Math Lesson plan:

Title: Area and Perimeter                                Time Estimation: 45 minute periods, 3 days.

Objective:  Students will use formulas to calculate areas and perimeters of different  shapes in a real world application.

Goal: The students will understand concepts in geometry such as area, circumference, surface area, and volume. The students will  understand and be able to work with ratios.

Topic questions: What is perimeter? What is area? What information do you need to calculate each?

Lesson Plan Aim: The students will calculate areas and perimeters of different polygons and figures, exterior and interior angle measures of polygons, Identify and classify shapes, discover ratios & proportions, cross-multiply to solve proportions, calculate scale factor, and construct accurate scale model

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| Time | Activity | Differentiation |
| 20 minutes | Warm up: On board:  What is the     area of the window?                4 ft,          2.5 ft      Height:  6 ft  Ask the students what are some uses of calculating areas and perimeters?  Point out the usefulness in calculating materials, space, for buiding purposes.  Review the formulas for triangles, trapezoids, circles, polygons, rectangles.  Explain the difference between area and surface area.  Pass out a scale drawing of the school. Have the students calculate the square feet of different parts of the building. | Process: Visual learners- utilizing diagrams,  Spacial learners: Given the floor plan of the school, the students can determine where they are in respect to the rest of the school. |
| 15 minutes | Explain the activity. Students will be divided into groups of 3. Each group will complete the following project.  Redesign the 2 courtyard areas on the North Front of City Hall.   Each of the courtyards is 750 square feet.  Within the two courtyards, you need to include: at least 400 square feet of green space or planters, at least one circular fountain in each courtyards, 300 square feet of pedestrian paths, 300 square feet for seating area, 100 square feet for a sculpture/s and 100 feet for ramps for accessibility.  You must use at least 4 polygonal figures in you plan(only one can be a triangle).  Draw the design of the courtyard. Also include a table that explains the amounts of square feet that you devote to each type of space.  In your calculations, include the areas calculated for each addition, and the perimeter of any figures within the design.   Include a labeled map of city hall and where your courtyard will be placed. |  |
| 10 minutes | Students will get into their groups to discuss roles of each of the students, and possible sketches for the park designs. | Visual/ Spacial learners will experiment with spaces   Linguistic learners can describe the different types of spaces that need to be used.  Mathematical/Logical learners will calculate the areas.   Interpersonal learners will help the group to work together and compromise on a design |
| Follow up classes | Students will continue working on the project. |  |

Rubric for Park design:

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| --- | --- | --- | --- | --- | --- | --- |
| Point values | 5 | 4 | 3 | 2 | 1 | Total |
| Table Require-  ments | The table is organized, includes all requirements,the correct amounts of square feet for each | The table is organized, includes most of the requirements and the correct amounts of square feet. | The table  is missing many of the requirements, | The table is unorganized, missing some requirements, and includes inaccurate calculations of the amounts of square feet | The table does not give a description of the amounts of square feet for each category |  |
| Calculations | The materials are itemized and listed by the amounts needed. All important materials are included. | The materials are itemized and listed by amounts needed, but some important items are missing | The materials are itemized and listed by amounts needed, but the amounts needed are improperly calculated | The materials needed are inaccurately listed, and amounts are improperly calculated. | All materials needed are not accurately listed and the amounts needed are not given |  |
| Scale drawing | The design is  correctly drawn to scale, and  including a key to represent distances | Design has some calculations which are not drawn to scale, but includes a key | Design has some calculations which are not drawn to scale, does not include a key. | Design is not correctly drawn to scale and does not include key. | Drawing is not included |  |
| Creativity | The design is innovative, blends  with the surrounding area, and will fit in the designated area | The design blends  with the surrounding area, and will fit in the designated area | The design fits in the surrounding area, and blends with the surrounding area, but is not creative. | The design does not fit in the given area, but blends well with the surroundings | The design is unoriginal, does not fit in the area provided, and does not blend with surrounding area |  |
| Map | Map is included with detailed labeling of streets and attractions within the area | Map is included with general labeling of the surrounding area and attractions | Map is includes general labeling of streets, not including area attractions | Map is included but does not include clear labeling, nor  does it include the area attractions. | Map of surrounding area is not included |  |

 Total points: 25

Assessment: The students will be assessed by the rubric above.

Materials: White paper, rulers, calculators, pencils, protractors, compass, access to Microsoft Word or Excel, worksheet with the floor plan of the school.

References:

<http://www.mathleague.com/help/geometry/area.htm>  This webpage gives a general description of calculating area and perimeter for squares, rectangles, trapezoids, triangles, circles, and more.