

# Summer Math Menu Details

## **BORED?... BOARD! AND MORE...**

Board and strategy games are fantastic ways to develop the logical/mathematical part of the brain. Most board games have a combination of chance coupled with strategy. For younger grades, games with more chance and less strategy are appropriate. Consider a game like Candy Land is entirely chance-based with zero strategy involved, whereas a game like Chess is entirely strategy-based with zero chance involved. Younger grades should be playing games more similar to Candy Land with higher grades diving into games with more strategy.

The next two games listed are two easy-to-play games, appropriate for any age, and are great for developing mathematical thinking...

---

### THE GAME OF NIM

Materials: 10 objects or a pencil and paper (where you draw and cross off 10 dashes)

Directions: Start with 10 objects (pens, coins, beans, anything) between the 2 players. Take turns choosing who goes first. The player going first chooses to remove 1, 2, or 3 objects from the pile (s/he cannot choose zero). The second player then chooses to remove 1, 2, or 3 objects from the pile. Then it's the first players turn again... The player who removes the last object wins the game!

Note: This is a game to be played several times in a row. The goal here is to develop a strategy where if you choose who goes first you will always win the game!

Challenges: Once you have figured out a way to always win the original Game of Nim, change the number of starting objects to 20, then 30 or some other number of your choice. Also, change the

number of objects each player can choose (instead of 1, 2, or 3 consider 1, 2, 3, or 4).

---

## DOUBLE WAR

Materials: a deck of playing cards

Directions: Split a deck of cards in two, each player getting half the deck (26 cards). The game is played by both players simultaneously flipping over the top two cards of their pile. The player with the highest sum wins all four cards and places them at the bottom of their pile. If the sum is a tie (this is called “War”), players place the next three topmost cards from their pile face down, then flip the next two cards at the same time as their opponent. The highest sum wins all 14 cards. A player wins once they have at least 45 cards in their pile.

Note1: all face cards count as 10; Aces count as one (you can change these to be 11 later). For younger players (K-2), begin with the face cards removed entirely from the deck (you can bring them in after playing the game a dozen or so times if you’d like).

Note2: the mathematical goal here is to figure out who wins *without* counting or adding the items on the cards (though initially this may need to happen). For example, player 1 flips an 8 and a 9; player 2 flips a 5 and a 3. Player 1 wins because both their cards were higher, so there is no way player 2 can have a greater sum. Another example, player 1 flips a 3 and a 10; player 2 flips a 4 and an 8. Player 1 wins because the first cards (3 and 4) gave player 2 an advantage of 1, but the second cards (10 and 8) gave player 1 an advantage of 2 which overall means player 1 has a greater sum than player 2.

Learning to compare quantities without adding helps students understand quantity and equality at a very deep level. Similarly, adding in cards to represent numbers (i.e. a King = 10) helps support an understanding of variables that students will grapple with in middle school.

If you are an adult playing with a child, your job is to simply ask each round, “Who won? How do you know?” If the child is always adding

or counting ask them, “Is there a way you can determine who won without adding or counting?” That’s it.

---

## **CODING, ETC.**

Coding is a fantastic way to exercise the logical/mathematical part of your brain while simultaneously helping you develop a valuable skill in today’s society. While challenging, coding is extremely rewarding asking you to use your creativity and ingenuity to solve a series of problems. One of the great parts about learning to code is that there are so many paths you can take based on what solely on what *you* are interested in.

---

TYNKER: [TYNKER.COM](http://TYNKER.COM)

Learn Block Code, Python, and Java through project-based challenges. Current LAAA students in grades 3 - 8 have access to Tynker for Schools over the summer to spend time learning to code! To sign in go to [tynker.com](http://tynker.com) and sign in using your ASPIRA google Account.

---

CODE.ORG

This is the only coding site on this list that has robust options for pre-readers.

A very robust site with tons of options for you to go and learn. From Minecraft, to Angry Birds, to Frozen, this site has lots of opportunities to engage with coding from first starting out to intermediate coding. A completely free site.

---

TINKERCAD: [TINKERCAD.COM](http://TINKERCAD.COM)

A fantastic site to learn the basics of coding, electronics, and 3D design. Aspira students in grades 3 - 8 can log in using their ASPIRA Google account. K - 2 students can sign up for a free account.

---

CODE MONKEY: [PLAYCODEMONKEY.COM](http://PLAYCODEMONKEY.COM)

Another great coding site that teaches the basics of coding while you direct a monkey to collect bananas. The free trial account has plenty to offer.

---

CODECADEMY: CODECADEMY.COM

A great site for learning professionally-used coding languages (not recommended for beginners to coding). The free trial account has plenty to offer.

---

## **EXPLORATIONS**

Exploring how things fit together or examining how one thing changes when you change something else is at the heart of mathematics. Spend time this summer exploring, building, and asking yourself, “What would happen if we changed this thing to that thing?”

---

### COOKING CHALLENGE

Cook together with an adult. Cooking offers a wonderful set of experiences around volume, measurement, and fractions. It is also offers a great level of stimulation appealing to our senses of touch, taste, sight, temperature, and smell—without being over-stimulating. Cooking isn’t merely an important life-skill, but it helps people lead healthier, happier lives.

Challenges: Change the recipe! If the initial recipe serves 4, change it to serve a different number (younger grades might want to simply halve or double the recipe, where older grades might want to consider changing the recipe to serve 6 or 7). Have a conversation with an adult about some of the following questions while you cook: if I want to double the serving size, how does that affect the amount of ingredients? The temperature of the stove/grill? The length of cooking time? An important part of being a mathematician is not simply knowing how to double (or triple, etc.) something but knowing when doubling something is appropriate, and when it isn’t.

---

## BUILD SOMETHING WITH BLOCKS, LEGOS, ETC.

Research supports the value in building with manipulatives. Building doesn't just help develop fine motor skills, but it helps with cognitive (brain) development as well. The building can be done with anything: LEGOs, cardboard strips, cubes, Magnatiles, cards—it doesn't matter.

---

## EXPLORE MATH SKILLS AT KHANACADEMY.ORG

If you want to spend some time over the summer working on math skills that you feel you never quite mastered, [khanacademy.org](https://www.khanacademy.org) is a great, free resource that can help you hone those skills.

---

## EXPLORE MATH SKILLS WITH I-READY AT: LOGIN.I-READY.COM

If you want to spend some time furthering your personal progress on your i-Ready math account, you can. Your account remains active over the summer. So feel free to log in and practice some math.

---

## POOR POUR

Gather several (5 to 10) different glasses, water pitchers, or just general containers that can hold a liquid. Fill the smallest container with water. Before transferring the water to one of the new containers, predict how high the water will reach. (If you are doing this with someone, you can take turns where one person predicts how high the water will go, and the other person guesses “higher” or “lower.”) Now that the second container is holding the water, predict how high the water will reach on the third container, then pour the water in. Continue this until you have poured water into each container. Try starting again with a different amount of starting water (even if this means you can no longer use your smallest container).

This activity is great for developing both a sense of spatial reasoning as well as a better sense of volume.