Unit 3: Interpreting Algebraic Expressions and Equations

Content Area: **Mathematics**
Course(s): **Practical Math (as per IEP)**
Time Period: **1 marking period**
Length: **10 weeks**
Status: **Published**

Unit Overview

This course is designed to assist classified students with the necessary mathematical skills. It will lead into real life and consumer math skills by emphasizing a strong foundation of basic math skills.

This unit will cover ...

- interpreting line graphs and writing basic equations to model a situation
- the various types of income, including but not limited to: hourly pay, salary, commission, unit pay
- interpreting solutions of equations that model real world problems

Transfer

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

- write and graph linear equations in two variables
- Investigate the various types of jobs available to them including part-time, seasonal and full-time.
- Calculate gross pay, deductions and net pay using real life samples.
- Define the relationships between dollars, time, hourly and salary wages, and commission and for both hourly and salary wages

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For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

Understandings

Students will understand that...

- there are several ways to graph a linear equation
- there is a process to write an equation
- basic math skills are used in every day life.
- the practical applications of math are studied using real world situations

Essential Questions

Students will keep considering...

- How would you graph an equation in y = mx + b form?
- How do you find the slope and y-intercept of a line from the equation of the line?
- What strategies can we use to identify patterns?
- How can I use graphs to describe relationships?
- What is slope?
- What do intercepts mean?
- How do I use real world data to write the equation of a line?
- What does the word percent mean?
- What is the difference between gross and net pay?
- What is the difference between evaluating an expression and simplifying an expression?
- How do you choose what the variable in a word problem should represent?

Application of Knowledge and Skill

Students will know...

Students will know...

- what the points on a coordinate plane represent
- linear equations can be graphed by a table of values and slope-intercept form
- what a quantity is
- choosing appropriate units is important to accuracy
- that different parts of a formula or equation
- understand how mathematical tools, such as tables, can help model real world problems
- how to choose what the variable in a word problem should represent

Students will be skilled at...

Students will be skilled at...

- plotting point on a coordinate plane
- graphing linear equations
- writing linear equations
- Expressing quantities related to money including the use of decimal and percents
- Choosing appropriate units when using a formula with problems involving percent
- Interpreting money as a unit of measurement
- Determing the reasonableness of an answer.
- Defining the relationships between dollars, time, hourly and salary wages, and commission and for both hourly and salary wages
- Calculating before gross salary, tax and after tax deductions and net paycheck amount post deductions

Academic Vocabulary

quantities

precision

measurement

unit

formula

table

model

solve

simplify

annual salary

weekly pay

biweekly pay

monthly pay

percent

deduction

net pay

wages

commission

intercept

linear

data

slope

expression

coordinate plane

ordered pair

x-axis

y-axis

quadrant

rise

run

Learning Goal 1 (Level of Difficulty 3: Analysis)

SWBAT interpret line graphs in context of real-world application problems.

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
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.
MA.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.

Target 1 (Level of Difficulty 2: Comprehension)

SWBAT find and interpret the intercept of linear graphs in context to the problem.

- incorporate LGBTQ+ relationships in scenarios (i.e. word problems, etc.)
- https://www.stonewall.org.uk/system/files/inclusive_curriculum_guide.pdf

MA.8.F.A.2	Compare properties (e.g. rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
MA.8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
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.

Target 2 (Level of Difficulty 2: Comprehension)

SWBAT find and interpret the slope of linear graphs in context to the problem.

MA.8.F.A.2	Compare properties (e.g. rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
MA.8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
MA.8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
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.

Target 3 (Level of Difficulty 3: Analysis)

SWBAT write basic equations of lines to model situations.

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

Learning Goal 2 (Level of Difficulty 3: Analysis)

SWBAT interpret the parts of and the solutions to equations that model real-world problems.

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.A-REI.B	Solve equations and inequalities in one variable
MA.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.

Target 1 (Level of Difficulty 1: Retrieval)

SWBAT identify parts of an equation.

MA.K-12.7	Look for and make use of structure.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.

Target 2 (Level of Difficulty 2: Comprehension)

SWBAT solve simple equations involving all four operations.

MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Target 3 (Level of Difficulty 3: Analysis)

SWBAT find and interpret the solution of linear equations in context to the problem.

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Formative Assessment and Performance Opportunities

Class participation, classwork/homework, class openers and closures, group work, presentations, projects, student-teacher discussions

Summative Assessment

Tests, quizzes, end of unit assessment, projects

21st Century Life and Careers

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.

Accommodations and Modifications

- Follow IEPs and 504 Plans
- Use of multiplication charts and calculators
- Differentiate instruction (number of problems, difficulty of problems, etc)
- Connect lessons to real-world situations as much as possible

Unit Resources

Learning Goal 1: SWBAT interpret line graphs in context of real-world application problems.

- https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs
- https://www.albert.io/learn/algebra-1/equations-of-lines/topic-summary

Learning Goal 2: SWBAT interpret the parts of and the solutions to equations that model real-world problems.

- https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations
- https://www.albert.io/learn/algebra-1/algebraic-expressions/topic-summary
- https://www.albert.io/learn/algebra-1/equations/topic-summary

Interdisciplinary Connections

Learning Goal 2: SWBAT interpret the parts of and the solutions to equations that model real-world problems.

Project Idea: Have students use formulas to calculate wages and income or track investments.

PFL.9.1.12.A.4	Identify a career goal and develop a plan and timetable for achieving it, including educational/training requirements, costs, and possible debt.
PFL.9.1.12.D.1	Calculate short- and long-term returns on various investments (e.g., stocks, bonds, mutual funds, IRAs, deferred pension plans, and so on).