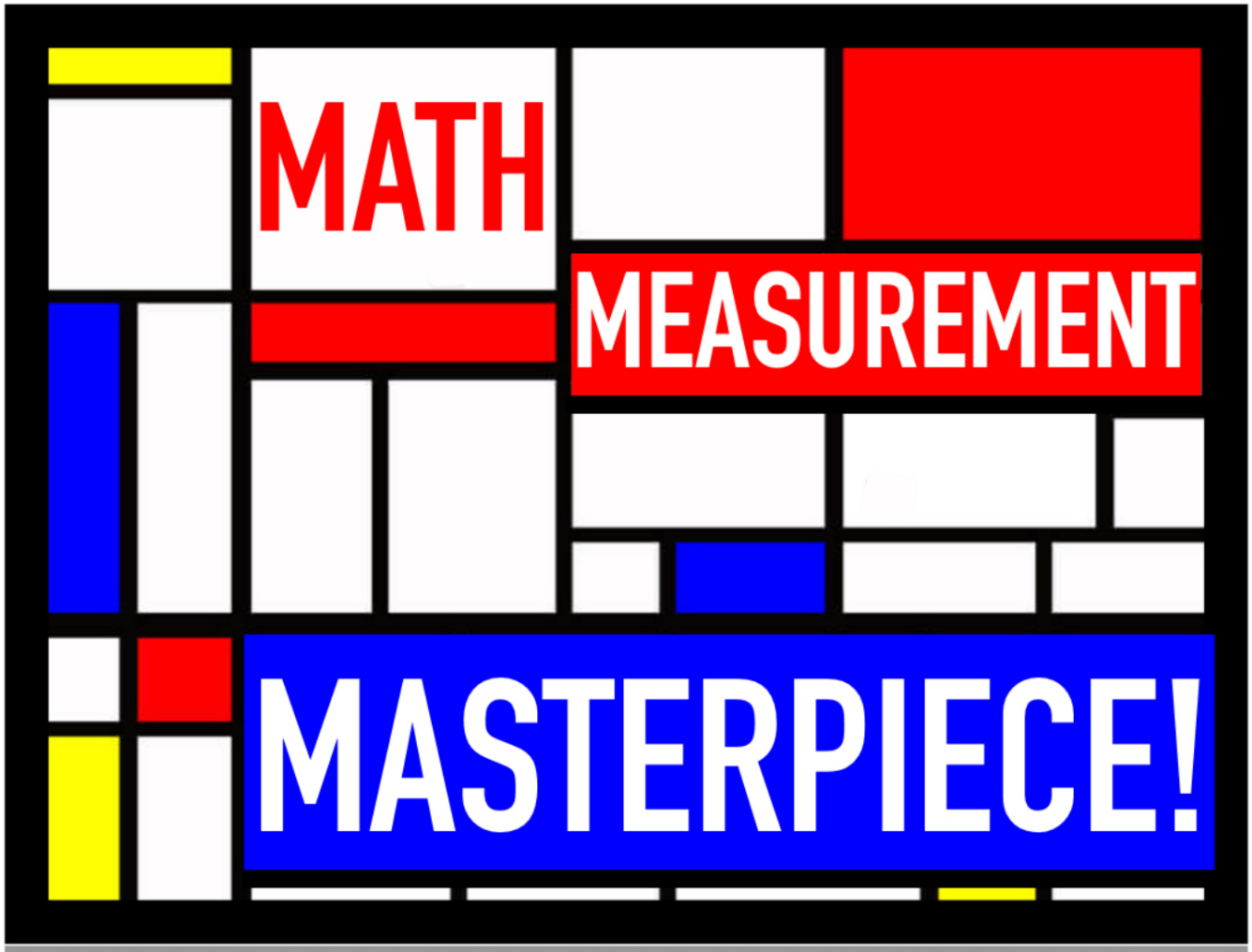
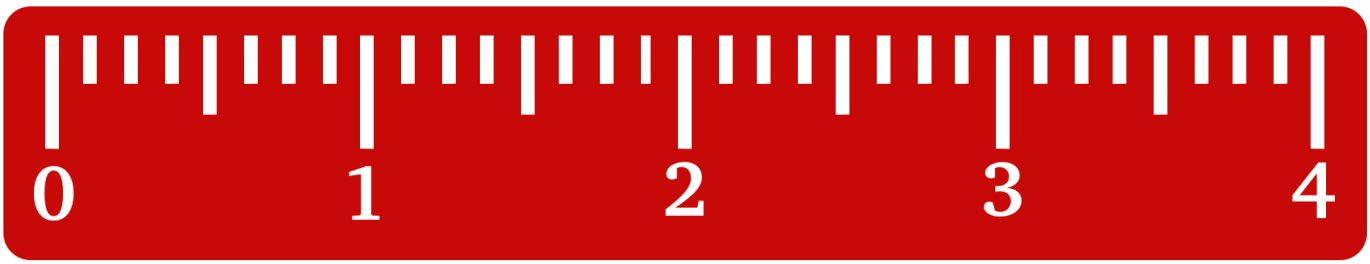


USING ART AS A PLATFORM FOR MATH

GRADES 3-5



Written by Kim Pierson, Karla Demars, and Cynthia Perilloux

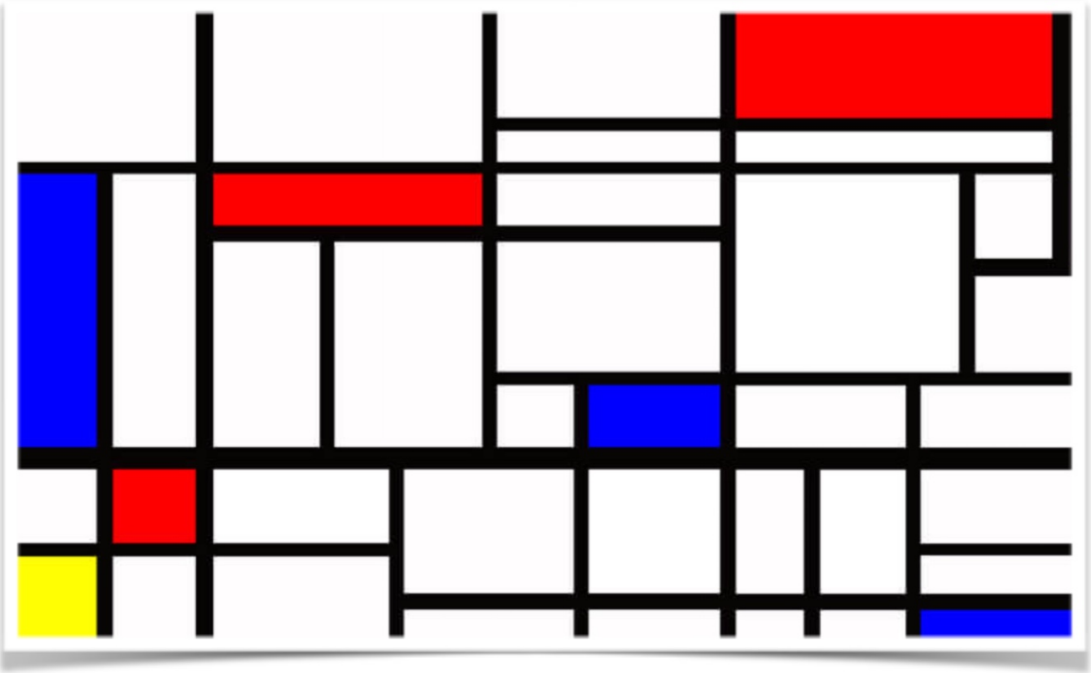
MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

CONTENTS:

 = Student Reproducible Page

Piet Mondrian

Abstract Art



A little bit about Mondrian!

Piet (pronounced Pete) Mondrian

Mondrian was an artist of the 20th century who is considered one of the greatest pioneers of abstract art. His early works contained recognizable figures but it became more abstract and simplified over time. Take a look at the images below. The first one is a perfect example of his early style of art. Anyone can tell it's a tree. As he matured in his skills he began shifting to

Mondrian's progressive shift to abstraction

1

2

3

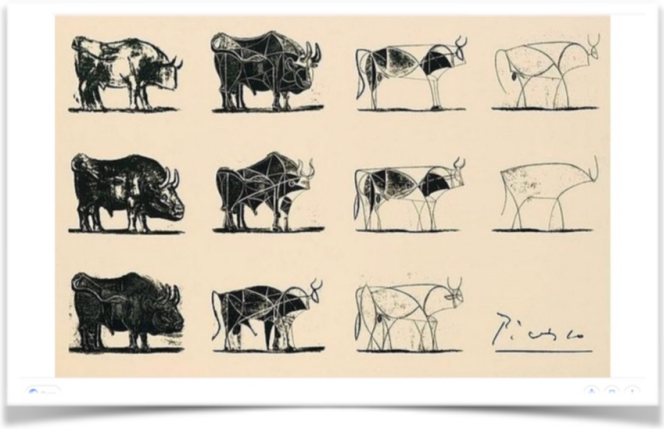
4

Birth: 1872
Mondrian was a Dutch artist.

1940's
Mondrian moved to New York to get away from the unrest of WWII

Mondrian's influence
Yves Saint Laurent, a famous designer, created an entire line of clothing in the 60's inspired by Mondrian's abstractions.

more simplified shapes. He is expressing ideas and emotions rather that recognizable shapes. Pablo Picasso created a study (right) that demonstrated the same concept. He wanted to share as much as possible with the least amount of shapes.



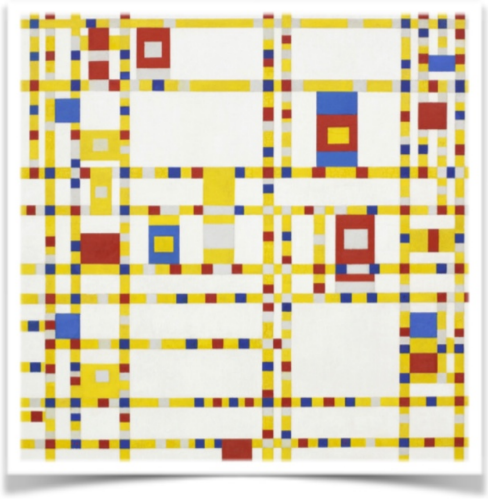
Another example of abstraction done by Picasso.

Question: In both examples can you explain how the last image came out of the first one?

Question: Can you see a "cow" in the abstract designs?

Picasso and Mondrian were using the same thought processes to conceptualize their work. Mondrian's most well known body of work consists of primary colors plus black and white arranged in rectangular forms. All of the lines are either horizontal or vertical.

BROADWAY BOOGIE-WOOGIE (1942-43)



The image at the right is considered Mondrian's masterpiece. It's his most famous and last completed painting. It was completed after he moved to New York where he celebrated and enjoyed the hustle and bustle of the city. He spent his free time dancing and listening to Jazz. The painting represents the busyness of New York with its stoplights and crowds and honking horns and the rhythm of music that he often enjoyed.

Question: In "Broadway Boogie-Woogie", describe the lines and shapes you see? Use vocabulary on the next page in your description.

Question: What are the similarities and differences between the image on the page 1 and this one?

Question: If you didn't know that this image was about the busy city and music, what would <u>you</u> see in it? What could it represent?

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

ART

Words to Know

Abstract
Simplify
Concept
Composition
Primary colors
Masterpiece

Definitions:

Abstract: expressing ideas and emotions by using ingredients such as colors and lines without creating a realistic picture

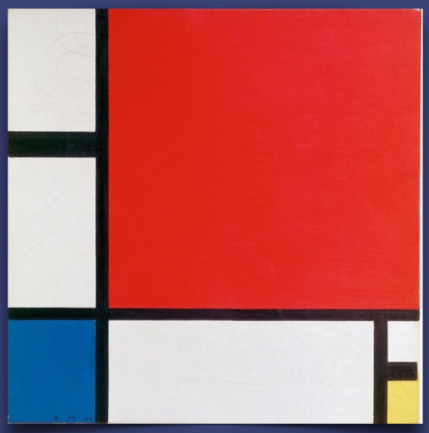
Simplify: to make realistic, complex elements simpler, less complicated

Concept: idea

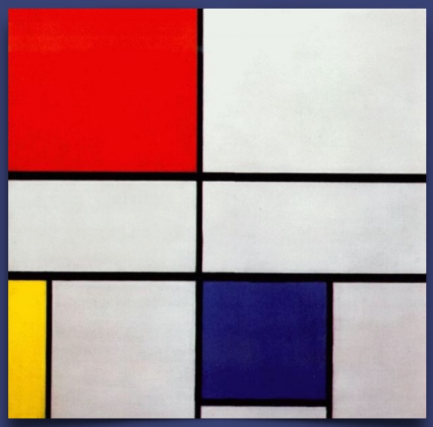
Composition: the arrangements of color and elements on the picture plane

Primary colors: the 3 colors that can't be made by mixing any other colors- *red, yellow, blue*

Masterpiece: of all of an artist's work, the single greatest piece created by him/her



1930 - Composition II with Red, Blue, and Yellow



1935 - Composition C (No. III) with Red, Blue, and Yellow

ART/MATH

Words to Know

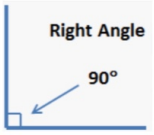
Vertical
Horizontal
Right Angle
Perpendicular
Parallel
Intersecting

Definitions:

Vertical: the direction of up and down

Horizontal: the direction of side to side

Right Angle: a 90 degree angle, formed by two lines that are perpendicular to each other. Angles found at the corner of a square or rectangle.



Perpendicular: describing something that intersects at right angles

Parallel: describes objects that run side by side the same distance apart without ever touching

Intersecting: lines that cross one another

Use a ruler like a pro!

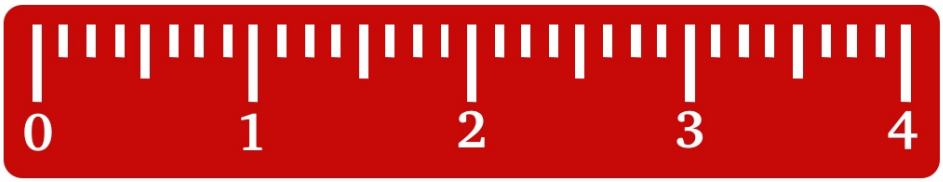
THINGS TO REMEMBER:

- Begin at ZERO, not the end of the ruler.

- Hold the ruler with wide fingers to stabilize it.

- Draw on the side of the ruler opposite the hand supporting the ruler.

- When drawing a line, drag the pencil along the edge of the ruler.



Using a Ruler

It's true that measuring with a ruler can be tricky. Making art really helps! You are going to create an abstract piece of art in the style of Mondrian but you'll need the help of a ruler to do it well. Before we discuss the artwork, we need to be sure you can use a ruler properly.

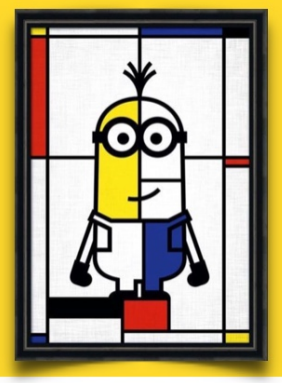
The ruler above is labeled in inches. The marks between the numbers indicate what fraction of the inch you're measuring. Make sure to start measuring at the 0, not at the edge of the ruler. Your teacher will explain the rest of the ruler to you.

A Note About Excellence

In art (and life) it's important to develop a habit of excellence. It just means that you try your absolute best. The most successful people are those who strive for excellence in whatever they do. Who doesn't want to be successful? Use this project as an opportunity to practice excellence.

Question: Can you think of any other activities that require excellence? What would happen if it was carelessly done?

When you create the project, you'll need to measure ACCURATELY!!! This is part of striving for excellence. Mondrian didn't draw or paint wonky lines. They were perpendicular, parallel, and straight. There were no diagonals because of his attention to accuracy. His desire for excellence eventually led to his huge success. Remember how much Composition C (no. III) sold for?

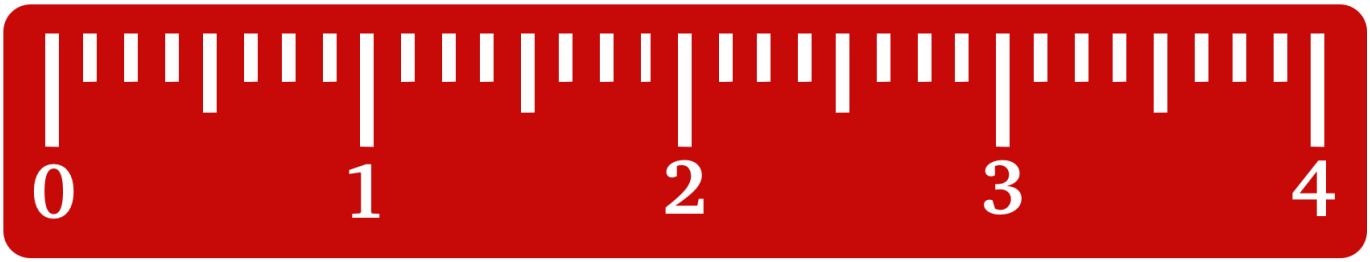


PARODY: A PRODUCT CREATED TO HUMOROUSLY IMITATE A FAMOUS WORK.

Mondrian has influenced art up to the present day. Recognize this guy? Mondrian didn't create this piece, but someone who was a fan did. This is called a parody. Kevin makes a great subject.

MP6- Mathematically proficient students try to communicate precisely to others.

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES



MINI LESSON 1

What is it?

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

MINI LESSON 1: WHAT IS IT?

Goal

Use a ruler to draw accurate line lengths to the inch.

Identify primary colors.

Generate original creative thought.

MP5- Mathematically proficient students consider and use the appropriate tools when solving a mathematical problem.

Materials

Red, yellow, & blue colored pencils or markers

Wide ruled loose leaf paper

Ruler

Introduction

Look at any Mondrian artwork. Observe the art using math terms.

Key items to discuss during the observation:

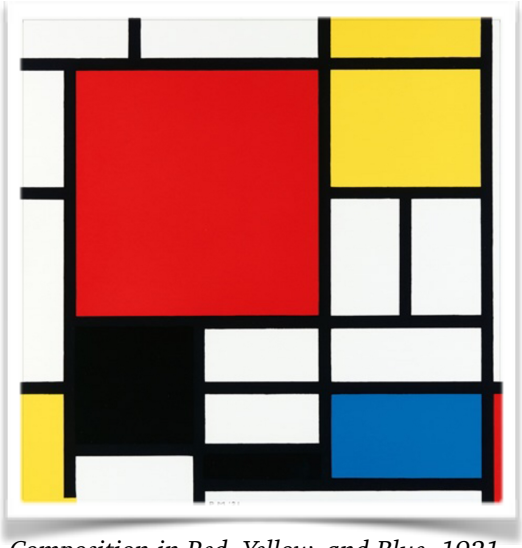
-Black lines are horizontal and vertical.

-Black lines are parallel or perpendicular.

-Primary colors (red, yellow, blue) are used.

-Primary color song: https://youtu.be/yu44JRTIxSQ

-A variety of sizes are used.



Composition in Red, Yellow, and Blue, 1921

Procedures

Demonstrate how to hold a ruler to stabilize it. Emphasize spreading thumb and fingers wide.

Point out that you draw on the side of the ruler opposite the hand supporting the ruler.

Emphasize that you begin at zero, not the end of the ruler.

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

On loose leaf paper, draw all lines on top of the printed blue lines beginning at the left margin (red line). Follow the chart below for line color and length.

Line Number	Color	Length
1	Red	2
2	Blue	3
3	Yellow	4
4	Blue	3
5	Red	2
6	**SKIP**	
7	Red	3
8	**SKIP**	
9	Red	5
10	**SKIP**	
11	Red	6
12	**SKIP**	
13	Red	5
14	**SKIP**	
15	Red	3
16	**SKIP**	2
17	Red	2
18	Blue	3
19	Yellow	4
20	Blue	3
21	Red	2

After all lines are drawn, turn your paper horizontally with the holes at the bottom. Without the ruler, draw a blue line connecting the tops of the lines you drew to create a shape.

Use your imagination to create a completed piece of artwork. Come up with something no one else would think of. Add details and a background to your work.

Final sample ***not to be copied.***

Closure

Share your artwork with the class. Discuss your unique creation and what inspired you.

Challenge: Do it again except this time change the measurements by adding half and quarter inches.

YOU'RE THE ENGINEER!

Line Number	Color	Length
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		

Building Materials

Colored pencils	Loose leaf paper
Ruler	Pencil

1.Design your own product using the empty chart.

2.Decide on color and length of line.

3.Use the word SKIP if you want to skip that line.

4.Make an answer key by drawing out your own design.

5.Trade with a partner to build each other's new design.

6.Compare your answer key with your partner's drawing.

7.Add detail to the design to make it your own.

Questions:

What did you build?_____

What made you think of that idea?

_____

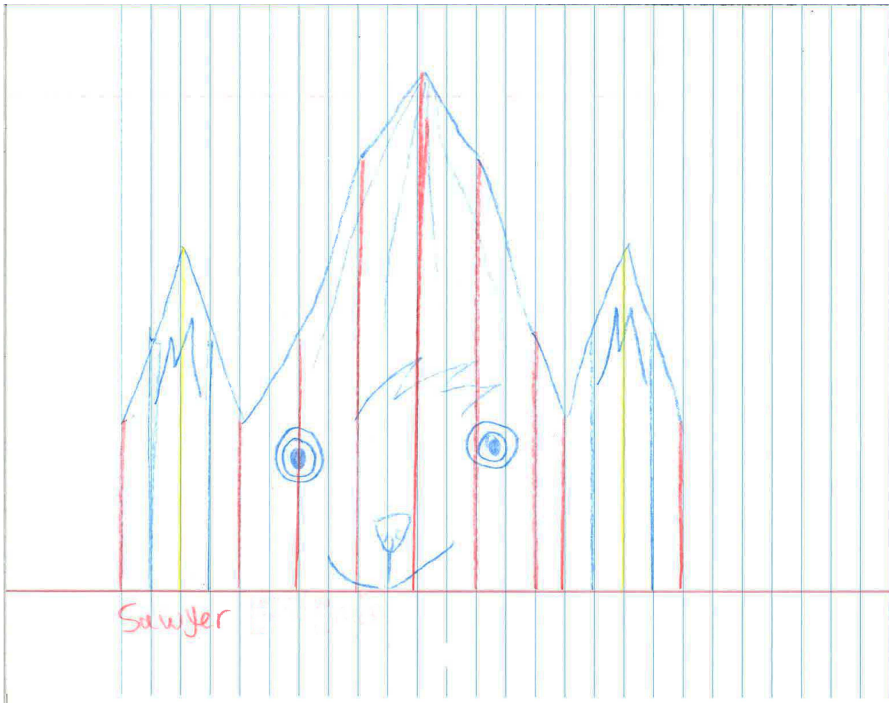
Where would you use this skill in real life?

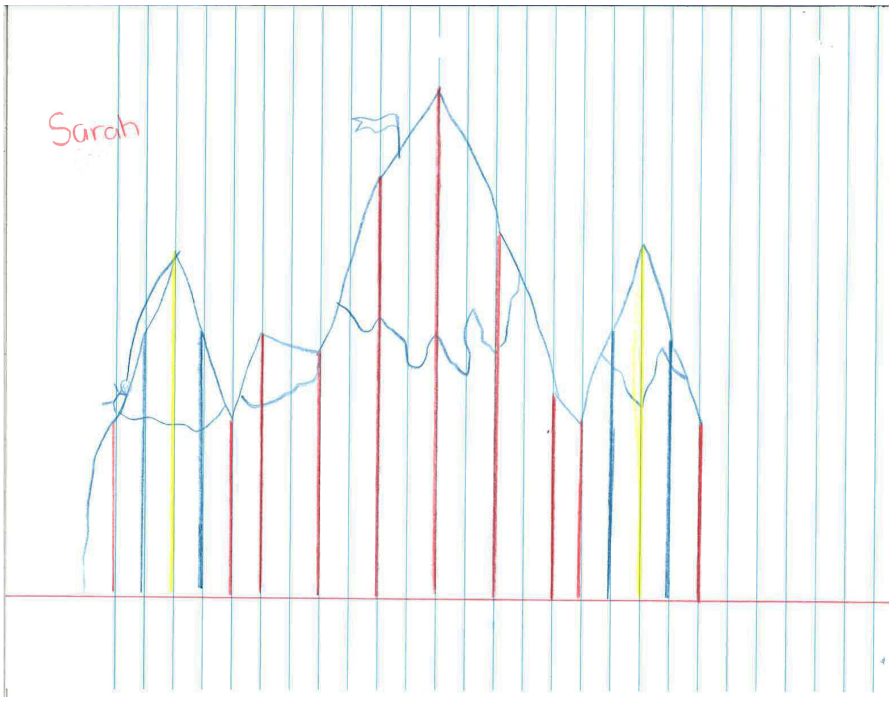
_____

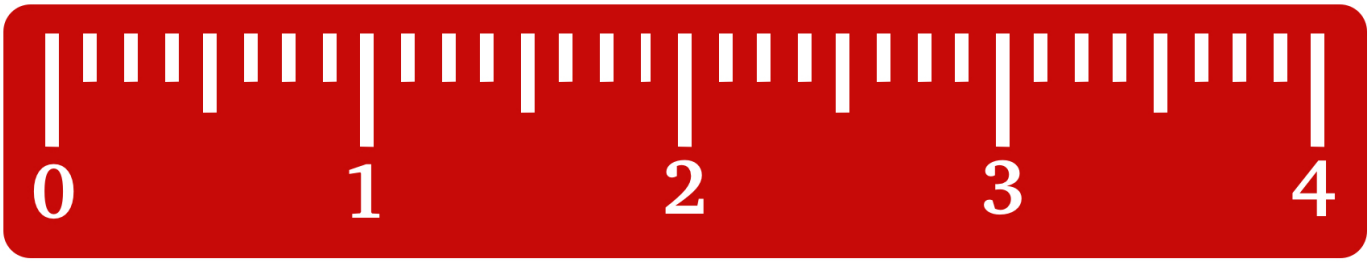
_____

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

STUDENT SAMPLES







MINI LESSON 2

Cityscape

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

MINI LESSON 2: CITYSCAPE

Goal

Use a ruler to draw accurate lengths of line to the half and quarter inch.

Create a cityscape using ruler and measurement skills.

MP5- Mathematically proficient students consider and use the appropriate tools when solving a mathematical problem.

MP6- Mathematically proficient students try to communicate precisely to others.

Materials

Colored pencils or markers	Wide ruled loose leaf paper
Ruler	Pencil

Introduction

Look at the artwork by Georgia O'Keeffe (right). Use your finger to trace a line down the side or top of the building. Identify whether the line is vertical or horizontal.

Mathematical Observations:

-vertical and horizontal lines

-perpendicular and parallel lines

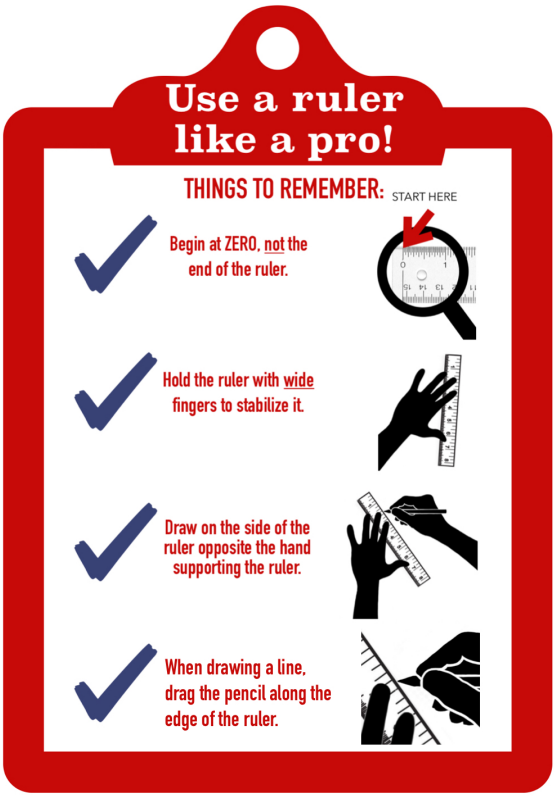
-right angles

Artistic Observations:

- Contrast creates visual interest
  - light against dark
  - small against large
  - organic shapes against geometric shapes

Radiator Building - Night; 1927.
Georgia O'Keeffe

Teamwork Time! Work with a partner to create the structure of a city.



Begin the drawing. Make your own and partner check for accuracy.

1. Starting at the top line, draw a 3 1/2 inch, horizontal line beginning at the left margin.
2. Skip 4 spaces. Draw a 6 1/4 inch, horizontal line beginning at the left margin.
3. On the line you just drew, measure 3 1/2 inches and put a dot.
4. Skip 6 spaces. Draw a 6 1/4 inch, horizontal line beginning at the left margin.
5. On the line you just drew, measure 4 1/4 inch and put a dot.
6. Skip 3 spaces. Draw a 4 1/4 inch, horizontal line beginning at the left margin.
7. On the line you just drew, measure 3 3/4 inch and put a dot.
8. Skip 5 spaces. Draw a 3 3/4 inch, horizontal line beginning at the left margin.
9. On the line you just drew, measure 2 1/2 inches and put a dot.
10. Skip 3 spaces. Draw a 2 1/2 inch line beginning at the left margin.

Congratulations! You're done with the horizontal lines!

11. Use your ruler to connect the end of line 1 to the dot of line 2. This line should be perpendicular to the lines you've already drawn.

12. Use your ruler to connect the ends of the 2 longest lines.

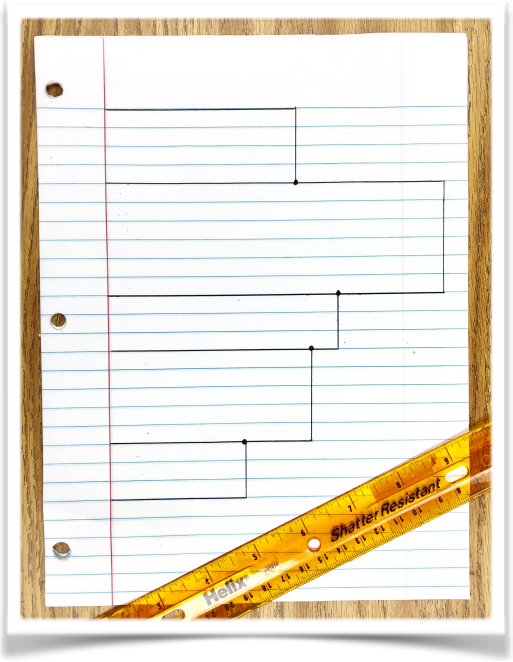
13. Use your ruler to connect the dot on the third line to the end of the 4th line.

14. Connect the dot on 4th line to the end of the 5th line.

15. Connect the dot on the 5th line to the end of the 6th line.

16. Turn your paper horizontally.

17. Remember Georgia O'Keeffe's artwork, *Radiator Building*? Use your imagination to create a completed piece of artwork. This is your city. Make it unique! Use any colors. Add interesting details to the foreground and background.



Closure

Share your artwork with the class. Discuss your creative differences. Point out your perpendicular and parallel lines.

Finished Early?

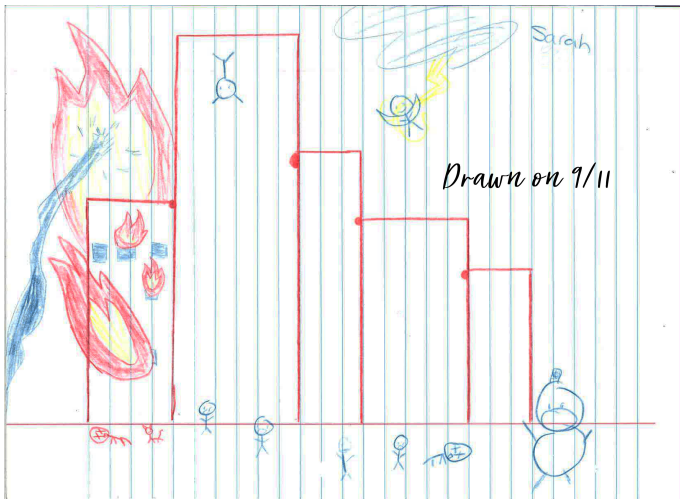
Challenge 1 LEVEL UP: Make your own cityscape, castle, mall, fort, etc. using measurements to the nearest quarter inch and partner check.

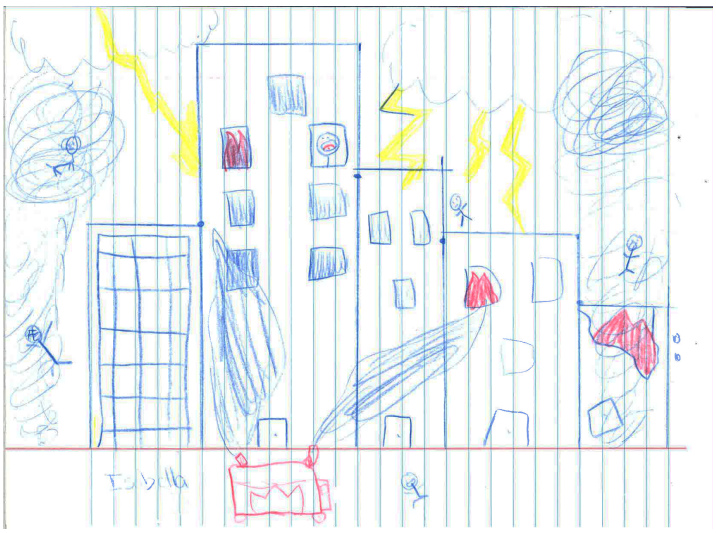
Challenge 2 LEVEL UP: Try working in centimeters.

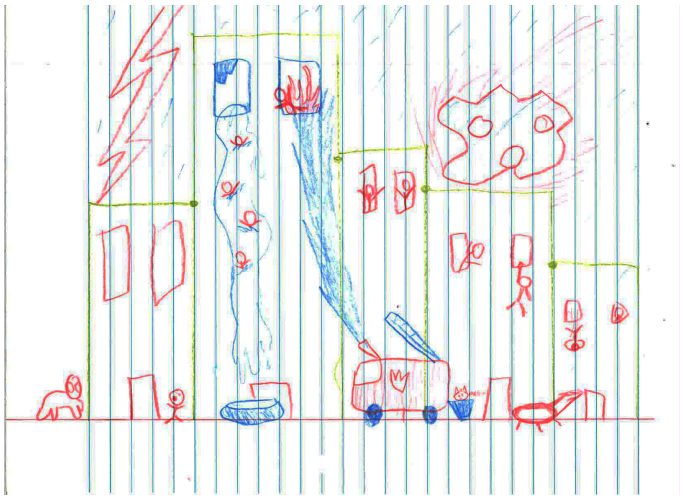
EXTREME CHALLENGE: Make your own city using accurate vertical and horizontal lines on unlined paper.

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

STUDENT SAMPLES







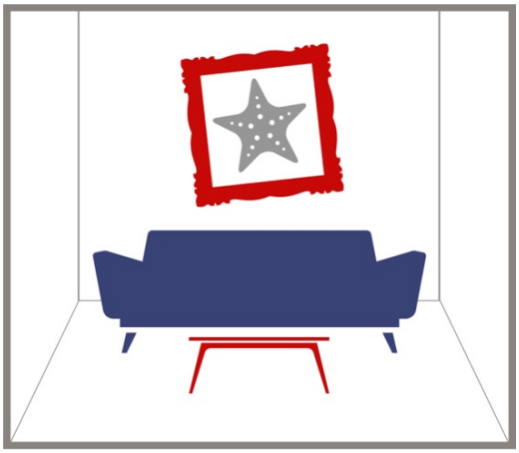
WHAT'S THE POINT OF LEARNING ALL THIS?

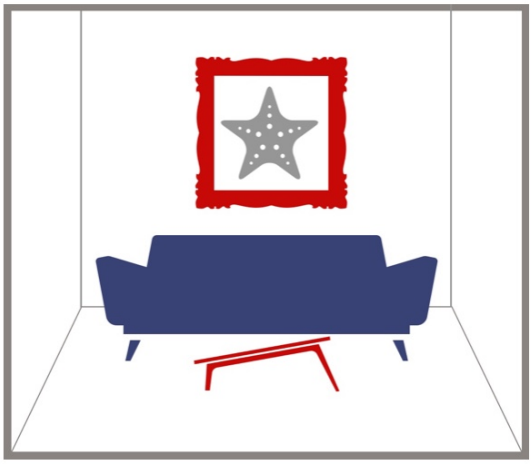
It's Real Life!

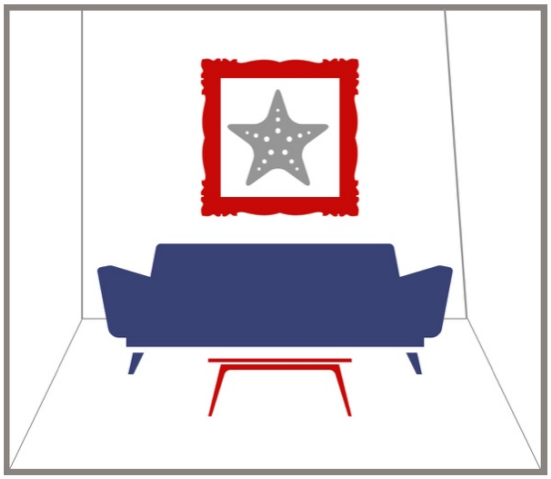
Imagine no one cared or knew how to make right angles, perpendicular, or parallel lines.

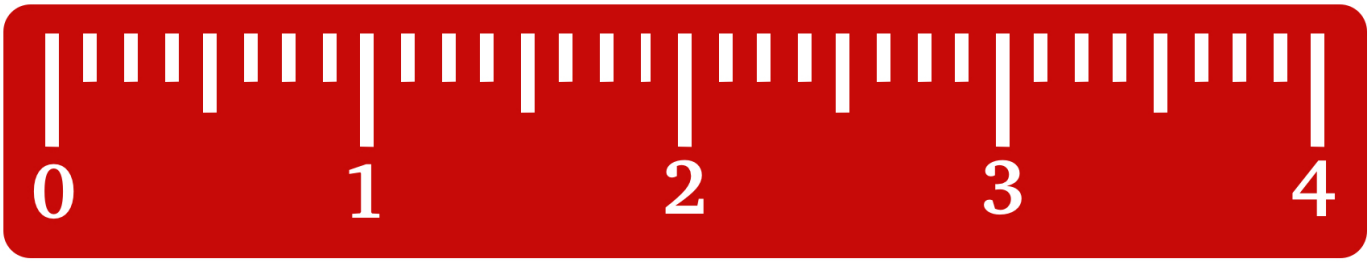
Directions: Draw your own sneaky problem below. Share with a partner and see if they can find the skewed part.

Circle the skewed part of the picture.









MINI LESSON 3

Minecraft Selfie

MINI LESSON 3: MINECRAFT SELFIE

(2-3 days)

Goal

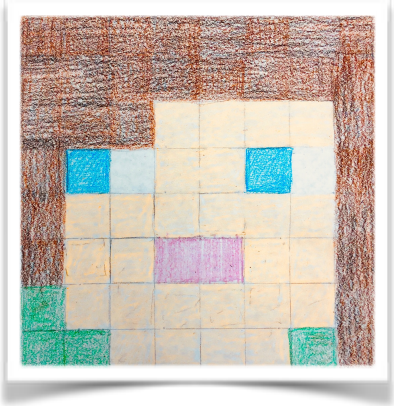
Measure and construct accurate parallel and perpendicular lines on unlined paper.

Draw level/square lines on unlined paper.

Create an original Minecraft style selfie.

MP5- Mathematically proficient students consider and use the appropriate tools when solving a mathematical problem.

MP6- Mathematically proficient students try to communicate precisely to others.



Materials

Pencil	Unlined white paper
Ruler	Scissors
Crayons or colored pencils	

Introduction

We are going to learn <u>why</u> we should draw lightly.

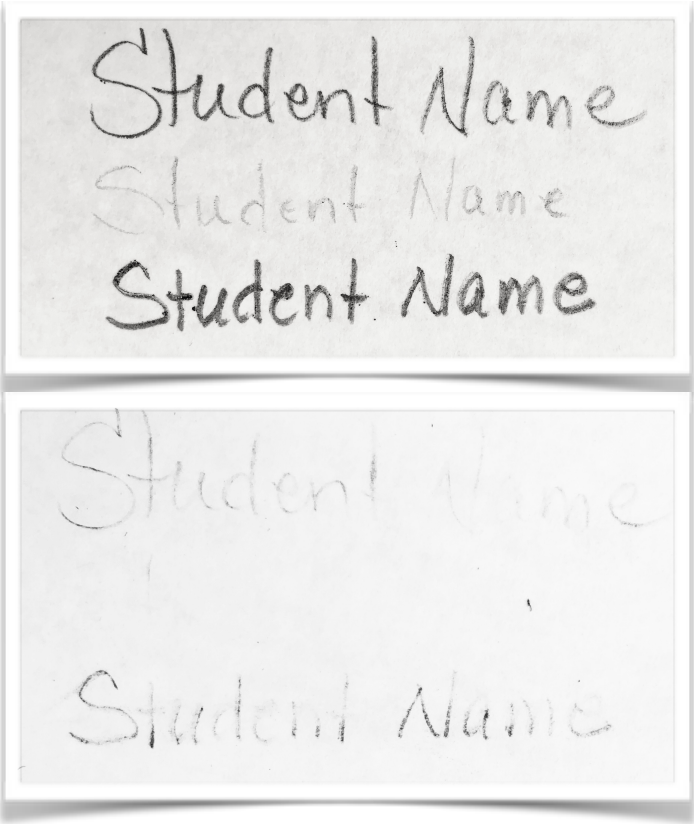
-Write your name on a piece of scratch paper like you normally do.

-Rewrite your name twice more: once as lightly as possible and once as dark as possible.

-Now erase EVERYTHING.

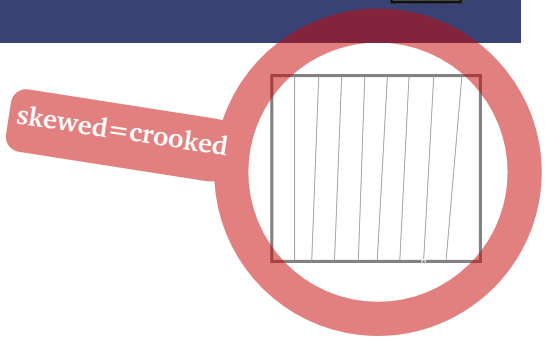
-What do you observe? *(One should be invisible or close to it. One might leave grooves in the paper and look like it may not have been erased at all.)*

-Drawing lightly will allow you to erase mistakes easily without feeling like your art is ruined.



MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

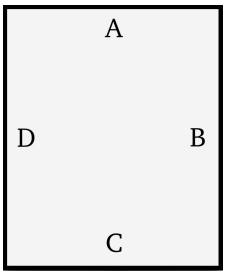
Before the Lesson



-You are about to make a square.

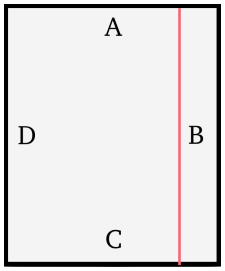
-If measurements aren't accurate the result will be **skewed** or crooked.

Procedures



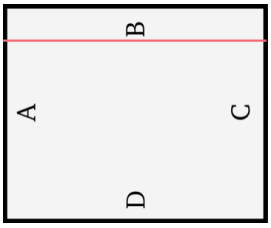
1. Position your paper in the portrait orientation. Label the top edge **A**. Continue labeling each edge **B**, **C**, and **D** in a clockwise manner.

2. Start with A position at the top. Using your ruler horizontally, line up your zero with the edge of the left side of the paper. Measure 8 inches across. Put a small dot there.



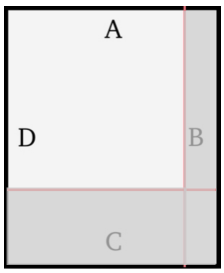
3. Slide your ruler down and make two more dots at the 8 inch mark.

4. Line up the ruler to connect the 3 dots. Use the ruler to draw a straight line extending off both sides of the page.



5. Turn your paper 90 degrees or 1/4 turn. The B position should be at the top.

6. On the line you just drew, measure 8 inches and put a dot.

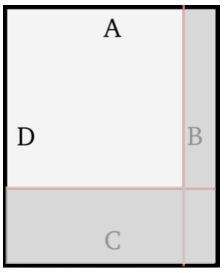


7. Slide your ruler down and make two more dots at the 8 inch mark.

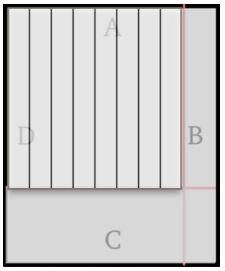
8. Line up the ruler to connect the 3 dots. Use the ruler to draw a straight line extending off both sides of the page. You should have an 8in x 8in square.

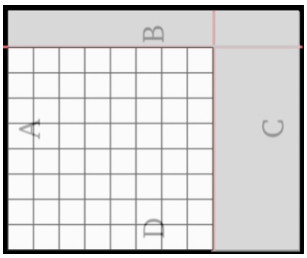
9. Do you see the square? With your pencil lightly shade the areas that are not the square. You should see the square clearly.

Drawing the Grid

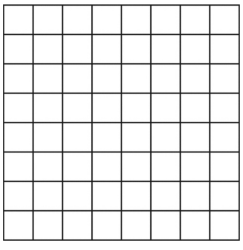


1. You will now draw a 1 inch grid in the square. Position your paper with **A** at the top.
2. Put your ruler at the top of the square and make a small mark at every inch.
3. Place the ruler in the middle of the page and the bottom of the page and do the same thing.
4. Then use the ruler to make a straight line connecting each dot at the top with its partners in the middle and the bottom.
5. Erase all of your dots so you won't get confused.





6. Position your paper with **B** at the top.
7. Then place the ruler at the top of the square and make a small mark at every inch.
8. Place the ruler in the middle of the page and the bottom of the page and do the same thing.
9. Then use the ruler to make a straight line connecting each dot at the top with its partners in the middle and the bottom.
10. You should now have a 1 inch grid.



11. Cut off the shaded part of the paper.
12. Plot your design in pencil before adding color unless you want to redraw the grid.
13. With crayons or markers, create a Minecraft selfie using the grid lines. No curves allowed. You're done!

Closure

Share artwork with the class. Discuss creative differences. Point out perpendicular and parallel lines.

For the teacher:

Younger grades may benefit from skipping one page from this lesson. You could either teach them to measure and cut the square OR provide the square and have them draw the grid.

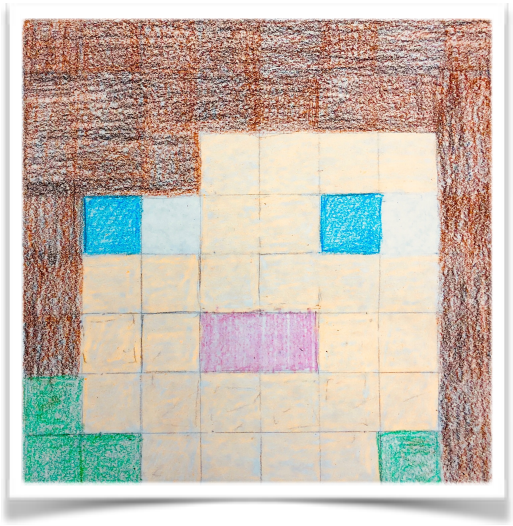
Extend the Lesson for extra practice:

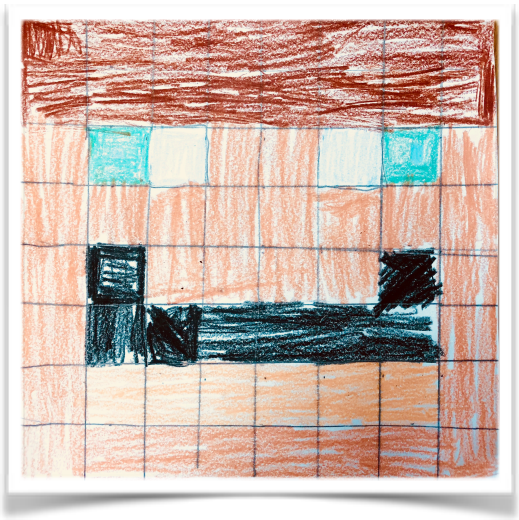
- Change the size of the square. *(Example: Make a 6 inch square.)*
- Put a square within the square. *(Example: Make a 2 inch frame.)*
- Put multiple squares within the square. *(Example: Make an 8 inch square and divide it into 4 squares.)*
- Make fractional statements about the design. *(Example: How much of the grid is blue?)*
- Design the grid according to provided fractions. *(Example: Make 1/4 of the grid red. Make 1/8th polka dots.)* Fractions can vary. Emphasize equivalent fractions.

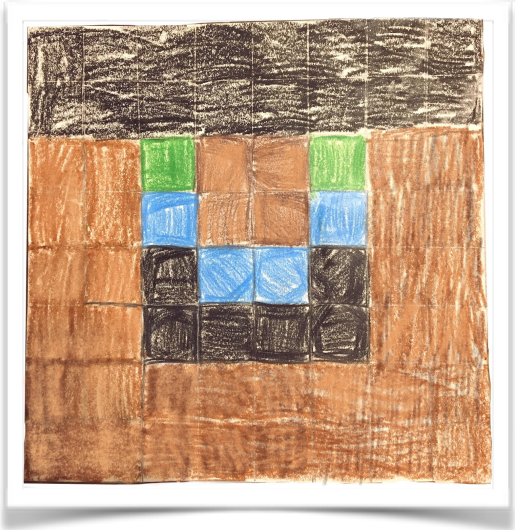
- Use blue tape to map out a grid on the tile floor or the wall.
- Design a hopscotch layout on the sidewalk using sidewalk chalk and a yardstick or ruler. Give students a starting point like a dividing crack in the sidewalk.
- Draw a 4 square basket ball layout on the concrete using a yard stick or tape measure and sidewalk chalk.
- Design a human sized board game using sidewalk chalk and yard sticks outside.

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

STUDENT SAMPLES







MINECRAFT SELFIE TEMPLATE

4 COLOR MYSTERY

Goal:

Use fractions to identify portions of a whole.

Reduce fractions to simplest terms.

Create an original design using 4 colors.

Materials

Pencil Crayons or colored pencils Gridded white paper

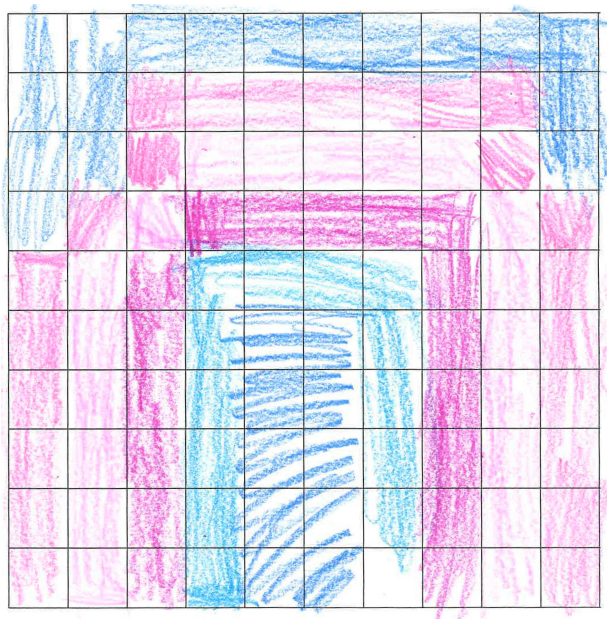
Directions: Randomly select 4 colors. Using these colors only, create a picture on the grid paper provided. Do not divide any of the squares. Each block must be a solid color.

How many squares are on the whole page? _____

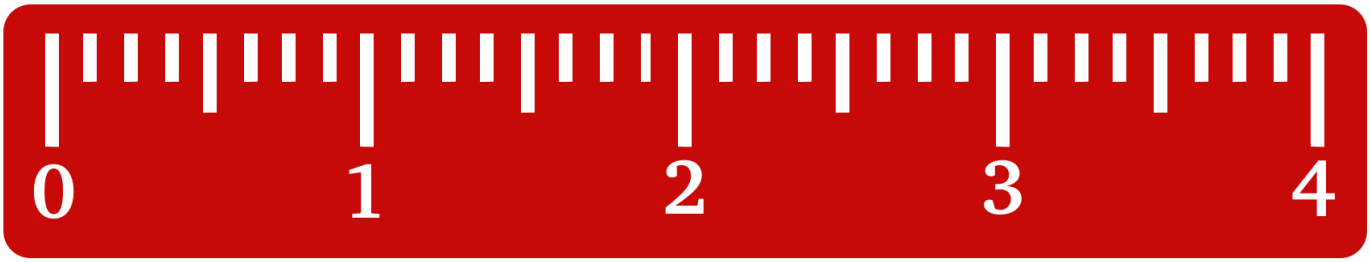
In the chart below, color the top square with each of the 4 colors you used in your picture.

Color 1	Color 2	Color 3	Color 4
In your design, how many squares are color 1?	In your design, how many squares are color 2?	In your design, how many squares are color 3?	In your design, how many squares are color 4?
What fraction of the picture is color 1?	What fraction of the picture is color 2?	What fraction of the picture is color 3?	What fraction of the picture is color 4?
Reduce the fraction to its lowest terms.	Reduce the fraction to its lowest terms.	Reduce the fraction to its lowest terms.	Reduce the fraction to its lowest terms.

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES



MEASUREMENT AND FRACTIONS
3RD–5TH GRADES



FINAL PROJECT

Self-Guided Student Instructions

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

THE PROJECT (LEVEL 1)

Get ready to create a beautiful piece of abstract art! Use this checklist to make sure you meet all the requirements. Follow these steps and you won't go wrong. Check the boxes when you finish each step.

☐ Gather your supplies. You'll need these things:

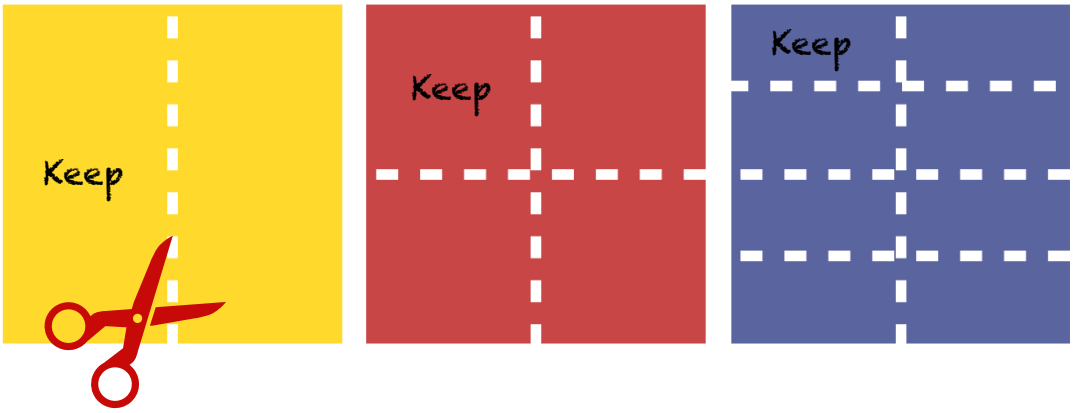
Colored paper (4"x4") - 1 piece of each primary color

White Paper (9"x12") - 1 piece

Scissors, ruler, pencil, black marker, glue stick

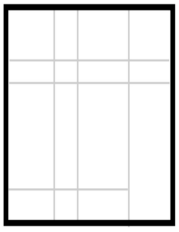
☐ Use the chart and diagram below to measure and cut the pieces.

Color Choice	Favorite color	Middle	Least favorite color
Fraction to cut and keep	1/2 of the paper	1/4th of the paper	1/8th of the paper



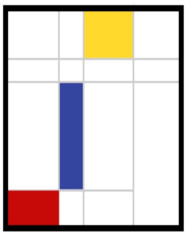
☐ Put the good pieces to the side and recycle the extra colored paper.

☐ On the white paper, draw at least 6 horizontal and vertical lines VERY LIGHTLY with a ruler. They can be drawn anywhere on the paper as long as they are horizontal or vertical and intersect. You will use them as guides to place your squares and rectangles. Whatever parts of the lines you don't use, you will erase at the end.

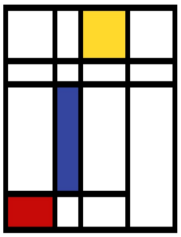


MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

- [ ] Place each colored shape in a corner of the lines you drew. Continue placing the shapes until you like the composition. When you are pleased with your layout, glue the shapes.



- [ ] When all pieces are glued down, use a black marker to trace next to the shapes and lines you've created. Erase any unwanted pencil lines.



- [ ] Sign your artwork small in the bottom right hand corner. You're an abstract artist!

- [ ] When you finish, look at your image and imagine what real thing it could represent. Use that idea to title your work. Be prepared to describe it to your classmates.

THE PROJECT (LEVEL 2)

Get ready to create a beautiful piece of abstract art! Follow these steps and you won't go wrong. Check the boxes when you finish each step.

☐ Gather your supplies. You'll need:

1 large piece of white paper, ruler, pencil, markers

☐ Make a random grid pattern using perpendicular lines. Some lines should extend to the edges of the page. The rest should end at an intersection. No diagonals. Make sure you have each of the following measurements as part of your design:

-3 inch x 2 inch rectangle

-1 inch square

-1/2 inch x 6 inch rectangle

☐ When you have created lots of intersecting squares and rectangles, and included the required shapes above, color some of the enclosed spaces using ONLY primary colors. Make sure that about 2/3 of the artwork is white.

☐ After you've neatly colored all of the rectangles and squares you've designed, use the edge of your ruler to trace all of your vertical and horizontal lines in black marker. Make them roughly 1/4 inch thick.

When you think you're done...

☐ Double check to see that you've met the requirements of the design.

☐ Sign your artwork small in the right hand bottom corner. You're an abstract artist!

☐ When you finish, look at your image and imagine what real idea it could represent. Use that idea to title your work. Be prepared to describe it to your classmates.

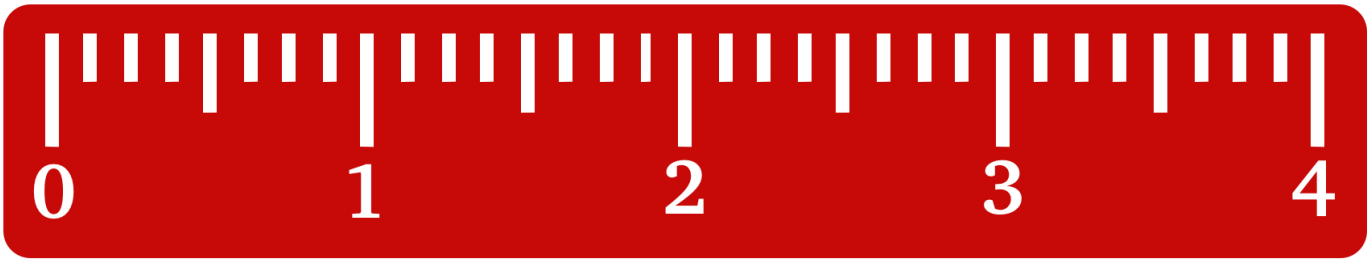
MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

RUBRIC: MONDRIAN AND MATH

Student Name:_____ Date:_____

	Needs Development	Meets Expectations	Exceeds Expectations
Accuracy in Measurement	The required measurements are mostly inaccurate. Lines are not parallel and perpendicular.	The required measurements are mostly accurate. Lines are mostly parallel and perpendicular.	The required measurements are accurate. Lines are parallel and perpendicular.
Creativity	The work is a close copy, not original in design.	The work is somewhat original in design.	The work unique and original in design.
Neatness	The work is sloppy.	The work is fairly neat.	The work is very clean.
Commitment to excellence	The work shows little effort and student attitude was lacking.	The work shows moderate effort and student attitude was acceptable.	The work shows a commitment to excellence and attitude was exceptional.
Points for each category	1	2	3

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES



LESSON PLAN

Final Project

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

FOR THE TEACHER

The lesson plan

Mondrian and Math (Measurement and Fractions Applied)

Grades 3-5

Art Objectives:

VA-CE-E3 Use art vocabulary and the elements and principles of design to convey the language of art (create and discuss own artwork)

VA-CE-E1Explore and identify imagery from a variety of sources and create visual representations

VA-CE-E5 Draw on imagination, individual experience, and group activities to generate ideas for visual expression

VA-AP-E1 Use elements and principles of design and basic art vocabulary for expressing responses to the work of others

VA-AP-E4 Recognize that there are many possibilities and choices in the processes for designing and producing visual arts

VA-HP-E6 Recognize great artists and works of art that have shaped the history of art

VA-CA-E1 View works of art and express observations about how the elements and principles of design are used in the works

VA-CA-E5 Express interpretations about works of art and give supporting reasons

Math Objectives:

Math: Associated Standards

The following standards are directly linked to the goals and objectives of these lessons.

GRADE 2

2MD.D.9

Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units

2.G.A.3

Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

GRADE 3

3.MD.B.4

Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. C

3.MD.C.6.

Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

3.MD.C. 7.

Relate area to the operations of multiplication and addition.

3.G.A.2

Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.

GRADE 4

4.MD.C.5a

Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.

4.MD.C.6

Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

4.MD.C.7.

Relate area to the operations of multiplication and addition.

4.G.A.1

Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

GRADE 5

5.NF.4.C

Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths.

5.G.A.1

Graph points on the coordinate plane to solve real-world and mathematical problems. 1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number in the ordered pair indicates how far to travel from the origin in the direction of one axis, and the second number in the ordered pair indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

5.G.B.3

Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

Materials

4”x4” red, blue, and yellow paper

9”x12” white paper

Ruler

Pencil

1/4” black masking tape (not electrical tape) **OR** black markers

Scissors

Glue stick

Prior Knowledge:

Students should have practiced drawing vertical and horizontal lines using a ruler.

They should have basic knowledge of fractions to 1/8th.

Introduction:

The teacher will display Mondrian’s work and ask students to imagine what the image could represent. Allow for answers.

Presentation:

Introduce Mondrian:

The teacher will discuss and explain Mondrian’s biography and artwork. See pages 3-5. Allot time for answering questions in red with a partner. Discuss answers as a class.

Discuss vocabulary on p.5 with students so they will be familiar with them during the task.

Explain to students that they will be creating their own artwork inspired by Mondrian’s work. Everyone’s should be different so don’t try to copy a neighbor’s design. Before beginning the project students need to practice measuring parallel and perpendicular lines. Diagonals are not allowed. The mini lessons provided should help to prepare students for this project.

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

Review Measuring Accurately:

The teacher will reinforce the method for drawing a measured line using a ruler. This should include

- how to hold the ruler while drawing by spreading fingers wide AND applying pressure
- what side of the ruler to use when drawing
- starting at 0 rather than the edge of the ruler
- using dots not dashes to mark measurements because dashes are inaccurate
- dragging the pencil along the ruler edge for straight lines

Explain to students that their measurements need to be accurate or their lines will end up slightly diagonal (skewed/crooked). Avoid diagonal lines!

Practice:

The mini lessons that precede this project should prepare students for measuring accurately.

The Project:

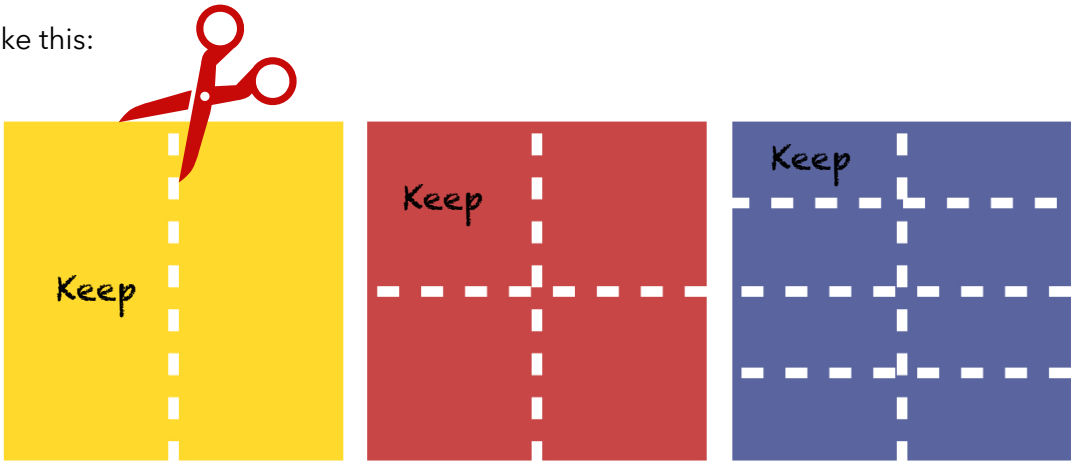
1. Students will collect materials.
2. Students will rank colors in order of preference. See chart below.
3. Students will mark and cut their colored pages using one of the following options.

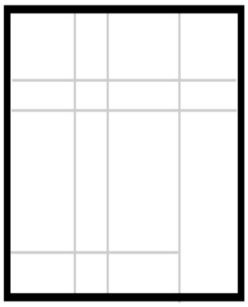
Color Choice	Favorite	Middle	Least favorite color
Fraction to cut and keep	1/2 of the paper	1/4th of the paper	1/8th of the paper

(Easier option:) Fold the paper to find the measurement then cut.

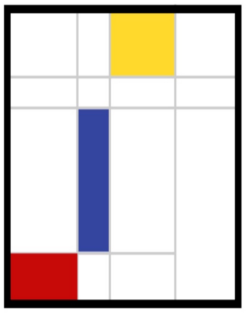
- Use the ruler to measure the assigned size. Draw a line down the center. Cut.

4. Pages should be cut like this:





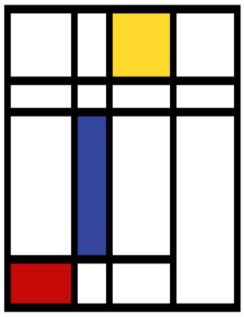
5. Instruct students to keep only pieces that were required. The remainder should be recycled. See chart and diagram above for which portions to keep.
6. Students will begin drawing at least 6 random vertical and horizontal lines on the white paper using the ruler to measure accurately. Lines should end at an intersection or the edge of the paper, not in an open space. Remind them to DRAW THE LINES LIGHTLY! Some may need to be erased later.
7. When at least 6 lines are drawn, students will line up colored cut outs at different corners. They should try different placements to see what they like best.



8. When they like the arrangement of colors, they will glue the pieces next to the corners.
9. Once all shapes are glued, students will add any extra lines to wrap around the shapes.
10. Students will erase any unwanted lines.
11. Lastly, they will outline all of the pencil lines in black marker.

    Alternative1: Cut out black strips of construction paper and glue them on top of the pencil lines and the shapes.

    Alternative 2: Use black Washi tape to cover the pencil lines. Don't use electrical tape. It doesn't stick well.



12. Have students sign their names discretely at the bottom right hand corner when they are done.
13. Hang the work and critique and discuss it as a group. Here are the 4 stages of criticism in order.

    1. Encourage students to use visual observation to **describe** the artwork. (It's mostly white, with yellow, black, red, and blue. All lines are vertical or horizontal.)
    2. **Analyze** the work using art and math vocabulary. (Primary colors and straight lines make up an abstract composition. The vertical lines suggest balance and the horizontal lines suggest calm.)
    3. **Interpret** the work by trying to explain the meaning of the work. This one is tough because it's abstract and students may not be able to tell what the work is about. They can make up their own interpretation instead. (This composition looks like a hide and seek game between colors.)
    4. Finally, students will make a **judgment** about the work. It's personal preference. (Save this question for a private writing assignment so feelings won't get hurt.)

MEASUREMENT AND FRACTIONS
3RD–5TH GRADES

Evaluation:

Mondrian and Math Rubric

Critique using the 4 stages of criticism

Cross-curricular ideas:

ELA-

- Use any of the stages of criticism as a writing project.
- Read further about Mondrian's earlier, more realistic works. Compare and contrast his early work with his later work.
- Write a descriptive poem or an acrostic poem about one of Mondrian's paintings.
- Write a short story about what you image your artwork to be about.

Social Studies-

- Have students explore information about what it must have been like to live in Europe during the World Wars and why Mondrian might have moved to New York.
- Mondrian and van Doesburg started an art movement called *De Stijl* which means *The Style*. Have students look up other art movements occurring at the same time as Mondrian's work and what external social influences played a part.

Technology-

- Have students use either Microsoft Paint or Excel to create a Mondrian-style artwork.

Science-

- Discuss physical structure of horizontal and vertical lines and why they create support and balance.

NOTES