Diocese of Wheeling-Charleston

Math Unit Plan: THE GEOMETRY OF CASTLES

Students will be able to relate school with something in their life, while tying it into History. The topic of castles will introduce geometry into a real life application. The hands-on approach used in the building of a castle project will develop student's academic and social skills. As students work on castle construction in cooperative work groups they will apply not only mathematical principles but also social problem-solving strategies as they discover their "way" may not always be universally embraced. This combination of geometry, working as a team, and having a math project that ties into religion & history will help the students feel a sense of learning while having fun.

Name of Teacher: Kathy Lewis-Payne	Grade Level: 7th

Domain: **Use of Geometric Shapes and Mathematic Concepts In Real Life Applications**

Specific **Clusters** Addressed: Applying the use of geometric shapes to understand real life applications and the creation of a geometric scale model.

Teaching Strategies: Use of lecture, guided instruction and internet in the application of geometry to create a geometric scale model of real life applications of the mathematical concept.

Catholic Identity Connections: Cross Curricular Opportunities with Religion, Science, Social Skills, and History

Assessment (authentic/published - summative/formative): creation of appropriate scale geometric representative model

Standards Addressed

Standard Number	**Standards**
7.M.7.GA 1A	**Incorporating geometry in with castles serves two purposes: the study of shapes and symmetry and the function of design. The shapes of geometry: squares, triangles, rectangles, and other geometric shapes can work in the designing of a castle. The function or use of these geometric designs will show the students that geometry is important. Incorporation of the use of mathematical scaling and how it is used will be an integral part of the modeling making process. Use of a scale (ratio) of the size of the final castle.**
7.M.7.GA 1B & 1C	**The function or use of these geometric designs will show the students that geometry is important. Students working with different three-dimensional shapes will explore how and where the students can use these shapes in their models. Working using geometry to further the student's understanding and application of certain geometric terms: Lines, Angels, Symmetry, Triangles, Quadrilaterals, and Polygons**

Description of Activity	Resources	Date of Completion
Introduction of project	Handout	Wk 1-1day
Guided Instruction/Research/ Internet lesson on History of Castles	http://castles.org/dokuwiki/architecture/history and Web sites of their choice using google.com	Wk -1 day
Guided Instruction/Research/ Internet lesson on Types of Castles	http://medievalcastles.stormthecastle.com/essays/the-types-of-castles.htm and Web sites of their choice using goodle.com	Wk 1-1 day
Guided instruction/Research/ Internet lesson on Geometry and Castles	http://cty.jhu.edu/descartes/explore/geometry.html secret castle and Web site of their choice using google.com	Wk 2-1day
Guided instruction/Research/ Internet lesson on Geometric Terms	http://www.aplusmath.com/games/geoterms.html, textbook and handout	Wk 2-1 day
Guided instruction/Research/ Internet lesson on Mathematical Scaling	https://www.mathsisfun.com/definitions/scale.html, textbook and handout	Wk 2-1 day
Guided Instruction on Model Design/Criteria Guidelines	Handout	Wk 3 – 1day
Creation of Scale Model Castle/Procedure Presentation	Handout & Power Point	Wk -3 days
Presentation of Scale Model Castle and Design Procedures	Power Point	Wk 4 -1 day
Model Strength/Suitability/Design Testing	Guided Instruction	Wk 4 – 1day
Group Feedback post testing	Guided Instruction	Wk 4 – 1 day

Differentiated Instruction Opportunities/Overview: use internet to see structures that use shapes, use of art supplies and techniques, use physical science and why structures need balance to stand on their own. .

Cross Curricular Opportunities: Science

Standard Number	Standard Description		Resources	Date
SC.0.7.3.02	science	Construct a variety of useful models of an object, event, or process.	Textbook, internet	Wk 1-2 days

SC.0.7.2.01	science	Use of inferential reasoning to make logical conclusions from collected data.	Textbook, guided learning	Wk 2 - 2 days

Mathematical Practice Standards - 8 Progressions		Check all the Apply
1	Make sense of problems and persevere in solving them.	x
2	Reason abstractly and quantitatively.	x
3	Construct viable arguments and critique the reasoning of others.	x
4	Model with mathematics.	x
5	Use appropriate tools strategically.	x
6	Attend to precision.	x
7	Look for and make use of structure.	x
8	Look for and express regularity in repeated reasoning	x

Summary of Unit:

Through use of textbook, handouts, guided learning, and the internet students will research the use of geometry in castle construction as a way to incorporate the use of geometry in real life situations. Guided learning on castle history, types, usages, terminology and construction. Guided learning on geometric design, mathematical scaling, and geometric terminology. Students will go through the steps on how to design and build a suitable, strong model to scale. Students will create a scale model that can successfully handle experiments. Students will create a final presentation incorporating the use of slides in their presentation. Other groups will evaluate the effectiveness of the student designs and provide creative feedback on successes and areas needing re-design.