Alabama CTE

Medical Mathematics: High School

Foundational Standards

1. **Incorporate safety procedures in handling, operating, and maintaining tools and machinery; handling materials; utilizing personal protective equipment; maintaining a safe work area; and handling hazardous materials and forces.** F.1
2. **Demonstrate effective workplace and employability skills, including communication, awareness of diversity, positive work ethic, problem-solving, time management, and teamwork.** F.2
3. **Explore the range of careers available in the field and investigate their educational requirements and demonstrate job-seeking skills including resume-writing and interviewing.** F.3
4. **Advocate and practice safe, legal, responsible, and ethical use of information and technology tools specific to the industry pathway.** F.4
5. **Participate in a Career and Technical Student Organization (CTSO) to increase knowledge and skills and to enhance leadership and teamwork.** F.5
6. **Demonstrate effective infection control techniques as defined by the Centers for Disease Control and Prevention (CDC) and The Joint Commission guidelines.** F.6

Healthcare Administration

1. **Research and report on the costs associated with operating a medical facility.** 1
   - a Estimate and calculate basic payroll expenses for a medical office in a given scenario. 1.A
   - b Estimate employee onboarding costs and calculate the length of time an employee would need to be retained to produce a positive return on investment. 1.B
   - c Analyze data to project ways to manage expenses and ensure that a medical facility generates the cash flow required to cover operating costs for a given scenario. 1.
   - d Analyze data to predict what equipment, medication, personnel, and space will be needed to serve the medical needs of a given community or scenario. 1.D

Disease Distribution and Spread

2. **Research and document the sizes and reproduction rates of common viruses and bacteria, organizing information in tables or graphs.** 2

   Express the size of virus and bacteria particles in microns and millimeters, using decimals, fractions, and scientific notation when appropriate. 2.A

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b Examine datasets and graph multiplication rates of bacteria at various temperatures over time. 2.B

c Analyze graphical trends, explaining the effects of temperature on the multiplication of bacteria and describing ways that healthcare workers can use this information to lower the risk and spread of bacterial infections. 2.C

3 Research and report on an infectious disease, including its incidence rate, prevalence, and virulence. 3

a Create and use a mathematical model to predict the spread of a disease based on one infected person in a variety of scenarios. 3.A

b Research specific diagnostic tests or screenings and use trial data to explain accuracy, sensitivity, specificity, and precision of the test results. 3.B

Treatment Schedules

4 Interpret and utilize medical terms and abbreviations and create a schedule for administering medications or treatments using the 12- and 24-hour clock systems. 4

5 Research and report on the drug half-life of a variety of medications and explain how half-life affects dosing schedules. 5

a Generate a drug table showing the peak, trough, and therapeutic ranges for a given medication, write an equation to describe this relationship, and explain how to apply this information to maintain consistent levels of medication in the body 5.A

Measurement Systems and Conversions

6 Utilize and fluently convert between the metric, English, and apothecary systems to indicate length, weight, and volume. 6

a Interpret measurement markings and scales on various types of syringes, graduated cylinders, IV solution bags, and urinary drainage bags and create accurate records of the amounts indicated. 6.A

b Convert temperature readings between Fahrenheit and Celsius scales. 6.B

7 Research and report on the use of goniometry to assess joint and skeletal anomalies. 7

Charts and Graphs

8 Record objective patient data during rehabilitation from an injury or surgical procedure for a given scenario. 8

a Assess a patient's recovery by comparing objective measurements to predictive goals established by evidenced-based standards of care. 8.A

9 Create and analyze medical charts and graphs, identifying trends and rates of change. 9

Ultrasound

10 Research and report on the use of ultrasound technology in healthcare professions, identifying the frequencies, wavelengths, and modes used to produce clear images. 10

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a Explain how different ultrasound frequencies and wavelengths are used for various purposes, including imaging and physical therapy through thermal healing and cavitation. 10.A

EKG

11 Identify a normal sinus rhythm from an electrocardiogram (EKG), locating and describing a constant interval and a normal P wave. 11

a Measure P wave, QRS interval, PR interval, ST segment, QT interval and T wave to determine times and amplitude of electrical cardiac activity. 11.A

b Identify and describe cardiac arrhythmias in graphs of EKG results that do not fall into the normal range. 11.B

Dosage Calculations

12 Interpret and calculate oral medication orders, utilizing rounding rules, unit rates, ratios, proportions, and dimensional analysis for pediatric, adult, and geriatric patients. 12

13 Interpret and calculate intravenous medication orders and drip rates for patients of various ages, using rates, ratios, proportions, and dimensional analysis. 13

14 Calculate medication dosage rate. 14

15 Compare and contrast the amounts of radiation exposure associated with various imaging tests. 15

a Using scientific notation, express the amount of radiation exposure from an imaging test and explain how the test exposure is related to a patient's average daily exposure. 15.A

16 Calculate body surface area and describe how this measure is used by medical professionals in diagnosing illness or administering treatment. 16

Statistical Analysis

17 Research and collect a dataset for a medical topic of interest. 17

a Use a dataset from research on a medical topic to create a display with a sufficient number of data points to predict a pattern. 17.A

b Describe the relationships present in the dataset and make a prediction based upon the pattern of change. 17.B

Application

18 Research and report on healthcare applications of the relationships of the Golden Ratio. 18

19 Research and report on the prevalence and consequences of errors in a given medical facility or scenario, presenting data in the form of graphs or charts and explaining its implications in the healthcare setting. 19