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Teach Nothing About Geometry

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Contrary to a likely interpretation of the title, I am not advocating the deletion of geometry from the mathematics curriculum. In fact, I am quite concerned about the near future of geometry in the curriculum and would not wish to see its position eroded any more than it is. I am concerned because the coming emphasis on and enthusiasm for computer literacy and microcomputer applications could easily push geometry further into the background, simply because geometry doesn't lend itself easily to micro-computer uses.

To return to the title, I am advocating the teaching of nothing about geometry in the sense of "no-thing." "No-thing" implies that we are not talking about a "thing." It is generally held that geometry instruction ought to include practice in space visualization, skills for organizing knowledge about space, attitudes favorable to local space exploration, and so on. But these are no-things that are about things. They are procedural skills, attitudes, or the seeing of relationships. The notion that no-things can be about things is crucial here, since the distinction between things and no-things is frequently the essence of arguments about the value of using geometric activities in the classroom. As an example, the "seeing of geometric relationships" might be acknowledged as an important mathematical goal, but none the less be slighted because it lacks a certain concreteness; for example, it is difficult to define as a teaching objective and is certainly difficult to test. None the less, a growing body of research indicates the existence of certain generalized skills and abilities that are important in problem-solving and applications. We ought to recognize these no-things of geometric activities and acknowledge their importance by insisting on their inclusion in the mathematics curriculum.

To further illustrate some of the points that I have been trying to make, I will describe and use a family of geometric activities. (Incidentally, these activities can easily be put into a game format if desired.) The activities will be defined, and references will be made to the no-things of geometry that they illustrate.

The game of "Turn a Pattern" (TAP)
(This is adapted from Marion Walter's *Boxes, Squares and Other Things.*) I will begin with a discussion of the rules for the two-dimensional version of the game:

1. Use line segments of the same length.
2. The line segments must be placed end-to-end with a right angle at every joint.
3. Play the game first with two line segments, and then with three, four, five segments, and so on.
4. The object is to generate as many "different" patterns as possible in each case.

Discussion
The following no-things would probably be exemplified in the activity above:

1. Two-dimensional space visualization skills would be exercised.
2. Inevitably, the process of defining "different" for Rule 4 above would include some no-things. For example, devising a rational decision rule for calling patterns different would probably be included.

(Are the three-segment patterns above different?)
3. Systematic methods for generating all possible patterns might emerge naturally or could be encouraged. E.g., from

we can obtain either

or

4. Systematic record-keeping could also be practised so that number patterns might be explored.

These are just a few of the possible important no-things that could emerge in such a geometric activity.

This game has an obvious extension into three dimensions. One additional rule forbidding more than two sticks to come from each joint is necessary here. The rest of the rules are the same.

Conclusion
Some additional no-things could emerge in this setting:

1. Three-dimensional space visualization skills would be exercised, particularly when combined with some of the three-dimensional space transformations.
2. By permitting the variation of rules, it would be possible to set up natural comparisons between different systems.
3. The enjoyment of experiencing and exploring the familiar space around us could be enhanced. Most important, this can be done without the need for much formal knowledge of geometry.
4. That questions can be raised and problems posed is a recognition skill that would probably emerge naturally in these activities.

The activities and statements above are only suggestive of the importance of the no-

things of geometry. Other activities and discussion points could be devised to illustrate these notions equally well.

As a final note, I would like to make a paradoxical plea that we recognize the possibility that teaching the no-things of geometry may be the most important thing that we can do in geometry.

Reference
Walter, M.I. *Boxes, Squares, and Other Things.* National Council of Teachers of Mathematics, 1970.

In the Red—An Integers Game for Junior Secondary
Reynold Redekopp
Manitoba Association of Mathematics Teachers

"In the Red" is a game that was devised to introduce and review the concepts of integers. It deals, of course, with one thing all students are familiar with—the gain and loss (emphasis on *loss*) of money. The game is set up so most students will end up in the "red" in their accounts.

When developing or reviewing integers, teachers can use this game because students are required to total (or sum), split (divide), and multiply (gains and losses. This knowledge can then be transferred to integer work.

Rules
1. Use groups of three or four (or 1,000?)
2. Each student must keep track of other group members' scores to guard against cheating (emphasize the cheating so that they do, in fact, keep track).
3. Decide which player will start—highest toss of die.
4. Each player in turn picks up a card from the face-down deck and follows the instructions. Scores are recorded with each student's turn, since the whole group is sometimes affected by the instructions.
5. A time limit (20-25 minutes—but quite variable) should be suggested to end the game.

Obviously, the game is very simple, but this contributes to its popularity. No special skill or knowledge is needed to play, and the game can be fiercely competitive (especially as your better students are dropping further into the hole.) Be prepared for some noise—the ecstasy of gain and the agony of loss.

Equipment
One die per group.
One set of game cards per group.
One scoresheet for each student.

Scoresheets can be organized in any numbers of ways. Two are illustrated: