Problem Solving Unit

Content Area: **Mathematics**
Course(s): **Generic Course, TAG Mathematics 4, TAG Mathematics 3**
Time Period: **Generic Time Period**
Length: **Length of unit**
Status: **Published**

Unit Overview

This unit introduces students to the basic steps of the problem solving methods, as well as, the 8 different problem solving strategies. Students are challenged to explain and defend their thinking.

Transfer

Students will be able to independently use their learning to...

-What kinds of long term, independent accomplilshments are desired?

-persevere to solve problems.

-have confidence in thier ability to solve problems.

Meaning

Understandings

Students will understand that...

-What specifically do you want students to understand?

-What inferences should they make/grasp/realize?

-There are many ways to find a solution to a mathematical problem.

-They need to persevere to find a solution.

-Problem solving involves a series of linear steps.

-Problems have varying degrees of difficulty.

Essential Questions

Students will keep considering...

-What thought provoking questions will foster inquiry, meaning making and transfer?

-Is there another way to solve the problem?

-Is this the best way to solve the problem?

-What is this problem asking?

Application of Knowledge and Skill

Students will know...

Students will know...

What facts and basic concepts should students know and be able to recall?

-5 problem solving steps

-8 problem solving strategies

-How to communicate thier thinking effectively

-there is more than one way to solve a problem.

Students will be skilled at...

Students will be skilled at...

What discrete skills and processes should students be able to use?

-problem solving

-deductive reasoning

-inductive reasoning

-logical reasoning

-critical thinking

Academic Vocabulary

Multiply
Product
Divide
Quotient
Remainder
Array
Unknown
Equal shares
Factor
Variable
Pattern
Even
Odd
Round
Unit fraction
Equivalent
Whole number
Fraction bar
Numerator
Denominator
Elapsed time
Open number line
Gram
Kilogram
Liter
Scale (of graph)
Unit square
Area
Perimeter
Rhombus
Quadrilaterals
Formula
Estimation
Factor pairs
Multiples

Prime
Composite
Sequence
Area model
Equation
Equivalent fractions
Mixed number
Improper fraction
Decimal
Hundredths
Tenths
Pound
Ounce
Conversion
Table
Line plot
Angle
Ray
Endpoint
Degrees
Protractor
Points
Lines
Line segments
Right angle
Acute angle
Obtuse angle
Perpendicular lines
Parallel lines
Right triangle
Line of symmetry
Parentheses
Brackets
Braces
Numerical expression
Evaluate
Powers of 10
Decimal point
Thousandths
Volume
Origin
formula

Ratio
diagram
Percent
Greatest Common Factor
Least Common Multiple
Distributive Property
Positive Number
Negative Number
Opposite

Inequality
Exponents
Order of operations
Substitution

variable
Median
Mode
Range
Mean

Learning Goal 1

Solve problems using critical thinking and logical reasoning including a clear explanation.

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.4.OA.A.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.4.OA.A.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Target 1

Identify the 5 steps of problem solving.

Target 2

Describe how to solve a problem using different problem solving methods.
(making a table, making an organized list, working backwards, guess and check, finding a pattern, acting it out, using a simpliar problem, and drawing a picture)

Target 3

Defend their chosen strategy by explaining their work.

Summative Assessment

Noetic Math Competition Tests

21st Century Life and Careers

Select all applicable standards from the applicable standards

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Formative Assessment and Performance Opportunities

Teacher observations

Class Participation

Class Discussion

Problem of the Day

Partner work

Brainteasers

Mental Math

Differentiation/Enrichment

As this is a TAG class, rigor is already increased. Students have the opportunity to participate in:

invention convention

Math night

Noetic Math Compeition

Creating their own math problems

Brainsteasers

Unit Resources