - Group compositions- number of groups in a class
  - Individual squares in the individual tiles... there are 9 squares in one tile... and how many of students in the class... 9 times # of students is.... \_\_\_\_\_. That would give us yet another denominator if we were looking at this like a fraction!
- Discuss: Are there visual clues that could be used to describe some of the units?
  - Colors
  - Rectilinear lines versus curvilinear lines
  - Embellishment types present





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- Discuss: Everyone's work individually is pretty amazing. It reflects who you are and your creativity. But as they come together, what is really neat is how your unique personality still shows, but also forms a bigger picture.
  - Think about all of the time and how hard it would be to make a composition this beautiful and complex. Your class forms a community, and you are part of what describes that community. This puzzle can be rearranged in so many ways to describe this class, or to make the design look just the way you want it, but before leaving, it is so important to say that without your contribution of your tile, the piece would not be the same!

### Post-Assessment and Clean Up (5 mins):

### UNIT ASSESSMENT:

- General Education teacher feedback (qualitative).
- Student Pre and Post Assessment.
- Museum To Go Educator feedback (qualitative) of observations, photographs, evidence of engagement and learning taking place.

*This lesson plan is created with the Museum To Go structure in mind, and with evaluation and content based on information gathered from The 2007-2008 Evaluation Toolkit published by the National Museum of Mexican Art, and the 2012 J. Paul Getty Trust, Summary Report of Survey Findings, Teacher Programs: Assessing the Getty Museum's Online Resources for K-12 Teachers.*

### Expanded Content:

**Rule of Thirds Worksheet** (for scribble activity, or individual working time)

**Calculate the Composition! And Math-sterpiece Creations!** (front and back)

**Template for Activity**

**Perfect Puzzle Worksheets** (requires scissors, brads, drawing materials.) Students create tiles, using the design rules from the Rule of Thirds Individual Composition activity. Students then cut the square compositions out and install them with brads in the middle of each square on the second page. When installed, the compositions will spin on each brad to create a spinning puzzle. This is in the teacher packet, as MTG lesson will not have time for this activity.

### Sources:

Canton Museum of Art Permanent Collections Archives.  
<https://www.cantonart.org/exhibits/permanent-collection>



# Math-stepiepie Creations!

Name:

Date:

$2/3$  Lines are Curvilinear


$3/9$  Squares are Colored In


$8/9$  Squares Have Circles Inside


$1/9$  of the Composition Has Stripes


$5/7$  Lines are Rectilinear

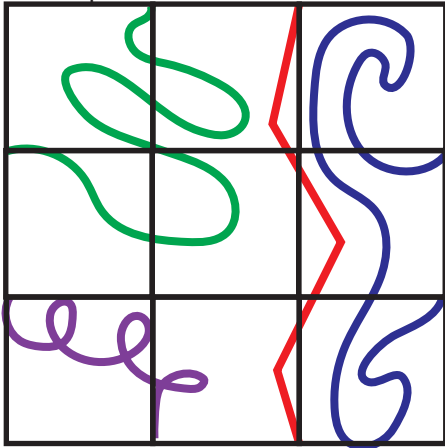

$1/3$  Squares Have Red Lines


Create your own compositions  
based on each fraction!

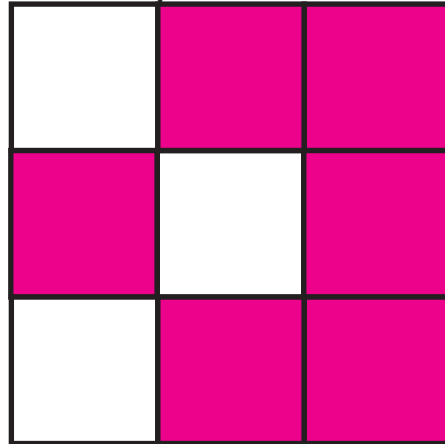
# Calculate the Composition!

Name:  
Date:

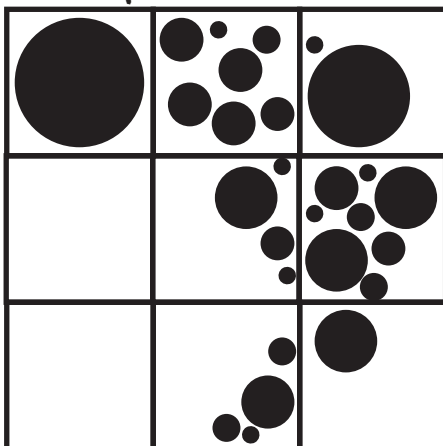
4 Lines are Curvilinear



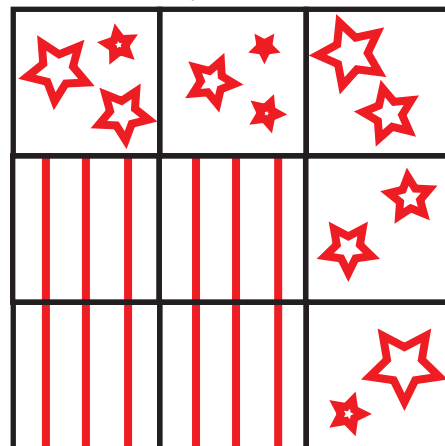
9 Squares are Colored in



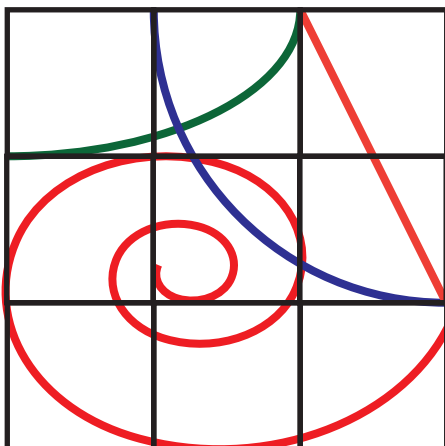
Squares Have Circles Inside



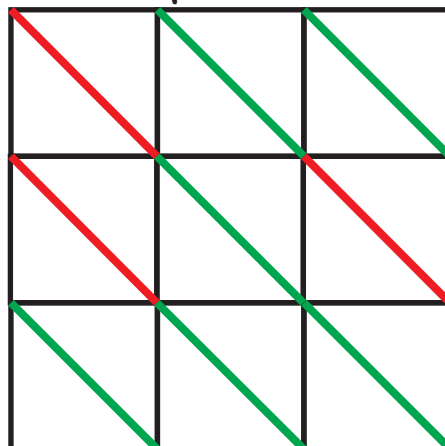
Parts of the Composition With Stripes



Lines are Rectilinear



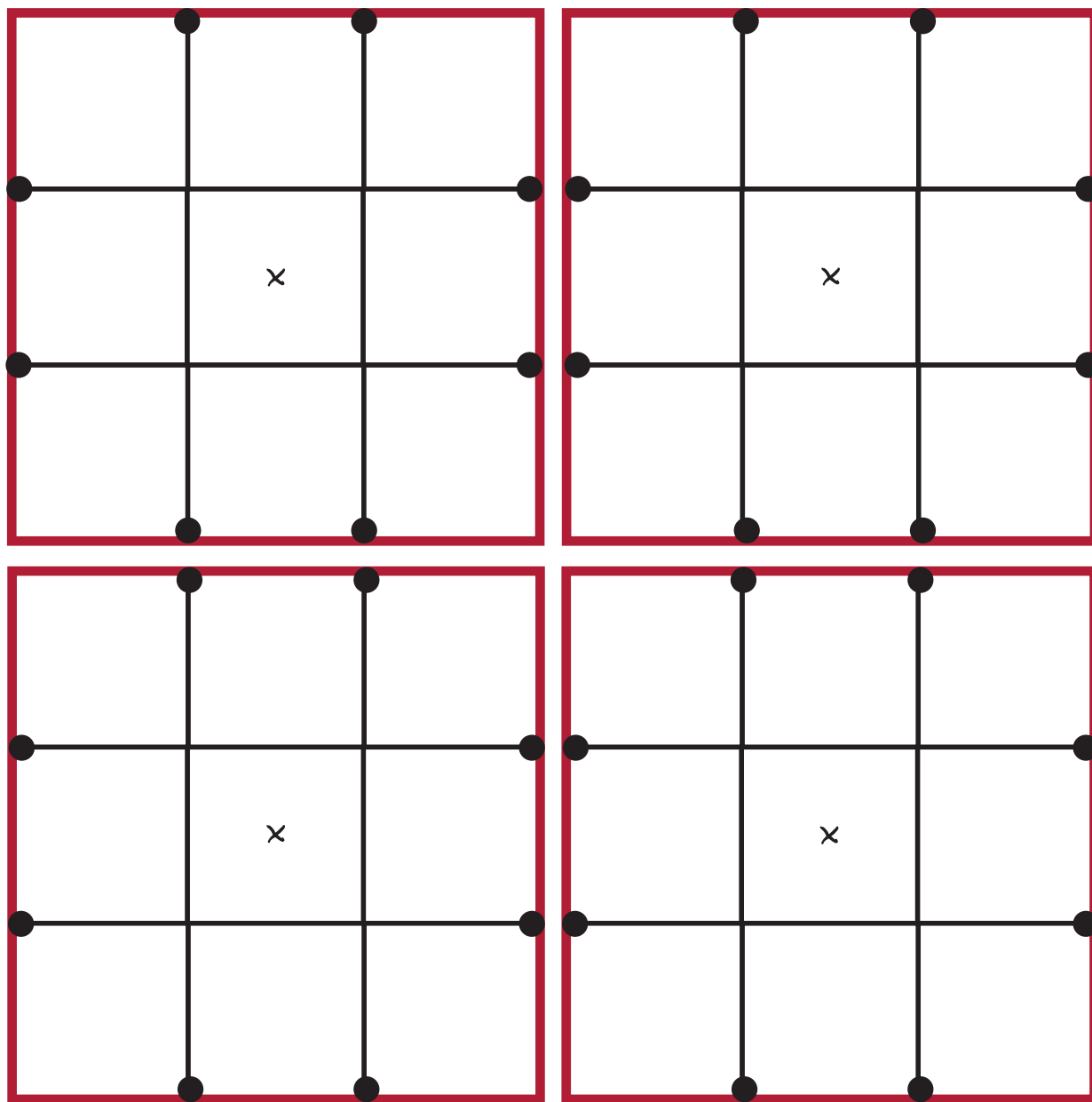
Squares Have Red Lines



Name: \_\_\_\_\_

# Perfect Puzzle Maker

Draw and color your own set of composition tiles.  
Use the rule of thirds lines on each square to start and stop your designs.  
Use the rule of thirds lines on each square to start and stop your designs.

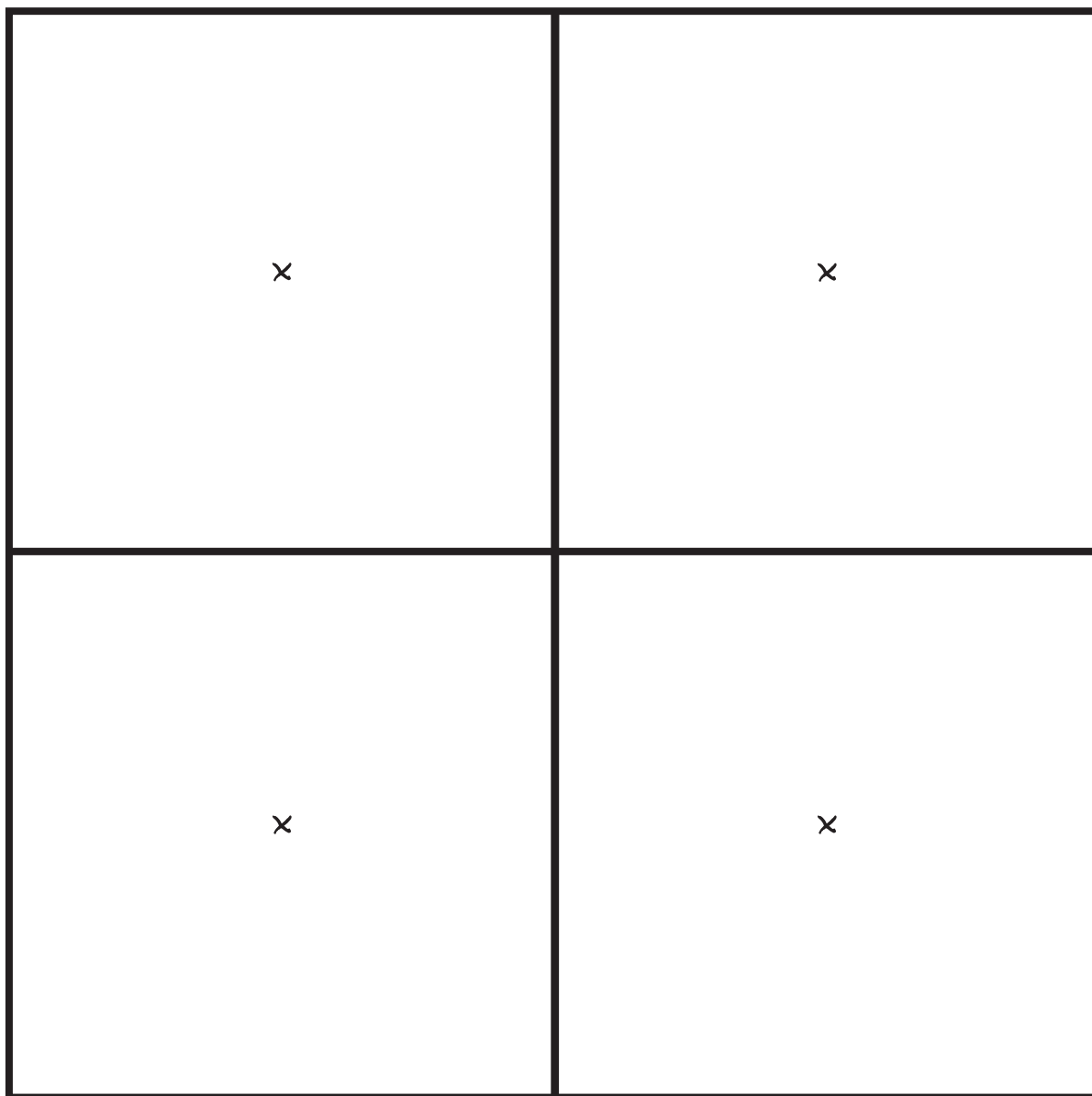


- = Start and stop each design line on 2 different dots
- x = insert board here
- Cut on the red lines

Name: \_\_\_\_\_

# My Perfect Puzzle

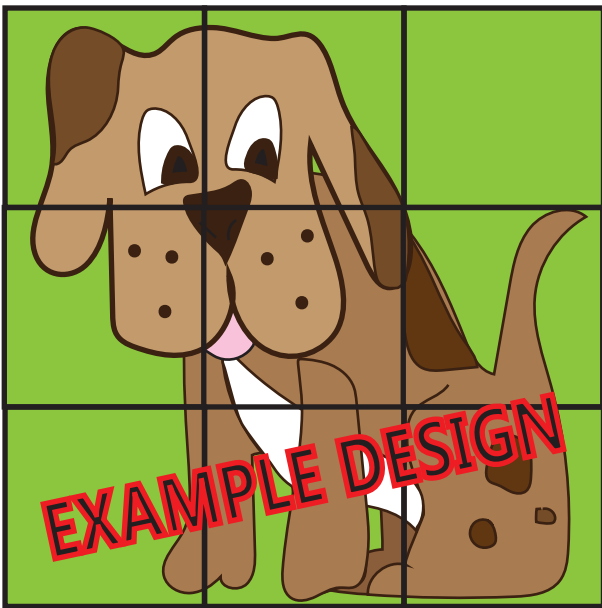
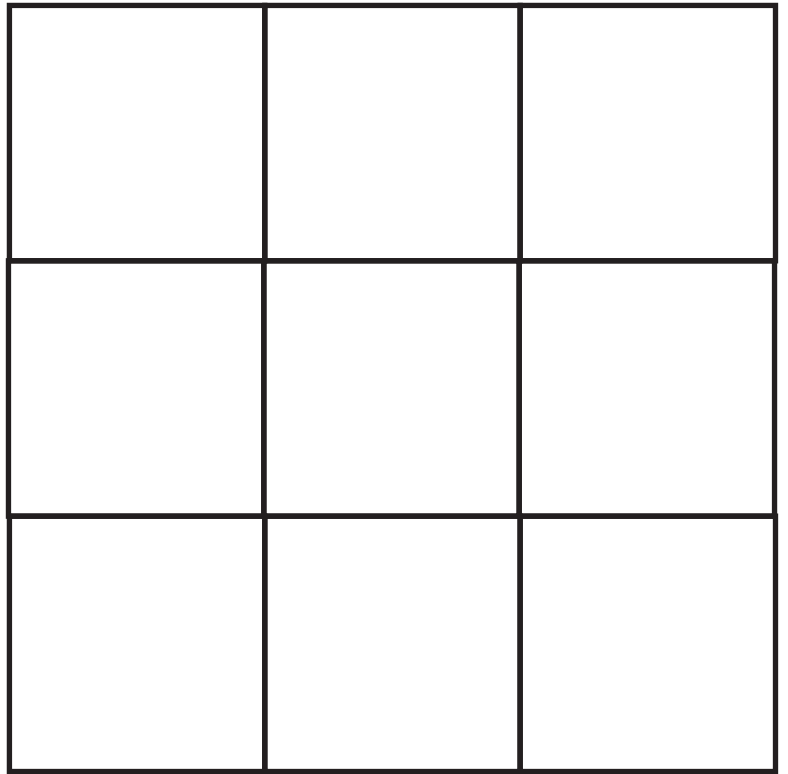
Spin the squares to change the composition.  
Your perfect puzzle should work with each  
puzzle piece rotation that you do! Try it out!



x = insert cut out squares and brads here

# Rule of Thirds

Draw a design  
inside the grid



**Create 3 fractions and use them to describe different parts of your design.**

Example: The dog's face takes up  $\frac{4}{9}$  of the composition.  
Example: The dog's tail takes up  $\frac{1}{9}$  of the composition.  
Example  $\frac{8}{9}$  of the squares have green in them.

1)

2)

3)

**BONUS!** Take each fraction and either simplify or expand it, to describe it using other numbers.

1)

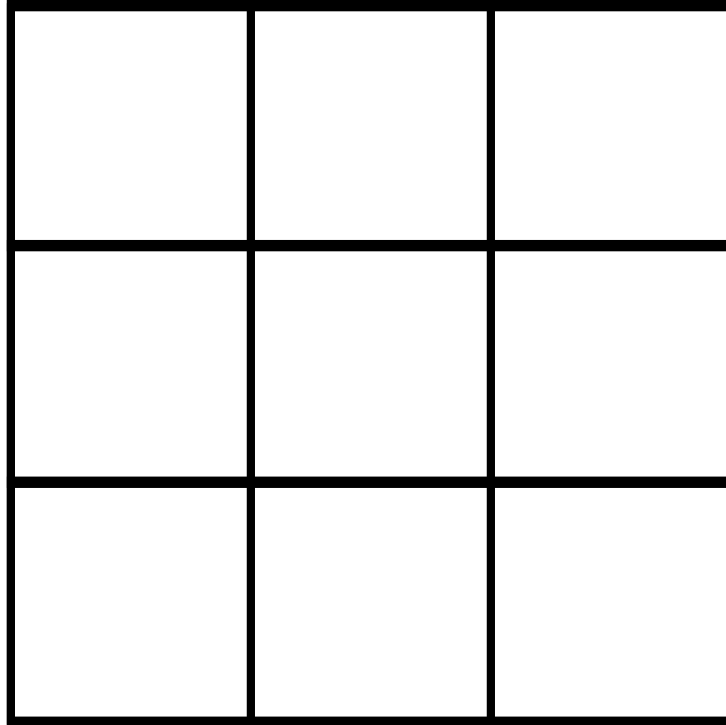
2)

3)



# Rule of Thirds Template

Each Square is 3.75 or 3 and 3/4 inches.  
Draw a line every 1.25 or 1 and 1/4 inches.



3.75"

