Previous Topics Class Examples

The topics classes at Camp Conway are a core part of the program. Each week, campers choose from a small set of advanced, curiosity-driven courses taught by mathematicians who emphasize deep, creative, and rigorous thinking.

Topics change from year to year (and session to session!) based on faculty interests, and we intentionally vary our offerings to ensure fresh and engaging options for returning students. These samples reflect the style, depth, and spirit of our topics classes: exploratory, rigorous, collaborative, and joyful.

For Summer 2026, we plan to offer four topics class options each week. **Please note that we do not announce the specific topics in advance**. On the first morning of each camp week, campers learn about the available options through short faculty presentations and submit a course preference form; their class then has its first meeting that afternoon. This approach encourages campers to choose based on what most sparks their curiosity and preserves the joy of discovering new ideas.

(K)not Your Mother's Math Class

Description: You've likely encountered knots in your everyday life—in your hair, in your shoelaces, in your necklaces. But have you ever encountered them in math? What even makes a knot "mathematical"? In this course, we'll explore the captivating world of knot theory, where your everyday knots lead to powerful mathematical questions and ideas. You'll get a taste of everything from basic concepts (e.g. defining knots and their properties, drawing knot diagrams) to tools for studying knots (e.g. unknotting, encoding, how to tell knots apart) to questions real mathematicians are thinking about today! At the end of the week, you'll walk away with a charcuterie board of knot theory knowledge—a little bit of everything. You may even pocket a favorite knot on your way out!

The Mathematics of Voting

Description: How do we decide who wins an election? What information should we collect from voters? Can the winner change depending on what we do with that information? In this course, campers will begin exploring the fascinating world of voting from a mathematical perspective. We'll learn about a variety of voting methods, and we'll see that different methods can lead to wildly different outcomes! Along the way, we'll use mathematical objects like directed graphs and partially ordered sets to help understand what's happening and why. This course blends logic, creativity, and real-world relevance, and might just leave you asking: Should we vote on how we vote?

Geometry in the Fourth Dimension and Beyond!

Description: While we can't visualize the fourth dimension—and beyond—we can use what we know about geometry on 2D paper and geometry in our 3D world together with the tools of mathematics to reason about how things in a 4D world would look and behave. Sometimes we'll find that the 4D world is more surprising and strange than we could have imagined!

The Art and Theory of Counting

Description: You may have seen counting problems before—like figuring out how many ways to arrange the letters in the word *MATHEMATICS*. But in this course, we'll go beyond solving individual problems and explore the deeper ideas that tie them together. Our focus will be on combinatorial identities: elegant equalities that connect seemingly different counting questions in surprising ways.

Along the way, we'll investigate Pascal's triangle, Fibonacci numbers, and the art of bijective proofs. This course offers a deeper dive into the structure of combinatorics, revealing a side of counting that's both beautiful and profoundly powerful.

Cryptography

Description: Throughout history, people have needed ways to send secret messages for all kinds of reasons. In ancient times, Romans used a very simple method to transform a message in Latin into something that doesn't look like Latin anymore. As codebreakers got smarter, encryption techniques had to evolve—and they continue to do so today. In this course, we'll explore many different methods of encrypting and decrypting messages, from ancient ciphers to more modern techniques. To understand how modern cryptography works, we'll also learn some number theory and use it to crack (and create) secret codes.

Big Numbers

Description: Some Big Numbers, like Graham's Number and TREE(3), have become familiar in popular math media. Aside from their sheer "gasp" factor, they are connected to a good amount of interesting mathematics: combinatorial problems with surprising features, Ramsey theory, the fast-growing hierarchy and proof theory. We will study some of the main ideas associated with big numbers, and have some fun doing so.