Pig Pens

If your pig pens can be any shape, how many pig pens can the farmer have using 12 sides?

Grade Levels Pre-K-2

Pig Pens

If your pig pens can be any shape, how many pig pens can the farmer have using 12 sides?

Context

The student work samples were taken from a first grade class. This problem allows the student to investigate geometry and it shows their understanding of number sense.

What This Task Accomplishes

This task offers a concrete example of representing different geometrical shapes and uses counting strategies.

What the Student Will Do

In solving this problem the students were provided with toothpicks to represent their pens and possible solutions. The work will demonstrate the student's ability to apply concepts of geometry, counting and to use problem-solving strategies.

Time Required for Task

Less than one hour.

At this level it is very important to allow a flexible amount of time for the children to work through the problem. It is also important to find out how they arrived at the answers they got.

Interdisciplinary Links

This problem was integrated into a farming theme. Other problem-solving activities can be centered around legs of farm animals, fence patterns, rows of crops and wheels used on the farm.

Teaching Tips

Students should have some experience with building shapes with the toothpicks or other manipulatives that can represent sides for pens. Errors may be related to inaccurate representations of geometrical shapes or inaccurate counting skills. Immature mathematical thinking will also effect their solutions. Time is often set aside for the whole group to share solutions and strategies.

Suggested Materials

- Manipulatives to represent the pens (i.e. toothpicks, popsicle sticks)
- Other math manipulatives to represent the pigs

Possible Solutions

At the Practitioner and Expert levels, students may arrive at their solution in different ways. Some students built triangles, rectangles, pentagons, hexagons, or had their pens share sides. Students do not know the names for some of these shapes, but made accurate drawings and labeling. Students at other levels chose to only make squares.

Benchmark Descriptors

Novice
Limited use of the toothpicks to show sides of pens. No numbers shown as a strategy. Drawing is not accurate and explanation not understood.

Apprentice
Beginning to understand the geometrical shapes that would work. Used numbers as a strategy, but inaccurate counting and solution is not complete. Weak explanation given.

Practitioner
The solution shows a clearer understanding of the task. Toothpicks were manipulated many different ways before the drawing was developed. Strong use of number sense as a strategy and a clear explanation was given.

Expert
Several solutions were tried with the toothpicks and strategies were used to change the drawings to create a solution. There is appropriate use of number strategies and detailed explanation of the choices of pens made.