



Using Manipulative Instruction to Solve Area Problems.

Objective: To teach students to solve geometry problems involving area.

Setting and Materials:

Settings: Special Education Resource Classroom/ one-on-one instruction

Materials:

- Geoboard (5 x 5 pegs)
- Rubber bands
- 25-foot measuring tape
- Paper
- Pencil

Content Taught

Using modeling, guided practice, and independent practice in conjunction with manipulative training to teach students to solve area problems.

Teaching Procedures

1. Introduce to the students what area means. "How much space does _____ take up?" (e.g. the classroom, their yard, building)
2. Model area by counting the room tiles of the classroom.
3. Model on your geoboard a four by four square.
4. Ask the student to do the same on their geoboard.
5. Ask the student to divide the square into as many one by one nail squares as possible.
6. If the student makes an error in counting or in stating the answer, provide verbal feedback (e.g. "No, you said ____ square units. That is incorrect, there are ____ square units." Then have the student recount the units and provide the correct answer.
7. Create 5 random shapes on your geoboard (one at a time) and ask the student to determine the area of each shape. Use prompting when necessary.
8. Select two area problems from the math book and demonstrate how to solve those problems using the geoboard.
9. Verbally state, "We need to represent the figure in the book on the geoboard," then create the figure on the board. Then compare the figure on the geoboard to the one in the book to show that they are the same. (e.g. "Yes, they are the same.")

10. Guide the student to represent the next problem on their geoboards and determine the area.
11. Select two more area problems from the math book and instruct the students to solve them using the geoboard. Prompt when necessary.
12. Give the student a 25-foot measuring tape and instruct them to measure an item in the room (e.g. desktop, section of a rug, or a table top) and then calculate the area of that item independently.
13. Select two area problems that involve multiplication with regrouping and instruct the students to solve those two problems independently.

Evaluation

Use problems students solve independently in steps 12 and 13 as your evaluation. Record the data of the number of errors the students experience during independent practice.

Common Core Standards:

[CCSS.MATH.CONTENT.7.G.A.1](#)

Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

[CCSS.MATH.CONTENT.7.G.B.6](#)

Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms

Lesson Plan Based on:

Cass, M., Cates, D., Smith, M., & Jackson, C. (2003). Effects of manipulative instruction on solving area and perimeter problems by students with learning disabilities.

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