



Math for Health Careers

New for 2021-2022

Rounding has been clarified.
Editorial updates have been made for clarity.

Event Summary

Math for Health Careers provides **Middle School Division** HOSA members with the opportunity to improve their ability to identify, solve and apply mathematical principles used in health careers. This competitive event shall be a 35 fill-in-the-blank written test dealing with selected problems involving math essentials, measurement systems and conversions, calculations and interpreting medical information and data. This event aims to inspire members to be proactive future health professionals and measure knowledge and understanding at the recall, application and analysis levels.

Dress Code Competitors must be in official HOSA uniform or in proper business attire. Bonus points will be awarded for [proper dress](#).

General Rules

1. Competitors in this event must be active members of HOSA-Future Health Professionals and in good standing in the Middle School division ONLY (in grades 6-8 during the 2021-2022 school year).
2. Competitors must be familiar with and adhere to the [“General Rules and Regulations of the HOSA Competitive Events Program \(GRR\).”](#)
3. All competitors shall report to the site of the event at the time designated for each round of competition. At ILC, competitor’s [photo ID](#) must be presented prior to ALL competition rounds.

Official Reference

4. The official reference for selection of symbols, abbreviations, and problems is: [Helms, Joel R., *Mathematics for Health Sciences: A Comprehensive Approach*. Cengage Learning. Latest edition.](#)

The Test

5. Test Plan:
Math essentials (add, subtract, multiply, divide, fractions, decimals)15%
Measurement Systems & Conversions..... 25%
Calculations..... 30%
 - Formulas & equations
 - Ratios & proportions
 - PercentagesInterpreting Medical Information & Data..... 30%
 - Charts, tables & graphs
 - Basic statistics (mean, median, mode)

6. **Sample Test Questions**

1. Calculate the following: $[(2 \times 5)^2 + 12] \div 2 = \underline{\hspace{2cm}}$.
Helms Pages 1-41

Solution: $2 \times 5 = 10$
 $10^2 = 100$
 $100 + 12 = 112$
 $112 \div 2 = 56$

2. A surgeon made an incision 15 cm long. How long is the incision in inches?
Helms Pages 104-114

Solution: $15 \text{ cm} \times 1''/2.54 \text{ cm} = 5.9055118 \text{ inches Rounded} = 6 \text{ inches}$

3. The outdoor temperature reads 60° on a Fahrenheit thermometer. What will this temperature register on a Celsius thermometer? (Round to the nearest tenth.)
Helms Pages 119-124

Solution: $^{\circ}\text{C} = (60^{\circ}\text{F} - 32) 5/9 = 28 \times 5/9 = 15.55^{\circ}\text{C Rounded} = 15.6^{\circ}\text{C}$

7. At the International Leadership Conference, HOSA will provide basic handheld calculators (no graphing calculators) for addition, subtraction, division, multiplication and square root. Check with State Advisor to determine if a calculator will be used at the State level.

8. All competitors will receive two (2) 8.5x11" sheets of blank paper for use during the test.

9. The "Reference Materials Summary" included in these guidelines (page 5) will be used as the official reference for the test for uniformity. Only equivalents and abbreviations included on the Reference Materials Summary sheet will be used in the test questions. **Middle School competitors will be provided a copy of this page for use during the test.**

10. **When a Scantron form is used** – the Scantron form for this event will require competitors to grid-in their responses.

At the state-level, when a paper/pencil test is used or the test is administered on a computer, the competitor will write in or key in his/her response to each question.

11. [Test Instructions](#): All competitors will be given a test, and a Scantron answer form.. There will be a maximum of **60 minutes** to complete the 35 fill-in-the blank question test.

*NOTE: **Chartered associations** may use a different process for testing, to include but not limited to pre-conference testing, online testing, and testing at a computer. Check with your **Chartered Association** for the process you will be using.*

12. **TIME REMAINING ANNOUNCEMENTS:** There will be a verbal announcement when there are 30 minutes, 15 minutes, 5 minutes, and 1 minute remaining to complete the test.

13. **ROUNDING:** Converting between measurement systems will often render a different answer depending upon which systems and conversions are being used. The answer to a calculation problem will ultimately be the same answer after

appropriate rounding. When determining a solution, round only the final answer after all calculation steps have been completed.

When rounding decimal numbers to the nearest tenths, hundredths, or thousandths, look to the immediate right of the digit located in the position to be rounded. If the number to the direct right is 5 or larger, round to the position up one number and drop everything that follows. If the number to the direct right is 4 or smaller, leave the position being rounded as is and drop everything that follows. In specific situations, answers will be rounded per medical protocol. For example, pediatric dosage is always rounded DOWN to avoid potential overdose. Unless otherwise indicated, all answers should be rounded to the nearest whole number. (Examples: 31.249 (rounded down) = 31 and 23.75 (rounded up) = 24).

Final Scoring

14. A series of five (5) complex, multi-step tie breaking questions will be administered with the original test. In case of a tie, successive tie-breaker questions will be used until a winner is determined. In the tie-breaker, spelling must be correct for credit to be awarded.

Competitor Must Provide:

- Two #2 lead pencils with eraser
- [Photo ID](#)

Math for Health Careers Reference Materials Summary

METRIC EQUIVALENTS

Length	Temperature
1 meter (m) = 100 centimeters (cm) = 1000 millimeters (mm) 1 centimeters (cm) = 10 millimeters (mm)	°C (Degrees Celsius) = (°F - 32) 5/9 °F (Degrees Fahrenheit) = (°C) 9/5 + 32
Weight	Weight Conversion
1 kilogram (kg) = 1000 grams (g)	1 kilogram (kg) = 2.2 pounds (lb)
1 gram (g) = 1000 milligrams (mg)	1 pound (lb) = 16 ounces (oz)
1 milligram (mg) = 1000 micrograms (mcg)	
Volume for Solids	Volume for Fluids
1000 cubic decimeters (dm) = 1 cubic meter (m ³)	1 liter (L) = 1000 milliliters (mL)
1000 cubic centimeters (cm ³) = 1 cubic decimeter (dm ³)	10 centiliters (cL) = 1 deciliter (dL)
1000 cubic millimeters (mm ³) = 1 cubic centimeter (cm ³ or cc)	10 deciliters (dL) = 1 liter (L)
	1 cubic centimeter (cm ³ or cc) = 1 milliliter (mL)

APPROXIMATE EQUIVALENTS AMONG SYSTEMS

Metric	Household/English
240 milliliters (mL)	1 cup = 8 ounces (oz) = 16 tablespoons (tbsp)
30 milliliters (mL)	1 ounce (oz) = 2 tablespoons (tbsp) = 6 teaspoons (tsp)
15 milliliters (mL)	1 tablespoon (tbsp) = 3 teaspoons (tsp)
5 milliliters (mL)	1 teaspoon (tsp)
1 milliliter (mL)	15 drops (gtts)
0.0667 milliliters (mL)	1 drop (gtt)
1 meter (m)	39.4 inches (in)
2.54 centimeters (cm)	1 inch (in)
	1 foot (ft) = 12 inches (in)