

The Mathematics of Puzzles & Games

Mathematics

Grade 1

In this course students will reason abstractly and quantitatively, strengthen collaborative and competitive skills and also challenge ability and memory. Students will apply prior knowledge to learn strategies for solving mathematical puzzles, with increasing speed and accuracy.

Revised: July 2019

Approved by the Montclair Board of Education: August 2019



Montclair Public School Elective Overview

Instructional Plan

Course: The Mathematics of Puzzles & Games

Marking Period or Trimester: One Trimester

Pacing: 8 weeks

NJSLS

Anchor Standard

Strand 1: Operations and Algebraic Thinking: Represent and solve problems involving addition and subtraction - 2.OA.A.1;

Operations and Algebraic Thinking: Add and subtract within 20, using mental strategies - 2.OA.B.2

Strand 2: Number and Operations in Base Ten: Use place value understanding and properties of operations to add and subtract - 2.NBT.B.5

Framing the Learning

Timeframe	Big Ideas	Essential Questions	Enduring Understandings
Weeks 1-2	Good problem solvers use prior knowledge and critical thinking.	What do effective problem solvers do, and what do they do when they get stuck?	Mathematicians make sense of problems and persevere in seeking solutions.
Weeks 3-4	Knowledge of addition facts can be used to solve subtraction problems and vice-versa.	How are addition and subtraction related?	Computation involves taking apart and combining numbers using a variety of approaches.
Weeks 5-6	Apply a flexible approach to combining and partitioning numbers to reach a solution.	How does explaining my process help me to better understand a problem's solution?	Sharing mathematical thinking develops a deeper understanding of a concept.
Weeks 7-8	There can be different strategies to solve a problem, but some are more effective and efficient than others are.	How do I decide if my answer makes sense and if not, what do I do?	Mathematicians overcome obstacles by employing strategies and learning from successes and failures.

Evidence of Learning

Accurately solve logic and computational problems. Persistently pursue solutions, while demonstrating flexibility among strategies. Cooperate with a partner to discern patterns which can be applied to problem solving puzzles. Cogently express reasonings undertaken, enroute to solutions.

Activities

Solve numerically based puzzles, at varied levels of difficulty, independently, and in collaboration with a partner and small group. Solve logic puzzles, at varied levels of difficulty, independently, and in collaboration with a partner and small group.

DIFFERENTIATION

Special Education	ELL	Intervention	Acceleration
<ul style="list-style-type: none"> ● Modify and accommodate as listed in student’s IEP or 504 plan ● Prioritize instruction ● Utilize wait-time ● Ensure directions are clear and concise ● Utilize probing and clarifying questions ● Support instruction with scaffolding ● Model (provide step by step instructions) use of learning strategies ● Provide extended time for practice and review of learning strategies ● Identify, categorize, and teach words critical to understanding instructional texts ● Utilize multiple approaches to monitor student understanding ● Create rubrics to develop assessments ● Vary assessments ● Assign peer assisted reading and tutoring ● Provide individual help to all students ● Create opportunities for/Monitor peer collaboration ● Monitor student progress frequently ● Utilize flexible/cooperative grouping based on instructional goals ● Prioritize and chunk lengthy assignments ● Utilize assistive technology, when appropriate ● Provide ongoing, effective, specific feedback ● Model/Utilize graphic organizers ● Provide leveled reading materials ● Utilize visual aids and props (flashcards, pictures, symbols) when possible ● Utilize a multi-sensory approach to new topics 	<ul style="list-style-type: none"> ● Get to know student ● Set high expectations ● Learn/Utilize/Display some words in student’s heritage language ● Allow electronic translator ● Reword, repeat, and clarify directions ● Determine student knowledge and level of understanding ● Research instruction that best matches student need ● Utilize ongoing informal assessments ● Refer to NJDOE Resources: https://www.state.nj.us/education/bilingual/resources/ ● NJDOE ELL Support Descriptions: https://www.state.nj.us/education/modelcurriculum/ela/ELLSupport.pdf <p>*Review Special Education list for additional recommendations.*</p>	<ul style="list-style-type: none"> ● Tiered Interventions following RtI framework ● RtI Intervention Bank ● Foundations Double-Dose (Tier II) ● LLI (Tier III) ● FFI Skill Report: DRA On-Line ● enVision intervention supports NJDOE resources 	<ul style="list-style-type: none"> ● Process should be modified: higher order thinking skills, open-ended thinking, discovery ● Utilize project-based learning for greater depth of knowledge ● Utilize exploratory connections to higher grade concepts ● Contents should be modified: abstraction, complexity, variety, organization ● Products should be modified: real world problems, audiences, deadlines, evaluation, transformations ● Learning environment should be modified: student-centered learning, independence, openness, complexity, groups varied

