Lesson Title	Parallel-o-Home
Length of Lesson	1-3 days
Created By	Kylie Nash
Subject	Math
Grade Level	10^{th} – 12^{th} (Geometry)
State Standards	9^{th} -12^{th} Geometry
DOK Level	DOK 3, DOK 2
DOK Application	Compare, Make Predictions, Identify Patterns, Collect, , Understand
National Standards	9^{th}- 12^{th} Geometry
Graduate Research Element	Shapes and designs are components of safety signs and labels are an area of warning and risk communication and panel/dashboards and aesthetics in a range of fields related to safety and human factors.

Student Learning Goal:

State Standards for 9^{th} – 12^{th} Geometry:

3b. Develop and evaluate mathematical arguments and proofs to include paragraph, two column, and flow chart forms. (DOK 3)

3c. Identify, classify, and apply angle relationships formed by parallel lines cut by transversals. (DOK 2)

National Standards for 9^{th} -12^{th} Geometry Standard:

- Use geometric ideas to solve problems in, and gain insights into, other disciplines and other areas of interest such as art and architecture.
- Explore relationships(including congruence and similarity) among classes of two- and dimensional geometric objects, make and test conjectures about them, and solve problems involving them
- Draw and construct representations of two and three dimensional geometric objects using a variety of tools

In this lesson plan activity, students will learn, identify and classify quadrilaterals and apply connect these concepts to building houses and architecture. Students will then explore these shapes by building a model of their "dream" home using only special quadrilaterals.

Materials Needed (supplies, hand-outs, resources):

Writing utensils, and handouts (Classifying Quadrilaterials.pdf, Parallelograms Chart.pdf, and Quad Jeopardy.ppt), markers, scissors, colored pencils, tape, glue, rulers, construction paper, wooden/plastic sticks (popsicle,or anything to be used for structure), and cardboard

Lesson Performance Task/Assessment:
Students will learn about the various types of quadrilaterals and be able to identify characteristics of quadrilaterals. Students will complete worksheets that will help strengthen their critical thinking skills. Students will get practice and experience with problems that they may encounter in an upcoming exam or nine- week's exam. Students will practice using the worksheet provided and completions of the PowerPoint game using characteristics of Quadrilaterals. Students should be able to answer questions related to topics learned in any 9-week school term. Students will build a dream home using the given materials only using shapes that are categorized and have properties of quadrilaterals. They will present their 3D designs to the class and describes the different shapes used in their design.

Lesson Relevance to Performance Task and Students:
Students will be learning and studying while learning about environmental objects that they encounter on a daily basis and never really think about. This activity will help strengthen math skills through an application that is familiar and fun to them. Students will learn concepts related to identifying different types of quadrilaterals and parallelograms. These lessons and performance tasks will strengthen the students, interest, knowledge and understanding of mathematical concepts of angle measurement and polygon shape design through the use of hands on activities to synthesize and interpret concepts learned in the classroom.

Anticipatory Set/Capture Interest:
This topic should be introduced to students by engineering design concepts and architecture. They can be introduced to the concept of aesthetics, sign design and cognition and how it related to human factors and ergonomics. The students have been selected by the city to design and aesthetically pleasing 3D house using only quadrilaterals and parallelograms and the materials provided by the instructor.

Guided Practice:
This lesson can be spread over multiple days.
<u>Day 1</u>
The instructor should introduce the concepts of quadrilaterals and parallelograms using the textbook and handouts provided in this lesson. The worksheets should be completed first or given as a quiz, homework etc.

<u>Day 2</u>
The Jeopardy game could be played next before the students build the 3D structure. They may be divided into teams.

<u>Day 3</u>
The instructor will divide students into teams or no more than four. Each student should be assigned a role as in an engineering firm. Students will be told to build a 3D structure

or dream home using only the materials provided using quadrilaterals and parallelograms shapes.

Note: Students are limited to using only quadrilaterals and parallelograms shapes to build their houses.

Independent Practice:
Day 1
Students will work textbook problems and learn vocabulary words and work handouts provided in this lesson.

Day 2
Students will play the Jeopardy game before the students build the 3D structure.

Day 3
Students will be told to build a 3D structure or dream home using only the materials provided using only quadrilaterals and parallelograms. Students will present their designs to their classmates and discuss the various shapes used. The team with the most unique design or the design that used the most shapes wins a prize.

Remediation and/or Enrichment:
Remediation:
Individual IEP

Enrichment/Extension:
The lesson can be extended by adding other shapes and also finding the area and perimeter of quadrilaterals and parallelograms.

Check(s) for Understanding:
1. What did you learn from this activity?

2. What areas can this topic be applied to in your everyday life?

3. Name and describe the characteristics of quadrilaterals and polygons.

4. Do you think that with the skills and knowledge learned through this exercise will help you be successful on the upcoming exam?

Possible Alternate Subject Integrations:
Physics
Physical Science
Engineering

Teacher Notes: