Game Room Task

Summary

Students will design a playroom the shape of a polygon. Different attributes are worth different amounts of money. Students want to design the shape that will make them the most money.

Main Core Tie

Mathematics Grade 3

Strand: GEOMETRY (3.G) Standard 3.G.1

Time Frame

1 class periods of 60 minutes each

Group Size

Pairs

Life Skills

Thinking & Reasoning

Materials

- Polygon Play room student sheet
- ruler
- pencil
- colored pencils or crayons

Background for Teachers

Attributes of shapes should already be taught before assigning this task. Students should be able to determine parallel lines, and know the 3 types of angles. Vocabulary such as: quadrilateral and parallelogram should also be familiar.

Student Prior Knowledge

Students should have already had a lesson on polygon attributes. They will use what they know about attributes to design a playroom that will earn them the most money.

Intended Learning Outcomes

Students will be able to determine shapes with attributes that will gain them the most money for their design.
Mathematical Practice #1 - Make sense of problems and persevere in solving them.
Mathematical Practice #7 - Look for and make use of structure.

Instructional Procedures

In this task, students will be asked to be a designer of a playroom. They will be paid for certain attributes in the playroom.
Students will understand the shapes in different categories - rhombi, rectangles and others - share attributes and that the shared attributes can define a larger category - quadrilaterals.
Before the task ask the students,"What kind of things would be in a playroom? What shapes might they take up? Today you will use what you know about playing in a game room to design your own

game room, but it must meet criteria for you to be paid. Task:
Design a playroom the shape of a polygon. Each polygon has attributes. Different attributes are worth different amounts of money. As the designer, you will get money for certain attributes.
Attributes are worth the following amounts:

right angles - $10 each - color blue.
Greater than a right angle - $7 each - color red
Less than a right angle - $15 each - color orange
Parallel lines - $20 set - color green
Quadrilaterals - $25 - color purple
Other polygons- $12 - color brown

Let students work as a team to figure out what kind of shapes would get them the greatest amount of money for their work. Once they have determined the shape they will make their game room - they will need to determine the games available inside the room and how much space (shapes) that the games will need.
Questions that might be asked to help the students:

What would be the shape of the room?
What have you discovered about the shapes?
Is there another way you can do that?
How do you know?
What choices do you have?
How do you know?
How are the shapes similar or different?
Explain why you chose those shapes?

After students have chosen and drawn their shape on the student page, have them determine the kind of games they will have in their game-room and what shapes the game areas will take up. Students will need to draw the shapes inside the game room and label the games that will be available.
Students will share under a document camera their creations. This is NOT a show and tell. The teacher needs to ask questions for clarification and encourage students to ask questions in a safe environment.
Make sure to make connections between attributes of the different shapes.

Strategies for Diverse Learners

For the struggling learner:
Give students graph paper to create shapes and determine the type of angles, parallel lines, and the number of sides. Have students classify the shapes. Power polygons would be a great manipulative in this activity. Students may want to look at the costs of the attributes and look for things that cost more money. That would be a good place to start.
Early Finishers: Find the cost for the shapes used.
For a Challenge, have students determine the perimeter and the area of the outside figure for the room.

Extensions

Give students a given amount of money -budget - that they must stay under as they build their game room.

Bibliography

Adapted from: Smith, Margaret Schwan, Victoria Bill, and Elizabeth K. Hughes. "Thinking Through a Lesson Protocol: Successfully Implementing High-Level Tasks." Mathematics

Teaching in the Middle School 14 (October 2008): 132-138.
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