LEARNING IN PLACE

LESSON PLAN

Subject: Grade 6 Math **Lesson:** The Many Shapes of a Chair

Standard Addressed: Solve real-world and mathematical problems involving area, surface area, and volume. (NC.6.G.1)

Objectives:

- Students will be able to create a geometric model of a chair leg.
- Students will be able to find the area of a triangle by decomposing a square.

Materials Needed:

- Device for playing the video
- Graph paper
- Ruler
- Compass (Students can make a compass using a pencil, pin, and string by following the instructions found in this link: https://sciencing.com/make-compass-home-geometry-12082521.html.)
- "The Many Shapes of a Chair" Activity

Outline:

- Prior to this lesson, students should be able to calculate the surface area of a square. Students should have experience working with composite shapes of triangles and rectangles.
- Show the 10-minute video, "The Many Shapes of a Chair." https://youtu.be/sTTfC-ypYFU
- Discuss the activity prompt. Model how to draw, measure, and bisect the square. Guide students in determining an equation for the area of the triangles.
- Students finish the activity independently or with a partner.

Take it Further: Students find the area of the octagon they drew on their activity sheet for number 4.

Cross-curriculum Connection: Students design their own board back chair referring to historic examples. (Possible search terms: "18th Century German Farmhouse Chairs"; "Pennsylvania Dutch Rocking Chairs"; "Moravian Rocking Chairs"; "Moravian Splay Leg Chairs".) Students cut out the design of the back and fold it at the center to check for symmetry.

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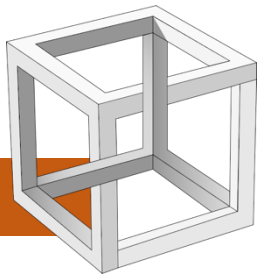


THE MANY SHAPES OF A CHAIR

Grade 6 Math

Student Name:_____ **Date:** _____

1. Using a ruler, draw a 6x6 inch square on a piece of graph paper representing the base of the chair leg.

   Calculate the area of the square.

2. Decompose the square into 2 symmetrical triangles by drawing a line connecting 2 of the opposite corners.

   Calculate the area of each triangle.

3. Connect the remaining 2 corners to decompose the square into 4 symmetrical triangles.

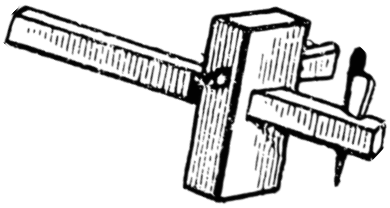
   Calculate the area of each triangle.

4. *Follow these steps to draw an octagon within your square just as the joiner did in the video:*

STEP 1: Using your compass, pivot from each corner of the square to draw an arc from one edge of the square to the other, intersecting the center of the square each time.

Mark a point wherever the arc meets the perimeter of the square.

STEP 2: Connect each of these points with your ruler to create an octagon. This represents the shape of the chair leg.



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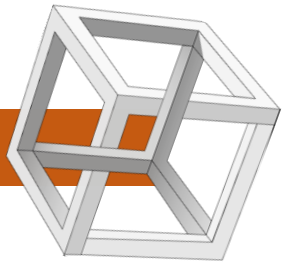
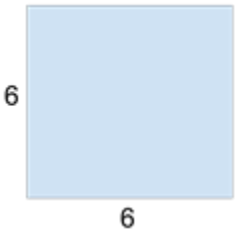
THE MANY SHAPES OF A CHAIR



Grade 6 Math

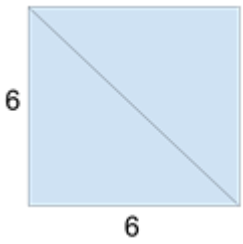
ANSWER KEY

1. Using a ruler, draw a 6x6 inch square on a piece of graph paper representing the base of the chair leg.



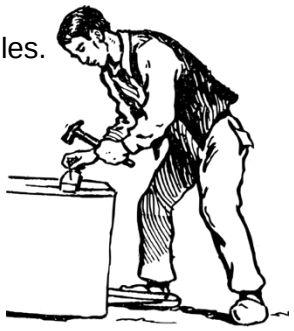
Calculate the area of the square. 6 in. x 6 in. = 36 in.²

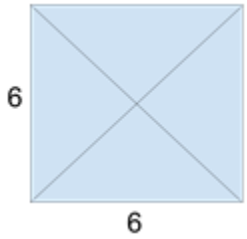
2. Decompose the square into 2 symmetrical triangles by drawing a line connecting 2 of the opposite corners.



Calculate the area of each triangle. 36 in.² ÷ 2 = 18 in.²

3. Connect the remaining 2 corners to decompose the square into 4 symmetrical triangles.





Calculate the area of each triangle. 36 in.² ÷ 4 = 9 in.²

4. *Follow the steps (on student page) to draw an octagon within your square just as the joiner did in the video:*