



# Chess in the Schools

## Program Logic Models Narrative

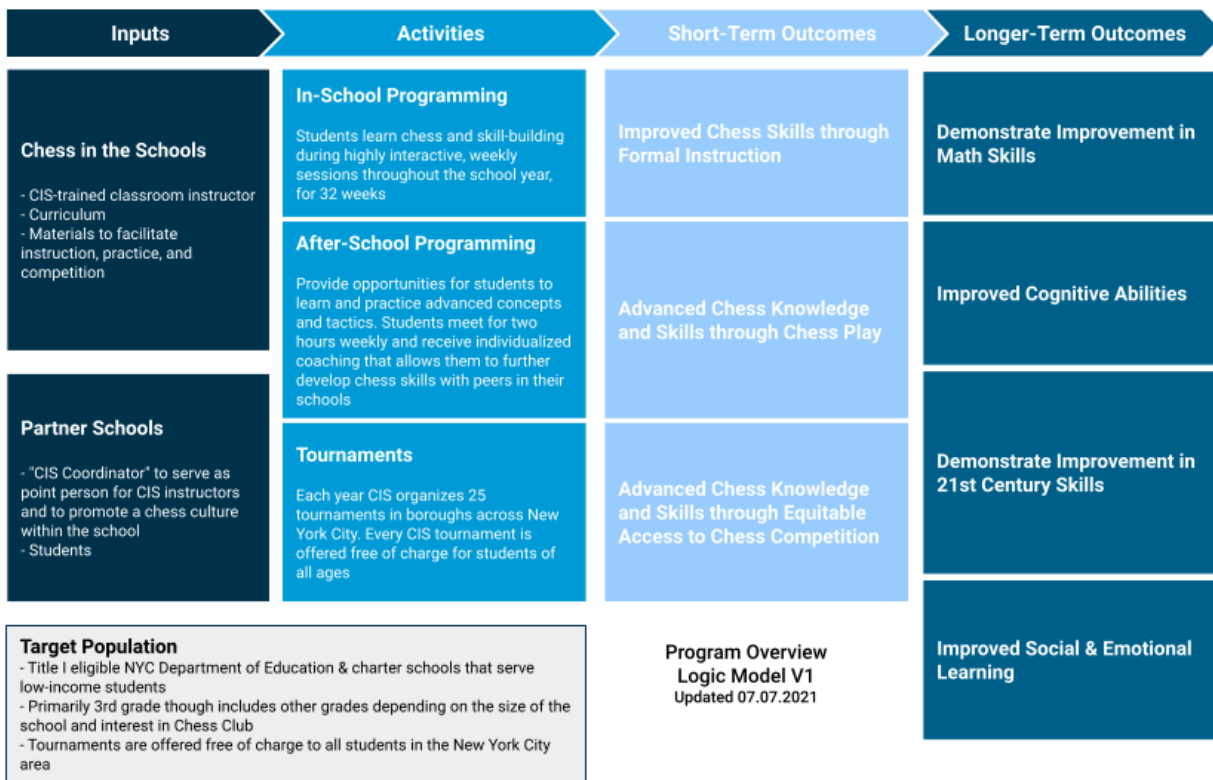
Updated September 2021

### Program Overview

Chess in the Schools (CIS) serves elementary and middle school students through school-based programs (Chess Class during the school day and Chess Club in after-school), chess tournaments, and through their College Bound program for high school students. This document describes logic models for the first three programs - in-school instruction, after-school clubs, and tournaments. Focusing on elementary and middle school program participants, these three programs seek to improve a student's chess skill through instruction, play, and competition. The theory that CIS will test is whether and how improving chess skills can also improve a student's math skills, cognitive ability, social and emotional learning, and 21st century skills (See Figure 1).

An individual student can experience CIS in a variety of ways. For example, a 3rd grader at PS 171 experiences CIS as "Chess Day," a weekly 45-minute structured lesson taught by a CIS-trained instructor. A 5th grader at the same PS 171 as the 3rd grader has continued to experience CIS through joining the after-school "Chess Club", lead by the same CIS instructor that teaches 3rd grader, and travels with their other Club members to weekend tournaments organized by CIS. A 7th grader may experience CIS as that organization that hosts tournaments on the weekend where they can play USCF Rated chess against other kids in the City free of charge. It will be important to place each of the program-logic models described below in the broader context of an individual student's experience.

**Figure 1: Program Overview Visual Logic Model**



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## In-School Logic Model

Students learn chess and skill-building during highly interactive, weekly sessions throughout the school year, for 32 weeks (See Figure 2).

### Target Population

Title I eligible NYC Department of Education (DOE) and charter schools that serve low-income students. In-school instruction focuses on 3rd grade and may include other grades depending on the size of the school.

### Inputs

CIS hires, trains, and provides ongoing support for instructors that lead weekly lessons. In each classroom, the partner school provides a DOE-licensed teacher that supervises the lesson that provides support to the CIS instructor as needed. CIS-trained instructors follow a pedagogical approach that focuss on respect for students, high expectations, and classroom management.

CIS also has developed a year-round curriculum of 32 lesson plans for elementary school students. Each lesson plan includes:

- A clearly stated objective;

- A review of the prior lesson;
- A participatory introduction and lesson aligned with learning standards;
- A demonstration of the material;
- Occasionally an opportunity to assess mastery of the lesson objectives; and
- An opportunity to practice the skill being taught.

Partner schools include both traditional public schools and charter schools in New York City that are eligible for and receive Title 1 Funding. Partner schools request to participate in CIS programming, and pay a nominal annual fee in exchange for receiving CIS programming. For larger elementary partner schools that have, for example, five 3rd grade classrooms, CIS will teach only 3rd grade students. If, though, a partner school has fewer than five 3rd grade classrooms, CIS might teach additional classrooms of older grades (for example, three 3rd grade classrooms and two 4th grade classrooms). As CIS continues to build their evidence building muscle, they will track the number of classrooms taught by grade across their portfolio of partner schools. While the vast majority of in-school CIS programming focuses on 3rd grade, about 20% of partner schools are middle schools. Typically, CIS instructors will adapt the curriculum for the middle school setting, using an accelerated sequence of lessons that provides a years worth of instruction over the course of a semester.

In addition to providing the classrooms and teacher support, partner schools also are required to assign a staff member to serve as the “CIS Coordinator”. That coordinator serves as the point person for CIS instructors and, most importantly, is responsible for promoting a chess culture within the school.

### **Activities**

Students participate in weekly 45-minute lessons, taught by CIS chess instructors, guided by a curriculum of 32 lessons plans. Each lesson plan is broken down into four steps:

1. Previous lesson review
2. Lesson objective
3. Related over-the-board activities for assessment
4. End of lesson review

The curriculum is organized and sequenced around each Chess piece, beginning with the pawn, followed by the rook, bishop, queen, knight, and finally the king. Each lesson covers the following three broad objectives (with additional guidance on more complicated topics, such as strategy):

1. How does the piece move?
2. How does it capture?
3. What is special about the piece?

In addition to the codified curriculum taught by CIS instructors, CIS provides additional resources to complement lessons learned in the classroom, including access to [ChessKid](#) and Google Classroom, where students can watch lessons (if they were absent that day or require reinforcement of what was covered), access slides that were used, and access additional enrichment resources to complement what is taught in each lesson.

## **Outputs**

As a direct result of the activities listed above, CIS will track:

1. Student attendance
2. The number/percent of lessons that need to be repeated
3. The number of lessons completed per academic year (or, in the case of middle school settings, per semester)
4. Amount of instruction in minutes/hours, based on the length of each lesson
5. Chess knowledge via the CIS Chess Test (Google quiz), administered at the end of each school year

Tracking these activities will help CIS understand what types of lessons are more challenging, how effective instructors are, and the particular dynamics within a given classroom. For example, student attendance might serve as a proxy for engagement (i.e. a student might be more likely to show up to school on “Chess Day”). Or, CIS might learn that half of all classes focused on the knight needed to be repeated, suggesting that the curriculum might need to be modified to build in more time to describe the intricacies of how the knight moves, captures, and what makes it special.

## **Outcomes**

CIS expects students that receive chess instruction through their in-school programming to develop a core set of chess skills (measured through CIS’s Chess Test), including:

- An understanding of chess rules and etiquette;
- An understanding of how the pieces move, how the pieces capture, and what is special about each of the six chess pieces; and
- An understanding of a game of chess is won, lost, or ends in a draw.

In addition to demonstrating an understanding of essential chess skills, CIS also expects students, in the short-term, to report that their CIS instructor cares about them, encourages their progress, that they have a positive relationship with their instructor, and that they are generally satisfied with CIS. For CIS program participants, these “Student Engagement” measures will likely be collected through developmentally appropriate surveys, which are currently being developed by researcher partners at Improvek12 (i.e. emoji-based scales for 3rd graders).

In the long-term (i.e. throughout the course of a student’s journey through elementary, middle, and high school), CIS believes that gaining an understanding of essential chess skills and playing the game of chess with peers, students will:

- Improve their math skills, as measured by standardized tests throughout a student’s school career;
- Improve their cognitive abilities, with a particular emphasis on problem solving, logical thinking, and productivity;
- Demonstrate improvement in “21st Century Skills<sup>1</sup>”, including notably learning skills (critical thinking, creativity, collaboration, communication), literacy skills (information, media, technology), and life skills (flexibility, leadership, initiative, productivity, social skills); and
- Demonstrate improvements in social and emotional learning, including relationship building through communication, cooperation, and empathy as well as resilience through emotional regulation, perseverance, and patience.

CIS’s evidence building activities in 2021-23 focus on understanding the connection between these short- and long-term outcomes, acknowledging the difficulties with drawing direct causal connections between these outcomes - for example, mastering the game of chess and demonstrating improved cognitive abilities. Additionally, while certain desired long-term outcomes, such as demonstrating improvement in math skills, are fairly simple and straightforward to measure, others, such as improvements in social and emotional learning, will require more effort to assess.

There is little published research linking chess skills and educational outcomes, but recently published findings in the Journal of Development Economics<sup>2</sup> found that chess training has a positive impact on math scores in the national exam, reduces the incidence of both time inconsistency and monotonic time preferences, and reduces the level of risk aversion almost a year later.

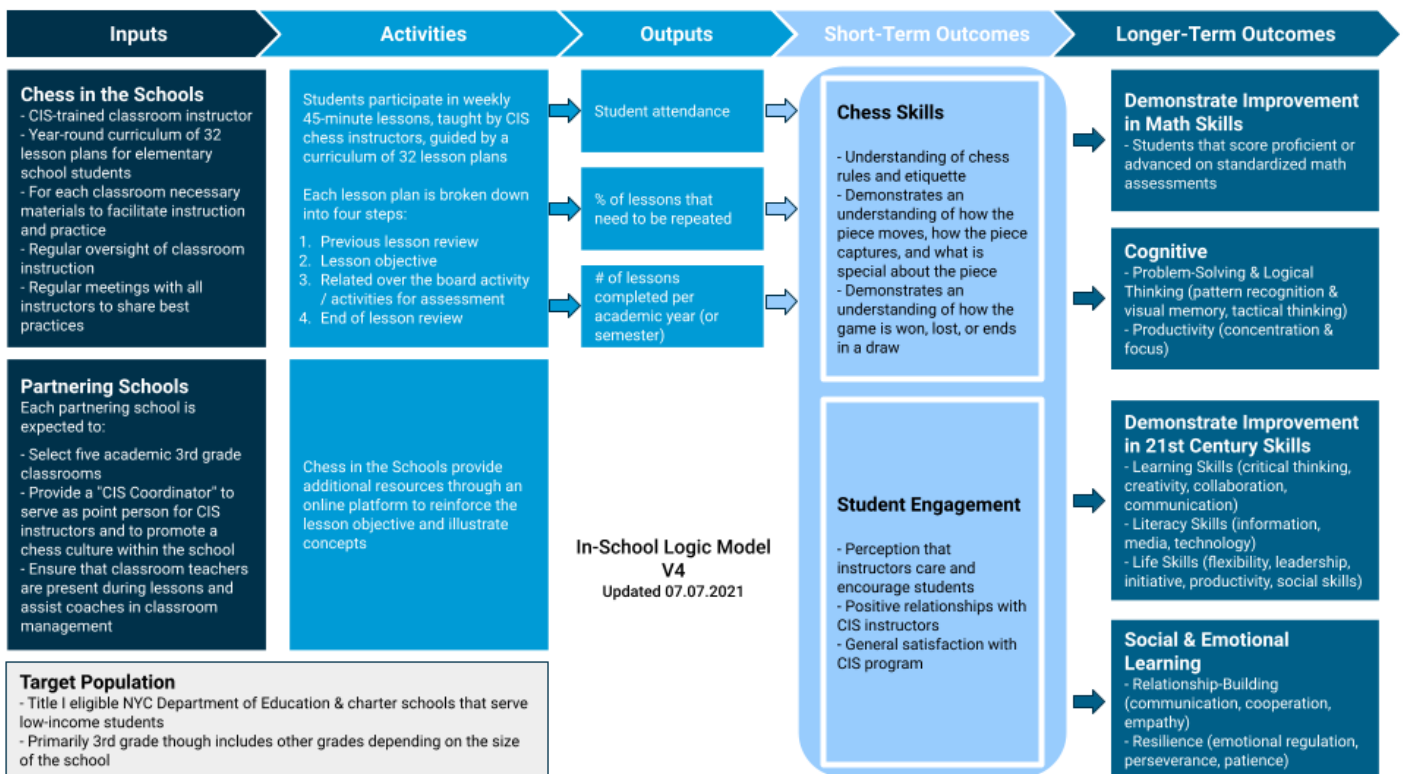
As CIS continues to engage with evaluation partners, they will explore creative ways to assess the desired outcomes above, through leveraging current education research (i.e. reviewing relevant literature on existent frameworks for measuring 21st Century Skills in students) or through developing unique measurement tools.

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<sup>1</sup> Educational researchers have created numerous frameworks to assess 21st Century Skills in students, though common across each is an emphasis on the skills needed for a student to experience academic and life success in the 21st century.

<sup>2</sup> Asad Islam et al. The Effects of Chess Instruction on Academic and Non-cognitive Outcomes: Field Experimental Evidence from a Developing Country, Journal of Development Economics (2021). Available at this link: <http://ftp.iza.org/dp12550.pdf>

**Figure 2: In-School Visual Logic Model**



## After-School Logic Model

The after-school program builds upon the in-school sessions by providing opportunities for students to learn and practice advanced concepts and tactics. Students meet for two hours weekly and receive individualized coaching that allows them to further develop analytical and chess skills, practice communication and cooperation, and build relationships with peers in their schools (See Figure 3).

### Target Population

The after-school program is open to any student in any grade in the partner school.

### Inputs

CIS hires, trains, and provides ongoing support for instructors that lead weekly lessons. In each classroom, the partner school provides a DOE-licensed teacher that supervises the lesson that provides support to the CIS instructor as needed. CIS-trained instructors follow a pedagogical approach that focuss on respect for students, high expectations, and classroom management.

In the after-school program, instructors deliver curriculum that builds on the core lessons from the in-school program instruction.

Partner schools include both traditional public schools and charter schools in New York City that are eligible for and receive Title 1 Funding. Partner schools request to participate in CIS programming, and pay a nominal annual fee in exchange for receiving CIS programming.. For larger elementary partner schools that have, for example, five 3rd grade classrooms, CIS will teach only 3rd grade students. If, though, a partner school has fewer than five 3rd grade classrooms, CIS might teach additional classrooms of older grades (for example, three 3rd grade classrooms and two 4th grade classrooms). As CIS continues to build their evidence building muscle, they will track the number of classrooms taught by grade across their portfolio of partner schools. While the vast majority of in-school CIS programming focuses on 3rd grade, about 20% of partner schools are middle schools. Typically, CIS instructors will adapt the curriculum for the middle school setting, using an accelerated sequence of lessons that provides a years worth of instruction over the course of a semester.

In addition to providing the classrooms and teacher support, partner schools also are required to assign a staff member to serve as the “CIS Coordinator”. That coordinator serves as the point person for CIS instructors and, most importantly, is responsible for promoting a chess culture within the school.

### **Activities**

In contrast to the In-School program, where students do not have a choice of whether they participate in Chess Class, the After-School program is entirely voluntary<sup>3</sup>. Because students have a choice of whether to join “Chess Club”, CIS engages in outreach and recruitment to encourage students to participate. As noted through staff interviews, these outreach and recruitment activities look different<sup>4</sup> across partner schools. All staff interviewed mentioned the importance of the partner school’s “Chess Culture” in CIS’s ability to recruit students for the after-school Chess Club. While the concept of “Chess Culture” lacks a strict definition, a few features include:

1. A CIS Coordinator that actively promotes chess in the partner school;
2. Participation in tournaments;
3. Displaying any awards won in tournaments; and
4. Displaying other chess related visuals throughout classrooms and in the school hallways.

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<sup>3</sup> It will be important for CIS to learn and document what alternatives are available to students in the After-School time. This will have implications for what outcomes you might expect, as it will answer the question, “In the absence of Chess in the Schools, a student would be experiencing...”

<sup>4</sup> Questions to consider based on this variation include: Who is participating and who is not? How full are programs relative to enrollment targets and capacity? What is different about schools that have full participation versus those that do not?

After-School Chess Club builds upon the in-school sessions by providing opportunities for students to learn and practice advanced concepts and tactics. Chess Club is offered one day per week, and varies in duration between 90 - 120 minutes depending on the partner school. In Chess Club, students receive differentiated formal instruction based on their individual skill levels. In addition, students are offered opportunities to practice with peers, engage in “Free Chess Play”, and review, with their instructors and peers, their tournament (and other competition) play.

### **Outputs**

As a direct result of the activities listed above, CIS will track:

- Student attendance
- Minutes of chess instruction per week
- Score on CIS Chess Test (expecting improvement over their in-school score)
- Activities and level of attainment in ChessKid

For students who participate in tournaments, CIS will be able to monitor their development in competitions.

### **Outcomes**

In the short-term (i.e. after receiving a year of chess instruction), CIS expects students that receive additional chess instruction through their after-school programming to further develop their chess skills through chess play, and demonstrate:

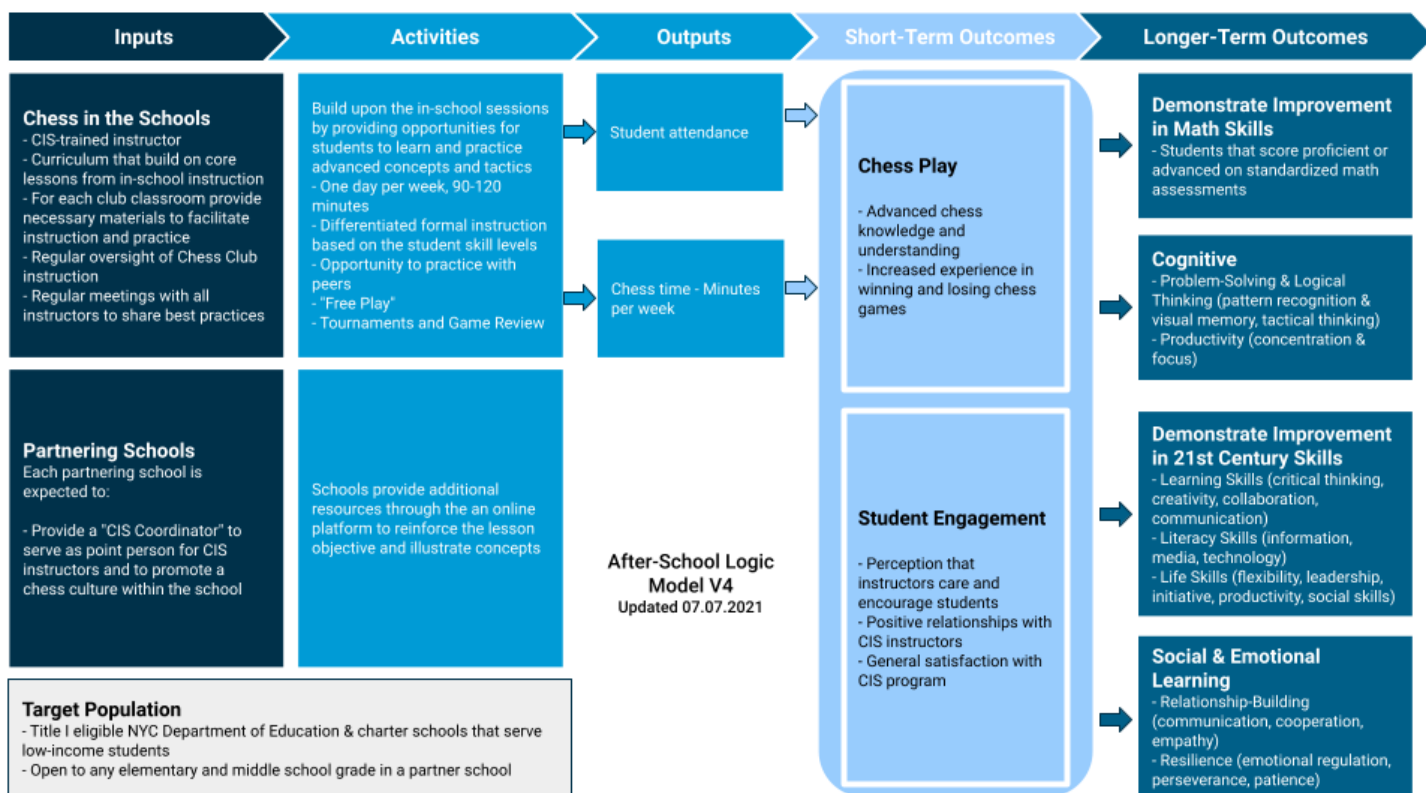
- Advanced chess knowledge and understanding; and
- Increased experience in winning and losing chess games.

Similar to the in-school program offering, CIS expects students to report that their CIS instructor cares about them, encourages their progress, that they have a positive relationship with their instructor, and that they are generally satisfied with CIS. For CIS program participants, these “Student Engagement” measures will likely be collected through developmentally appropriate surveys (i.e. emoji-based scales for 3rd graders).

While the long-term outcomes associated with after-school programming are the same as in-school programming, it is important to note the role that dosage plays to influence CIS’s desired short- and long-term outcomes. CIS believes, and will build evidence to support the belief, that students who participate both in the in-school program and after-school program will demonstrate increased improvement in desired outcomes (i.e. math skills, cognitive ability, mastery of 21st century skills, and social and emotional learning) as compared to those students that only receive chess instruction through in-school programming.



**Figure 3: After-School Visual Logic Model**



## Tournament Logic Model

*Tournaments provide students with an opportunity to practice and showcase their skills in a friendly, competitive environment. Every school year CIS organizes 25 tournaments in boroughs across New York City, with attendance at each ranging from 400 to 750 students of all ages. Every CIS tournament is offered free of charge for participating students (See Figure 4).*

### Target Population

CIS's tournaments are held in all five of the city's boroughs, and include youth from a broad diversity of backgrounds, allowing participants to meet a cross-section of peers and develop new relationships. Participants include not only CIS students, but also children from private chess programs and unaffiliated students as well.

Unique to tournament programming, CIS also expects to promote access and equity for students in the New York City area through offering tournaments free of charge to all participants. CIS believes that exposure to other boroughs and neighborhoods in addition to other students from a range of communities and life experiences promotes broader outcomes of access and equity.

## **Inputs**

CIS provides an advanced registration and check-in system which feeds into an internally housed database. Additionally, CIS staffs all tournaments with instructors that not only supervise match play but also provide instruction to students in between games. CIS also provides all chess sets, boards, clocks, awards, a microphone, and speaker.

## **Activities**

Tournaments follow a standard schedule for both USCF Rated and Unrated (or open) Sections. Check-in occurs between 8:30 and 9:30 AM, followed by 4 rounds of match play for Rated Sections and 3 rounds for Unrated Sections. All participants gather at 3:30, after match play is complete, for an Award Ceremony. In between rounds of match play, students gather in their team rooms to review their matches as a group and with a CIS instructor. Students may also receive 1:1 coaching from instructors between rounds. For both Rated and Unrated Sections, after the second round of play CIS hosts a “Lunch Break Blitz” as an opportunity for students to play rapid Blitz Chess games with their peers.

## **Outputs**

As a direct result of the activities listed above, CIS will track:

- The number of tournaments offered per month and per year; and
- The number of participants, disaggregated by CIS and non-CIS students

## **Outcomes**

In the short-term (i.e. after receiving a year of chess instruction), CIS expects students that participate in tournament play to, through chess competition:

- Demonstrate advanced chess knowledge and understanding; and
- Increased experience in winning and losing chess games.

Similar to the outcomes for CIS’s after-school program, CIS believes that increased exposure to chess through tournament play will promote a students demonstration of improvement in 21st century skills, cognitive ability, and social and emotional learning.

**Figure 4: Tournaments Visual Logic Model**

