Grade 6 Math Enrichment - Unit 1 - Where is the Magic - Puzzles and Logic

Unit Focus

Problem solving and mathematical reasoning are important part of mathematics for middle school students. In this unit students will investigate and analyze the logic and math behind puzzles by making conjectures, collecting evidence and forming arguments. They will look for patterns in their work and create clear explanations for their solutions. They will learn to justify what they do and communicate their results using the language of mathematics. Throughout the unit, students will create their own puzzles, communicating the logic and mathematics within the puzzle.

Problem solving involves knowing what you can do when you are 'stuck'. Students will be encouraged to take risks and learn from mistakes and explore alternative strategies.

For the culminating activity will be research other mathematical puzzles of their interests and create one their own to share.

Stage 1: Desired Results - Key Understandings

Standard(s)

Common Core
Mathematics: 6

- Make sense of problems and persevere in solving them. (CCSS.MATH.MP.1)
- Construct viable arguments and critique the reasoning of others. (CCSS.MATH.MP.3)
- Look for and make use of structure. (CCSS.MATH.MP.7)
- Look for and express regularity in repeated reasoning. (CCSS.MATH.MP.8)

Madison Public Schools Profile of a Graduate

- Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)

Transfer

Students will be able to independently use their learning to...
T1 represent and interpret patterns in numbers, data and objects.
T2 make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution.
T3 justify reasoning using clear and appropriate mathematical language.

Meaning

Understanding(s)

Students will understand that...
U1 Effective problem solvers work to make sense of the problem before trying to solve it.
U2 Mathematicians overcome obstacles by employing strategies and learn from success and failure.
U3 Mathematicians can describe patterns, relations, and/or functions to access strategies to solve problems.

Essential Question(s)

Students will keep considering...
Q1 What makes a puzzle good?
Q2 How do I decide if my answer makes sense and if not, what do I do?
Q3 How can understanding a pattern help me?
Q4 What do effective problem solvers do when they get stuck?

Acquisition of Knowledge and Skill

Knowledge

Students will know...
K1 how to use (specific) strategies to solve logic problems
K2 Will know how to read a number in a base other than 10.
K3 Students will know there are often different levels of difficulty of the same type of problem and doing easier puzzles can build skills and confidence for doing harder puzzles.
K4 Students will know that some puzzles can be solved using deductive reasoning.

Skill(s)

Students will be skilled at...
S1 Students will be skilled at using organizational tools (ex charts) to solve problems.
S2 Students will be skilled at working backwards to solve a problem.