

Title – Math Exploration at the Hall of State at Fair Park
By – Rashunda Sims
Primary Subject - Math
Grade Level - 5th-7th grade
Time - 50 minutes
Content - Measurement

I. RATIONALE AND BACKGROUND

This lesson was produced to incorporate Math concepts in a Texas History Museum. This lesson can be performed with or without manipulatives.

II. LESSON OBJECTIVES

By the end of this lesson, students will be able to estimate units of measurement and use them to calculate perimeter, area, circumference, and diameter.

III. TEKS:

- 4.11 Measurement. The student applies measurement concepts. The student is expected to estimate and measure to solve problems involving length (including perimeter) and area. The student uses measurement tools to measure capacity/volume and weight/mass. The student is expected to:
 - 4.11 (A) estimate and use measurement tools to determine length (including perimeter), area, capacity and weight/mass using standard units SI (metric) and customary;
 - 4.14 Underlying processes and mathematical tools. The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to:
 - 4.14(A) identify the mathematics in everyday situations;
 - 4.14(C) select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
 - 4.10(D) use tools such as real objects, manipulatives, and technology to solve problems.
- 5.10 Measurement. The student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems. The student is expected to:
 - 5.10(B) connect models for perimeter, area, and volume with their respective formulas; and
 - 5.10(C) select and use appropriate units and formulas to measure length, perimeter, area, and volume.
- 5.14 Underlying processes and mathematical tools. The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to:
 - 5.14(C) select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and

- checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
- 5.14(D) use tools such as real objects, manipulatives, and technology to solve problems.
 - 6.6 Geometry and spatial reasoning. The student uses geometric vocabulary to describe angles, polygons, and circles. The student is expected to:
 - 6.6(C) describe the relationship between radius, diameter, and circumference of a circle.
 - 6.8 Measurement. The student solves application problems involving estimation and measurement of length, area, time, temperature, volume, weight, and angles. The student is expected to:
 - 6.8(A) estimate measurements (including circumference) and evaluate reasonableness of results;
 - 6.8(B) select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight;
 - 7.9 Measurement. The student solves application problems involving estimation and measurement. The student is expected to:
 - 7.9(A) estimate measurements and solve application problems involving length (including perimeter and circumference) and area of polygons and other shapes;

IV. LIST OF RESOURCES

- Worksheet
- Tape measure
- Pencil

V. PROCEDURES

- Overview:

Give an overview of the history of the Hall of State and what each room details. Each student should receive a worksheet to complete. The worksheet starts at the front of the building and then goes inside to The Great Room. If you do not have tape measures, students can estimate lengths with tangible items such as: shoe, palm of hands, finger, etc.
- Lesson Body:

The students will be required to answer the front side of the question within the first 25 minutes. They must label the diagram and use the pictures as a guide. Space has been given for calculations and students should use their math chart for formulas.
- Lesson Closure:

The students will review their answers and give justification on their estimates if measurement tape was not used.

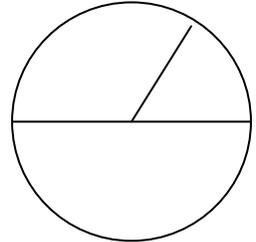
VI. Evaluation

Dallas Historical Society at the Hall of State in Fair Park

“Math Exploration in Texas History”

1. Define diameter and label it on the diagram.

2. Define radius and label it on the diagram.



3. Define circumference and label it on the diagram.

4. Find the circumference of the circular saw on the bronze door.



5. Find the circumference of the circular oil symbol.

6. Estimate the height of the Tejas Warrior.



7. Using the height of the Tejas Warrior, what would be the height of the 4 pillars next to the Tejar Warrior?

8. What is the diameter of the semi circle formed in the front of the Hall of State?



9. True or False. The Hall of Heroes is about the same semi circumference as the front of the building. Explain why.

10. What are ways you can estimate the diameter of items located in the Hall of State?

11. How can we estimate the height of the building including the steps?

12. Estimate the perimeter of The Great Hall.



13. Estimate the area inside The Great Hall.

14. What is the radius of the Great Seal? Do not touch the Great Seal and use the floor as a guide.



15. What is the circumference of the Great Seal?

16. What is the approximate area of the Great Seal? Use $\pi=3$

17. What types of math topics are located in The Great Hall?

18. How many different shapes can you find in the murals in the “The History of Texas” (mural on the left facing the Great Seal)?



19. How many different shapes can you find in the mural “The State of Texas” (mural on the right facing the Great Seal)?



Answers to Scavenger Hunt
Dallas Historical Society at the Hall of State in Fair Park
“Math Exploration in Texas History”

1. Define diameter and label it on the diagram.

Diameter –is any straight line segment that passes through the center of the circle and whose endpoints are on the circle

2. Define radius and label it on the diagram.

Radius - A line segment that joins the center of a circle with any point on its circumference.

3. Define circumference and label it on the diagram.

Circumference- the perimeter of a circle

4. Find the circumference of the circular saw on the bronze door.

Diameter=14 in or 36 cm

Circumference = 3.14×14 or 3.14×36

C= 43.96 in or 114.04 cm

5. Find the circumference of the circular oil symbol.

Diameter=14 in or 36 cm

Circumference = 3.14×14 or 3.14×36

C= 43.96 in or 114.04 cm

6. Estimate the height of the Tejas Warrior.

Height = 11 ft

7. Using the height of the Tejas Warrior, what would be the height of the 4 pillars next to the Tejar Warrior?

Height = 77 ft

8. What is the diameter of the semi circle formed in the front of the Hall of State?

There are 13 squares and each square is 39 inches or 3 ft 3 in

Diameter = 507 in or 42 ft 3 in

9. True or False. The Hall of Heroes is about the same semi circumference as the front of the building. Explain why.

No because the Hall of Heroes has a larger diameter

10. What are ways you can estimate the diameter of items located in the Hall of State?

By using the tile on the floor.

11. How can we estimate the height of the building including the steps?

There are 25 sections on the larger pillar and add the steps

$$3\text{ft } 2\text{ in} * 25 = 83\text{ ft } 3\text{ in}$$

12. Estimate the perimeter of The Great Hall.

Students will have to count the squares and find the length of each square. This will be a rough estimate because the Great hall is not a perfect square.

13. Estimate the area inside The Great Hall.

Students can estimate and make a square by counting the tiles of the perimeter and multiplying the length and width.

14. What is the radius of the Great Seal? Do not touch the Great Seal and use the floor as a guide.

The diameter is about 285 inches therefore the radius is 142.5

15. What is the circumference of the Great Seal?

$$3.14 * 285 = 894.9\text{ inches}$$

16. What is the approximate area of the Great Seal? Use $\pi=3$

$$A = \pi r^2 \quad 3 * 142.5 * 142.5 = 60,918.75$$

17. What types of math topics are located in The Great Hall?

18. How many different shapes can you find in the murals in the “The History of Texas” (mural on the left facing the Great Seal)?

Rectangles, ovals, circles

19. How many different shapes can you find in the mural “The State of Texas” (mural on the right facing the Great Seal)?

Cylinder, rectangular prism