

Forensic Science

New for 2018 - 2019

The event name has been changed to Forensic Science to match resources and better align with career opportunities. At ILC, [photo ID](#) must be presented prior to competing in each round. Editorial updates and clarifications have been made to guidelines. The rating sheet has been updated.

CAUTION: *The content and pictures in the suggested resources are graphic in nature and may be considered offensive by some. HOSA Advisors should seek administrative and parental approval before allowing HOSA members to participate in this event.*

- This event is intended for advanced level HOSA members with a strong background in Anatomy & Physiology.

Purpose To encourage HOSA members to analyze careers in forensic science and to work as a team to apply their knowledge and skills in creating a solution to a forensic science-related problem.

Description This event will involve two rounds of competition. Round One will consist of a written test to evaluate the team’s understanding of forensic science. Written test will measure knowledge and understanding at the recall, application or analysis levels. Higher-order thinking skills will be incorporated as appropriate. The top scoring teams will advance to Round Two and will be given a case study related to forensic science. Teams will have six (6) minutes to analyze a case study, which will include written information and may include physical evidence. Finally, teams will be given thirty (30) minutes to write their conclusions with supporting evidence.

Dress Code Competitors shall wear the HOSA uniform, proper business attire, medical scrubs, or polo and khakis. Bonus points will be awarded in both rounds for [proper dress](#). All team members must be properly dressed to receive bonus points.

- Rules and Procedures**
1. Competitors in this event must be active members of HOSA-Future Health Professionals in good standing in the division in which they are registered to compete (Secondary or Postsecondary/Collegiate).
 2. Competitors must be familiar with and adhere to the [“General Rules and Regulations of the HOSA Competitive Events Program \(GRR\).”](#)
 3. Teams must be composed of two (2) members.
 4. [Round One Test Instructions:](#) Each team will be evaluated in Round One by a fifty (50) item multiple choice written test. Competitors will be given sixty (60) minutes to complete the test.
 - a. All competitors shall report to the site of the event orientation at the time designated. The Round One test will immediately follow the orientation. **No proxies will be allowed for the orientation.** At ILC, [photo ID](#) must be presented prior to competing in each round.

b. The team test score average from Round One will be used to qualify the team for the Round Two case study. The team test score average will then be added to the written conclusion score to determine final results.

c. Round I: Written Test Plan

- Forensic History and Careers 10%
- Crime Scene and Death Investigation 20%
- Forensic Toxicology and Pharmacology 20%
- Forensic Anthropology 10%
- Forensic Entomology 10%
- Identification of Blood, Bloodstains, Biological Fluids and Stains 10%
- Techniques of DNA Analysis 10%
- Forensic Psychology and Psychiatry 10%

5. All official references are used in the development of the written test.

- [Forensic Science Fundamentals & Investigations by Anthony J. Bertino & Patricia Nolan Bertino. National Geographic Learning/South-Western Cengage Learning. Latest edition.](#)
- [Forensic Science. Edited by James, S., Nordby, J., and Bell, S. Taylor & Francis Group/CRC Press, Latest edition.](#)

NOTE: States/regions may use a different process for testing, to include but not limited to pre-conference testing, online testing, and testing at a computer. with your Area/Region/State for the process you will be using.

6. In Round Two, each team will be asked to solve the same case study. The case study is a secret problem that is not disclosed until the event begins. Professional ethics demand that competitors DO NOT discuss or reveal the secret topic until after the event has concluded. Competitors who violate this ethical standard will be penalized in accordance with [GRR #15-17.](#)

7. No electronic, printed or recorded materials may be brought to the competition. Competitors will be provided with index cards for taking notes. They may keep these index cards with them throughout the event.

8. There will be two parts per section as follows:

Part #1	Case study analysis	6 minutes
Part #2	Written conclusion	30 minutes

Multiple rooms or one large room (ballroom) with multiple stations may be used. If one large room is used, there will be tables and chairs for multiple teams. The room will be large enough so that competitors will be able to discuss and prepare their conclusion without being overheard by other teams. The exact set-up will vary by state and at ILC. A holding room may be used. Please note it is possible that all competitors in Round 2 will view the case study at the same time and prepare their written conclusion at the same time.

9. *OPTIONAL:* If the case study does not involve a crime scene or physical evidence and instead is in written format, then competitors will be directed to a room for developing their written conclusion, and will be given a total of 36 minutes.

10. The timekeeper or designee will announce when teams have one (1) minute remaining in each of the two parts of Round Two.

11. Competitors will use the evidence and information they gather in Part #1 in order to develop a written conclusion as follows:

**Part #1:
Case Study
Analysis** This part of the event allows competitors to gather evidence/information about the death. There may be a written police report and/or other written information about the case. There may be physical evidence in the room for the competitors to analyze, including but not limited to a manikin, bones, dental x-rays, photos, or other physical evidence. There may also be a police officer, medical examiner and/or a witness in the room. Each team will see the same information/evidence; possibly at the same time.

**Part #2
Written
Conclusion** Competitors will identify the time of death, immediate cause of death, manner of death and record their remarks (pertinent observations and evidence) about the case that explains why they came to the conclusions they reached.

12. One copy of the written information provided to the team in Part #1, including the police report, autopsy, etc. (if provided), will be kept by team members to use while they are developing their written conclusion (Part #2).
13. In case of a tie, the highest averaged test score will be used to determine the rank.

Competitor Must Provide

- Event guidelines – one per team (orientation)
- #2 lead pencils with eraser
- [Photo ID](#)
- Watch with second hand (optional)
- Highlighters (optional)

FOR SPECIFICS ON EVENT MANAGEMENT SEE [MANAGING COMPETITIVE EVENTS](#)

Required Personnel

- One Event Manager
- One QA to provide quality assurance for the event by ensuring that the guidelines are followed and all event documents are complete.
- One Section Leader per section
- One - three judges per section (preferably with experience in forensics)
- One-two event assistants per section
- One time-keeper per section in written conclusion room, and one for case study scene as applicable
- Witness, victim(s) or other actors for case study (as required per scenario)

Facilities, Equipment and Materials (Per Section)

Round One: Written Test (Reference: All resources)

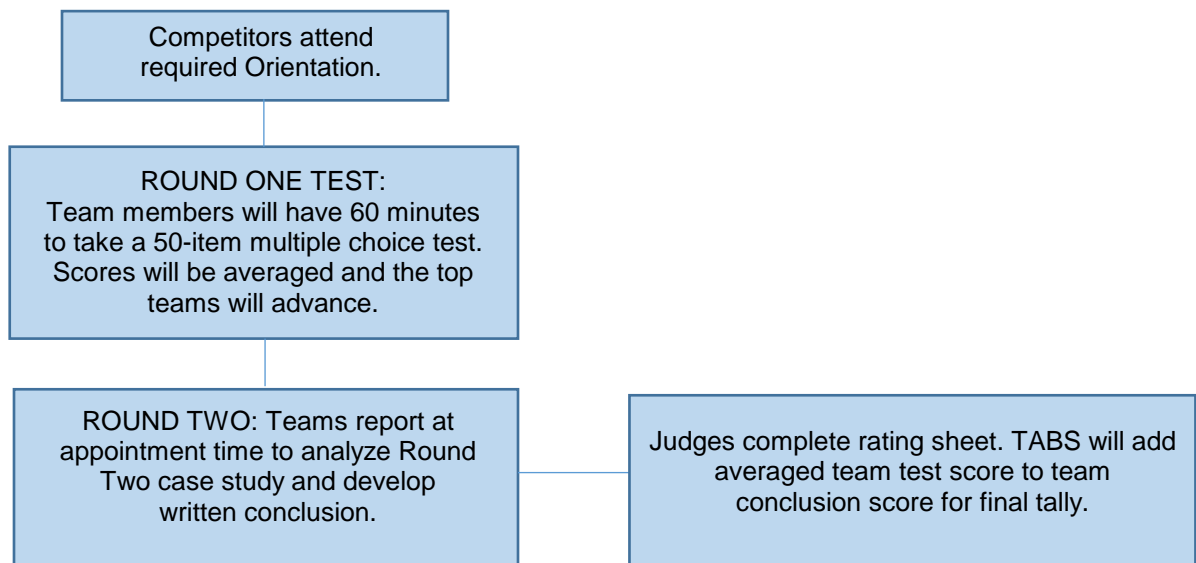
- Testing room with tables/chairs for the number of registered competitors (see [HOSA Room Set](#))
- List of competitors for check-in
- One pre-numbered test per competitor
- Scantron/answer forms- one copy per competitor
- Evaluation forms - competitor and event personnel
- #2 lead pencils with eraser to complete evaluations (event personnel)

Round Two: Case Study Analysis/Written Conclusion

- Case study room(s) with table and chairs – If physical evidence is provided, then a minimum of two rooms are needed per section. (see [HOSA Room Set](#))

- List of competitors for check-in
- Case study props (as needed for case study scene)
- Case study notes (for judge and EM)
- Witness, actor/victim and judge scripts as needed for case study scene
- stopwatches (one per section)
- Copy of secret case study with written conclusion form - one per team and judge
- Index cards (for team notes)
- Clip boards to be used by competitors during crime scene analysis (if needed)
- Flash card for 1 minute remaining
- Rating sheets – one per judge per team
- Evaluation Forms – competitor, judge, and personnel
- #2 lead pencils with eraser (judges & evaluations)
- Copy of guidelines for judges
- Hand sanitizer (alcohol based handrub)

Event Flow Chart



Sample Round One Test Questions

1. The system using 11 body measurements, with descriptive information, that was widely used into the early 1900s for the identification of suspects and criminals was called:
 - A. anatomic pathology.
 - B. anemometry.
 - C. anthropometry.
 - D. forensic pathology.

2. In blunt-force injuries, an object striking the skin can leave a telltale mark known as a/an:
 - A. welt mark.
 - B. laceration.
 - C. greenstick pattern.
 - D. patterned contusion.

3. Amphetamines are classified as stimulants, whereas opiates are classified as:
 - A. anorexics.
 - B. sedatives.
 - C. tranquilizers.
 - D. depressants.

Sample Case Study

Scenario Note: Each case study is unique. The case study may include photos and/or a manikin, and or/set props, instead of or in addition to a written medical examiner's report and/or external examination.

Police Report by Officer Gold:

At 0734 hours a 911 call was placed from the residence of Fred Mars. He states that a guest in his home, Red Fisher, is on the living room floor and unresponsive.

Upon arrival by the EMS and Officers Gold and Freeman at 0739 hours, the decedent was found on the floor....

On 6/25/2016, the decedent reportedly went to a party at the home of Fred Mars at 3400 Main Street. It is reported that the decedent was depressed and angry at having been fired from his job that day, and was allegedly using heroin and cocaine, as well as some other drugs. Sometime between 2300 and 2400 hours, Fred Mars and the decedent had a physical altercation, and according to Mars "He collapsed. I figured I knocked him out, or he passed out. I wasn't sure which. I rolled him over onto his back and he didn't wake up. I figured he would be angry when he woke up so I left him there and went to my girlfriend's house. When I got home after seven this morning, Red was still on the floor in the same position I left him, and wouldn't wake up. That's when I called 911."

Medical Examiner's Report:

Date: June 26, 2016

Name: Red Fisher
Address: 8916 Ashcroft Ave,
Nashville, Tennessee
Sex: M
Age: 20
DOB: 1-23-96
Height: 67
Weight: 110
Eyes: Brown
Hair: Black
Teeth: Own
Condition: Viewable

Time Autopsy Began: 1005 hours

EXTERNAL EXAMINATION:

6/26/2013, 1005 hours. The body is that of an unembalmed adult male who appears the stated age of 20 years. The body is identified by toe tags. The body weighs 110 pounds, measures 67 inches in length and is lean and fairly well nourished. There is no abnormal skin coloring or pigmentation. No tattoos are present. Rigor Mortis is well developed in the limbs and jaw. Livor mortis is present, not fixed, and distributed over the posterior surface of the body as well as the palms of the hands. The liver temperature is 93°F.

There are multiple abrasions and lacerations of the upper extremities and hands. The right shin shows a red purple contusion. The head, which is normocephalic, is covered by brown hair. There is no balding. Examination of the eyes reveals pupils with green irides and sclerae that show no injection or jaundice. There are no petechial hemorrhages of the conjunctivae of the lids or the sclerae. The oronasal passages are unobstructed. The nasal septum is intact and without inflammation. Upper and lower teeth are present. The neck is unremarkable. There is superficial chest deformity and a red purple contusion over the right anterior ribs. There is no increase in the anterior posterior diameter of the chest. There are no scars of the chest or abdomen. The abdomen is flat. The genitalia are those of a circumcised adult male. There is no anal or genital trauma. There are no needle tracks identified on the arms or neck. Edema of the extremities is not present. Joint deformities, crepitation and abnormal mobility are not present.

CLOTHING:

The body is unclothed when received. Accompanying the body are the following items:

- 1) A pair of black shorts.
- 2) A tee shirt.
- 3) A pair of socks.

INTERNAL EXAMINATION:

The body cavities are entered through a Y shaped incision. No foreign material is present in the mouth or upper airway. No lesions are present nor is trauma of the gingiva, lips or oral mucosa demonstrated. Both hyoid bone and larynx are intact without fractures. No hemorrhage present in the adjacent throat organs. There are no prevertebral fascial hemorrhages. The pleural cavities contain a small quantity of straw colored fluid. The right chest wall has fractures of ribs six and seven anteriorly. The parietal pleurae are intact. The lungs are well expanded. Soft tissues of the thoracic and abdominal walls are well preserved. There is no recent evidence of injury to the chest and abdominal walls other than the contusion on the right chest wall and liver temperature mark. The organs of the abdominal cavity have a normal arrangement. None are absent. There is no fluid collection of the abdomen. The peritoneal cavity is without evidence of peritonitis. There are no adhesions.

TRAUMATIC INJURIES TO HANDS AND UPPER EXTREMITIES:

1. On the lateral aspect of the right distal forearm, adjacent to the wrist, there is a 3/4 x 1/2 inch abrasion on the ulnar surface, red-brown in color, nonpatterned.
2. On the lateral or outer aspect of the left forearm there are multiple abrasions both linear and one that is approximately triangular measuring 3/4 x 1/2 inch; they are all brown to red-brown in color and antemortem; the longest linear abrasion is 3/4 inch in length.
3. On the dorsal surface of the right hand there are fresh bruises (red-purple in color) and fresh red-brown abrasions.

CARDIOVASCULAR SYSTEM:

The aorta is elastic and of even caliber throughout with vessels distributed normally from it. It shows a minimal lipid streaking. There is no tortuosity, widening or aneurysm of the aorta.

Within the pericardial sac there is a minimal amount of serous fluid. The heart weighs 310 grams. It has a normal configuration. There are a few petechial hemorrhages of the posterior epicardium. The chambers are normally developed. The valves are thin, leafy and competent. There is no endocardial discoloration. The

chambers are without mural thrombosis. There is no scarring or hemorrhage of the apices of the papillary muscles. There are no defects of the septum. The great vessels enter and leave in a normal fashion. The ductus arteriosus and foramen ovale are obliterated. The coronary ostia are widely patent. The right coronary artery is the dominant vessel. There is no coronary artery atherosclerosis. There are no focal lesions of the myocardium.

RESPIRATORY SYSTEM:

There is no edema of the larynx. There are no fractures of the laryngeal cartilages. Scant mucoid fluid is found in the upper respiratory passages. The mucosa is intact. The right lung weighs 500 grams and the left lung weighs 350 grams. The lungs are subcrepitant and there is dependent congestion. The visceral pleurae are smooth and intact. The parenchyma is mildly congested. The pulmonary vasculature is without thromboembolism.

GASTROINTESTINAL SYSTEM:

The esophagus is intact throughout. The stomach is moderately distended by gas. It contains approximately 200cc of dark fluid. The mucosa is intact without hemorrhage or ulceration. No medication or capsular material is identified. The external appearance of the small intestine and colon is unremarkable. The small intestine and colon are opened along their anti-mesenteric border and no mucosal lesions are present. The appendix is present. The pancreas occupies a normal position. The parenchyma is lobular and firm. The pancreatic ducts are not ectatic. There is no parenchymal calcification.

HEPATOBIILIARY SYSTEM

The liver weighs 1860 grams. It is red brown. The capsule is thin. The consistency is soft and the cut surface is smooth. There is a normal lobular arrangement. The gallbladder is present and its wall is thin and pliable. It contains no stones and a moderate quantity of bile is present. There is no obstruction or dilatation of the extrahepatic ducts. The periportal lymph nodes are not enlarged.

URINARY SYSTEM:

The right kidney weighs 120 grams and the left kidney weighs 140 grams. The kidneys are normally situated and the capsules strip with ease revealing a surface that is smooth and dark purple. The corticomedullary demarcation is obscured by congestion. The pyramids are not remarkable. The peripelvic fat is not increased. The ureters are without dilatation or obstruction. The urinary bladder is unremarkable. The bladder contains approximately 30cc of urine.

GENITAL SYSTEM

The prostate is without enlargement or nodularity. Both testes are in the scrotum and without trauma.

HEMOLYMPHATIC SYSTEM

The spleen weighs 250 grams. The capsule is smooth and intact. The parenchyma is firm and dark red. There is no increase in the follicular pattern. Lymph nodes throughout the body are small and inconspicuous.

ENDOCRINE SYSTEM:

The thyroid gland is unremarkable. The adrenals are intact without necrosis or hemorrhage. The thymus has the usual appearance for the age. The pituitary gland is of normal size.

CENTRAL NERVOUS SYSTEM:

There is no hemorrhage beneath the scalp, into the orbits nor into the temporal muscles. The external periosteum and dura mater are stripped showing no fractures of the calvarium or base of the skull. There are no intracranial hematomas. There are no tears of the dura mater and no epidural, subdural or subarachnoid hematoma. The brain weighs 1540 grams. The leptomeninges are thin and transparent. A normal

convolutionary pattern is observed. Coronal sectioning demonstrates a uniformity of cortical gray thickness. The cerebral hemispheres are symmetrical. There is softening discoloration or hemorrhage of the white matter. The basal ganglia are intact. Anatomic landmarks are preserved. The ventricular system is symmetrical without dilatation or distortion. Pons, medulla and cerebellum are unremarkable. There is no evidence of uncal or cerebellar herniation. Vessels at the base of the brain have a normal pattern of distribution. There are no aneurysms. The cerebral arteries are without arteriosclerosis.

SPINAL CORD: The spinal cord is not dissected.

HISTOLOGIC SECTIONS:

Representative specimens from various organs are preserved on 10% formalin and placed in the storage jar.

TOXICOLOGY DATA:

Blood Alcohol:	
Ethanol	Negative
Acetone	Negative
Isopropranol	Negative
Methanol	Negative
Drug Screen:	
Amphetamines	Negative
Antidepressants	Negative
Barbiturates	Negative
Benzodiazepines	Positive
Cannabinoids	Positive
Cocaine	Positive
Lidocaine	Negative
Methadone	Negative
Phencyclidine	Negative
Phenothiazines	Negative
Propoxyphene	Positive
Acetaminophen	Negative
Oxycodone	Positive
Pentanyl	Negative
Quantitation:	
Cocaine	0.05 micrgrams/ML
Morphine	0.5 milligrams/ML
Hydrocodone	1.2 milligrams/L
Oxycodone	0.49 micrograms/ML

FORENSIC SCIENCE ROUND TWO-JUDGE'S RATING SHEET

Team # _____

Section # _____

Judge's Signature _____

Division: _____ SS _____ PSC

Items Evaluated	Points Possible						Points Awarded
	Superior	-----				Poor	
1. Time of Death Range*	10	6	0				
2. Immediate Cause of Death**	10	6	0				
3. Manner of Death***	10		0				
4. Other Conditions, as applicable****	10	6	0				
5. Evidence*****							
A. Accurately connects evidence to conclusions, using forensic protocol from event resources.	10	8	6	4	2	0	
B. Accurately applies knowledge of human anatomy & physiology and forensic science in evaluating conclusions.	10	8	6	4	2	0	
C. Explanations are concise, clear and logical.	5	4	3	2	1	0	
D. Remarks are neatly written and spelled correctly.	5	4	3	2	1	0	
Total Points	70	-----				0	

***Time of Death Range:** Indicates the date and approximate time of death correctly (ten (10) points). A close approximation of the correct answer will earn 6 points. A response not even close or missing date or time will earn 0 points.

****Immediate Cause of Death:** Accurately identifies the medical cause of death. A correct response will earn 10 points. A close approximation of the correct answer will earn 6 points. A response not close will earn 0 points.

*****Manner of Death:** Accurately identifies the manner of death as either:

- Natural
- Accident
- Suicide
- Homicide
- Undetermined

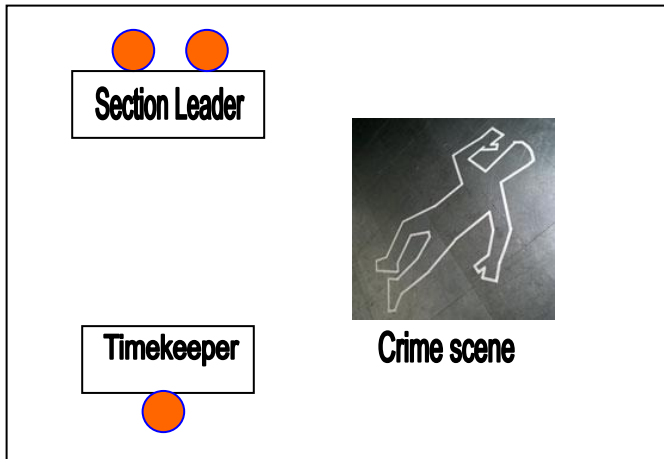
******Other conditions:** includes specific relevant factors contributing to death but not considered the immediate cause.

*******Evidence:** This section is used to identify the physical evidence in this case and determine its significance to the time, cause and manner of death. Remarks should accurately connect as much evidence as possible to appropriate conclusions using forensic protocol within the resources listed in these guidelines.

Forensic Science Sample Room Arrangement

* Sample room set. Actual room set will vary.

Case Study "Analysis" Room



Written Conclusion Room (Example shows one large room with 6 stations. Another option would be to use multiple small rooms for the written conclusion. A separate room may be used for judging.)

