



# MEDICAL LABORATORY ASSISTING

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**Purpose:** To provide Health Science students with an opportunity to develop and demonstrate knowledge and skills in the medical laboratory.

**Description of Event:** This event will consist of two rounds of competition. Round One will be a written, multiple choice test of knowledge and understanding. The top scoring competitors will advance to Round Two for the performance of selected skill procedure(s) identified in a written scenario. The scenario will require the use of critical thinking skills. The performance will be timed and evaluated according to the event guidelines.

**Dress Code:** Competitors shall wear proper business attire or official HOSA uniform, or attire appropriate to the occupational area, during the orientation and written test. Competitors will wear attire appropriate to the occupational area during the skill procedure(s). School identification or name pins must be removed or covered during competition. Bonus points will be awarded for proper dress.

- Rules and Procedures**
1. Competitors in this event must be active members of HOSA in good standing in the category in which they are registered to compete (Secondary or Postsecondary/Collegiate). Competitors should compete in skill events at the highest level of their training.
  2. The test shall be developed from the National HOSA test item bank and will consist of fifty (50) multiple choice items. Competitors will be given one hour to complete the test.

Round One:	Written Test Plan	
	Careers in the Medical Laboratory.....	5%
	Laboratory Safety & Infection Control.....	15%
	Hematology.....	10%
	Immunology.....	10%
	Urinalysis.....	15%
	Microbiology and Parasitology.....	10%
	Clinical Chemistry.....	10%
	Laboratory Math.....	15%
	Phlebotomy.....	10%

3. 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.** No study materials are allowed in the room.
4. All official references are used in the development of the written test. The specific reference selected for each procedure is listed in the Facilities, Equipment and Materials section of these guidelines.
  - Estridge, Barbara and Anna Reynolds. *Basic Clinical Laboratory Techniques*. Delmar Publishing. Latest edition.
  - Hoeltke, Lynn B. *Complete Textbook of Phlebotomy*. Delmar Publishing. Latest edition.
5. The test score from Round One will be used to qualify the competitor for the Round Two skill procedures. The skill procedures approved for Round Two for this event are:

- Procedure I: Artificial Venipuncture
  - A. Artificial Venipuncture - Evacuated Tube
  - B. Artificial Venipuncture - Syringe
  - C. Artificial Venipuncture - Butterfly
- Procedure II: Hematocrit
- Procedure III: ABO Grouping
- Procedure IV: Urinalysis
  - A. Physical Exam
  - B. Chemical Exam
- Procedure V: Gram Stain
- Procedure VI: Fecal Occult Blood
- Procedure VII: Antibiotic Susceptibility Testing

**\*(FOR ALL PROCEDURES, URINE AND/OR BLOOD WILL BE A SIMULATED PRODUCT)**

6. The selected procedure(s) for Round Two, in the form of a written scenario, will be presented to the competitor at the start of the skill to be performed. The timing for the skill will begin when the scenario is presented. The scenario will be the same for each competitor and will include a challenging component that will require the competitor to apply critical thinking skills.
7. The scenario is a secret topic. 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 disqualified.
8. In case of a tie, the highest test score will be used to determine the rank.
9. Competitors must complete all steps of the procedure listed in the guidelines even if the steps must be simulated/verbalized. Steps may not be simulated/verbalized when the equipment/materials are available.
10. The competitor must earn a score of 70% or higher on the combined skill procedure(s) of the event (excluding the test) in order to be recognized as an award winner at the NLC.
11. Competitors will be stopped at the end of the time allowed for a selected procedure(s).
12. Competitors must bring all items noted with \*\*\* in the materials section of these guidelines to the event.
13. Competitors must be familiar with and adhere to the **"General Rules and Regulations of the National HOSA Competitive Events Program."**

**Required Personnel**

1. One Event Manager per event
2. One Section Leader per section
3. One judge per procedure selected per section (with expertise in the specific skill area)
4. Proctors for testing
5. One-two Courtesy Corps per section
6. One-two patients as required by the scenario (per section)
7. Holding room attendants(s)
8. Timekeepers (if necessary)

## Facilities, Equipment and Materials (Per Section)

- General**
1. Clinical and/or laboratory stations for selected procedures
  2. Holding rooms or areas for competitors
  3. Written scenario (one copy per competitor and judge)
  4. Calculators, note pads, pencils for judges
  5. Certificates for each competitor who completes Round One
  6. Event evaluations and pencils to complete.
  7. Stopwatch
  - \*\*\* 8. Watch with second hand
  - \*\*\* 9. Pens and pencils for all events

**Round One Written Test** (Reference: All resources)

1. One test copy per competitor
2. Scantron forms

**Round Two**

**Procedure I**

**Artificial Venipuncture** (Reference: Hoeltke)

1. Evacuated tube holder
2. Disposable safety needle for evacuated system, 20-, 21- or 22-gauge needle
3. Evacuated tube(s) or special collection tube(s) with labels
4. Tourniquet
5. 70 percent isopropyl alcohol swab
6. Gauze or cotton balls
7. Adhesive bandage or tape
8. Sharps container
9. Syringe, vary in size
10. Safety Butterfly needle system, 21-, 23-, or 25-gauge needle with or without leur adapter
11. Transfer device
- \*\*\* 12. Gloves
13. Mannequin arm for venipuncture
- \* 14. Artificial blood
15. Surface disinfectant
16. Alcohol-based handrub
17. Patient wristband (if required by scenario)
18. Requisition or computer label

**Procedure II Hematocrit** (Reference: Estridge and Reynolds)

1. Blood (anticoagulated)\*
2. Self-sealing capillary tubes (plain)
3. Microhematocrit centrifuge
4. Reader (card, wheel, and/or calibrated centrifuge will be provided)
- \*\*\* 5. Gloves
- \*\*\* 6. Safety glasses, face shield or goggles
7. Surface disinfectant and paper towels
8. Biohazard container
9. Biohazard sharps container
10. Paper towels or soft laboratory tissue
11. Pre-marked hematocrit tubes
12. Alcohol-based handrub
13. Laboratory slip for recording results (1 per competitor)

**Procedure III ABO Grouping** (Reference: Ward's Natural Science Simulated ABO Blood Typing Lab Activity 36W0022)

1. Antiseptic
  2. EDTA anticoagulated blood specimen (simulated)
  3. Timer
  4. Pen or pencil for labeling slides
  5. Applicator sticks or stirrers
  - \*\*\* 6. Gloves
  - \*\*\* 7. Safety glasses, face shield or goggles
  8. Disposable plastic pipets
  9. Anti-A
  10. Anti-B
  11. Cell typing slides
  12. ABO worksheet
  13. Surface disinfectant and paper towels
  14. Biohazard container
- \* Simulated ABO blood typing kit available at [www.pocketnurse.com](http://www.pocketnurse.com) Item # 09-19-0022

**Procedure IV Urinalysis** (Reference: Estridge and Reynolds)

1. Paper towels
2. Soft tissue
3. Reagent strips with color chart
4. Pre-tested simulated urine
5. Test tube rack
6. Distilled water
7. Disposable transfer pipettes
8. Refractometer and urinometer
9. Laboratory report to record results
10. Lab timer
- \*\*\* 11. Gloves
- \*\*\* 12. Safety glasses, face shield or goggles
13. Surface disinfectant and paper towels
14. Biohazard container
15. Sharps container
16. Plastic clear conical centrifuge tube
17. Alcohol-based handrub and surface disinfectant
18. Specimen cups

**Procedure V Gram Stain** (Reference: Estridge and Reynolds)

1. Sink with tap water and/or distilled water from beaker or plastic squeeze bottle
2. Gram's stain kit or individual gram stain reagents
3. Microscope
4. Staining rack
5. Lens paper/gauze or soft tissue
6. Bibulous paper
7. Lab timer
8. Saline
- \*\*\* 9. Gloves
- \*\*\* 10. Safety glasses, face shield or goggles
11. Surface disinfectant and paper towels
12. Biohazard container
13. Sharps container
14. Forceps or spring clothespin
15. Alcohol-based handrub
16. Surface disinfectant and paper towels
17. Prepared smear (1 per competitor)

\*\*\* Must be provided by student competitor

**Procedure VI Fecal Occult Blood** (Reference: Estridge and Reynolds)

1. Laboratory timer
  2. Test kit for fecal occult blood
  3. Applicator sticks
  4. Specimen cups
  5. Fecal specimen (simulated)
  - \*\*\* 6. Gloves
  - \*\*\* 7. Safety glasses, face shield or goggles
  8. Surface disinfectant and paper towels
  9. Biohazard container
  10. Paper towels and lab tissues
  11. Fume hood or biosafety cabinet (may be simulated)
- \* Fecal Occult Blood test kit 09-49-5076 available at [www.pocketnurse.com](http://www.pocketnurse.com)

**Procedure VII Antibiotic Susceptibility Testing** (Reference: Estridge and Reynolds)

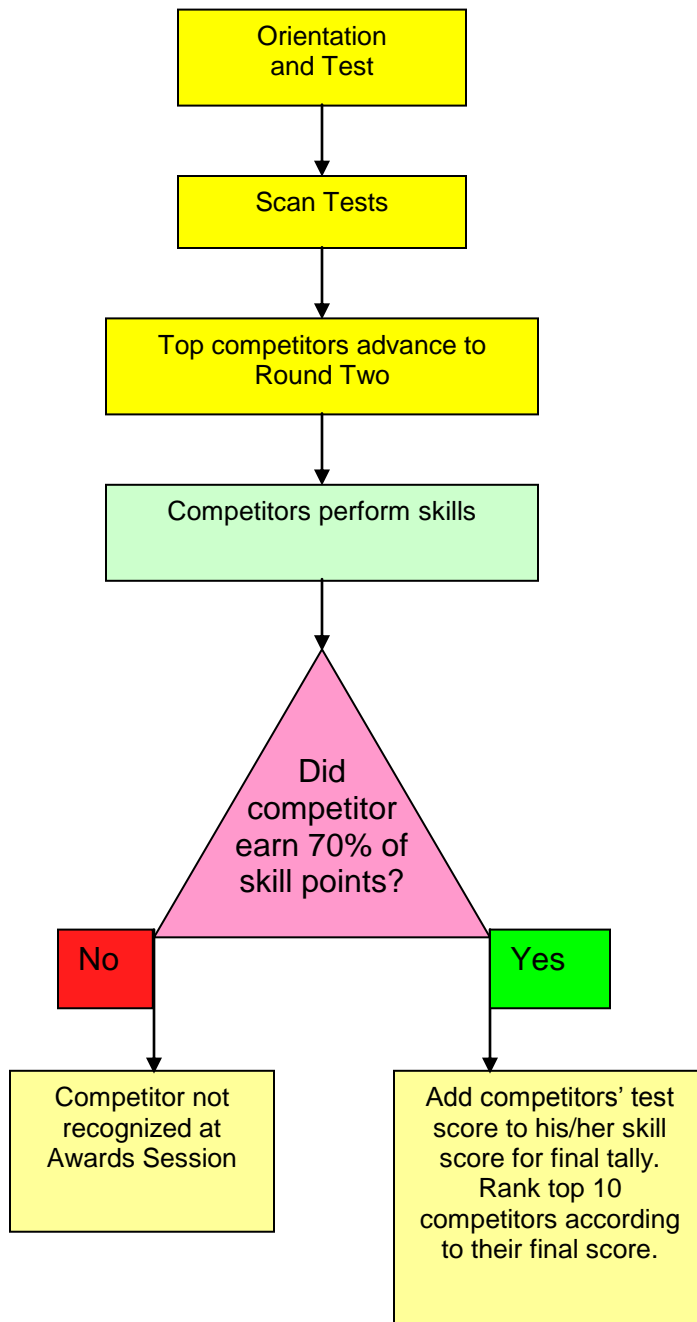
1. Incubated Mueller-Hinton plate with 5 antibiotic discs (Sensi-Discs from BBL: ampicillin, Augmentin, norfloxacin, nitrofurantoin, trimethoprim, Bactrim and/or cephalothin)
2. Package insert for each disc cartridge used
3. Calipers, ruler or template to measure zones of inhibition
4. Surface disinfectant and paper towels
- \*\*\* 5. Gloves
6. Laboratory report form (1 per competitor)

**Order of Draw for Venipuncture Procedures**

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- |         |   |
|---------|---|
| First:  | Blood culture bottles or yellow-stopper blood culture tubes |
| Second: | Coagulation tube (light blue-stopper)                       |
| Third:  | Serum tube (red-stopper or red/black stopper)               |
| Fourth: | Heparin tube (green-stopper)                                |
| Fifth:  | EDTA (lavender-stopper)                                     |
| Sixth:  | Oxalate/fluoride, glycolytic inhibitor tubes (gray-stopper) |

## Event Flow Chart



## MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

<b>Procedure I-A:</b>	<b>Artificial Venipuncture: Evacuated Tube Procedure (Time: 8 minutes)</b>	<b>Possible</b>	<b>Allocated</b>
1.	Identified patient. For an in-patient: Asked patient to give full name, address, hospital number or date of birth and compare to computer label or requisition information. Verify wristband name and hospital number with computer label or requisition information. For an out-patient: ask patient's name and verify with computer label or requisition information	2	
2.	If a fasting specimen is required, asked patient when he/she last ate	1	
3.	Explained the procedure to the patient	2	
4.	Assembled equipment	2	
5.	Washed hands or used alcohol-based handrub for hand hygiene [Don gloves at this point or at Step #12]	2	
6.	Broke needle seal. Threaded appropriate needle into holder using the needle sheath as a wrench	2	
7.	Before using, tapped all tubes that contained additives to ensure that all the additive was dislodged from stopper and wall of the tube	1	
8.	Inserted tube into holder until the needle slightly entered the stopper.	1	
9.	Applied tourniquet	1	
10.	Asked patient to close hand. The patient was not allowed to pump the hand. Placed the patient's arm in downward position	1	
11.	Selected a vein, noting the location and direction of the vein	2	
12.	Cleaned venipuncture with 70 percent isopropyl alcohol swab	1	
13.	Put on gloves while alcohol is drying, not touching the venipuncture site [Don gloves here if you did not do so at Step #5.]	1	
14.	Patient's skin was drawn taut with phlebotomist's thumb. The thumb should be one to two inches below puncture site	2	
15.	With bevel up, lined up needle with vein and performed venipuncture	3	
16.	Removed hand from drawing the skin taut.	1	
17.	Grasped the flange of the evacuated tube holder and pushed the tube forward until the butt end of the needle punctures the stopper. The hand that performed the venipuncture is the hand that held the evacuated tube holder.	2	

Items Evaluated	Possible	Allocated
18. Filled the tubes in the correct order of draw until the vacuum is exhausted and blood flow into the tube ceases.	2	
19. Released tourniquet as soon as possible after the blood begins to flow	1	
20. When blood ceased to flow, removed tube from holder. While securely grasping evacuated tube in one hand, used the other hand to change the tubes	3	
21. Mixed immediately after drawing each tube that contained an additive. Gently inverted tube five to ten times to provide adequate mixing	2	
22. Asked patient to open hand	1	
23. Removed the last tube to draw from the holder.	1	
24. Lightly placed gauze square or cotton ball above the venipuncture site	1	
25. Removed needle from arm making sure the last tube was removed from holder before removing needle	1	
26. Activated safety shield over needle.	2	
27. Applied pressure to the site for 3 to 5 minutes (the patient may assist if able)	1	
28. Disposed of needle in sharps container.	1	
29. Rechecked arm band with labels or requisitions	2	
30. Labeled all tubes	2	
31. Applied adhesive bandage	1	
32. Discarded used gauze into biohazard container	1	
33. Cleaned work area with surface disinfectant	1	
34. Removed and discarded gloves into biohazard container and used alcohol-based handrub for hand hygiene or washed hands	2	
<b>TOTAL POINTS - PROCEDURE I-A</b>	<b>52</b>	

*\*\*If a competitor jeopardizes the patient's or his/her own safety or fails to perform a critical step and does not take immediate action to correct the error, the total points for the procedure or specific subpart(s) of the procedure will be deducted by the judge(s).*

# MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

<b>Procedure I-B:</b>	<b>Artificial Venipuncture: Syringe Procedure (Time: 8 minutes)</b>	<b>Possible</b>	<b>Allocated</b>
1.	Identified patient. For an in-patient: Asked patient to give full name, address, hospital number or date of birth and compare to computer label or requisition information. Verify wristband name and hospital number with computer label or requisition information. For an out-patient: ask patient's name and verify with computer label or requisition information	2	
2.	If a fasting specimen is required, asked patient when he/she last ate	1	
3.	Explained the procedure to the patient	2	
4.	Collected equipment	2	
5.	Used alcohol-based handrub for hand hygiene or washed hands. [Don gloves at this point or at Step #13]	2	
6.	Opened the sterile needle and syringe packages, attached the needle if necessary	1	
7.	Prevented the plunger from sticking by pulling it halfway out and pushing it all the way in one time	1	
8.	Selected the proper tube(s) to transfer blood to after collection, placed tubes in the proper order for filling	2	
9.	Applied tourniquet	1	
10.	Asked patient to close hand. The patient was not allowed to pump the hand. Placed the patients arm in downward position	1	
11.	Selected a vein, noting the location and direction of the vein	2	
12.	Cleaned venipuncture with 70 percent isopropyl alcohol swab	1	
13.	Put on gloves while alcohol is drying, not touching the venipuncture site [Don gloves at this point or at Step #5]	1	
14.	Patient's skin should be drawn taut with phlebotomist's thumb. The thumb should be one to two inches below puncture site	2	
15.	With bevel up, lined up needle with vein and performed venipuncture	3	
16.	While securely grasping the syringe with one hand, used the other hand to slowly pull the plunger back until the desired amount of blood has been obtained.	2	
17.	Asked patient to open hand	1	
18.	Released tourniquet	1	

Items Evaluated	Possible	Allocated
19. Lightly placed gauze square or cotton ball above venipuncture site	1	
20. Removed needle from arm	1	
21. Activated safety shield over needle.	2	
22. Applied pressure to the site for 3 to 5 minutes. (The patient may assist if able.)	1	
23. Aliquot blood into appropriate tube(s). Removed needle from syringe and attached transfer device. Filled tubes in proper order of draw via transfer device.	4	
24. Allowed blood to enter tube until flow stops. Mixed if any anticoagulant or additive is present.	2	
25. Disposed of syringe and transfer device in sharps container – disposed of devices intact	2	
26. Rechecked arm band with labels or requisitions	2	
27. Labeled all tubes before leaving the bedside	2	
28. Applied adhesive bandage	1	
29. Discarded used gauze into biohazard container	1	
30. Cleaned work area with surface disinfectant	1	
31. Removed and discarded gloves into biohazard container and used alcohol-based handrub for hand hygiene	2	
<b>TOTAL POINTS - PROCEDURE I-B</b>	<b>50</b>	

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## MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

<b>Procedure I-C: Artificial Venipuncture: Butterfly Collection System (Time: 8 minutes)</b>		<b>Possible</b>	<b>Allocated</b>
1.	Identified patient. For an in-patient: Asked patient to give full name, address, hospital number or date of birth and compare to computer label or requisition information. Verify wristband name and hospital number with computer label or requisition information. For an out-patient: ask patient's name and verify with computer label or requisition information	2	
2.	If a fasting specimen is required, asked patient when he/she last ate	1	
3.	Explained the procedure to the patient	2	
4.	Assembled equipment	2	
5.	Washed hands or used alcohol-based handrub for hand hygiene [Don gloves at this point or at Step #12]	2	
6.	Broke needle seal. Threaded appropriate needle into holder using the needle sheath as a wrench	2	
7.	Before using, tapped all tubes that contained additives to ensure that all the additive was dislodged from stopper and wall of the tube	1	
8.	Inserted tube into holder until the needle slightly entered the stopper.	1	
9.	Applied tourniquet	1	
10.	Asked patient to close hand. The patient was not allowed to pump the hand. Placed the patient's arm in downward position	1	
11.	Selected a vein, noting the location and direction of the vein	2	
12.	Cleaned venipuncture with 70 percent isopropyl alcohol swab	1	
13.	Put on gloves while alcohol is drying, not touching the venipuncture site [Don gloves here if you did not do so at Step #5.]	1	
14.	Patient's skin was drawn taut with phlebotomist's thumb. The thumb should be one to two inches below puncture site	2	
15.	With bevel up, lined up needle with vein and performed venipuncture. When the needle entered the vein, noted a flash of blood.	3	
16.	Removed hand from drawing the skin taut, grasped the flange of the evacuated tube holder, and pushed the tube forward until the butt end of the needle punctured the stopper.	2	
17.	Competitor held the butterfly needle in place if needed. For multiple draws that require both hands to manipulate the tubes, the butterfly needle was temporarily taped down or left in place.	2	
18.	Filled the tubes in correct order of draw until the vacuum was exhausted and blood flow into the tube ceased.	1	

Items Evaluated	Possible	Allocated
19. Released tourniquet as soon as blood stops flowing	1	
20. Mixed immediately after drawing each tube that contained an additive. Gently inverted tube five to ten times to provide adequate mixing	2	
21. If additional specimens required, inserted the next tube into the holder and repeated the collection process	2	
22. Asked patient to open hand	1	
23. When blood ceased to flow, removed tube from holder. While securely grasping evacuated tube in one hand, pulled the tube from the holder.	3	
24. Removed the last tube to draw from the holder.	1	
25. Lightly placed gauze square or cotton ball above the venipuncture site	1	
26. Removed needle from arm making sure the last tube was removed from holder before removing needle	1	
27. Activated safety shield over needle.	2	
28. Applied pressure to the site for 3 to 5 minutes (the patient may assist if able)	1	
29. Disposed of butterfly device in sharps container by inserting the needle end of the device in first and allowing the tubing and holder to drop into the container.	1	
30. Rechecked arm band with labels or requisitions	2	
31. Labeled all tubes	2	
32. Applied adhesive bandage	1	
33. Discarded used gauze into biohazard container	1	
34. Cleaned work area with surface disinfectant	1	
35. Removed and discarded gloves into biohazard container and used alcohol-based handrub for hand hygiene or washed hands	2	
<b>TOTAL POINTS - PROCEDURE I-C</b>	<b>54</b>	

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# MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_ Judge's Signature: \_\_\_\_\_

Procedure II: Hematocrit	(Time: 6 minutes)	Possible	Allocated
1. Assembled equipment and materials and put on face protection		2	
2. Used alcohol-based handrub for hand hygiene and put on gloves		2	
3. Filled two capillary tubes (using simulated blood)		2	
4. Allowed tube to fill 2/3 by capillary action			
a. Mixed the tube of blood thoroughly by gently rocking tube from end to end a minimum of 2 minutes (verbalized) 50 – 60 times by hand.		2	
b. Removed cap from tube, wearing face protection		2	
c. Tilted the tube so the blood is very near the top edge of the tube.		2	
d. Inserted the tip of a plain capillary tube into the blood and filled three-quarters full by capillary action, or if using precalibrated tubes, filled to the line.		2	
5. Wiped outside of capillary tube to remove excess blood		1	
6. Sealed the capillary tube and checked to see that the plug expanded		2	
7. Place tubes in centrifuge, balancing tubes with sealed end of the tube against the rubber gasket.		2	
8. Fastened both lids securely.		1	
9. Started the centrifuge and verbalized the total time for spinning is 5 minutes.  <i>* The judge will stop the centrifuge after 30 seconds and give the competitor the tubes to be read.</i>		2	
10. Using pre-marked tubes, read hematocrit using built in scale or hematocrit reader.		3	
11. Averaged the values from the two tubes and recorded hematocrit correctly (the values must agree with + or – 2%) on the Laboratory Report form.		3	
12. Hematocrit is +/- one percent of known value		4	
13. Discarded capillary tube into sharps container		1	
14. Cleaned and returned equipment		1	
15. Cleaned work area with surface disinfectant		1	
16. Removed gloves and discarded into biohazard container		2	
17. Used alcohol-based handrub for hand hygiene		1	
<b>TOTAL POINTS - PROCEDURE II</b>		<b>38</b>	

*\*\*If a competitor jeopardizes the patient's or his/her own safety or fails to perform a critical step and does not take immediate action to correct the error, the total points for the procedure or specific subpart(s) of the procedure will be deducted by the judge(s).*

# MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

<b>Procedure III: ABO Grouping</b>	<b>(Total time: 6 minutes)</b>	<b>Possible</b>	<b>Allocated</b>
1.	Assembled equipment and materials.	2	
2.	Used alcohol-based handrub for hand hygiene and put on gloves.	2	
3.	Put on face shield or goggles.	2	
4.	Performed slide grouping as follows:		
a.	Obtained a slide with two wells and labeled the slide with the patient's name.	2	
b.	Placed three drops of the patient's blood in each of the A and B wells. Did not allow dropper to touch the slide.	2	
c.	Placed three drops of the anti-A serum in the A well.	2	
d.	Placed three drops of the anti-B serum in the B well.	2	
e.	Obtained two toothpicks. Stirred each well with a separate clean toothpick for 30 seconds.	3	
f.	Stirring motion was effective. Avoided splattering the simulated blood.	2	
f.	Recorded agglutination results on ABO worksheet.	2	
g.	Accurately determined the agglutination, blood type, and transfusion responses on the Laboratory Report form.	5	
5.	Discarded disposable labware into appropriate biohazard container.	2	
6.	Returned simulated blood, reagents and unused equipment to proper storage.	2	
7.	Cleaned work area with surface disinfectant.	2	
8.	Removed gloves and discarded into biohazard container.	2	
9.	Used alcohol-based handrub for hand hygiene.	2	
<b>TOTAL POINTS - PROCEDURE III</b>		<b>36</b>	

*\*\*If a competitor jeopardizes the patient's or his/her own safety or fails to perform a critical step and does not take immediate action to correct the error, the total points for the procedure or specific subpart(s) of the procedure will be deducted by the judge(s).*

# MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

<b>Procedure IV-A: Urinalysis: Physical Exam (Time: 5 minutes)</b>		<b>Possible</b>	<b>Allocated</b>
1.	Assembled equipment and materials and put on face protection	2	
2.	Used alcohol-based handrub for hand hygiene and put on gloves	2	
3.	Recorded patient information onto lab slip	2	
4.	Mixed specimen gently by swirling and poured approximately 10 mL into a clear, conical centrifuge tube	2	
5.	Correctly recorded clarity (clear, cloudy, hazy, turbid)	2	
6.	Correctly recorded color (straw, yellow, amber, red)	2	
7.	Noticed the odor of the urine. If unusual, recorded in comment section	2	
8.	Determined specific gravity with refractometer <ul style="list-style-type: none"> <li>a. Placed one drop of distilled water on the glass plate of the refractometer and closed gently</li> <li>b. Looked through ocular and read the specific gravity from the scale. For water, the specific gravity should read 1.000</li> <li>c. Cleaned the glass plate, placed one drop of urine control solution on the plate and closed gently</li> <li>d. Looked through the ocular, read the specific gravity from the scale, and recorded the control value</li> <li>e. Cleaned the glass plate with disinfectant and dried with a soft tissue</li> <li>f. Repeated steps 8c to 8e with a urine specimen, and recorded the result on the worksheet +/- .001 of known value</li> </ul>	2 2 2 2 2 2	
9.	Determined specific gravity with urinometer <ul style="list-style-type: none"> <li>a. Poured 40 to 50 mL of distilled water into the glass cylinder</li> <li>b. Inserted urinometer, with gentle spinning motion</li> <li>c. Read the specific gravity from the scale on the stem of the urinometer when it stopped spinning and recorded</li> <li>d. Rinsed equipment and dried with laboratory tissue and repeated 9a to 9c with a urine specimen and recorded result</li> <li>e. Disinfected urinometer and cylinder</li> </ul>	2 2 2 2 2	
10.	Recorded specific gravity within +/- .001 of known value	4	

Items Evaluated	Possible	Allocated
11. Discarded urine sample properly	1	
12. Cleaned equipment	1	
13. Cleaned work area with surface disinfectant	1	
14. Removed gloves and discarded into biohazard container	2	
15. Used alcohol-based handrub for hand hygiene	2	
<b>TOTAL POINTS - PROCEDURE IV-A</b>	<b>47</b>	

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## MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

<b>Procedure IV-B: Urinalysis: Chemical Exam (Time: 5 minutes)</b>	<b>Possible</b>	<b>Allocated</b>
1. Assembled equipment and materials and put on face protection	2	
2. Used alcohol-based handrub for hand hygiene and put on gloves	2	
3. Recorded patient information onto lab slip	2	
4. Obtained urine sample. Mixed specimen gently by swirling	1	
5. Performed reagent strip test:		
a. Dipped reagent strip into well-mixed urine, moistening all pads	2	
b. Remove strip from urine immediately and tap on container edge to remove excess urine; quickly blotted edge of strip on absorbent paper. Began timing as strip was withdrawn from urine	2	
c. Observed reagent pads and compare colors to color chart at appropriate time intervals	2	
d. Recorded results on urinalysis worksheet	1	
e. Discarded reagent strip into biohazard container	2	
6. Disposed of urine specimen properly, avoiding splashes	2	
7. Disposed of test tube and contents properly, avoiding splashes	2	
8. Discarded used materials into appropriate biohazard containers	2	
9. Cleaned work area with surface disinfectant	2	
10. Removed gloves and discarded into biohazard container	2	
11. Used alcohol-based handrub for hand hygiene	2	
12. Laboratory report form (1 pt for each correct observed result)	5	
<b>TOTAL POINTS - PROCEDURE IV-B</b>	<b>33</b>	

*\*\*If a competitor jeopardizes the patient's or his/her own safety or fails to perform a critical step and does not take immediate action to correct the error, the total points for the procedure or specific subpart(s) of the procedure will be deducted by the judge(s).*

## MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

Procedure V:	Gram Stain	(Time: 7 mins)	Possible	Allocated
1.	Assembled equipment and materials.		2	
2.	Used alcohol-based handrub for hand hygiene and put on gloves.		2	
3.	Obtained prepared smear and placed on staining rack.		1	
4.	Flooded the slide with crystal violet for one minute.		2	
5.	Rinsed slide with gentle stream of water from a beaker, faucet, or plastic squeeze bottle and tilted the slides to remove excess water.		2	
6.	Flooded the slides with Gram's iodine for the recommended time.		2	
7.	Rinsed slide with gentle stream of water from a beaker, faucet, or plastic squeeze bottle and tilted the slides to remove excess water.		2	
8.	Held the slide by the short edge using forceps or clothespin. Added the decolorizer by squeeze bottle or Pasteur pipette until no more purple color ran off the slide ( <i>Note: Important not to decolorize more than a few seconds to prevent over-decolorization</i> )		3	
9.	Rinsed the slides immediately to remove the decolorizer; tilted the slides to remove excess water		2	
10.	Counterstain the smears by flooding the slides with safranin for 30-60 seconds		2	
11.	Rinsed the slides, tilted to remove excess water; wiped the back of the slide with paper towel to remove stain; stood slides on end or blotted between bibulous paper to dry.		2	
12.	Judges will verify properly stained smear		3	
13.	Returned slides to storage or discard into proper biohazard containers for disposal		2	
14.	Cleaned work surfaces with disinfectant		2	
15.	Removed and discarded gloves into biohazard container and used alcohol-based handrub for hand hygiene		2	
<b>TOTAL POINTS - PROCEDURE V</b>			<b>31</b>	

*\*\*If a competitor jeopardizes the patient's or his/her own safety or fails to perform a critical step and does not take immediate action to correct the error, the total points for the procedure or specific subpart(s) of the procedure will be deducted by the judge(s).*

## MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

<b>Procedure VI: Fecal Occult Blood Test</b>	<b>(5 minutes)</b>	<b>Possible</b>	<b>Allocated</b>
1. Used alcohol-based handrub for hand hygiene and put on gloves		2	
2. Assembled materials and equipment		2	
3. a. Filled out the patient information on the front of the slide package Working in a fume hood or biosafety cabinet:		2	
b. Opened the flap on the front to expose two paper guaiac squares. Followed the directions and obtain small portion of the stool sample on the applicator stick. Applied thin smear to box A		2	
c. Reused the applicator stick to obtain a second sample from a different part of the specimen. Applied a thin smear to box B		2	
d. Closed the cover and discarded applicator into biohazard container		2	
e. Waited 3 to 5 minutes for the smears to dry. (verbalized)		2	
4. Turned the slide over and opened the perforated flap to expose the backs of boxes A and B, and the performance monitor area.		2	
5. Applied two drops of the developer onto each smear and started the timer		2	
6. Read the results after the appropriate time interval		2	
7. Compared the color on the slide to the color guide in the package insert. Any blue color at the edge of the smear is a positive test		2	
8. Applied one drop of developer between the positive and the negative performance monitor areas. Read the results after the appropriate interval.		2	
9. Correctly verbalized the results to the judge		4	
10. Disposed of all potentially infectious materials in a biohazard container		2	
11. Wiped the counter with surface disinfectant		2	
12. Returned equipment to proper storage		2	
13. Removed gloves and discarded in biohazard container		2	
14. Used alcohol-based handrub for hand hygiene		2	
<b>TOTAL POINTS – PROCEDURE VI</b>		<b>38</b>	

*\*\*If a competitor jeopardizes the patient's or his/her own safety or fails to perform a critical step and does not take immediate action to correct the error, the total points for the procedure or specific subpart(s) of the procedure will be deducted by the judge(s).*

# MEDICAL LABORATORY ASSISTING

Competitor #: \_\_\_\_\_

Judge's Signature: \_\_\_\_\_

<b>Procedure VII: Antibiotic Susceptibility Testing (5 minutes)</b>		<b>Possible</b>	<b>Allocated</b>
1.	Used alcohol-based handrub for hand hygiene and put on gloves	1	
2.	Removed Mueller-Hinton plate from incubator and observed for zones of inhibition through bottom of plate	2	
3.	Measured zones, using a metric ruler, calipers, or a special transparent template	2	
4.	Record the susceptibility of the organism to each antibiotic disc as sensitive (S), resistant (R), or intermediate (I), following the guidelines included on the package insert for each disc cartridge or the template markings	2	
5.	Discarded agar plate in biohazard container (verbalized)	2	
6.	Cleaned equipment and returned to storage	1	
7.	Wiped counter with surface disinfectant	1	
8.	Removed gloves and discarded in biohazard container	1	
9.	Used alcohol-based handrub for hand hygiene.	1	
10.	Correctly identified susceptibility of organisms. (Results from Antibiotic Susceptibility form.)	10	
<b>TOTAL POINTS – PROCEDURE VII</b>		<b>23</b>	

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COMPETITOR # \_\_\_\_\_

<b>LABORATORY REPORT</b>
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**PROCEDURE II: Hematocrit**

Patient Identification \_\_\_\_\_

DATE \_\_\_\_\_

**Hematocrit**

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Sample #	Hematocrit Value
1	_____
2	_____
Recorded Value	_____

COMPETITOR # \_\_\_\_\_

<b>LABORATORY REPORT</b>
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**PROCEDURE III: ABO Typing**

Patient Identification \_\_\_\_\_ DATE \_\_\_\_\_

**Blood Type Analysis**

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**Agglutination Reaction**

Patient	Anti-A Serum	Anti-B Serum	Blood Type

1. If the patient needed a transfusion, what blood type(s) could this patient safely receive?  
\_\_\_\_\_
2. What blood type(s) could safely receive this patient's blood? \_\_\_\_\_

COMPETITOR # \_\_\_\_\_

**LABORATORY REPORT**

**PROCEDURE IV A: Urinalysis**

Patient Identification \_\_\_\_\_ DATE \_\_\_\_\_

SPECIMEN NO. \_\_\_\_\_

**PHYSICAL EXAMINATION OF URINE**

<u>Physical Examination</u>	<u>Normal Values</u>
1. Clarity : _____	clear (Clear)
2. Color: _____	straw to amber
3. Specific gravity:	
Refractometer _____	1.005-1.030
Urinometer _____	1.005-1.030

Comments:

COMPETITOR # \_\_\_\_\_

**LABORATORY REPORT**

**PROCEDURE IV-B: Urinalysis**

Patient Identification \_\_\_\_\_ DATE \_\_\_\_\_

SPECIMEN NO. \_\_\_\_\_

**CHEMICAL EXAMINATION OF URINE**

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Chemical Examination

A.	<u>Reagent Strip</u>	<u>Observed Result</u>	<u>Normal Values</u>
	pH	_____	5.5-8.0
	protein	_____	negative
	glucose	_____	negative
	ketone	_____	negative
	blood	_____	negative

COMPETITOR # \_\_\_\_\_

<b>LABORATORY REPORT</b>
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**PROCEDURE VII: Antibiotic Susceptibility**

Patient Identification \_\_\_\_\_ DATE \_\_\_\_\_

SPECIMEN NO. \_\_\_\_\_

**Antibiotic Susceptibility**

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<b>Disc</b>	<b>Antibiotic</b>	<b>Susceptibility</b>