

Mathematical Calculations in Health Care

Course

Health Science
Technology II

Unit X

Occupationally
Specific
Knowledge and
Skills

Essential Question

How will health
care workers
apply
mathematical
concepts in the
coming
decades?

TEKS

121.4 1A, 1B

TAKS

ELA 1, 3, 4
Mathematics 1,
2, 10

Prior Student Learning

An
understanding of
Algebra I.

Estimated time

3 hours

Rationale

To pursue a career in the health care industry, students should be proficient in academic subject content.

Objectives

Upon completion of this lesson, the student will be able to:

- Illustrate the knowledge and skills necessary to perform the mathematical processes as related to careers in health care;
- Formulate mathematical calculations appropriate to career prep learning situations;
- Apply concepts of measurement functions in multiple- step conversion problems; and
- Analyze mathematical functions required in health care careers.

Engage

Supply several malpractice scenarios demonstrating incorrect mathematical calculations leading to injury or death. Have the students analyze them recognizing the need for correct calculations.

Key Points

- I. Medical professionals use math every day while providing health care for people around the world.
 - A. Write prescriptions
 - B. Administer medication
 - C. Drawing up statistical graphs of epidemics
 - D. Figuring success rates of treatments
- II. Basic mathematical calculations are used for:
 - A. Conversions
 - B. Charting
 - C. Graphing
 - D. Dosage calculations
 - E. Measurements

Activity

- I. Interview health care professionals at various unpaid career prep sites to determine the mathematical calculations utilized. Present to class.
 - A. Are the mathematical calculations completed by human or machine?
 - B. What units of measurement are used in the health care area?
 - C. What post-secondary courses are required to prepare for this career?
 - D. How is data is recorded in this career?

- E. Determine the need for accuracy of mathematical calculations and how accuracy affects the quality of client care.
- II. Supply an epidemiological case study and have students work through the mathematical calculations. See college board at <http://www.collegeboard.com/yes/ft/iu/units.html> for resources - "Measures in Epidemiology" is a great module to choose.

Assessment

Project Rubric

Successful completion of Epidemiological case study calculations.

Materials

Hayden, Jerome & Davis, Howard T., Fundamentals of Mathematics for Health Careers, Delmar, ISBN 0-8273-6689-2

Dunlap, Kathi, Mathematics for Health Occupations, Delmar, ISBN 0-8273-4173-3.

Olsen, etal., Medical Dosage Calculations, Addison-Wesley.

Pickar, Gloria D., Dosage Calculations, Delmar, ISBN 0-8273-4982-3.

Accommodations for Learning Differences

For reinforcement, the student will practice basic mathematical conversion problems.

For enrichment, the student will research the math requirements of health care careers represented at a clinical site to determine which careers require and utilize math skills most frequently and create a visual diagram of findings.

National and State Education Standards

National Health Science Cluster Standards

HLC01.01 Academic Foundations

Health care workers will know the academic subject matter required (in addition to state high school graduation requirements) for proficiency within their area. They will use this knowledge as needed in their role.

HLC10.01 Technical Skills

Health Care Workers will apply technical skills required for all career specialties. They will demonstrate skills and knowledge as appropriate.

TEKS

121.4 (c) 1A Perform mathematical calculations appropriate to work-based learning situations; and

121.4 (c) 1B Use measurement functions in multiplestep conversion problems.

Texas College Readiness Standards

English Language Arts

II. B. Understand new vocabulary and concepts and use them accurately in reading writing and speaking.

III. B. Develop effective speaking styles for both group and one on one situations.

IV. A. Apply listening skills as an individual and as a member of a group in a variety of settings.

IV. B. 2. Listen actively and effectively in one-on-one communication situations.

Mathematics

I. B. 1. Perform computations with real and complex numbers.

IV. A. 1. Select and use the appropriate type of unit for the attribute being measured.

IV. B. 1. Convert from 1 measuring system to another.

Science

II. A. 1. Understand the real number system and its properties.

II. A. 7. Use calculators, spreadsheets, computers, etc., in data analysis.

Project Rubric

Student: _____

Course: _____

Date: _____

| Scoring criteria | 4 Excellent | 3 Good | 2 Needs Some Improvement | 1 Needs Much Improvement | N/A |
|---|----------------|-----------|--------------------------------|--------------------------------|-----|
| Clearly/effectively communicates the main idea or theme. | | | | | |
| Information clearly provided. | | | | | |
| Strong examples used to describe the theme or objective. | | | | | |
| Illustrations follow a logical reasoning. | | | | | |
| Each image and font size is legible to entire audience. | | | | | |

NOTE: N/A represents a response to the performance which is "not appropriate."

Scale:

22-25 - A Excellent

18-21 - B Good

14-17 - C Needs Some Improvement

10-13 - D Needs Much Improvement

5-9 - F Not Appropriate

TOTAL =