

Chess is an exercise of infinite possibilities for the mind, one which develops mental abilities used throughout life: concentration, critical thinking, abstract reasoning, problem solving, pattern recognition, strategic planning, creativity, analysis, synthesis, and evaluation, to name a few. Chess can be used very effectively as a tool to teach problem solving and abstract reasoning. Learning how to solve a problem is more important than learning the solution to any particular problem. Through chess, we learn how to analyze a situation by focusing on important factors and by eliminating distractions. We learn to devise creative solutions and put a plan into action. Chess works because it is self-motivating. The game has fascinated humans for almost 2000 years, and the goals of attack and defense, culminating in checkmate, inspire us to dig deep into our mental reserves.

Chess has been played and enjoyed by people around the world for two thousand years.

Many parallels have been drawn between mathematics, music, and chess. Lasker (1949) states:

Mathematical thinking is generally held to be more or less closely related to the type of thinking done in chess. Mathematicians are indeed drawn to chess more than most other games. What is less widely known is that very frequently mathematicians are equally strongly attracted to music. Many musicians do not reciprocate this attraction, but I firmly believe that this is mainly due to their lack of acquaintance with mathematics, and to the widespread confusion of mathematics with “figuring.”

An intriguing phenomenon that links mathematics, music and chess is the fact that child prodigies have been known only in these three fields. That children have never produced a masterwork in painting, sculpture, or literature seems only natural when we consider their limited experience of life. In music, chess, or mathematics, that experience is not needed. Here, children can shine, because native gifts are the dominant factor. Aesthetic sensitiveness and ability to think logically are certain inborn qualities. How, otherwise, could Mozart have composed a minuet, and actually written it down, before he was four years of age? How could Gauss, before he was three years old, and before he knew how to write, have corrected the total of a lengthy addition he saw his father do? How could Sammy Reshevsky play ten games of chess simultaneously when he was only six?

The reasoning ingredient in a chess combination is always of prime importance, even though a vivid imagination will make a chess player think of possibilities that will not occur to a less imaginative logician.

The above passage indicates abstract reasoning, a generally accepted quality inherent in both mathematics and music, is of prime importance in chess.

In the twentieth century, many educators, parents and chess experts maintain that chess education improves a host of mental abilities, including abstract reasoning and problem-solving (Schmidt, 1982; Rifner, 1997). Artise (1993) argues that “the game of chess makes one of the most important contributions to the field of education. Inherent in it is [sic] the basic principles of psychological learning theory: memory, pattern recognition, decision-making, and reinforcement.” Proponents believe that “chess belongs in schools.... Interest in chess can be generated in all groups of students regardless of cultural or economic background. Aptitude for the game is not restricted to the more

scholarly students” (Hall, 1983). Peter Shaw, a computer science and chess teacher in Pulaski, Virginia, states, “The game demands both inductive and deductive reasoning. You see the kid looking at a problem, breaking it down, then putting the whole thing back together. The process involves recall, analysis, judgement, and abstract reasoning” (Graham, 1985). As Vail (1995) points out, “Chess, it seems, possesses a rare quality: Children enjoy it despite the fact it’s good for them.” Chess, with its aesthetic appeal and inherent fascination for students of all ages, is catching the attention of educators, who are beginning to realize its academic and social benefits:

Several benefits accrue from the teaching and promoting of chess in schools: 1. Chess limits the element of luck; it teaches the importance of planning. 2. Chess requires that reason be coordinated with instinct [intuition]; it is an effective decision teaching activity. 3. Chess is an endless source of satisfaction; the better one plays, the more rewarding it becomes. 4. Chess is a highly organized recreation.... 5. Chess is an international language.... It can be a lifelong source of interest, amusement, and satisfaction.

Chess is found as required curricula in nearly 30 countries (Ferguson, 1995). In Russia, it has been part of the curriculum for over 40 years, where “adolescents were encouraged to play chess at a very early age to increase their problem-solving and reasoning skills” (Milat, 1997). In Vancouver, B.C., the Math and Chess Learning Center, recognizing the correlation between chess playing and math skills development, has written a series of workbooks to assist Canadian students in math (<http://www3.bc.sympatico.ca/mathchess/>). Liptrap (1997) states,

The mathematics curriculum in New Brunswick, Canada, is a text series called “Challenging Mathematics” which uses chess to teach logic from grades 2 to 7. Using this curriculum, the average problem-solving score of pupils in the province increased from 62% to 81%.

Reports from students, teachers and parents not only extol the academic benefits of chess on math problem solving skills and reading comprehension, but increased self-confidence, patience, memory, logic, critical thinking, observation, analysis, creativity, concentration, persistence, self-control, sportsmanship, respect for others, self-esteem, coping with frustration, and many other positive influences which are difficult to measure but which can make a great difference in student attitude, motivation and achievement.

The Province of Quebec, where the program was first introduced, has the best math scores in Canada. Canada consistently scores higher than the United States on international mathematics exams. Former U.S. Secretary of Education Terrell Bell encourages knowledge of chess as a way to develop a preschooler’s intellect and academic readiness

The New York City Schools Chess Program included more than 3,000 inner-city children in more than 100 public schools between 1986 and 1990. Based on academic and anecdotal records only, Palm (1990) states that the program has proven:

- Chess dramatically improves a child's ability to think rationally.
- Chess increases cognitive skills.

- **Chess improves children's communication skills and aptitude in recognizing patterns, therefore:**
- **Chess results in higher grades, especially in English and Math studies.**
- **Chess builds a sense of team spirit while emphasizing the ability of the individual.**
- **Chess teaches the value of hard work, concentration and commitment.**
- **Chess instills in young players a sense of self-confidence and self-worth.**
- **Chess makes a child realize that he or she is responsible for his or her own actions and must accept their consequences.**
- **Chess teaches children to try their best to win, while accepting defeat with grace.**
- **Chess provides an intellectual, competitive forum through which children can assert hostility, i.e. "let off steam," in an acceptable way.**
- **Chess can become a child's most eagerly awaited school activity, dramatically improving attendance.**
- **Chess allows girls to compete with boys on a non-threatening, socially acceptable plane.**
- **Chess helps children make friends more easily because it provides an easy, safe forum for gathering and discussion.**
- **Chess allows students and teachers to view each other in a more sympathetic way.**
- **Chess, through competition, gives kids a palpable sign of their accomplishments.**
- **Chess provides children with a concrete, inexpensive and compelling way to rise above the deprivation and self-doubt which are so much a part of their lives (Palm, 1990, pp. 5-7).**