Unit 1: Order of Operations and Expressions

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

UNIT RATIONALE

Persistence in solving problems and developing collaboration strategies are key components of success in Algebra I. Students will develop and utilize a strong foundation in pre-algebra skills. They will produce solutions to order of operations problems and will evaluate expressions. This will develop the knowledge and skills necessary for success in more complex tasks such as solving linear and quadratic equations.

ESSENTIAL QUESTIONS

How do we apply previous content knowledge and work together with others to solve difficult problems?

Why do we use mathematical expressions/equations to model different situations?

Why do we use order of operations and evaluating expressions in mathematics?

Why is it important to develop a strong understanding of pre-algebra skills to master grade-level content?

STANDARDS

NEW JERSEY STUDENT LEARNING STANDARDS: CONTENT AREA

New SectionNew Jersey (NJSLS) - K-12 - Math Practice Standards (2020)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

New Jersey (NJSLS) - High School - Mathematics (2020)

MA.A-SSE	Seeing Structure in Expressions
MA.N-RN	The Real Number System
MA.A-SSE.A	Interpret the structure of expressions
MA.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
MA.A-SSE.B	Write expressions in equivalent forms to solve problems
MA.A-SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
MA.A-APR.A	Perform arithmetic operations on polynomials
MA.A-APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

NEW JERSEY STUDENT LEARNING STANDARDS: CAREER READINESS, LIFE LITERACIES AND KEY SKILLS

PFL.9.1.12.CFR.2	Summarize causes important to you and compare organizations you seek to support to other organizations with similar missions.
PFL.9.1.12.CFR.4	Demonstrate an understanding of the interrelationships among attitudes, assumptions, and patterns of behavior regarding money, saving, investing, and work across cultures.
9.3.12.ED.1	Apply communication skills with students, parents and other groups to enhance learning and a commitment to learning.
9.3.12.ED.3	Use critical thinking to process educational communications, perspectives, policies and/or procedures.
9.3.12.ED.5	Demonstrate group collaboration skills to enhance professional education and training practice.
9.3.12.AC-DES	Design/Pre-Construction
9.3.12.AC-DES.5	Identify the diversity of needs, values and social patterns in project design, including accessibility standards.
9.3.12.AC-DES.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
9.3.12.AC-DES.7	Employ appropriate representational media to communicate concepts and project design.
9.3.12.AC-DES.8	Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.
9.3.12.ED-PS.1	Identify strategies, techniques and tools used to determine the needs of diverse learners.
9.3.12.ED-PS.2	Implement methods to enhance learner success.
9.3.12.ED-PS.3	Identify resources and support services to meet learners' needs.
9.3.12.ED-PS.4	Identify resources and support services available in the learning organization to enhance the learning environment.
WRK.9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
WRK.9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.9-12.8.1.12.AP.1	Design algorithms to solve computational problems using a combination of original and existing algorithms.
CS.9-12.8.1.12.AP.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
CS.9-12.8.1.12.AP.9	Collaboratively document and present design decisions in the development of complex programs.
CS.9-12.8.1.12.DA.2	Describe the trade-offs in how and where data is organized and stored.

PRE-ASSESSMENTS

Non-curricular tasks to identify students' readiness levels with problem solving.

Students will be placed in groups to problem solve real world tasks.

INSTRUCTIONAL PLAN

MODULE 1

Student Learning Intentions (SLI) WALT: (We are learning to…)	**We are learning to create an egg drop apparatus collaboratively so that our egg will be protected fr cracking.**
Student Learning Strategies	Brainstorm, Modeling, etc...
Success Criteria	- I can collaborate productively with peers to develop a apparatus - I can problem-solve to protect the egg from cracking - I can select and use strategies needed to be succes in this project
Formative Assessment (drives instructional decisions)	Students will be graded on a rubric.
Activities and Resources	Egg Drop Project
Suggested Modifications	Students can use examples presented online as

	as ask for help.

The Egg Drop Challenge

MODULE 2

Student Learning Intentions (SLI) WALT: (We are learning to…)	Students will learn to simplify expressions by usir order of operations.
Student Learning Strategies	Discuss and develop everyday activities that use order of operations(ie. You can't put your shoes c before socks) Order of operations "Tell us about yourself" Pentominoes Task Challenge Students will manipulate expressions' algebraic symbols in order to simplify to a specific value us the 4's 4s. Students will do a gallery walk to check each oth work from the activity listed above. Breaking down problems and simplifying problem with students to understand how symbols have a different outcomes depending on the order they a placed.
Success Criteria	I can successfully use the order of operations to simplify expressions. I can determine the correct steps to simplify orde operations.
Formative Assessment (drives instructional decisions)	Students will be graded on a rubric on the numbe problems they can complete.
Activities and Resources	Four's Fours.

Suggested Modifications	Students will be given problems as they complete them. The goal is for students to understand the manipulation of algebraic symbols.

Fours_Challenge.pdf

BKHSMAlgebra1.pdf
all_about_me_order_of_operations_project.pdf
expressions_task.pdf
The_Answer_Are.pdf

MODULE 3

Student Learning Intentions (SLI) WALT: (We are learning to…)	We will evaluate expressions so we can evaluate functions in the future.
Student Learning Strategies	Everyday scenarios that show how evaluating an expression matters while including order of operations. Task cards Find the mistakes
Success Criteria	I can plug in a value in the correct locations in an expression. I can simplify the expression using order of operations. I can evaluate expressions correctly. I can connect evaluating expressions to real world scenarios. (ie. Bowling and skating prices, order of operations matter)
Formative Assessment (drives instructional decisions)	Results of activities completed during week.
Activities and Resources	Task Cards Desmos Finding mistake

Suggested Modifications	Students will be placed in groups and can work with teacher through out the activities.

REFLECTIONS

We did not use these materials, because we used the week to complete the Egg Project.

Rubric needed to be update. Updated rubric is below, including a word document for others to edit.

EggDropRubric.docx

EggDropRubric.pdf

INTERDISCIPLINARY CONNECTIONS: NEW JERSEY STUDENT LEARNING STANDARDS FOR ELA, SOCIAL STUDIES, SCIENCE AND/OR MATHEMATICS

LA.K-12.NJSLSA.W4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LA.K-12.NJSLSA.W6	Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
LA.K-12.NJSLSA.W8	Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
LA.K-12.NJSLSA.SL2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
LA.K-12.NJSLSA.SL4	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
LA.W.9-10.2.D	Use precise language and domain-specific vocabulary to manage the complexity of the topic.
LA.W.9-10.3.C	Use a variety of techniques to sequence events so that they build on one another to create a coherent whole.
LA.SL.9-10.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance findings, reasoning, and evidence and to add interest.