STRANDS AND STANDARDS
MEDICAL MATH

Course Description

An instructional program that prepares students with skills to compute mathematical equations related to healthcare. The course integrates medical-physiological concepts and mathematics. Students will engage in math activities including problem solving, reasoning and proof, communication, connections, and representations.

Intended Grade Level	11-12
Units of Credit	0.5
Core Code	36.01.00.00.150
Concurrent Enrollment Core Code	
Prerequisite	Secondary Math II PLUS a health science course
Skill Certification Test Number	N/A
Test Weight	1.0
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Medical Math
Endorsement 2	N/A
Endorsement 3	N/A

CTE® Learning that works for Utah

STRAND 1

Uses of Mathematics in healthcare.

Standard 1

Analyze the use of medical mathematics in the healthcare system.

STRAND 2

Common Mathematical Operations as used in Real World Healthcare.

Standard 1

Compute fluently and make reasonable estimates.
- Evaluate and simplify numerical expressions containing real numbers using the order of operations.
- Compute solutions to problems and determine the reasonableness of an answer by relating them to the real problem.
- Whole numbers
  - Supplies and inventories
  - Intake and output
  - Cholesterol
  - Quantities
  - Nutrition
  - Vital signs labs
  - Lever systems

Standard 2

Represent real numbers in a variety of ways.
- Choose appropriate and convenient forms of real numbers for solving problems and representing answers, e.g., decimal, fraction, or percent.
- Decimals
  - Tools, instruments
  - Nutrition
  - Weights
  - Estimation
  - Temperature
  - EKG's
  - Medications
  - Labs

Standard 3

Identify relationships among real numbers and operations involving these numbers.
- Fractions
  - Tools, instruments
  - Weights

- Estimation
- EKG's
- Medications
- Labs
- Conversions (F, C)

Standard 4

Calculate percentages.
- Percents
  - Solutions
  - Labs
  - Growth Charts
  - Medications
  - Target heart rate
  - Stroke volume
  - Cardiac output
  - Blood loss
  - Body surface area, burns
  - Oxygen

STRAND 3

Ratios and Proportions

Standard 1

Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
- Solve proportions that include algebraic first-degree expressions.
- Nutrition

Standard 2

Use rations to compare data.
- Labs

Standard 3

Medications

Standard 4

Diseases

STRAND 4

Gathering Data (Use of Medical Instruments).

Standard 1

Use patterns, relations, and functions to represent mathematical situations.
- Conversions

- Metric units
- Time (12/24 hour)
- Roman numerals (Arabic/Roman)
- Temp (C/F)
- Apothecary

Standard 2

Represent quantitative relationships using mathematical models and symbols.
- Find and interpret rates of change by analyzing graphical and numerical data.
- Instruments
  - IV, flow rates
  - Macro/micro drops (tubing)
  - Syringes
  - Rulers, tape measures
  - Scales
  - Goniometry, ROM
  - Centrifuges
  - Sphygmomanometer gauges
  - Pulse oximeters, oxygen flow rates
  - Thermometers

Standard 3

Solve problems using visualization, spatial reasoning, and geometric modeling.

Standard 4

Understand measureable attributes of objects and the units, systems, and processes of measurement.

STRAND 5

Interpreting Data

Standard 1

Formulate and answer questions by collecting, organizing, and analyzing data.
- Collect, record, organize, and display a set of data.
- Determine whether the pattern of the data is linear or nonlinear when given in a list, table, or graph.
- Interpret the correlation between two variables as positive, negative, or having no correlation.
- Find a line of best fit by estimation, choosing two points, or using technology for a given set of data.
- Analyze the meaning of the slope and y-intercept of a line of best fit as it relates to the data.
- Make predictions based on a line of best fit.
- Find mean, median, mode, and range for a data set.

- Analyze the meaning of the maximum or minimum and intercepts of the regression equation as they relate to a given set of bivariate data.
- Make predictions and estimations and determine their reasonableness using a regression equation.
- Graphs and charts
  - Interpreting charts and graphs
  - Temperature, pulse, respiration graphs
  - Intake and output charts
  - Height, weight, measurement graphs
  - Cardiac output
  - Medication errors
  - Census
  - Acuities
  - Disease, mortality rates
  - Job outlook, projections
  - Treatments
  - Differential diagnosis
  - Health care costs
  - Effectiveness (facilities, providers)
  - Wellness indicators
  - Reliability and validity
  - Body mass index
  - Statistics
  - Epidemiology

Standard 2
Apply basic concepts of probability.
- Determine and express the probability of an event as a fraction, percent, ratio, or decimal.

Standard 3
Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
- Solve systems of two linear equations or inequalities:
  - Numerically; e.g., from a table
  - Algebraically
  - Graphically
  - Using technology

Standard 4
Identify relationships among real numbers and operations involving these numbers.
- Identify matrices that can be added, subtracted, or multiplied.
- Demonstrate that matrix multiplication is not commutative.

STRAND 6

Math for Medications

Standard 1

Compute fluently and make reasonable estimates.
- Reading drug labels and prescriptions

Standard 2

Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
- Simplify and evaluate numerical expressions (including integer exponents and square roots), algebraic expressions, formulas, and equations.
- Using medical reference books to determine if calculated dosages are safe

Standard 3

Represent quantitative relationships using mathematical models and symbols.
- Dosing

Standard 4

- Patient instructions

STRAND 7

Medical Accounting and Business

Standard 1

Compute fluently and make reasonable estimates.
- Numerical filing

Standard 2

Represent real numbers in a variety of ways.
- Appointment scheduling

Standard 3

Identify relationships among real numbers and operations involving these numbers.
- Calculating cash transactions

Standard 4

Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
- Maintaining accounts

Standard 5

Checks, deposit slips, and receipts

Standard 6

Paycheck calculation

Standard 7
Budgeting

Standard 8
Depreciation, amortization

Standard 9
Insurance

STRAND 8
Exponents and Logarithms

Standard 1
Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.
- Radiation exposure

Standard 2
Determine measurements using appropriate techniques, tools, and formulas.
- Half life

Standard 3
Use properties of logarithms and exponents to solve equations.
- pH

Standard 4
- Research data