Grade Level/Course:
Grade 1 & Grade 2

Lesson/Unit Plan Name:
Partitioning Shapes

Rationale/Lesson Abstract:
This lesson helps builds student's understanding of partitioning shapes into equal pieces – a foundation for later work with fractions. Creating various concrete and hands-on experiences for first and second grade is a critical component for developing an understanding of partition shapes and early fractions. Using pattern blocks, paper plates, and rectangles will be used to support and develop an understanding and meaning of partitioning.

Timeframe:
Activity 1 What is partitioning - Pattern Blocks – 60 min
Activity 2 Partitioning Equal Size Pieces - Circles & Rectangles – 60 min
Activity 3 Paper Folding – Smaller or Bigger Pieces?
Activity 4 Drawing Practice

Common Core Standard(s):
1.G.3 Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

2.G.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.

Instructional Resources/Materials:

1. Pattern Blocks
2. Paper Plates
3. Rectangles from construction paper, various sizes
4. Pencil, crayons or markers

Additional Materials for Extension Activities

1. PlayDoh
2. Cuisinart Rods
3. Cookie Template
4. Sheet Protectors and dry erase pens
5. GeoBoards

Activity/Lesson:

The following activities begin students' conceptual development of partitioning shapes. In first grade students focus on halves and fourths. Students do not need to know how to write a fraction.

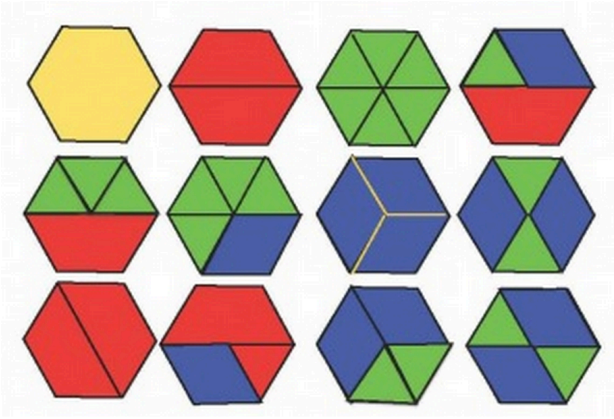
In 2nd grade students will continue to develop an understanding of partitioning shapes and include thirds. In grade 3, students are formally introduced to fractions.

Activity 1: What is partitioning?

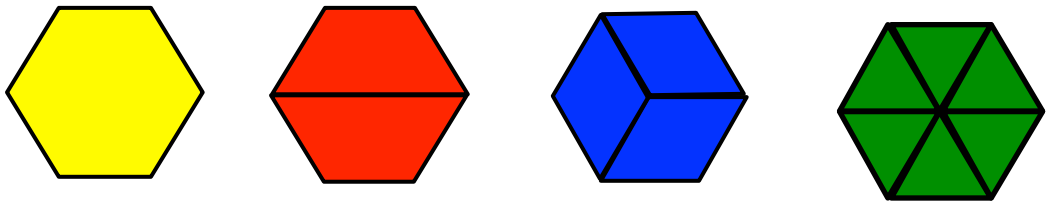
Objective: Students will be introduced to the idea of partitioning shapes by working with pattern blocks to determine which shapes can be used to be "equal shares" of a hexagon.

1. Introduce pattern blocks to students. Ask them about what they notice, and what are the names of the shapes.
2. Tell students that today's exploration is going to be about creating same shapes. We will use smaller shapes to create bigger shapes.
3. Model using the pattern blocks – use smaller shapes to create a bigger shape. The smaller shapes do not need to be identical.
4. Have students explore and create different shapes.
5. Class debrief – have students share different creations that were made.
6. Introduce the word "PARTITION".
7. Classify whether the shapes are made of equal pieces or different sized pieces.
8. Introduce the vocabulary and language to discuss the shapes and partitioning. Continue practicing the sentence frames and vocabulary over the course of several days as you go through a variety of lessons and activities

Partition means to split or separate something into different pieces. Shapes can be partitioned into equal sized pieces or different sized pieces. We are interested in taking a closer look at shapes that are partitioned into equal size pieces.



Hexagons – with pattern blocks that show partitioned into equal pieces



How many equal pieces?

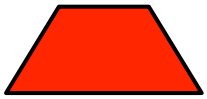
- The hexagon is **partitioned** into **2 equal pieces** with 2 red trapezoids.
- The hexagon is **partitioned** into **3 equal pieces** with 3 blue rhombi.
- The hexagon is **partitioned** into **6 equal pieces** with 6 green triangles.

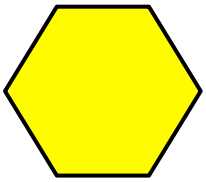
*Note: The focus of first grade is to understand partitioning into 2 equal pieces as halves and 4 equal pieces as fourths/quarters. This activity is to help students understand the idea of partitioning and have the partitions be equal size pieces.

A focus on "Half" & "Fourth/Quarter"

For 1st & 2nd Grades

Students need to talk about equal shares as "half of" and "a quarter of" or "fourth of ".





The TRAPEZOID is HALF OF the HEXAGON.

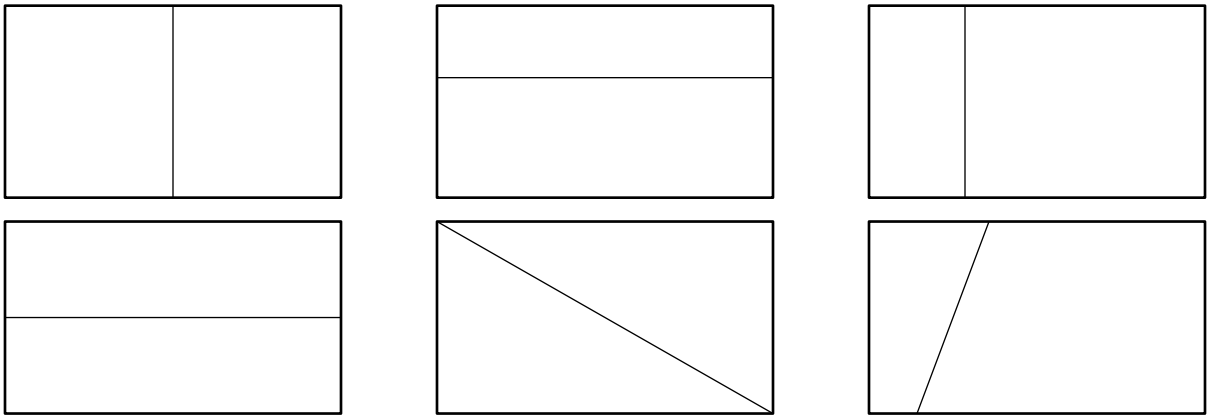
The Hexagon is 2 EQUAL SHARES of the TRAPEZOID

This concludes a hands-on introductory to partitioning shapes. Next it is important to look at circles and rectangles and explore different ways to partition these shapes – with a focus on partition to create 2 equal pieces that we call "half" and partitioning into four equal pieces that we call "fourths" or "quarters".

Activity 2: Partitioning Equal Size Pieces

Objective: Students will look at rectangles and circles and identify which ones are partitioned into equal size pieces. Students will be able to identify a shape partitioned into 2 equal pieces as "halves" and 4 equal pieces as "fourths/quarters". (Grade 1: halves & fourths/quarters Grades 2: halves, thirds, & fourths/quarters)

Shapes Partitioned into Equal Pieces (Rectangles)
2 Equal Pieces - Halves



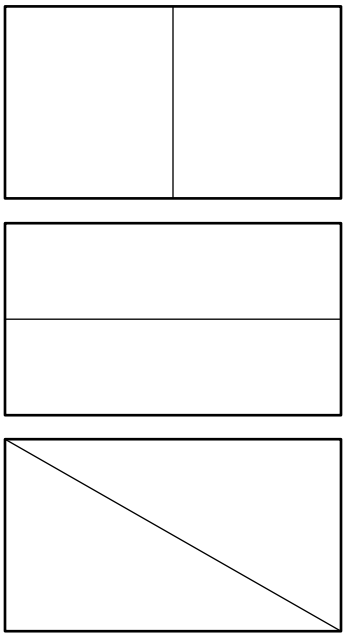
T: What do you notice about these shapes? [Rectangles, two pieces, have straight lines, etc.]

T: Let's see if we can place these into two different groups. How could we separate these into different groups?

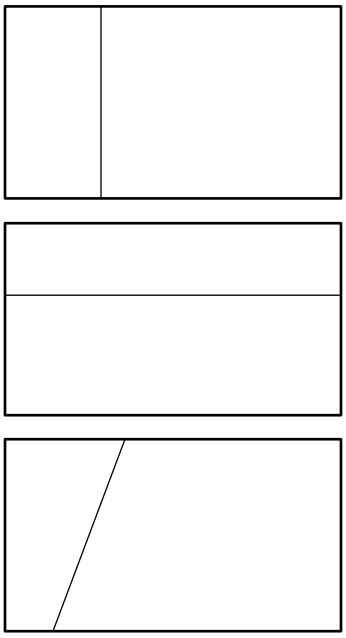
Which rectangles are partitioned into 2 equal size pieces? Which rectangles are partitioned into 2 pieces that are not the same (unequal)?

Rectangles into Halves
2 Equal Pieces

Examples

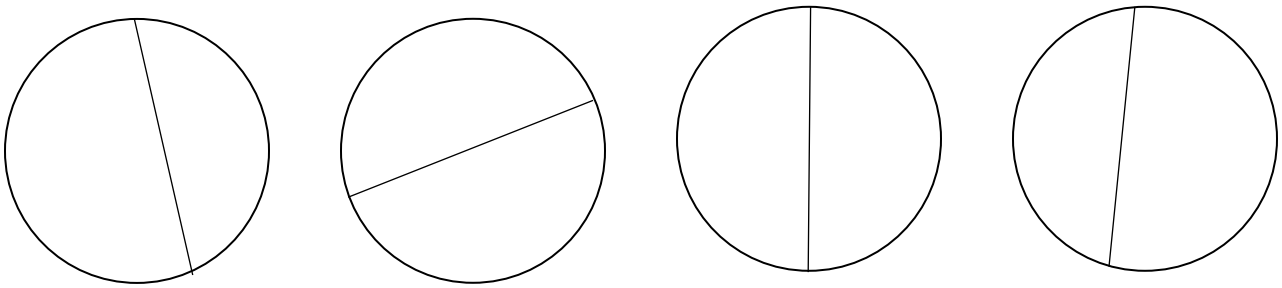


Non-Examples



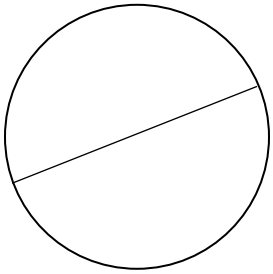
Continue the conversation looking at circles partitioned into 2 equal pieces.

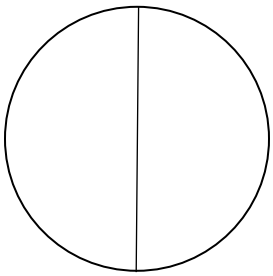
Shapes Partitioned into Equal Pieces (Circles)
2 Equal Pieces - Halves



Circles into Halves
2 Equal Pieces

Examples





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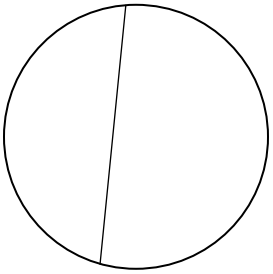
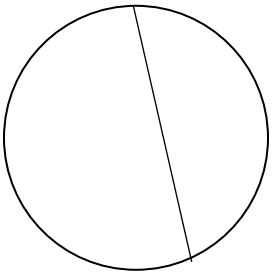




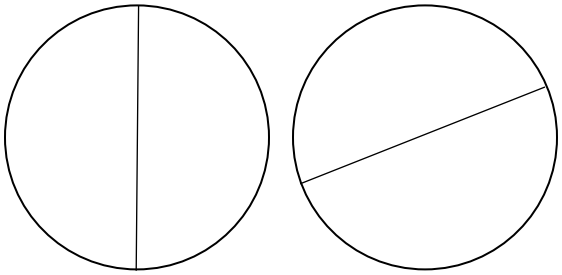
"When a shaped is partitioned into 2 equal pieces, each piece is called a HALF."

"When a shaped is partitioned into 2 equal pieces, each piece is called a HALF."

T: When have you heard the word "half"?
S: when sharing a pizza or cookie (or other food).

T: Great! Yes, when we share something with a friend, we split it in HALF. If we want to be fair, we each have the same size.

T: These circles are partitioned into 2 equal pieces.
T: Each piece is HALF of the circle.



Extension:
Prepare cards with circles that are partitioned into 2 pieces. Some should be partitioned into 2 equal pieces (halves) and some should be partitioned into 2 pieces that are not halves.

Have students get one card and find their partner that has a match to create a full circle.

Have students decide if their circle is partitioned into HALVES.

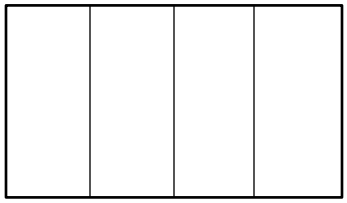
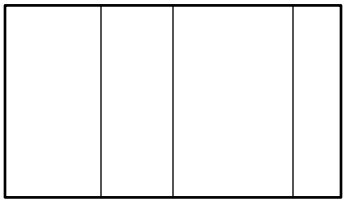
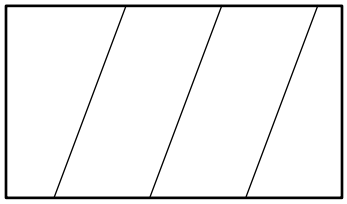
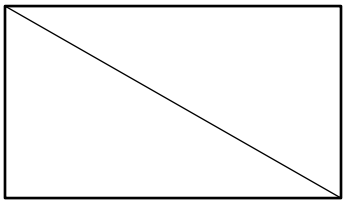
T: Is your circle an equal share?
T: If your circle were a cookie, would you be happy with your part?

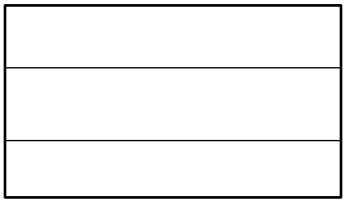
T: Who has a circle that is partitioned into 2 equal pieces, into halves?

Have students share their circle. Encourage students to start describing the circles as having 2 equal partitioned pieces and that these pieces are called "halves". One of the equal pieces if *half of* the entire circle.

Shapes Partitioned into Equal Pieces (Rectangles)
4 Equal Pieces –Quarters & Fourths

Continue the conversation looking at rectangles and circles partitioned into 4 equal pieces.

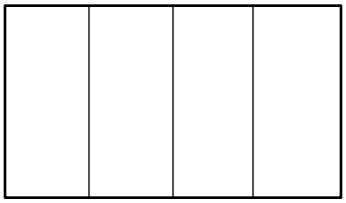


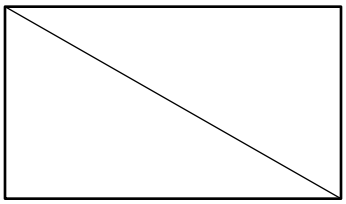
Create a chart – which shapes are examples of a rectangle partitioned into equal sized pieces and which ones are non-examples.

"When a shaped is partitioned into 4 equal pieces,
each piece is called a QUARTER or a FOURTH."

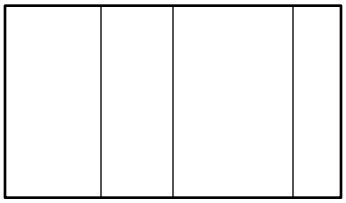
Rectangles into FOURTHS/QUARTERS
4 Equal Pieces

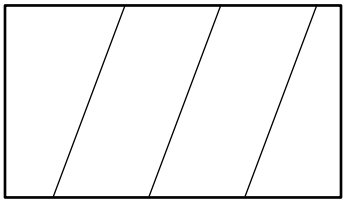
Examples

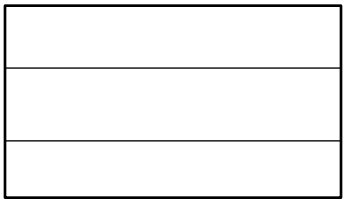




Non-Examples



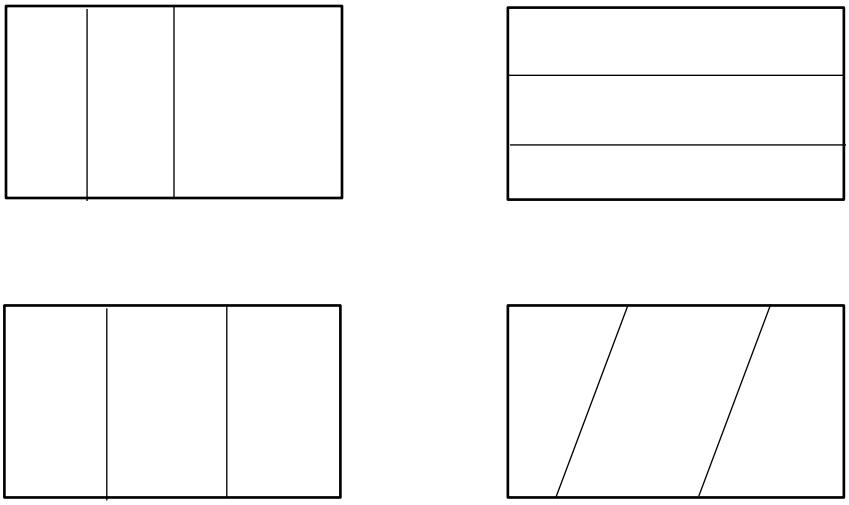




Shapes Partitioned into Equal Pieces (Rectangles & Circles)
3 Equal Pieces –Thirds
(Grade 2)

In a similar way to the examples above for looking at circles and rectangles that are partitioned into halves or fourths/quarters, introduce partitioning into 3 equal pieces. One of those pieces is called a "THIRD".

"When a shaped is partitioned into 3 equal pieces, each piece is called a THIRD."



T: Which rectangles are partitioned into 3 equal pieces? {Top right, and bottom left]

T: When a shape is partitioned into 3 equal pieces, one of the pieces is called a THIRD.

Activity 3: Paper Folding

Objective: Students will be able to identify when a shape will have smaller sized pieces based on how many equal partitions are made.

Folding Circles using a paper plate

Materials – paper plates

Each student will need a paper plate for this activity.

T: What shape is this? [Circle]
T: If I want to show two equal pieces what could I do [cut it in half, fold It in half]
T: Today, I am going to fold it in half.

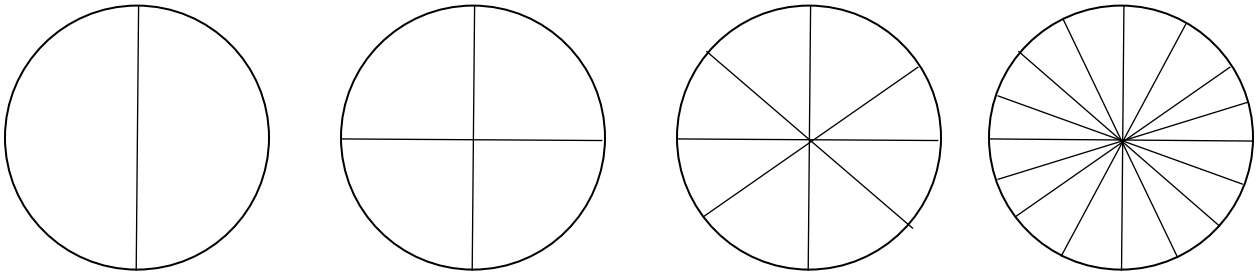
Fold the paper plate in half. Open it up and look at the two partitions.

T: How many partitions do we have?
T: Are they the same size? [Yes]
T: What is each partition called? [A half]

T: Let's fold it back in half. Ok. Now what will happen if I fold the plate again? [Accept student answers]
T: Ok, let's fold it a second time.

Fold it again. Then open it up. Discuss if the partitions are equal or not, how many equal shapes are there, and that each one if called a quarter or fourth of the circle.

Continue folding the paper plate 2 more times.



Class Discussion/TPS:

What happens to the size of the pieces as you make more partitions?

T: As we made more folds to the paper plate, what happened to the number of pieces? [Each time we had more pieces]
T: What happened to the size of the pieces? [The pieces get smaller]

Lead students through a discussion on the amount of pieces and the size of the pieces. Have students share ideas with a partner and then as a class.

As the number of partitions increase, the size of each piece gets smaller – the size of the pieces decreases.

Folding a Rectangle using a strip of paper

Materials – strip of paper or adding machine tape

Each student will need a strip of paper for this activity.

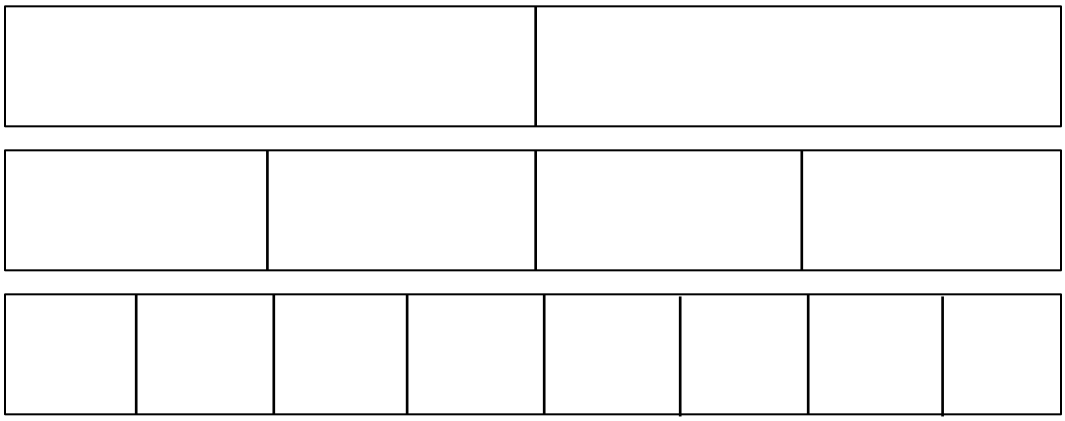
T: What shape is this? [Rectangle]
T: If I want to show two equal pieces what could I do [cut it in half, fold It in half]
T: Today, I am going to fold it in half.

Fold the strip of paper in half. Open it up and look at the two partitions.

T: How many partitions do we have?
T: Are they the same size? [Yes]
T: What is each partition called? [A half]

T: Let's fold it back in half. Ok. Now what will happen if I fold the strip of paper again? [Accept student answers]
T: Ok, let's fold it a second time.

Fold it again. Then open it up. Discuss if the partitions are equal or not, how many equal shapes are there, and that each one if called a quarter or fourth of the rectangle.



Class Discussion/TPS:

What happens to the size of the pieces as you make more partitions?

T: As we made more folds the strip of paper, what happened to the number of pieces? Each time we had more pieces]
T: What happened to the size of the pieces? [The pieces get smaller]

Lead students through a discussion on the amount of pieces and the size of the pieces. Have students share ideas with a partner and then as a class.

As the number of partitions increase, the size of each piece gets smaller – the size of the pieces decreases.

Activity 4 Part A: Student Practice - Drawing

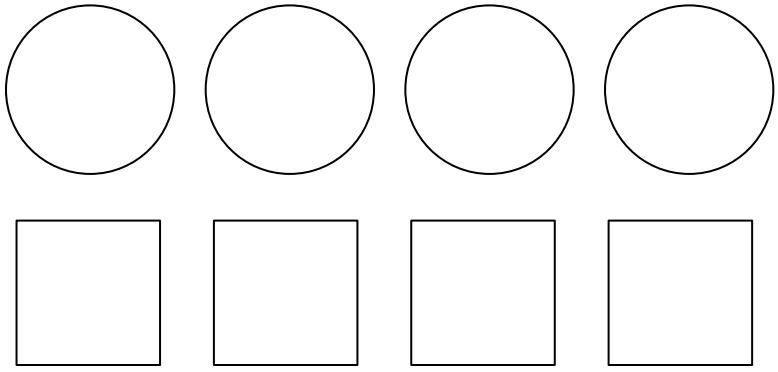
Student activity sheets are included at the end of this lesson to help students practice drawing lines to partition shapes into halve and fourths (and thirds). Model with students how to draw lines to create a shape with equal shares.

Discuss with students how to draw straight lines, how to know you have equal size pieces.

Include:

- Draw a multiple ways to partition circles and rectangles into halves and fourths/quarters (for Grade 2 include thirds).
- Sample students prompts include:
    - *Show 4 different ways to make HALVES*
    - *Show 4 different ways to make FOURTHS/QUARTERS*
    - *Draw lines to show 2 equal shares.*
    - *Partition each shape into halves.*
    - *Partition each shape into thirds.*
    - *Partition each shape into fourths/quarters.*

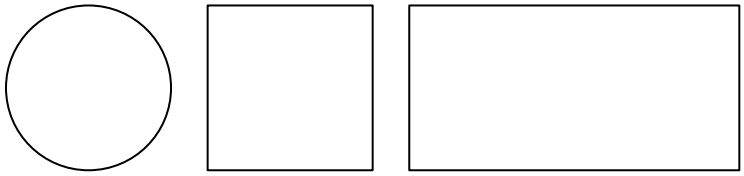
Show 4 different ways to make _____.



Activity 4 Part B: Student Practice - Drawing

Below are student activity sheets to practice drawing lines to partition shapes into halve and fourths. Model with students how to draw lines to create a shape with equal shares.

Draw lines to show _____ equal shares.
Partition each shape into _____.



Extension Activities:

Extension Activity #1 - Marking on a Segment
Using a variety of shapes and representations is important to help students understand the concept of partitioning. Using a line segment is a similar model to partitioning a rectangle. It also supports students in becoming more familiar and proficient with using a number line.

Using a line segment, have students mark half of a segment or quarter/fourth of the segment. For grade 2, mark the segment into 3 equal parts – into thirds.

Extension Activity #2 - Using PlayDoh
PlayDoh offers a tactile way of exploring partitioning. Give each student a piece of PlayDoh and a plastic knife. Have students create a circle or rectangle (or rope-like). Then ask students to cut into 2 equal pieces or 4 equal pieces. For Grade 2, students can cut into 3 equal pieces.

Key Discussion Points:

- How do you know that your partitioning created equal pieces?
- Discuss the number of cuts that are made to create each type of partitioning.
- What is the name of each piece? [A “half”, a “quarter/fourth” or for grade 2 - a ”third”]

Extension Activity #3 - Marking a Template (in sheet protector)
Use a template of a circle or rectangle and place inside a plastic sheet. Have students practice partitioning the shape using a dry erase pen.
Sample templates are included in this lesson.

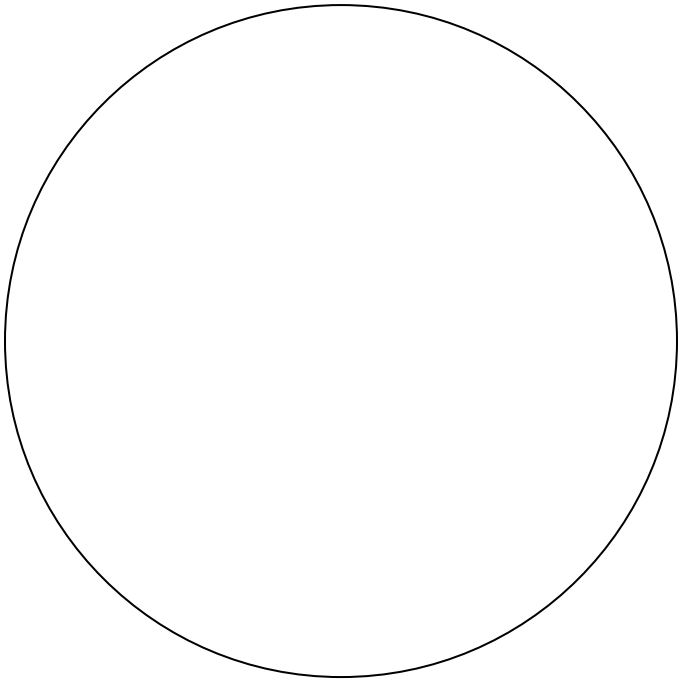
Extension Activity #4 - Cuisinart
Cuisinart rods can be used to explore the relationship between the lengths of each rod. Have students explore which rod can be created by two other rods of the same size (or 4 rods of the same size).

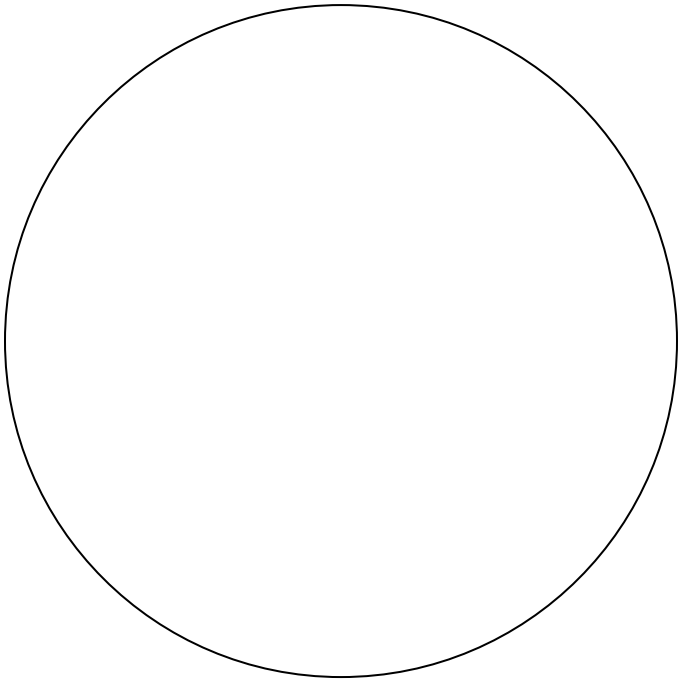
Extension Activity #5 – GeoBoards

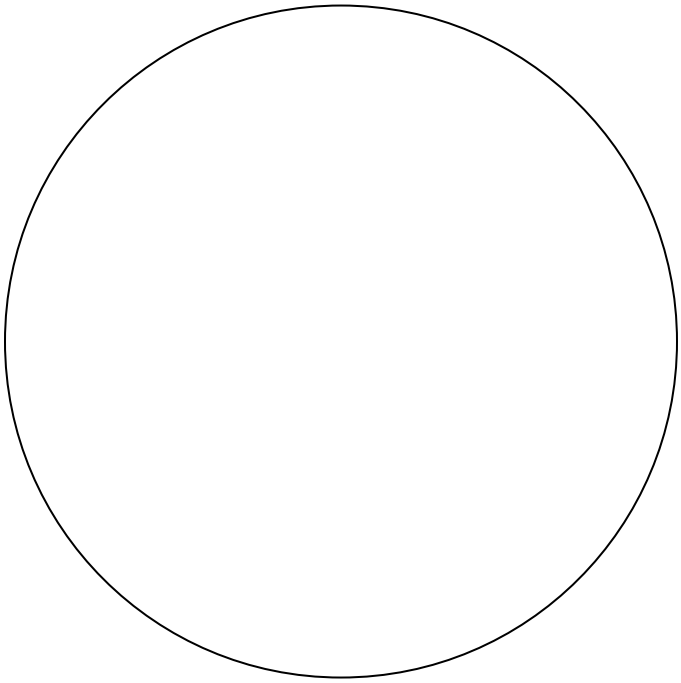
Use a GeoBoard to create different rectangles and partition the rectangles into halves or fourths (and thirds for Grade 2).

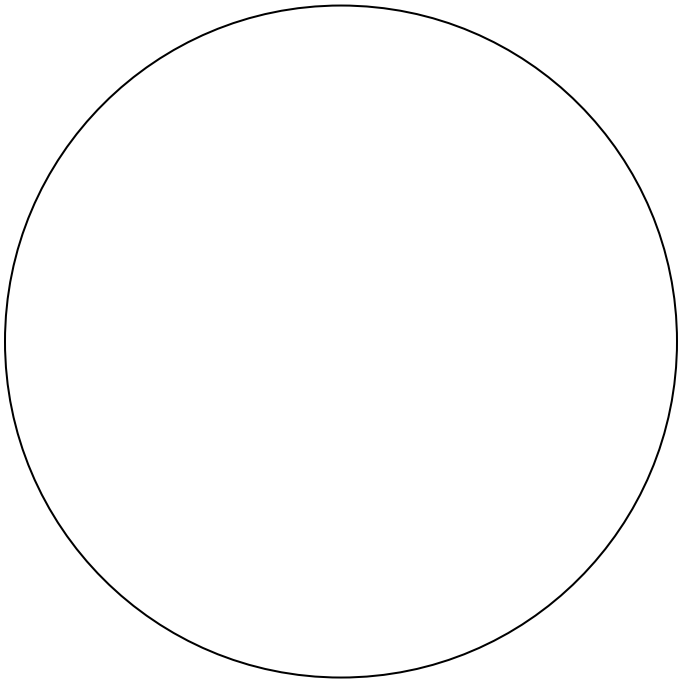
Student Name _____ #_____

Show 4 different ways to make HALVES.



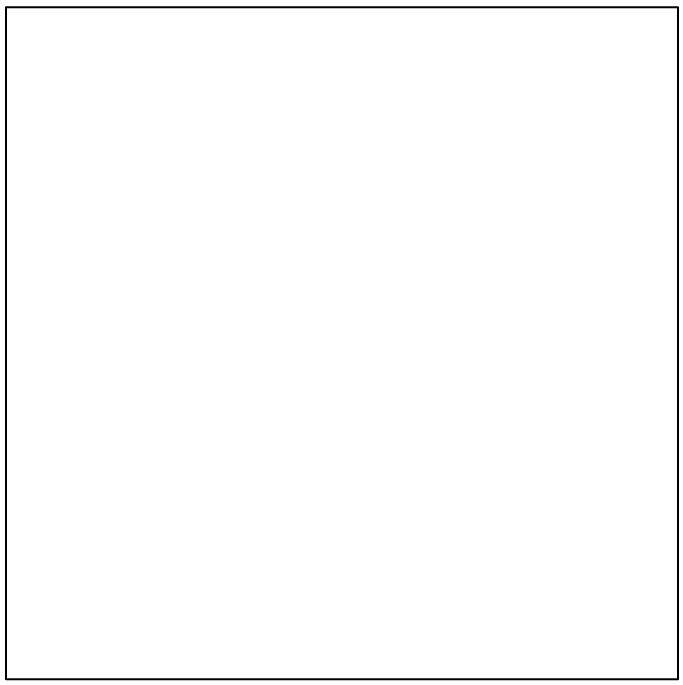


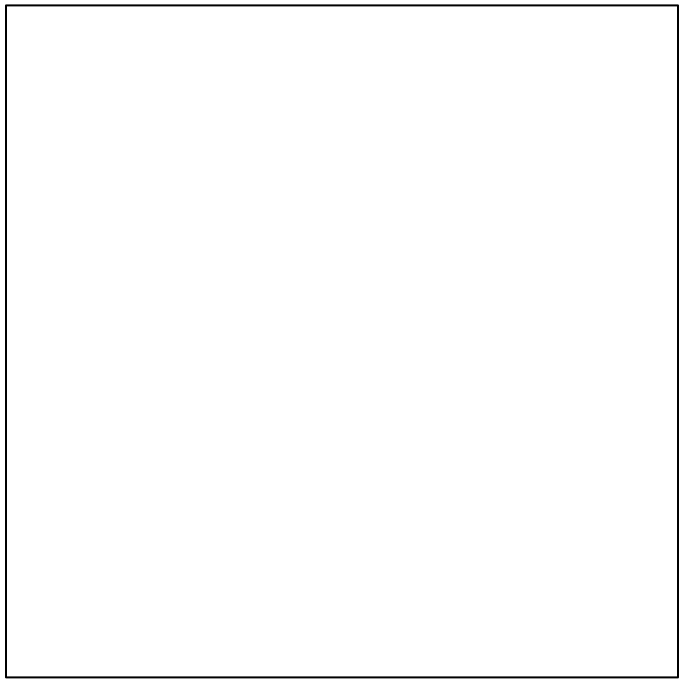


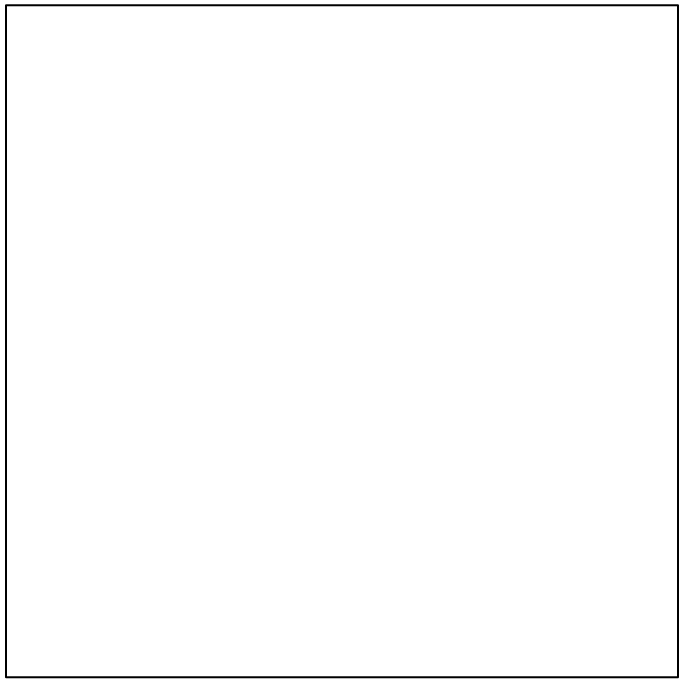


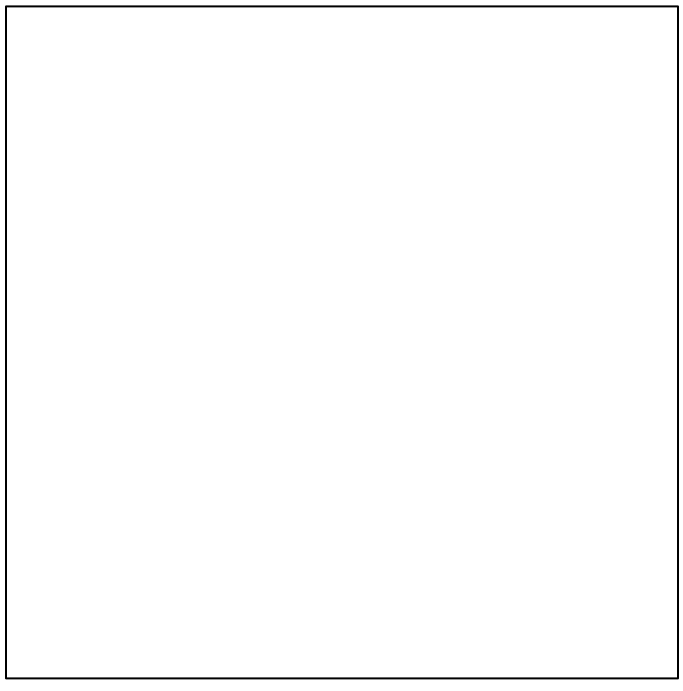
Student Name _____ #_____

Show 4 different ways to make HALVES.



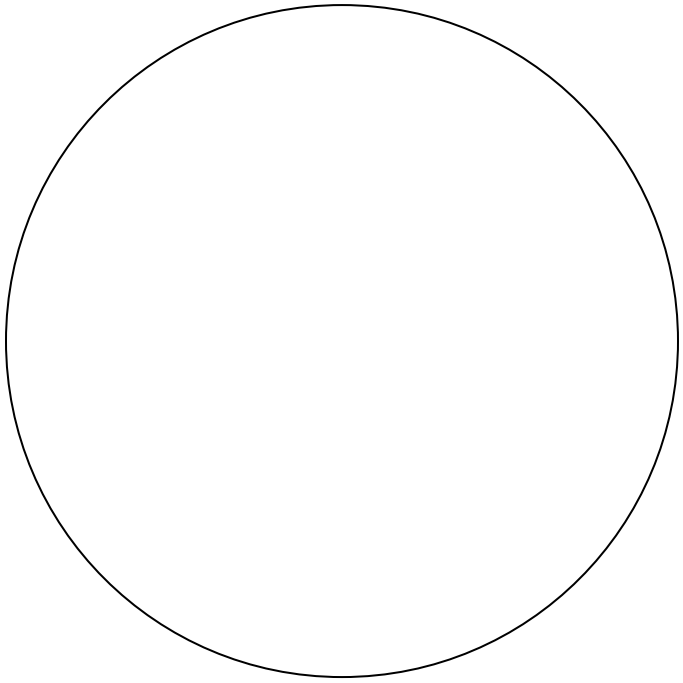


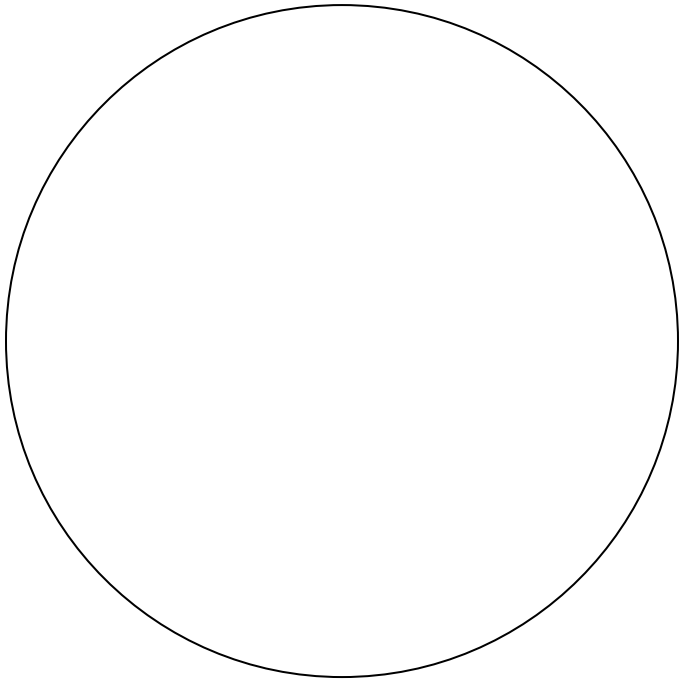


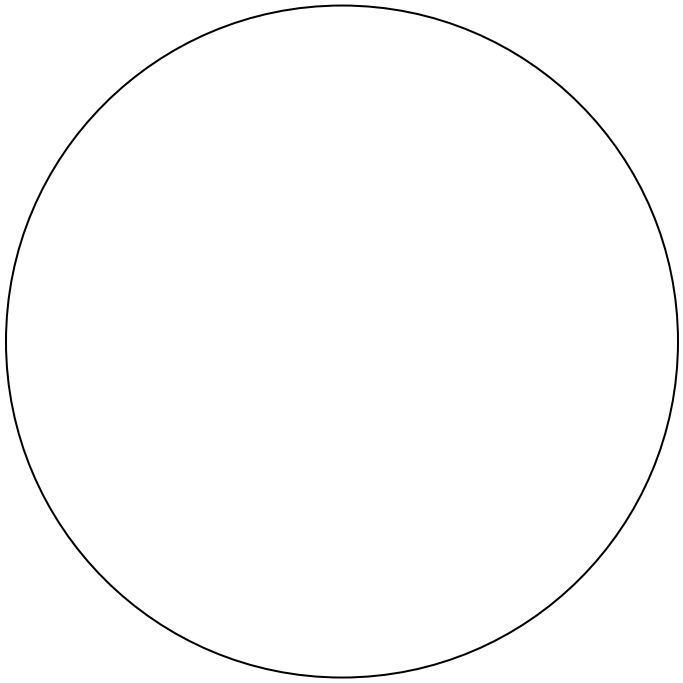


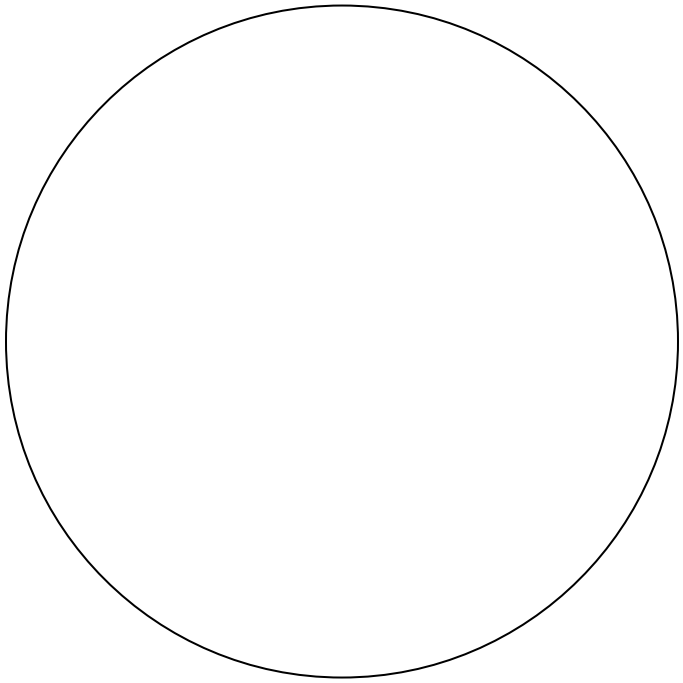
Student Name _____ #_____

Show 4 different ways to make FOURTHS.



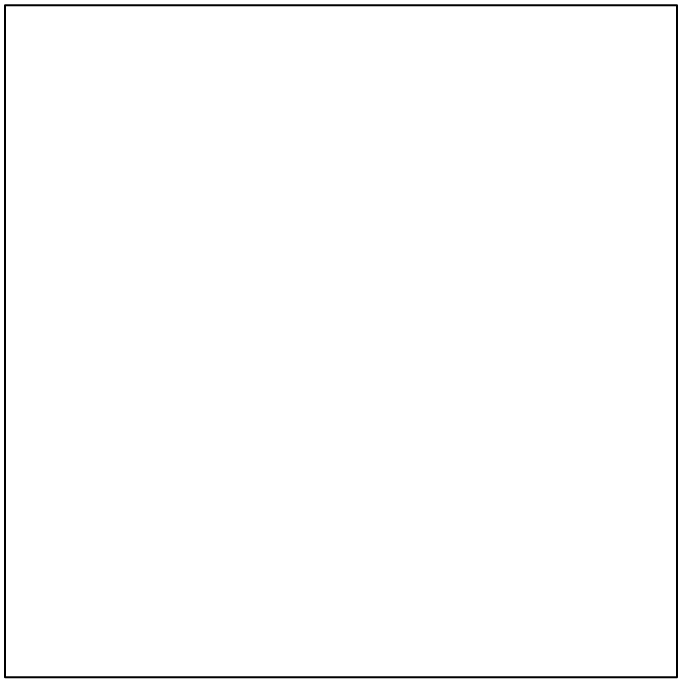


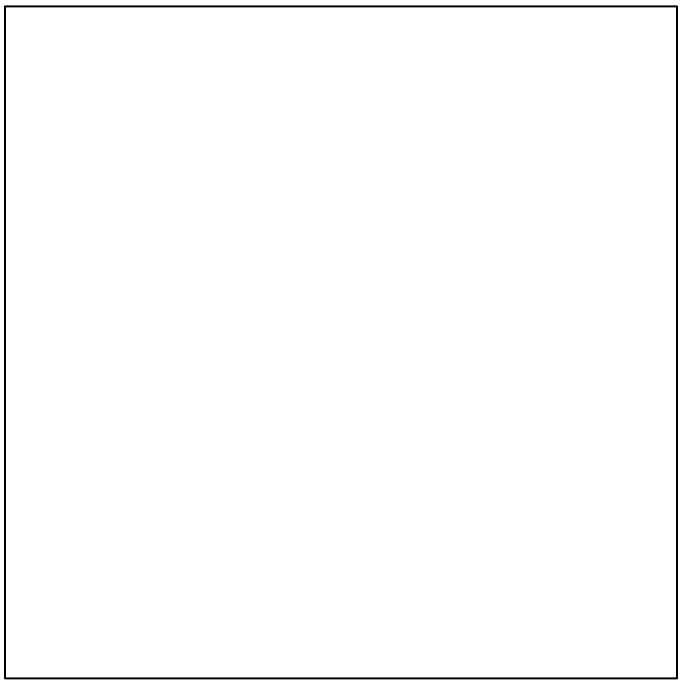


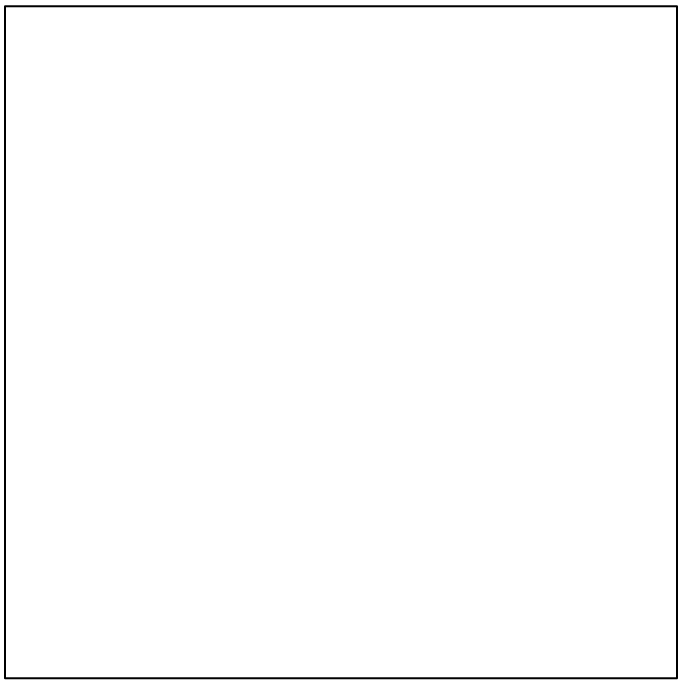


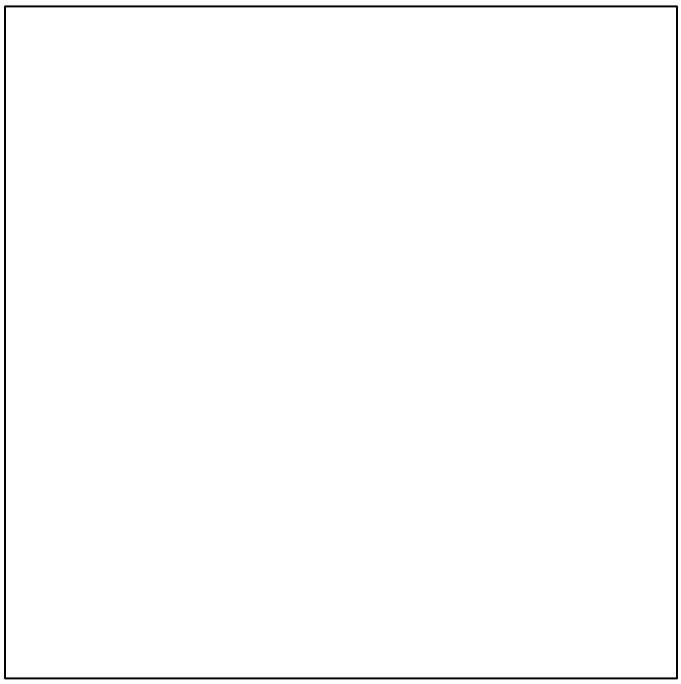
Student Name _____ #_____

Show 4 different ways to make FOURTHS.



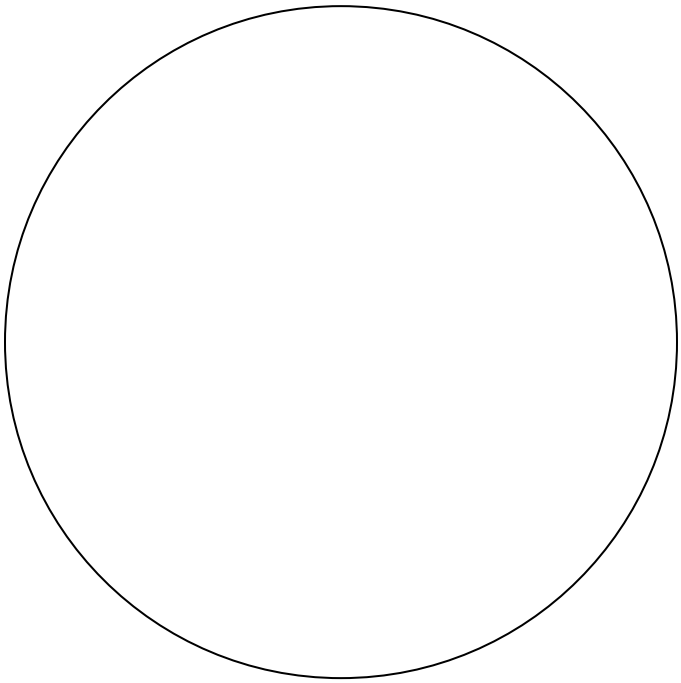


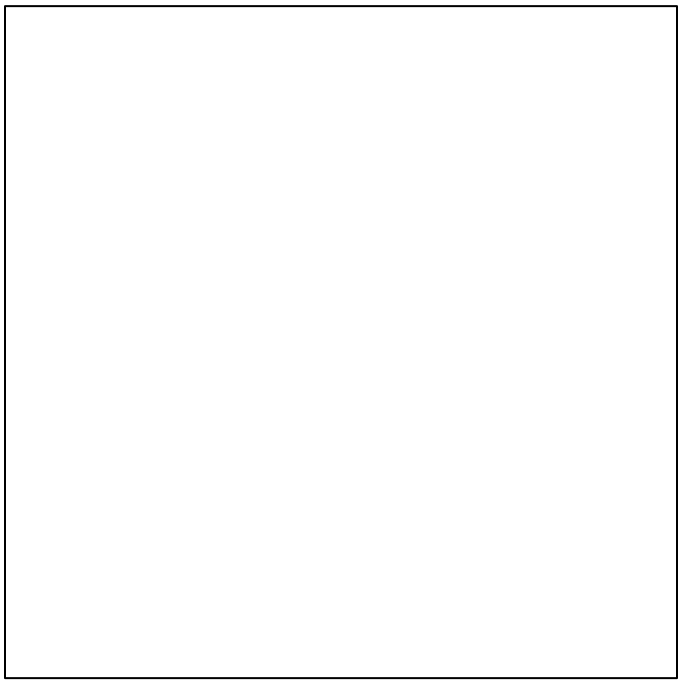


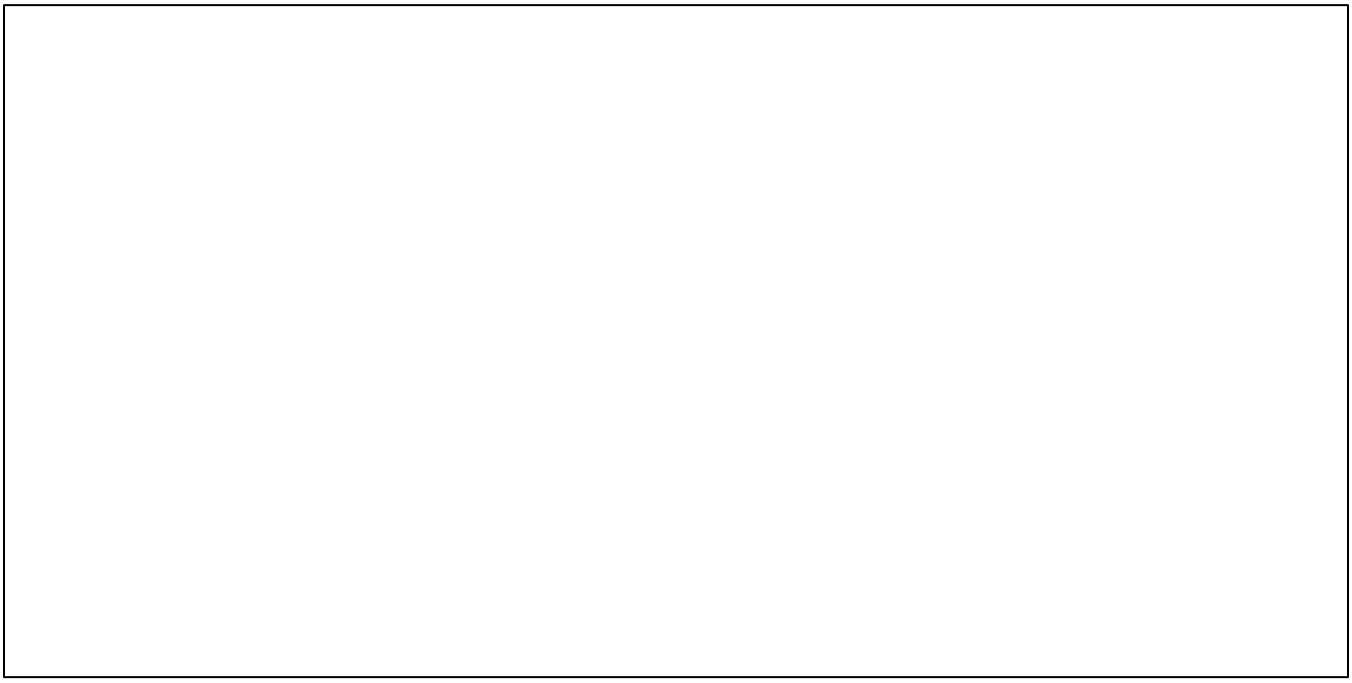


Student Name _____ #_____

Draw lines to show 2 equal shares.

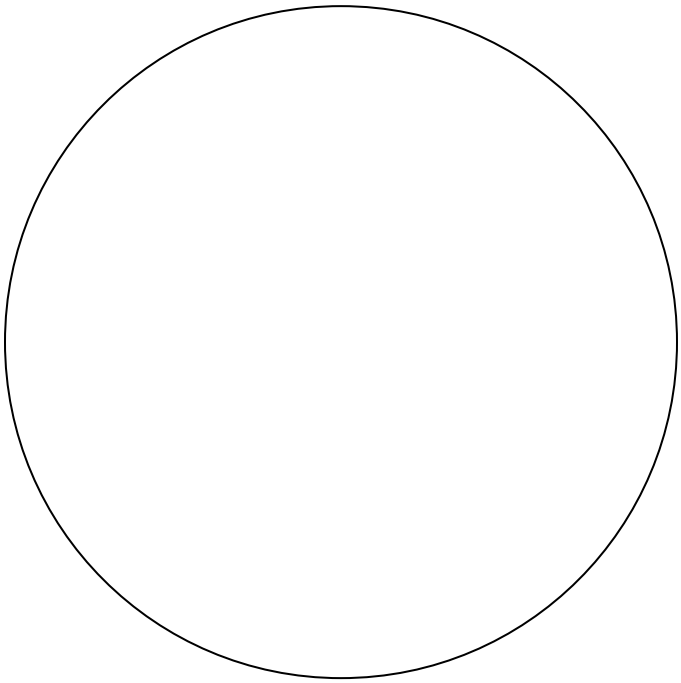


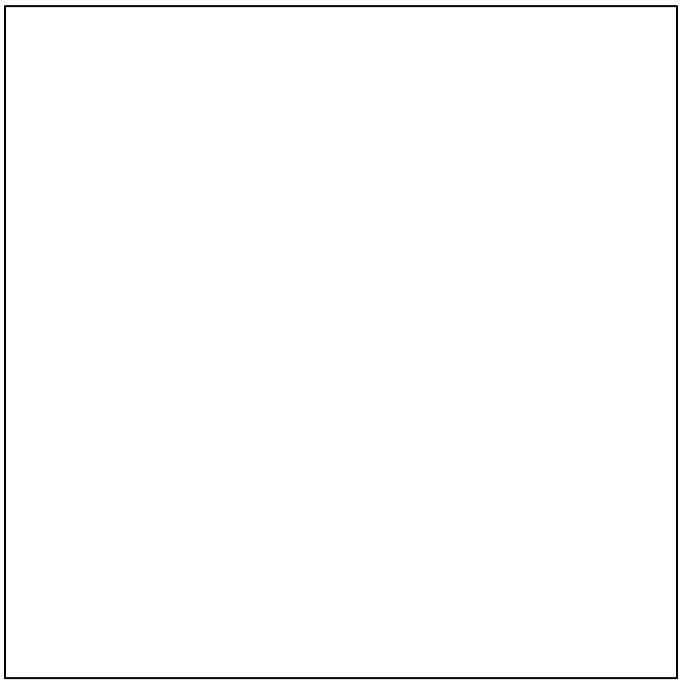


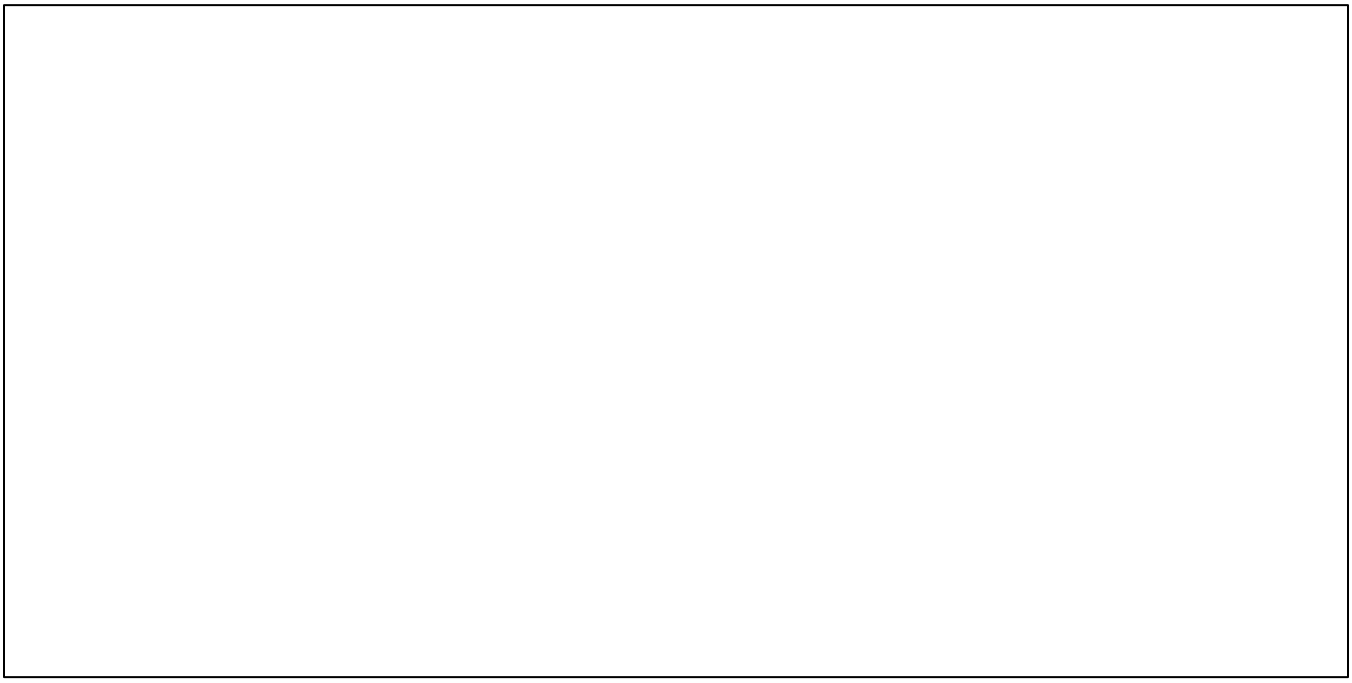


Student Name _____ #_____

Partition each shape into halves.

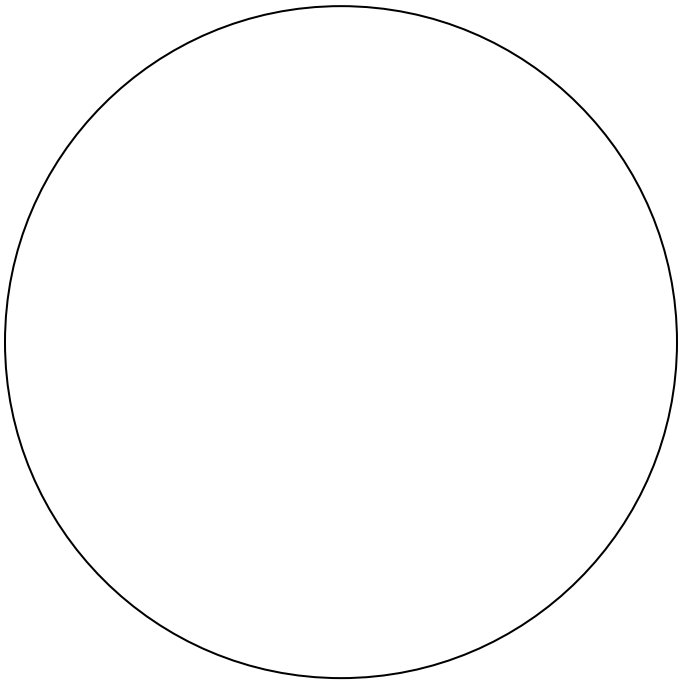


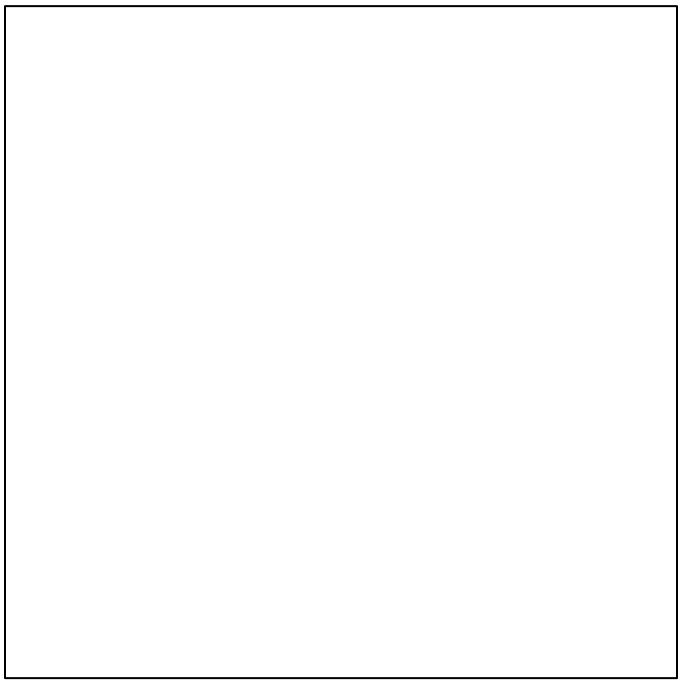


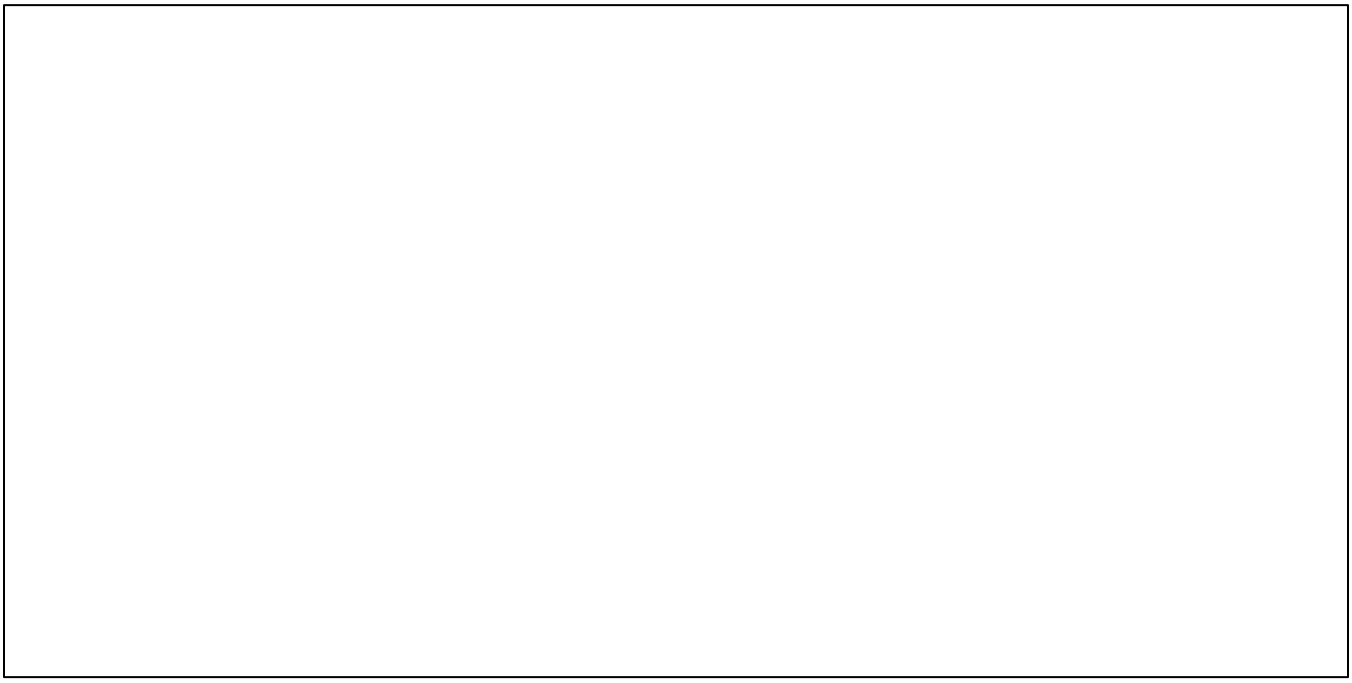


Student Name _____ #_____

Draw lines to show 4 equal shares.

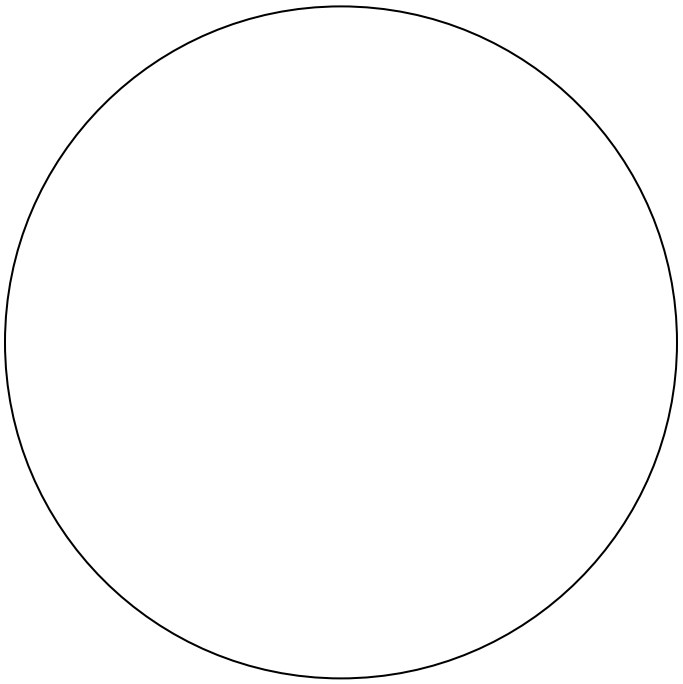


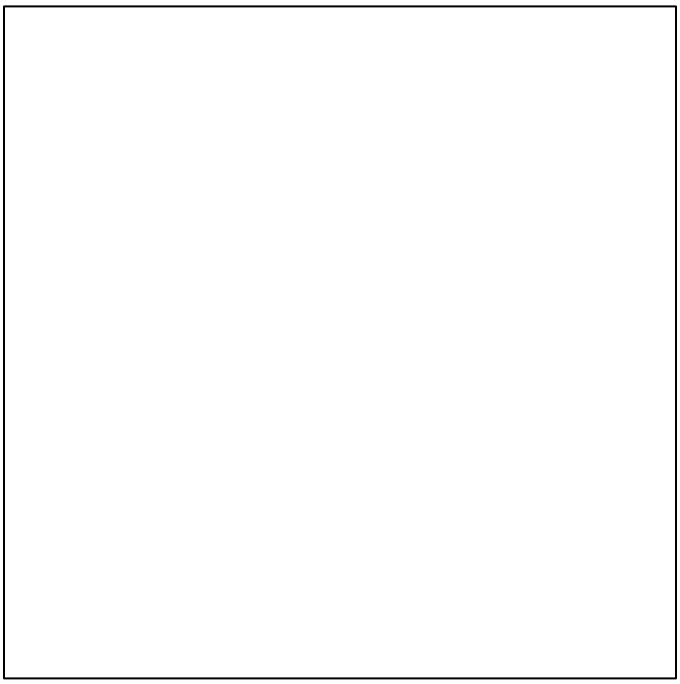


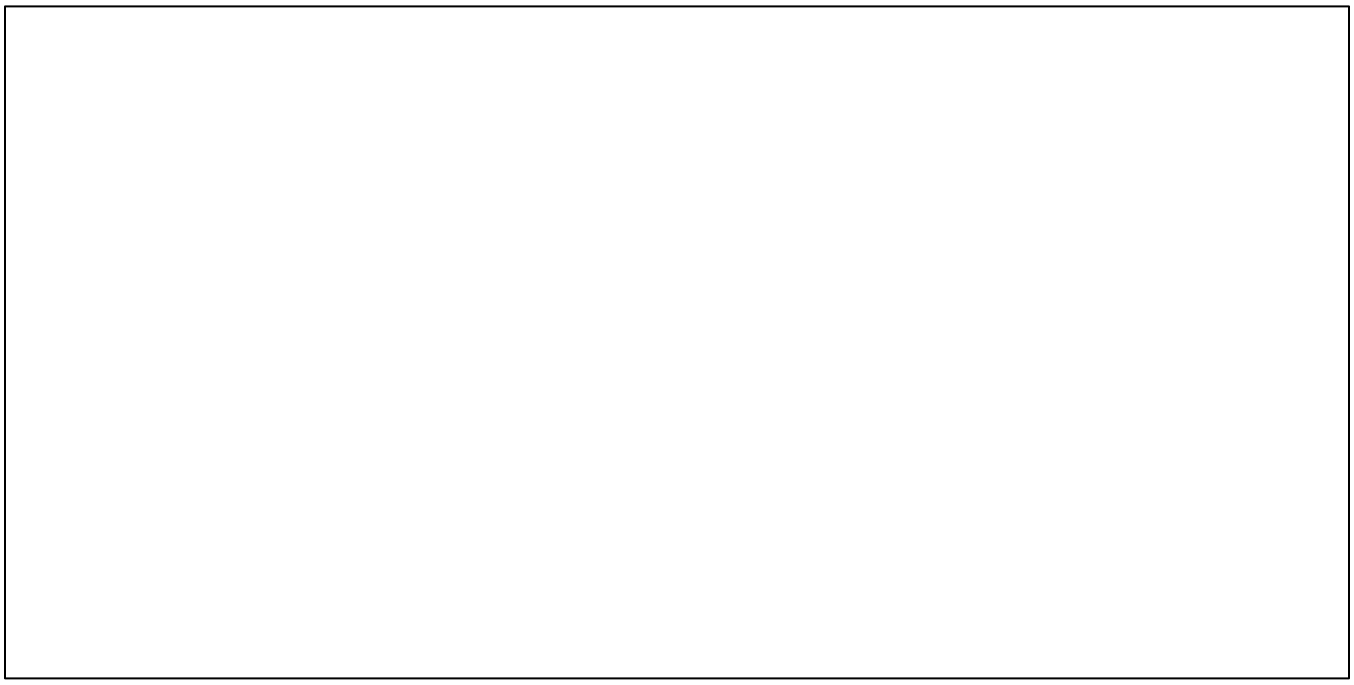


Student Name _____ #_____

Partition each shape into fourths.

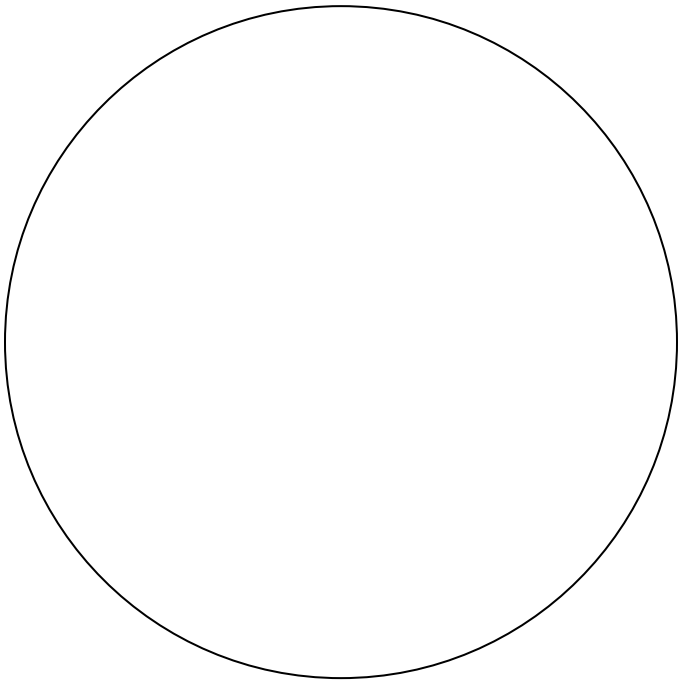


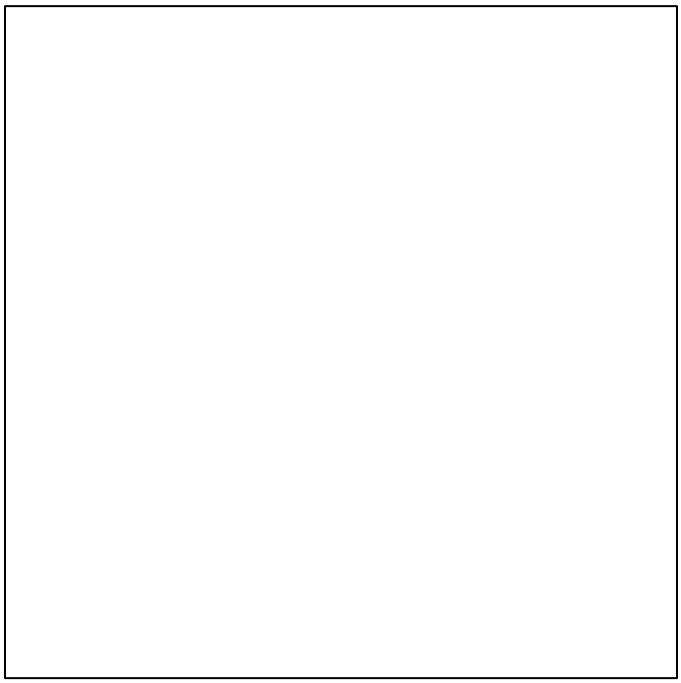


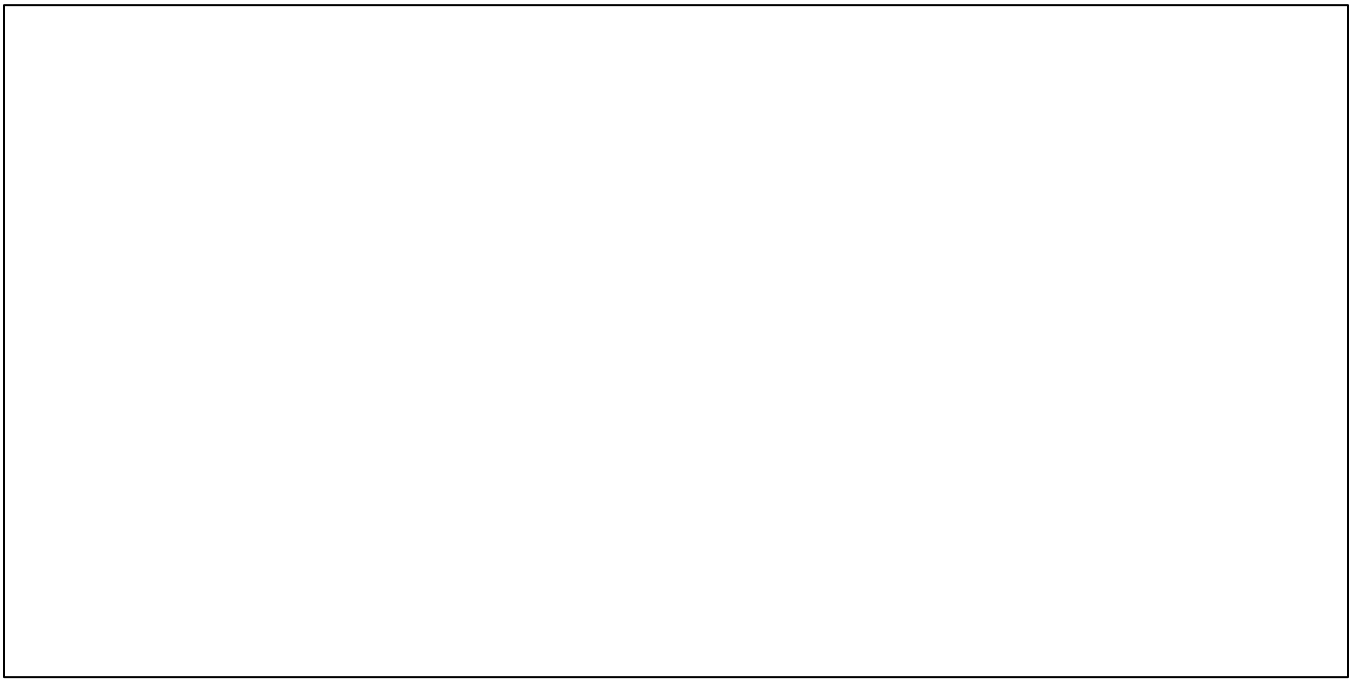


Student Name _____ #_____

Draw lines to show 3 equal shares.

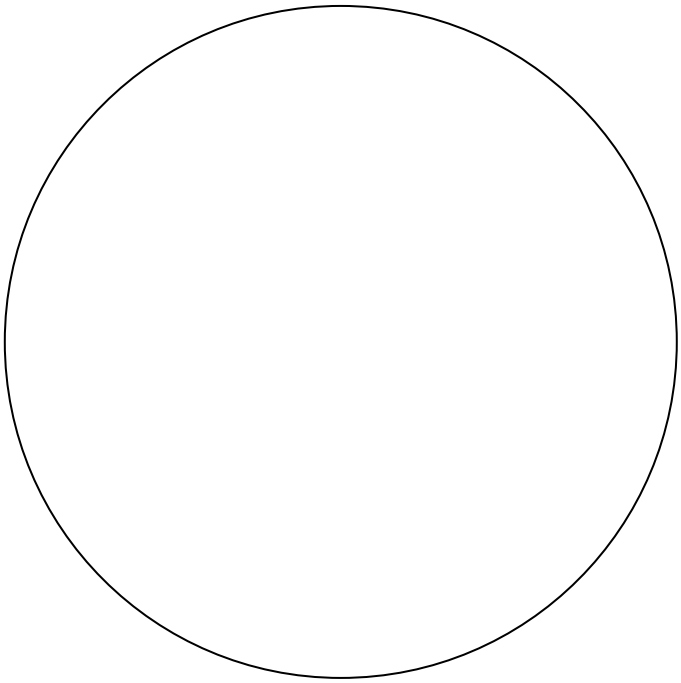


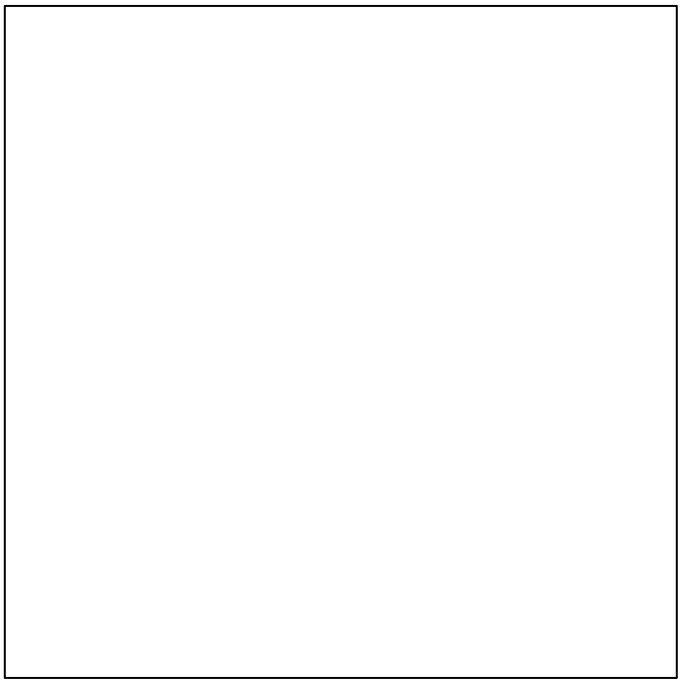


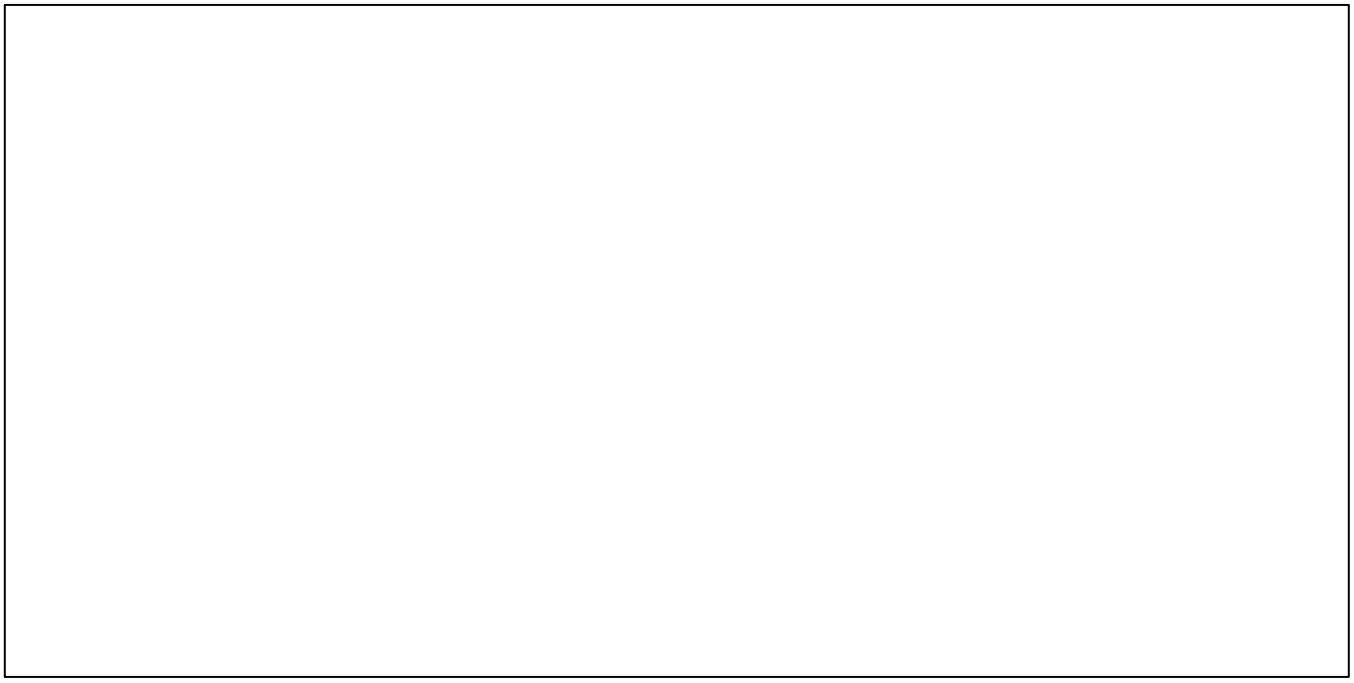


Student Name _____ #_____

Partition each shape into thirds.







Cookie Template for Extension Activity