National Geographic Learning Academic Testing Center
All Events

Purpose   The purpose of the Academic Testing Center is to provide as many International Leadership Conference HOSA delegates as space permits with the opportunity to demonstrate their basic knowledge in preparation to become future health professionals.

Description   These events shall be written tests based on items from the text specific to the event. Competitors will recognize, identify, define, interpret and apply knowledge in a 50 item multiple choice test with 10 tie-breakers. The written test will measure knowledge and understanding at the recall, application and analysis levels. Higher-order thinking skills will be incorporated.

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

Rules and Procedures

1.   Competitors in this event must be active members of HOSA-Future Health Professionals and in good standing in one of the following divisions: Secondary, Postsecondary/Collegiate, or Alumni.

2.   Competitors must be familiar with and adhere to the "General Rules and Regulations of the HOSA Competitive Events Program (GRR)."

3.   A series of ten (10) tie-breaking questions will be administered with the original test. In case of a tie, the tie-breakers will be graded to break the tie.

4.   All competitors shall report to the site of the event at the time designated for the test in ILC publications. Competitors will bring a photo ID as well as two #2 lead pencils for test-taking.

5.   Test Instructions: The competitors will be given instructions and will be notified to start the test. There will be a maximum of 60 minutes to complete the test. Competitors should leave the testing site promptly after submitting all testing materials.

6.   HOSA offers numerous scholarships every year to its members interested in pursuing a variety of health careers. As you consider participating in this event, please keep in mind there may be a HOSA Scholarship offered that fits your interests! For more information on the HOSA Scholarship program, please visit http://www.hosa.org/scholarships.

7.   All information from National Geographic Learning as related to the HOSA Academic Testing Center can be found at: https://www.cengage.com/coursepages/hosa_2019

Testing Areas and Resources

8. The fifteen (15) approved tests for ILC 2020 and their associated resources are as follows:

Subject	Resource Title (Cengage)	ISBN
Allied Health Statistics	Basic Allied Health Statistics and Analysis, 4th Edition	9781133602705
Anatomy and Physiology	Body Structures and Functions, 13th edition.	9781337907538
Biochemistry	Introduction to General, Organic and Biochemistry, 12th edition	9781337571357
Bioengineering	Image Processing, Analysis and Machine Vision, 4th Edition	9781133593607
Biology	Biology: The Unity and Diversity of Life, 15th AP Edition	9781337408592
Career Development	DHO Health Science Updates 8th Edition	97871305509511
General Chemistry	A Comprehensive Approach Chemistry AP Edition, 10th edition	9781305957732
Human Heredity	Human Heredity: Principles and Issues, 11th edition	9781305251052
Leadership	7 Habits of Highly Effective People The 21 Irrefutable Laws of Leadership	B00OHXRYJQ 0785288376
Medical Math Advanced	Math for Health Care Professionals, 2nd edition	9781305509788
Microbiology	Microbiology: Practical Applications and Infection Prevention, 1st Edition	978113369642
Occupational Health and Safety	CareerSafe Safety Education for America's Future	Online Resource
Organic Chemistry	Introduction to General, Organic and Biochemistry, 12th edition	0781337571357
Physics College	College Physics AP Edition, 11th	9781305965393
Public Health	**Resources Coming Soon!**	

9. Chapter Advisors – contact your Cengage Sales Consultant for a review copy of the reference title of your choice. Most resources also offer online interactive study tools, virtual labs, and auto-graded practice. Find your Sales Consultant at NGL.Cengage.com/repfinder

Registration Priority and Process

10. Delegates will pre-register for the Academic Testing Center and indicate one or two preferred choices for testing. The registration process occurs in the HOSA Conference Management System when delegates register for the 2020 International Leadership Conference. Delegates will receive an Academic Testing Center Schedule prior to the ILC.

11. If space is available at testing sessions, HOSA delegates may register on-site at ILC for additional subjects in addition to the two pre-registered tests.

12. Competitors should refer to the General Rules and Regulations #6 for information on how many competitive events they can register for at ILC.

Recognition and Awards

13. A Certificate of Participation is given to every delegate who takes a test in the Academic Testing Center.

    The Top Ten HOSA members in each event will be recognized on stage at the Grand Awards Ceremony, with 1st, 2nd and 3rd place receiving special recognition.

    HOSA Advisors will receive a Certificate of Excellence for any HOSA members from their chapter ranking in the Top Ten.

Sample Test Questions
The remaining pages of these guidelines include sample test questions from each of the eleven event tests.

Allied Health Statistics
1. Which of the following facilities delivers the highest level of nursing care?
    a. Intermediate Care
    b. Residential Care
    c. Skilled Nursing Care
    d. Rehabilitation Care

2. Which type of validity refers to how well the study adheres to accepted and established standards?
    a. Face validity
    b. Content validity
    c. Construct validity
    d. Criterion validity

3. Where do low numbers appear in a frequency polygon?
    a. Bottom and to the right
    b. Bottom and to the left
    c. Top and to the right
    d. Top and to the left

Anatomy and Physiology
1. Health care workers use a spirometer to measure the_____.
    a. level of carbon dioxide in the blood
    b. lungs' capacity for air
    c. amount of pressure in the lungs
    d. level of pleural fluid

2. What causes plasma like fluid to flow from the blood in the glomerulus into Bowman's capsule?
    a. Increase in blood pressure in the capillaries
    b. Hormonal secretions
    c. Stimulation from the nerves
    d. Level of salt in the blood

3. Which of the following is the definition of a fomite?
    a. Bacterial infection transmitted through contaminated water.
    b. Small worm that may be present in meat and which infects the intestinal tract.
    c. Person who experiences no symptoms but can transmit an infection.
    d. Nonliving object that is contaminated with an infectious agent

Biochemistry
1. Which of the following compounds would have the highest boiling point?
    a. $CH_3CH_2CH_2CH_3$
    b. CH_3NH_2
    c. CH_3OH
    d. CH_2F_2

2. Which subatomic particle is found in all isotopes of hydrogen?
    a. Proton
    b. Neutron
    c. Electron
    d. Positron

3. $CH_3C \equiv CCH_2CH_2Cl$ is named:
    a. 1-chloro-3-pentyne
    b. 5-chloro-2-pentene
    c. 1-acetylenyl-3-chloropropane
    d. 5-chloro-2-pentyne

Bioengineering
1. Which of the following is an important aspect that separates Biomechatronics devices from conventional orthotic and prosthetic devices?
    a. A connection with the nerves and muscle systems to store and convert information from the device.
    b. A connection with the nerves and muscle systems to send and receive information from the device.
    c. A connection with the nerves and muscles systems to receive and store information from the device.
    d. A connection with the nerves and muscle systems to restore and remove information from the device.

2. What is the function of a galvanic detector?
    a. Detect an electric current produced by mechanical means.
    b. Detect an electric current produced by chemical means.
    c. Detect a mechanical motion produced by electrical means.
    d. Detect an electric circuit produced by mechanical means.

3. What does CRISPR stand for?
   a. Clustered Regulatory Interspaced Short Palindromic Repeats
   b. Clustered Regulatory Interspaced Small Palindromic Repeats
   c. Clustered Regulatory Interspaced Short Protein Repeats
   d. Clustered Regulatory Interspaced Small Protein Repeats

Biology

1. In the electromagnetic spectrum, _____.
   a. infrared energy has the shortest wavelength
   b. infrared radiation has more energy than red radiation
   c. visible light provides the energy for photosynthesis
   d. near-infrared radiation provides the energy for photosynthesis

2. In order for DNA molecules to undergo recombination,_____.
   e. they must be from the same species
   f. their strands must separate as in replication
   g. they must be cut and spliced at specific nucleotide sequences
   h. one of the two DNA strands must be degraded

3. In garden peas, one pair of alleles controls the height of the plant, and a second pair of alleles controls flower color. The allele for tall (*D*) is dominant to the allele for dwarf (*d*), and the allele for purple (*P*) is dominant to the allele for white (*p*). A tall plant with purple flowers crossed with a tall plant with white flowers produces 3/8 tall purple, 1/8 tall white, 3/8 dwarf purple, and 1/8 dwarf white. What is the genotype of the parents?
   i. Dd Pp x Dd pp
   j. Dd Pp x Dd Pp
   k. DD Pp x dd Pp
   l. Dd pp x dd Pp

Career Development

1. If a physician fails to use a degree of skill and learning commonly expected and the person receiving care is injured, the physician can be sued for ____.
   a. Negligence
   b. Defamation
   c. Malpractice
   d. Assault and battery

2. Patients confined to bed should have their position changed at least every ____.
   a. 30 minutes
   b. Hour
   c. 2 hours
   d. 3 hours

3. 5/8 + 3/12 = ____.
   a. 11/12
   b. 13/16
   c. 8/24
   d. 7/8

General Chemistry

1. Select the correct molecular structure for CO_2:
   a. linear
   b. trigonal planar
   c. tetrahedral
   d. Bent

2. Consider the molecular orbital description of the NO^- anion. Which of the following statements is false?
   a. NO^- is paramagnetic.
   b. NO^- is isoelectronic with CO.
   c. The bond energy in NO^+ is greater than the bond energy in NO^-.
   d. The bond order in NO^- is 2.

3. For which of the following compound(s) are *cis* and *trans* isomers possible?
   a. 2,3-dimethyl-2-butene
   b. 3-methyl-2-pentene
   c. 4,4-dimethylcyclohexanol
   d. *ortho*-chlorotoluene

Human Heredity

1. The letters G, Q, R, and C, used to describe the appearance of chromosomes, refer to the ___.
   a. position of the bands
   b. staining procedure used to reveal the bands
   c. number of arms per chromosome
   d. number of centromeres per chromosome

2. Which of the following sequences indicates the promoter region of a gene?
   a. CAAT
   b. UAAG
   c. CTTT
   d. ACAT

3. The ability to taste PTC and other bitter chemicals is controlled by_____.
   a. hormone levels that change throughout life
   b. proteins on the surface of receptor cells
   c. the amount of PTC exposure as a child
   d. the amount of capsaicin present in taste buds

Medical Math Advanced

1. Goniometers measure
   a. range of motion
   b. weight
   c. surface area
   d. Time

2. The hospital uses a 15-drop-per-mL drip set. How will you adjust the IV to infuse 250 mL over 3 hours?
   a. constant infusion
   b. every minute
   c. every 30 seconds
   d. every 3 seconds

3. Calculate the BMI for Weight: 165 pounds; Height: 73 inches.
    a. 30
    b. 25
    c. 18
    d. 22

Microbiology
1. By what mechanism does a virus cause disease?
    a. by infecting the nervous system in humans
    b. by shutting down or destroying a cell
    c. by living on or in another organism
    d. by infecting red blood cells

2. Toxic proteins that can be secreted outside of the cell are called?
    a. bactericides
    b. endotoxins
    c. exotoxins
    d. aspergillus

3. Which main class of disease-causing parasites contain tapeworms?
    a. helminths
    b. protozoa
    c. ectoparasites
    d. Ergosterol

Occupational Health and Safety
1. One way of reducing fall hazards is to keep floors clean and dry. What else can be done to reduce the hazard?
    a. Use non-slip material on floors
    b. Use tape on corridors
    c. Use reflective materials on walls
    d. Use fans

2. Daydreaming while driving is an example of which type of distraction?
    a. Visual
    b. Auditory
    c. Biomechanical/Manual
    d. Cognitive

3. How frequently should you take breaks when driving long distances?
    a. Every 3 hours
    b. Every 2 hours
    c. Every 30 minutes
    d. Every 4 hours

Organic Chemistry

1. Name the following: $CH_3 - CH_2 - CH_3$
   a. ethane
   b. propane
   c. butane
   d. Pentane

2. $CH_3C \equiv CCH_2CH_2Cl$ is named:
   a. 1-chloro-3-pentyne
   b. 5-chloro-2-pentene
   c. 1-acetylenyl-3-chloropropane
   d. 5-chloro-2-pentyne

3. What is the correct (IUPAC) name of the following molecule: 2-methyl-4-t-butylpentane
   a. 2-t-butyl-4-methylpentane
   b. 2,2,3,5-tetramethylhexane
   c. 2,4,5,5-tetramethylhexane
   d. 1-sec-butyl-1,2,2-trimethylpentane

Physics

1. How many moles of air must escape from a 15.0-m × 9.0-m × 6.0-m room when the temperature is raised from 10.0°C to 20.0°C? Assume the pressure remains unchanged at one atmosphere while the room is heated. (R = 8.31 J/mol·K)
   a. 4.9E+3 moles
   b. 1.2E+3 moles
   c. 2.2E+2 moles
   d. 7.9E+2 moles

2. A loop of area 0.384 m^2 is in a uniform 0.0565-T magnetic field. If the flux through the loop is 6.10×10^{-3} T·m^2, what angle does the normal to the plane of the loop make with the direction of the magnetic field?
   a. 73.7°
   b. 89.3°
   c. 16.3°
   d. 76.0º

3. The escape speed from the surface of the Earth is 11.2 km/s. Estimate the escape speed for a spacecraft from the surface of the Moon. The Moon has a mass 1/81 that of Earth and a radius 0.25 that of Earth.
   a. 2.5 km/s
   b. 4.0 km/s
   c. 5.6 km/s
   d. 8.7 km/s