

### Dots and Boxes!

Dots and Boxes is a fun game that has been played around the world for many years. Ask your parents about it; there's a good chance they played it in school.

Dots and Boxes is played on a rectangular array of dots. Different sizes are possible. Two players take turns connecting two neighboring dots with a vertical or horizontal line segment. If your move completes a square (or possibly two squares), you put your initials in the square(s), and you move again. (You *must* move again; it's not a choice.) This last rule means that one player can make several moves in a row, as long as he or she is completing squares. The game is over when all the squares are completed, and the player with the most squares wins.

Different size "boards" are possible. You should play on boards with squares in 2 x 3, or 3 x 3 or 5 x 5 arrays. (Do you see that a 4 x 4 array of dots will create a 3 x 3 array of squares?) You can keep track of a game by numbering each move, and by using different colors for each player. A sample game on a 2 x 3 board is shown on the other side. Squiggle was the first player. This game ended in a tie.

- 1) Play Dots and Boxes! Have fun! Remember to play against a lot of different people so you can learn from their strategies.
- 2) Draw a neatly colored and numbered diagram showing one game you played. It might be wise to play on a relatively small board for this one.
- 3) Do you have any strategy suggestions for Dots and Boxes?
- 4) If given the choice, would you want to go first or second? How would you decide?
- 5) How many unique opening moves are there on the 2 x 3 board? How many possible second moves are there? How many unique games do you think are possible?
- 6) Can you do research to learn more about playing Dots and Boxes? Can you find out what "chains" and "double crosses" are? Remember to cite your sources.
- 7) Is there a strategy for winning this game? Does the strategy change when the size of the board changes?
- 8) Can you invent a variation? What happened when you tried it out? Write down the rules and explain how it is different from the normal version of the game.
- 9) Have Fun!