



Lesson Plan 3: A Model Field

Subject: Mathematics

Course/Grade: 7-8

Objectives/Outcomes:

- Research information on different measurements used in football
- Use formulas and research to identify area, and perimeter/circumference
- Compare these measurements to other sports and fields of interest

Curriculum Framework Standard(s):

- MCAS (Standards 8.M.1, 8.M.2, 8.M.3)
 - Select, convert, and use appropriate units of measurement or scale
 - Given the formulas, convert from one system of measurement to another. Use technology as appropriate
 - Demonstrate an understanding of the concepts and apply formulas and procedure for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms, cylinders, and spheres. Use technology as appropriate

Procedure:

1. “Frontloading” (Before)

- a. Preparation & Planning
 - i. Research the length and width of a football field, basketball court, hockey rink, and a baseball field. Professional length fields or youth fields could be used, or for further analysis, both could be used and compared
 - ii. Access to graph paper and a ruler

2. Assistance and Associations (During)

- a. Using a common scale, have all students draw a model football field on a regular piece of graph paper. Consider a common scale or having more advanced students develop their own personal scale
- b. Calculate the area and perimeter, both in actual units (yards, feet, or inches) and model units (yards or centimeters). What are the ratios of the model unit to the actual unit for the area and perimeter? Is this the same as the scale used to draw the model?
- c. On another paper or on the backside of the original graph, students can draw a second model of a basketball court, hockey rink, or a baseball field (these may vary, online research required)
- d. Calculate the area and perimeter/circumference as in the second step above. Shapes could include a semi-circle (hockey), diamond (baseball), or a triangle (baseball).

3. Reflection & Readiness for Application (After)

- a. Consider having the students create a final draft of their model field (any sport is fine here). Look for a consistent scale, accurate measurements.





- b. On the football field, look to include yard markers at the correct marks on the model
- c. On the basketball court, look to include the half-court line, three-point line, and free-throw lines
- d. On the hockey rink, look to include face-off circles, and red/blue lines
- e. Comparison to youth dimensions, including area and perimeter, could also be included
- f. Think about:
 - i. Where in real life, apart from fields, are scales like these used?
 - ii. How can the scales be associated with mathematical terms like ratios and proportions?

