



Grade 5 Math Enrichment - Unit 4 - Mosaic Masterpieces

Unit Focus

Creating interesting images that communicate meaning to the viewer is a complex but important process. Computer codes such as binary and hexadecimal can be used to digitally create thousands of colored pixels which combine together to form beautiful graphics. Students will learn what binary code and hexadecimal are and how to use them, then design and create their own pixelated images on Code.org. As a culminating project they will build their images into mosaic displays using Rubik's cubes.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
CSTA: Computer Science Standards (2017) 3-5 - Test and debug (identify and fix errors) a program or algorithm to ensure it runs as (1BAP-15) Common Core Mathematics: 5 - Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (CCSS.MATH.CONTENT.5.NBT.A.2) Mathematics: 6 - Make sense of problems and persevere in solving them. (CCSS.MATH.MP.1) - Attend to precision. (CCSS.MATH.MP.6) National Core Arts Standards Visual Arts: 5 - Combine ideas to generate an innovative idea for art-making. (VA:Cr1.1.5.a) Madison Public Schools Profile of a Graduate - Product Creation: Effectively use a medium to communicate important information. (POG.3.2)	<i>Students will be able to independently use their learning to...</i> T1 Initiate a plan using a variety of methods/strategies appropriately, execute it, and evaluate the reasonableness and accuracy of the solution. T2 Demonstrate fluency with mathematical computations and definitions.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Mathematicians monitor progress while problem solving, change course if necessary and evaluate the reasonableness of their solution. U2 Mathematicians calculate efficiently and accurately while using appropriate symbols and labels.	<i>Students will keep considering...</i> Q1 What makes an effective problem solver? Q2 How do I check my work for accuracy and completeness?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 Vocabulary: mosaic, pixelation, binary, denary, algorithm, consensus, decimal, hexadecimal, face, vertex K2 Conceptual understanding of how a group of individuals reaches a consensus. K3 Knowledge of how algorithms are used in diverse applications. K4 Understanding of various number systems (decimal, binary, hexadecimal) their respective bases, where and why they are used.	<i>Students will be skilled at...</i> S1 Using binary coding to create a black and white image adhering to given dimensional restraints. S2 Using hexadecimal coding to create a color image adhering to color, size and thematic restraints. S3 Applying algorithms to manipulate the front faces of Rubik's cubes to create a mosaic design based on a pixelated image of their design.