Mathematics: The Language of STEM

DREAM HOME

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CONTENT AND TASK DECISIONS

Grade Level(s): 6

Description of the Task: Students will create a floor plan of their dream home and calculate the cost to carpet the floor. Students must have at least four different rooms and each room must be a different shape. Not every wall can be at a right angle. The total square footage of the house must fall between 2,800 and 3,000 square feet.

Indiana Mathematics Content Standards:
6.GM.4
6.C.3

Indiana Mathematics Process Standards: 1,2,3,4,5,6,7,8

Mathematics Content Goals: Students will be able to find the area of complex shapes. Students will be able to solve real-world problems using fractions and decimals.

Language Objectives:
Speaking/Writing/Listening: Students will present their work and their rationale for finding area and cost in roundtable discussions.
Using academic vocabulary, describe the plan without the other students seeing it.
Prepositions (above, below, outside, over, under, etc.)
Students will explain how to find the area of complex figures using negative space and formulas.
Ex: To find the area of a (insert figure), one must … (multiply/divide/etc.).
Key Terms-negative space, trapezoid, parallelogram, base, height, length, width

Materials:
Floor plan app or graph paper
Pencil
Ruler

THE LESSON

Before:
· Student Actions
-Listen and ask questions to understand the task.
-Begin to brainstorm solutions to the task.
· Teacher Actions
-Introduce the problem and make sure everyone understands the task.
-Show sample floor plans.
-Define negative space.

During:
· Student Actions
-Create floor plan that fits the specifications on Graph Paper app. (1 unit = 6 inches)

-Calculate area of the floor.
-Calculate the cost to cover the floor with carpet. (Carpet costs $0.30 per square foot)
-Improve on the design to stay within a budget.
-Wish for area formulas.
-If finished early, begin to add furniture and determine how much of the floor will be uncovered.

· Teacher Actions

-Ask questions to support student thinking.
-Refrain from giving advice.
-Encourage students to improve their plans in order to minimize area without sacrificing productivity.
-Ask, "How sure are you that your area measurement is accurate? How important is it to be accurate?" (not sure because of acute/obtuse angles; some may just count the units instead of multiplying; some may overlook the scale and assume that 1 unit = 1 foot)

After:

· Student Actions

-Understand the formulas for finding area of different shapes.
-Realize the necessity of staying under budget.
-Form roundtable groups of 4 to 6. One student will be nominated to be the speaker. He or she will use academic language to describe his or her floor plan to the other students in the group. The other students will listen and attempt to draw what the speaker is describing. When listeners are finished drawing, they will compare it with the speaker's floor plan, then the listeners will attempt to calculate the volume of the plan.

· Teacher Actions

-Ask, "What do you wish you had?"
-Give area formulas.
-Encourage detailed descriptions and engaged listening.

ASSESSMENT

Observe:

Look for students who struggle to understand the scale of the floor plan. These students may end up with an exponentially larger area.
Are students following all of the guidelines?
Are students challenging themselves to create the best possible floor plan?

Ask:

Is there a way to change the shape of some of your rooms to lower the cost of carpet?