GirlsGetMath Curriculum Overview

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Module	Summary	Materials
Cryptography	This module has three parts. The first presentation introduces modular arithmetic and basic properties of addition, multiplication, and multiplicative inverses modulo *n*. The second presentation covers Caesar and multiplication ciphers. The third presentation is on public key cryptography, specifically the Diffie-Hellman key exchange.	● 3 presentations ● 3 handouts ● 2 labs
Data Science (under construction)	This theme introduces two topics in data science: classification and visualization. For the visualization portion, students are introduced to two vector similarity measurements and then create heat maps using survey data that they collect.	● 1 presentation ● 1 lab
Fair Division and Apportionment	This module has two parts: the first covers several methods for fairly dividing assets. The second part is about apportionment, using the US House of Representatives as an example. The lab explores different apportionment methods applied to the 2000 Presidential election.	● 2 presentations ● 2 handouts ● 2 labs
Fractals	This theme introduces fractals and self-similarity through pictures and examples. The second presentation is a hands-on activity conducting a simple measuring experiment. The aim of the experiment is to approximate the dimension of a crumpled piece of paper.	● 2 presentations ● 2 handouts

Graph Theory	This theme explores topics in graph theory with an emphasis on adjacency matrices. After an introduction to terminology, the latter two presentations cover the coloring problem and modeling epidemic spread with graphs.	● 3 presentations ● 2 handouts ● 2 labs
Image Processing	This module presents basic elements of digital image processing. It begins with a discussion of digital images as matrices and then describes several image manipulations (e.g. negating an image and altering color channels) through matrix operations.	● 2 presentations ● 2 labs
Introduction to Matlab	This presentation and sequence of labs is an introduction to Matlab and introductory logic. The activities walk students through how to use Matlab as a calculator, how to enter and interpret logical statements, and how to write simple programs with for loops.	● 1 presentation ● 2 labs
Introduction to Vectors and Matrices	Students are introduced to vectors and matrices and basic operations: vector and matrix addition, scalar multiplication, the dot product, and matrix multiplication.	● 1 presentation ● 1 lab
Warm-up Activities	The warm-up activities are a collection of engaging, hands-on activities related to a wide range of topics in mathematics.	● 6 presentations and/or activities