

# National Geographic Learning Academic Testing Center All Events

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## Summary

The goal 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.

The series of events in the Academic Testing Center are written tests based on items from the identified text specific to each event. Competitors will recognize, identify, define, interpret and apply knowledge in a 50-item multiple choice test with a tie-breaker question. 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 tie-breaker question(s) will be administered with the original test. In case of a tie, the tie-breaker question(s) 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.

## Sponsors

6. Twelve (12) of the Academic Testing Center events are sponsored by National Geographic Learning. A summary page for these 12 events will be available at a special link in the near future. If you wish to review the 2019 information until the 2020 information is released, you can review this link: [https://www.cengage.com/coursepages/hosa\\_2019](https://www.cengage.com/coursepages/hosa_2019)
7. The *Leadership* test is sponsored by Corporate Education Resources, Inc. The *Occupational Health and Safety* test is sponsored by CareerSafe.

## Testing Areas and Resources

8. The fourteen(14) approved tests for ILC 2021 and their associated resources are as follows:

Event	Resource Title (National Geographic Learning/Cengage)	ISBN
1. Allied Health Statistics	<a href="#">Basic Allied Health Statistics and Analysis, 4<sup>th</sup> Edition</a>	9781133602705
2. Anatomy and Physiology	<a href="#">Body Structures and Functions, 13<sup>th</sup> edition.</a>	9781337907538
3. Biochemistry	<a href="#">Introduction to General, Organic and Biochemistry, 12<sup>th</sup> edition</a>	9781337571357
4. Bioengineering	<a href="#">Image Processing, Analysis and Machine Vision, 4<sup>th</sup> Edition</a>	9781133593607
5. Biology	<a href="#">Biology: The Unity and Diversity of Life, 15<sup>th</sup> AP Edition</a>	9781337408592
6. Career Development	<a href="#">DHO Health Science Updates 8<sup>th</sup> Edition</a>	97871305509511
7. General Chemistry	<a href="#">A Comprehensive Approach Chemistry AP Edition, 10<sup>th</sup> edition</a>	9781305957732
8. Human Heredity	<a href="#">Human Heredity: Principles and Issues, 11<sup>th</sup> edition</a>	9781305251052
9. Math for Health Professionals	<a href="#">Math for Health Care Professionals, 2<sup>nd</sup> edition</a>	9781305509788
10. Microbiology	<a href="#">Microbiology: Practical Applications and Infection Prevention, 1<sup>st</sup> Edition</a>	978113369642
11. Organic Chemistry	<a href="#">Introduction to General, Organic and Biochemistry, 12<sup>th</sup> edition</a>	0781337571357
12. Physics College	<a href="#">College Physics AP Edition, 11<sup>th</sup></a>	9781305965393

Event	Resource Title	ISBN
13. Occupational Health and Safety	<a href="#">CareerSafe Safety Education for America's Future</a>	Online Resource
14. Leadership	<a href="#">7 Habits of Highly Effective People</a>	B00OHXRYJQ
	<a href="#">The 21 Irrefutable Laws of Leadership</a>	0785288376

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](http://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 2021 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 fourteen 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?
- Bacterial infection transmitted through contaminated water.
  - Small worm that may be present in meat and which infects the intestinal tract.
  - Person who experiences no symptoms but can transmit an infection.
  - Nonliving object that is contaminated with an infectious agent

### Biochemistry

1. Which of the following compounds would have the highest boiling point?
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
  - $\text{CH}_3\text{NH}_2$
  - $\text{CH}_3\text{OH}$
  - $\text{CH}_2\text{F}_2$
2. Which subatomic particle is found in all isotopes of hydrogen?
- Proton
  - Neutron
  - Electron
  - Positron
3.  $\text{CH}_3\text{C} \equiv \text{CCH}_2\text{CH}_2\text{Cl}$  is named:
- 1-chloro-3-pentyne
  - 5-chloro-2-pentene
  - 1-acetylenyl-3-chloropropane
  - 5-chloro-2-pentyne

### Bioengineering

1. Which of the following is an important aspect that separates Biomechatronic devices from conventional orthotic and prosthetic devices?
- A connection with the nerves and muscle systems to store and convert information from the device.
  - A connection with the nerves and muscle systems to send and receive information from the device.
  - A connection with the nerves and muscles systems to receive and store information from the device.
  - 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?
- Detect an electric current produced by mechanical means.
  - Detect an electric current produced by chemical means.
  - Detect a mechanical motion produced by electrical means.
  - Detect an electric circuit produced by mechanical means.
3. What does CRISPR stand for?
- Clustered Regulatory Interspaced Short Palindromic Repeats
  - Clustered Regulatory Interspaced Small Palindromic Repeats
  - Clustered Regulatory Interspaced Short Protein Repeats
  - Clustered Regulatory Interspaced Small Protein Repeats

### Biology

1. In the electromagnetic spectrum, \_\_\_\_\_.
- infrared energy has the shortest wavelength
  - infrared radiation has more energy than red radiation
  - visible light provides the energy for photosynthesis
  - near-infrared radiation provides the energy for photosynthesis

2. In order for DNA molecules to undergo recombination, \_\_\_\_\_.
  - a. they must be from the same species
  - b. their strands must separate as in replication
  - c. they must be cut and spliced at specific nucleotide sequences
  - d. 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?
  - a.  $Dd Pp \times Dd pp$
  - b.  $Dd Pp \times Dd Pp$
  - c.  $DD Pp \times dd Pp$
  - d.  $Dd pp \times dd Pp$

### 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  $\text{CO}_2$ :
  - a. linear
  - b. trigonal planar
  - c. tetrahedral
  - d. Bent
  
2. Consider the molecular orbital description of the  $\text{NO}^-$  anion. Which of the following statements is false?
  - a.  $\text{NO}^-$  is paramagnetic.
  - b.  $\text{NO}^-$  is isoelectronic with CO.
  - c. The bond energy in  $\text{NO}^+$  is greater than the bond energy in  $\text{NO}^-$ .
  - d. The bond order in  $\text{NO}^-$  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

### Math for Health Professionals

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?
- helminths
  - protozoa
  - ectoparasites
  - 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?
- Use non-slip material on floors
  - Use tape on corridors
  - Use reflective materials on walls
  - Use fans
2. Daydreaming while driving is an example of which type of distraction?
- Visual
  - Auditory
  - Biomechanical/Manual
  - Cognitive
3. How frequently should you take breaks when driving long distances?
- Every 3 hours
  - Every 2 hours
  - Every 30 minutes
  - Every 4 hours

#### Organic Chemistry

1. Name the following:  $\text{CH}_3 - \text{CH}_2 - \text{CH}_3$
- ethane
  - propane
  - butane
  - Pentane
2.  $\text{CH}_3\text{C} \equiv \text{CCH}_2\text{CH}_2\text{Cl}$  is named:
- 1-chloro-3-pentyne
  - 5-chloro-2-pentene
  - 1-acetylenyl-3-chloropropane
  - 5-chloro-2-pentyne
3. What is the correct (IUPAC) name of the following molecule: 2-methyl-4-t-butylpentane
- 2-t-butyl-4-methylpentane
  - 2,2,3,5-tetramethylhexane
  - 2,4,5,5-tetramethylhexane
  - 1-sec-butyl-1,2,2-trimethylpentane

#### Physics College

1. How many moles of air must escape from a 15.0-m  $\times$  9.0-m  $\times$  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. ( $R = 8.31 \text{ J/mol}\cdot\text{K}$ )
- 4.9E+3 moles
  - 1.2E+3 moles
  - 2.2E+2 moles
  - 7.9E+2 moles

2. A loop of area  $0.384 \text{ m}^2$  is in a uniform  $0.0565\text{-T}$  magnetic field. If the flux through the loop is  $6.10 \times 10^{-3} \text{ T}\cdot\text{m}^2$ , what angle does the normal to the plane of the loop make with the direction of the magnetic field?
  - a.  $73.7^\circ$
  - b.  $89.3^\circ$
  - c.  $16.3^\circ$
  - d.  $76.0^\circ$
  
3. The escape speed from the surface of the Earth is  $11.2 \text{ km/s}$ . 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.  $2.5 \text{ km/s}$
  - b.  $4.0 \text{ km/s}$
  - c.  $5.6 \text{ km/s}$
  - d.  $8.7 \text{ km/s}$

### Leadership

1. While researching attitudes and behaviors, Stephen Covey studied the Pygmalion effect. Which statement best describes this concept?
  - a. A person's high expectations of self will diminish the probability of failure.
  - b. High expectations of a person leads to increased performance.
  - c. A person's low expectations of others will decrease the chance of success.
  - d. Low expectations of a person leads to minimal performance.
  
2. Ralph Waldo Emerson, philosopher and poet said, "*For everything you have missed, you have gained something else; and for everything you gain, you lose something.*" Which law of leadership does this statement best represent?
  - a. Respect
  - b. Priorities
  - c. Legacy
  - d. Sacrifice
  
3. Goethe said, "*Treat a man as he is, and he will remain as he is. Treat a man as he can and should be, and he will become as he can and should be.*" Which habit of highly effective people is reflected by this quote?
  - a. Sharpen the Saw
  - b. Put First Things First
  - c. Seek First to Understand, Then to be Understood
  - d. Think Win/Win