

Nimomania

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After attending my second summer session of the Leadership Program at Rutgers, I decided to do a unit on the game of Nim with my 3rd-grade class. This is a class of twenty math students of different abilities in a suburban public school. It happens that math is the favorite subject of more than half my students, which is unusual.

We started the year with a review of addition. The chapter in their Addison-Wesley text emphasizes strategies for mentally adding numbers. By now, students should have facility with basic addition and subtraction facts, but this is not yet true of all of them. As I was teaching it this year, I was much more aware of the emphasis on strategies. Nim is introduced at the end of the chapter as a Critical Thinking Activity. We began with a simple game in which there is a single pile of eleven markers. Each player may pick up 1, 2, or 3 markers on a turn. To win, you must make *your partner* pick up the last counter.

The students were very excited to be able to play a game and began enthusiastically. I didn't give any suggestions for play the first few rounds, and basically they played without much planning. After a few games I told them to pay attention to their strategies and try to determine if there was a way to always win. I asked them to notice if it made a difference if they played first or second. After a few more

rounds we recorded their Hints to Win on a chart.

I was surprised at what they discovered in such a short time. Their findings included: a) whoever reduces the pile to 5 wins, b) 5 is the "trap," c) player 2 should take whatever player 1 takes, and d) if player 1 takes an even number, player 2 should take an odd number and vice versa. Those last two strategies didn't always win, but they showed that the students had come to understand the concept of a strategy.

Several weeks later I introduced the game of 3-5-7 Nim. Here there are three piles and at each turn a player can take as many markers as he wants, but they must all be from the same pile. The winner forces *his opponent* to take the last one. I asked them to play and this time record what they did at each play, who won, and could they find a winning strategy. Later in the week I introduced variations on Nim that can be found in *Creating Nim Games* (see page 3).

I was beginning to wonder if maybe we had become "Nimomaniacs" and it all might just be too much of a good thing. My concern was addressed on the day of our field trip to the Museum of Natural History when the buses were delayed. I hadn't really planned anything for that day because of the trip. Since we had time, one of the students asked, "Please can we play Nim?" As they got out the unifix cubes for markers, one of the parents, who was coming along as a chaperone, said to me, "My son can't get enough of this game. He loves playing it and figuring out the strategies." I had my answer.

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