

## CHES AND COMMON CORE STANDARDS

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Chess was developed as a simulation to help develop the mind with skills in probability theory, planning ahead and to apply “what if” analysis to anticipate possible scenarios and a response for multiple outcomes. Chess in the afterschool program provides a fun activity that develops skill in common core mathematics standards. When students are not successful in math, we should not stick to the “theoretical instruction model” used by the classroom teacher. Using chess provides an alternative method to teach some of the most important probability skills using an applied instructional model through game simulation.

In Afterschool, Chess will provide a way for students to do mental exercises (tied to math standards) that will be fun and led to them playing chess at home and during break time during school. Chess can be a good fit for an afterschool activity.



Benjamin Franklin, in his work, [The Morals of Chess](#), regarded chess as more than just an idle amusement, ascribing several “valuable” qualities of the mind, useful in the course of human life, [that] are to be acquired or strengthened by it, so as to become habits, ready for all occasions. For Life is a kind of Chess...” (Franklin, 1776). Franklin enumerated these qualities as “1. Foresight... 2. Circumspection... 3. Caution... and 4. Perseverance in hope of favorable resources.” In this sense, we may credit Franklin with being one of the first to hypothesize that chess strengthens “valuable qualities of the mind” and to open the inquiry concerning whether or not chess makes one smarter. Source: <http://www.edutechchess.com/whychess.html>

Source: <http://www.corestandards.org/the-standards/mathematics/grade-7/statistics-and-probability/>

Mathematics » Grade 7 » Statistics & Probability

7.SP.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

Vic: The probability events in a game of chess are the various moves of the pieces and the possibility of outcomes are a mathematical problem that is applied and tangible to the learner compared the typical “theoretical” approach used in the daytime classroom.

- Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a [student](#) is selected at random from*

*a class, find the probability that Jane will be selected and the probability that a girl will be selected.*

Vic: With chess, every piece movement can be critical to the outcome of the game. Pieces move differently and the relationship of movement with different properties for different pieces provide an applied exercise in algebraic equation solving that is done without the typical symbols used in math, but with physical pieces on a chessboard.

- 7.SP.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
  - Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

Vic: Chess is filled with compound events (Castling, Discovered check, Sacrificing a piece for better position, ect.)

- Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.

Vic: The chessboard provides a grid of spaces for possible moves (probability) within the game.

- Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*

Vic: Chess is a simulation that generates compound events with an infinite number of potential outcomes. Below are national math standards and the skills learned by the simulation of Chess (these standards are incorporated into the Common Core Standards). Chess sets are very inexpensive and provide a hand’s on learning experience for children.

## **NATIONAL MATH STANDARDS ADDRESSED**

NM-ALG.1: Understand patterns, relations, and functions

NM-ALG.2: Represent and analyze mathematical situations and structures using algebraic symbols

NM-GEO.1: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships

NM-GEO.2: Specify locations and describe spatial relationships using coordinate geometry and other representational systems

## NATIONAL READING STANDARDS ADDRESSED

NL-ENG.K-12.1: [Apply](#) a wide range of strategies to comprehend, interpret, evaluate and appreciate texts.

NL-ENG.K-12.6: Apply knowledge of language structure, language conventions, media techniques, figurative language and genre to create critique and discuss print and non-print texts.

NL-ENG.K-12.10: Applying non-English perspectives to develop competency in the English language arts and to develop understanding of content across the curriculum for students where English is not the first language.

Chess is one of the best tools for learning logic, problem solving, and visualization. Students learn problem solving techniques in an enjoyable fashion by using the hands-on approach.

As part of this curriculum, students will learn algebraic and geometric concepts using chess as a game model. Children love games and chess is the ultimate “mind sport”. Students will learn the basics of the chess game, how the pieces move and interact with each other, basic chess tactics, strategy and notation.

Lessons will be conducted using a chess demonstration board, chess boards and pieces for the students to practice with, and worksheets to reinforce the concepts learned. Collaborative discussions and analysis will be encouraged to develop problem solving, decision-making, and team building skills.

Source: <http://www.thechessacademy.org/lessons.html>

## WHAT ARE OTHER NATIONS DOING?

Finland has been an example of educational excellence, with students doing very well on international tests in math. Is it only a coincidence that the Finns encourage their children in school to play chess? They have chess competitions that are as important as our sports programs are. However, the mental math development that students gain from chess is evidenced by their standing in math compared to other nations.



Singapore is another nation, where US educators are visiting to see what they are doing that helps them be considered among the world's top educational systems. You will find Chess embedded in the Singapore schools as well.

Singapore has a special chess school and they have competitions among schools [http://the-chess-school.com/?page\\_id=134](http://the-chess-school.com/?page_id=134)



(Above) Elementary chess instruction

< Winners of the under 9 age group

### **ADDITIONAL CHESS RESOURCES TO EXPLORE:**

[http://innovateducators.com/web\\_documents/nctmchess.pdf](http://innovateducators.com/web_documents/nctmchess.pdf) Chess as presented to National Council of Teachers of Math in 2011

<http://www.thechessacademy.org/lessons.html> The Chess Academy

Using Chess to teach Math to Elementary Students

<http://www.chess-game-strategies.com/using-chess-to-teach-maths-in-elementary-schools.html>

<http://www.characterchess.org/about.html> Character Chess

<http://www.edutechchess.com/whychess.html> Why Chess- from an Ed Tech perspective

Susan Polgar Chess News- Emphasis on girls learning Chess

<http://susanpolgar.blogspot.com/2006/11/teaching-math-through-chess.html>

<http://www.moveorder.com/> Another site promoting girls to embrace Chess