'Minesweeper': Secret to age-old puzzle?

BOSTON (AP) — *Minesweeper*, a seemingly simple game included on most personal computers, could help mathematicians crack one of the field's most intriguing problems.

While some people may pass hours mindlessly playing *Minesweeper*, mathematicians are toiling over a larger version of the game, hoping to solve a problem so confounding that an institute offered $1 million to anyone who could crack it.

The buzz began after Richard Kaye, a mathematics professor at the University of Birmingham in England, started playing *Minesweeper*.

"I'm always interested in games with math elements. Math and games go together brilliantly," Kaye said. "I realized there was probably some nice mathematics behind it. But I didn't know what I was looking for."

Minesweeper, which is included with the Windows operating system, is a game in which players try to figure out which squares of a grid contain computerized mines. A number in each square indicates how many mines are in the squares around it.

After playing the game steadily for a few weeks, Kaye realized that *Minesweeper*, if played on a much larger grid, has the same mathematical characteristics as other problems deemed insolvable.

In fact, he said, *Minesweeper* could help in the quest for one of mathematics' white whales: the solution to what is known as the "P vs. NP" problem. The problem has been around for about 30 years.

The problem attempts to determine whether questions that seem to be unsolvable within a reasonable period of time might actually have a relatively simple way of being solved, possibly by computer.

Kaye said that if someone were to figure out an algorithm for determining all combinations of mine placement in a large-scale version of *Minesweeper*, that person will have solved the P vs. NP problem

The Clay Mathematics Institute in Cambridge, Mass., has offered $1 million to anyone who can solve it.

The discovery could have a wider impact.

"If there was a way of playing *Minesweeper* efficiently, then there would also be a way of cracking codes efficiently," Kaye said.

Ian Stewart, a research mathematician who teaches at the University of Warwick in England, said: "It's surprising that such a simple game would put us at such a frontier of mathematics. But the big questions in math are not very far below the surface of everyday life."

Arthur Jaffe, president of the Clay Mathematics Institute, said he was already a fan of *Minesweeper* before he heard about Kaye's research. He plays the game on nights when he has trouble falling asleep.

"I told my 14-year-old daughter about it," he said. "She was just amazed it was educational."