**Perfect Games**

Perfect games, also known as solved games, can be won every time with an algorithm and if the player knows whether to go first or second. Tic-Tac-Toe is also considered a perfect game because it will always result in a draw for players who know what moves to make. According to Wired magazine, Connect Four and checkers have now been solved. The games below are perfect games. As you play them you will start to notice some points where you may have your opponent beat, or you may be beat. Try to work backwards and see if you can figure out all the moves to win. If you do not know whether to go first or second, you have not solved the game.

**8 and 11**

**OOOOOOOO**

**OOOOOOOOOOO**

Put out a line of 8 coins and a line of 11 coins.

On each turn a player can take as many coins as they want from just one of the lines (it can be a different line on each turn)

The player who gets the LAST coin wins.

**25 (This is really a shorter version of 100 where players take between 1 and 10)**

**OOOOOOOOOOOOOOOOOOOOOOOOO**

Put 25 coins out between two players.

Each player takes between 1 and 5 coins on each turn.

The player who gets the LAST coin wins.

Some students will be able to deduce how to win 100 once they solve this.

**Game of 12**

On each turn a player needs to take either one or two coins from a circle set like a clock. If taking two coins, they must be adjacent to each other. LAST coin wins.



Practice Games

**8 and 11**

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**Game of 12**

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**Solutions to Perfect Games**

**8 and 11**

The key to this game is getting the two piles even and keeping them even. If you go first, you would take 3 from the pile of 11. Then keep the two piles even.

**25**

Students will figure out that if there are 6 left and it is their turn, they will lose. If you leave your opponent with 12, you can always get it to 6. The other key numbers are 18 and 24. If a student goes first, they should take one. They should then get the number left to 18, 12, and then 6.

**Game of 12**

This is the hardest game to figure out. To win you need to let your opponent go first and then mirror what they do. Take the piece or pieces that are directly across from the piece(s) or they took.