**High Plains Technology Center**

**Health Careers**

**Learning Activity Packet (LAP) for Diagnostic Aide**

**Related unit of instruction:**

Phlebotomy Specimen Collection & Processing

**Approximate Completion time:**

9 hours

**Rationale for the Lap:**

This LAP is designed to help the student recognize appropriate methods for analyzing specimens. In this course, the student will learn these methods in collecting and processing the specimen to be analyzed.

**Criteria for successful completion:**

By the end of this LAP the student will

1. Read and turn in work sheets for Chapters 5, 6 and 7 in *Warekois and Robinsons Phlebotomy Worktext and Procedures Manual 2nd ed.,* Saunders Elsevier, 2007
2. Pass the tests for the chapters

**Learning Objective:**

Medical Terminology Chapter 5

1. Define selected roots, suffixes and prefixes.
2. Translate the English or common word for a condition or system into the appropriate medical form.
3. Use selected medical terms or expressions in their proper context.
4. Define and use correctly specific medical terms that apply to phlebotomy.
5. Define selected medical abbreviations and use them correctly.

Human Anatomy and Physiology Chapter 6

1. Describe the three levels of organization of the human body.
2. Name four structures of the cell and describe the functions of each.
3. Name four kinds of tissue and explain the roles of each.
4. Define each anatomic term discussed and use it to locate various structures and position a patient.
5. Describe the eight major body cavities and list at least one organ contained in each.
6. For each of the following body systems, describe its major features, organs and functions and list diseases and common laboratory tests associated with each:
   1. Skeletal
   2. Muscular
   3. Integumentary
   4. Nervous digestive
   5. Urinary
   6. Respiratory
   7. Endocrine
   8. Reproductive

Circulatory, Lymphatic and Immune Systems Chapter 7

1. Describe the circulation of blood from the heart to the lungs and other body tissues.
2. Differentiate arteries, veins and capillaries.
3. Locate the major arteries and veins of the human body.
4. Define systole, diastole and sphygmomanometer.
5. List and define at least 10 diseases of the heart and blood vessels.
6. Describe the components of whole blood.
7. Describe the three cellular elements of the blood, including their major functions.
8. Explain the process of hemostasis.
9. For red blood cells, white blood cells and hemostasis, list at least three diseases that affect each.
10. Describe laboratory tests that may be used to detect diseases of red and white blood cells and hemostasis.
11. Differentiate lymphatic circulation from that of blood.
12. Explain the functions of the lymphatic system.
13. Differentiate among nonspecific, humoral and cellular immunity.
14. Describe the functions of T and B cells.

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12 hours

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**Criteria for successful completion:**

By the end of this LAP the student will

1. Read and turn in work sheets for Chapters 8, 9, 10 and 11 in *Warekois and Robinsons Phlebotomy Worktext and Procedures Manual 2nd ed.,* Saunders Elsevier, 2007
2. Pass the tests for the chapters

**Learning Objective:**

Venipuncture Equipment Chapter 8

1. List the equipment that should be available for venipuncture.
2. Describe the purpose of a tourniquet; list types that may be used to locate a vein.
3. Differentiate between an antiseptic and a disinfectant. List those that may be used for blood collection.
4. Locate the bevel, shaft, hub and point of a needle. Describe safety features that may be included.
5. Define gauge.
6. Name the parts of a syringe and describe how the syringe system differs from the evacuated tube system.
7. Explain when a syringe system or winged infusion set (butterfly) is used in blood collection.
8. Describe the proper use of the tube holder (needle adapter).
9. Differentiate whole blood, serum and plasma. List at least one use for each.
10. Describe at least nine additives, including their mode of action and uses.
11. List at least ten different colors for tube stoppers. Identify the additive(s) in each and state one use for each.
12. State the correct order in which various types of tubes should be collected.
13. Describe the proper disposal of a used needle.

Routine Venipuncture Chapter 9

1. List the information that is commonly found on a test requisition.
2. List in order the steps in a routine venipuncture.
3. Discuss the information that must be verified for inpatient identification before the blood collection procedure.
4. Explain how the identification of outpatients differs from that of inpatients.
5. Describe patient preparation and positioning.
6. Describe how to assemble the evacuated tube system.
7. Explain how to apply a tourniquet and list three consequences of improper application.
8. List the veins that may be used for blood collection, including the advantages and disadvantages of each.
9. Explain how to clean the venipuncture site.
10. Describe how to properly insert the needle into the vein.
11. Discuss how the needle should be removed when the last tube of blood has been collected.
12. List the information that must be included on the label of each tube.
13. Describe how venipuncture using a syringe differs from that using the evacuated tube system.

Dermal Puncture Chapter 10

1. List situations in which a dermal puncture might be preferred.
2. Explain why it is necessary to inform the physician when capillary blood is collected.
3. Describe skin puncture devices, including safety features they may have.
4. Discuss containers that may be used to collect capillary blood.
5. List the steps in the BD Unopette™ dilution method.
6. Explain how circulation may be increased at the puncture site.
7. Discuss proper dermal puncture site selection.
8. Explain why it is important to control the depth of the puncture.
9. List in order the steps for dermal puncture.
10. Describe how the cut should be made when a finger is used.
11. Explain why the first drop of blood is discarded.
12. List precautions to be observed when collecting capillary blood.
13. State the order of the draw in collecting capillary blood.
14. Explain the use of bleeding time test.
15. List the equipment required to perform a bleeding time test.
16. List in order the steps for performing a bleeding time test.
17. Explain the procedure for performing a bedside glucose test.

Venipuncture Complications Chapter 11

1. Explain the procedure to be followed in these situations:
   1. The patient is not in his or her room.
   2. The patient has no identification band.
   3. The patient is sleeping, unconscious or apprehensive.
   4. Clergy or a physician is with the patient.
   5. Visitors are present.
   6. The patient cannot understand you.
   7. The patient refuses to have blood drawn.
2. List at least four sites that must be avoided when collecting blood, and explain why.
3. Describe techniques that can be used to help locate a vein.
4. Discuss limitations and precautions to be followed if a leg or hand vein is considered for venipuncture.
5. List at least two situations in which alcohol should not be used to clean the venipuncture site and state at least one alternative.
6. Describe four potential problems associated with tourniquet application.
7. Define syncope and explain what to do when a patient experiences this condition during the collection of blood.
8. Describe the actions to be taken if a patient has a seizure, complains of nausea or vomits.
9. List three reasons why blood may not flow into a tube, and explain how to prevent or correct the problem.
10. Explain what should be done in the following situations:
    1. An artery is inadvertently punctured.
    2. No blood is collected on the first try.
    3. The patient requests something.
    4. There is prolonged bleeding from the puncture site.
11. List the causes of a hemolyzed sample and name the test results that may be affected.
12. List tests that may be affected by a patient’s position.
13. Describe five long-term complications associated with venipuncture, and explain how they can be avoided.
14. State reasons why a sample may be rejected by the laboratory.

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15 hours

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**Criteria for successful completion:**

By the end of this LAP the student will

1. Read and turn in work sheets for Chapters 12, 13, 14 and 15 in *Warekois and Robinsons Phlebotomy Worktext and Procedures Manual 2nd ed.,* Saunders Elsevier, 2007
2. Pass the tests for the chapters

**Learning Objective:**

Blood Collection in Special Populations Chapter 12

1. Describe two physiologic differences between children and adults that should be considered when collecting blood from infants and children.
2. Describe steps that can be taken to help reduce a child’s anxiety and make the venipuncture experience more pleasant.
3. Explain how blood collection supplies and the venipuncture procedure are modified for infants and children.
4. List the steps in dorsal hand vein puncture in children.
5. Define bilirubin, explain its significance and describe precautions that must be observed when collecting blood for bilirubin testing.
6. Explain the usual procedure for collecting blood for neonatal screening tests and list five tests that may be done.
7. Explain physical changes that may occur with aging that should be considered when collecting blood.
8. List conditions that may require blood draws for an extended period of time and alternative collection sites for these patients.
9. Define vascular access device and describe eight types.
10. Describe how blood should be collected from a vascular access device.
11. List steps to be followed when collecting blood from a patient with an intravenous line in place.

Arterial Blood Collection Chapter 13

1. Explain how arterial blood differs from venous blood.
2. Describe what is measured in arterial blood gas testing and explain the significance of abnormal results.
3. List the equipment needed to collect arterial blood and discuss the differences from routine venipuncture equipment.
4. List the arteries that can be used for blood gas collection and describe the advantages and disadvantages of each.
5. Explain the principle and procedure for testing collateral circulation.
6. Define respiratory steady state and list the steps that should be taken to ensure that it exists when blood is collected.
7. Describe the steps in arterial blood gas collection.
8. Discuss at least five complications that may occur with arterial puncture.
9. List at least seven sample collection errors that may affect arterial blood gas testing.
10. Describe capillary blood gas testing, including uses, limitations and procedure.

Special Collections and Procedures Chapter 14

1. Define basal state.
2. Define and explain the uses of:
   1. Fasting specimens
   2. Timed specimens
   3. 2-hour postprandial specimens
3. Describe the procedure for performing the various tolerance tests.
4. Define diurnal variation and list the blood constituents that may be affected by it.
5. Define therapeutic drug monitoring, describe the differences among a random level and peak and trough levels and explain how TDM samples are collected.
6. Describe the reasons and procedures for collecting blood for culture.
7. Explain the steps in collecting blood from donors for transfusion.
8. Define and explain the uses of autologous donation and therapeutic phlebotomy.
9. Explain how samples to be tested for or suspected of containing cold agglutinins, cryofibrinogen or cryoglobulin should be handled.
10. List samples that should be chilled until tested.
11. List samples that are light sensitive and explain how they should be handled.
12. Describe the precautions to be taken when collecting legal or forensic specimens.
13. List samples that are time sensitive and explain how they should be handled.
14. Explain how to prepare blood smears, describe features of unacceptable smears and list the possible causes.
15. Explain how to prepare smears to be examined for malaria.

Special Nonblood Collection Procedures Chapter 15

1. Describe six kinds of urine samples; explain how each is collected and state one use for each.
2. Instruct a patient how to collect a midstream clean-catch urine specimen.
3. Explain how a urine sample can be collected from an infant and state at least one limitation.
4. Discuss why a fecal sample may be requested, list three types of samples and describe collection methods.
5. Discuss how and why semen samples may be collected.
6. Explain the proper procedure for collecting a throat sample and a nasopharyngeal sample.
7. Explain the reason and the procedure for collecting a sweat chloride sample.
8. Describe how cerebrospinal fluid is collected, and explain how the tubes collected should be distributed.
9. Define each of the following terms and list at least one reason for collecting each fluid:
   1. Synovial fluid
   2. Peritoneal (ascetic) fluid
   3. Pleural fluid
   4. Pericardial fluid
10. Explain how amniotic fluid is formed and describe three reasons for testing it.

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By the end of this LAP the student will

1. Read and turn in work sheets for Chapters 16, 17 and 19 in *Warekois and Robinsons Phlebotomy Worktext and Procedures Manual 2nd ed.,* Saunders Elsevier, 2007
2. Pass the tests for the chapters

**Learning Objective:**

Specimen Transport, Handling and Processing Chapter 16

1. Discuss what might happen to a sample that is not properly handled and processed.
2. Describe four ways in which samples can be safely transported to the lab.
3. Explain why tubes should be transported in an upright position.
4. State the acceptable time between specimen collection and separation of cells from plasma or serum and explain why this is necessary.
5. List two exceptions to this rule and state the maximum time that each may be held.
6. List two tests for which the samples must be kept warm and explain how to do this.
7. Describe how to handle samples that must be chilled.
8. List at least three analytes that are light sensitive and explain how to protect them.
9. Describe four ways that a sample may be transported to the laboratory.
10. Describe the safety equipment that must be used when processing samples.
11. Explain why samples must be allowed to clot fully before processing and state the average time for complete clotting to occur in a red-topped tube and when clot activators are used.
12. Explain the principle and proper operation of a centrifuge.
13. Describe the proper procedure for removing a stopper.
14. List at least five reasons for specimen rejection.

Quality Phlebotomy Chapter 17

1. Define quality assurance, quality control, total quality management, and continuous quality improvement and discuss their differences and roles in quality phlebotomy.
2. Describe the contents of the procedure manual and explain how the phlebotomist can use it.
3. Explain the role of the floor book and describe the information it contains.
4. List three types of analytical variables.
5. Describe at least five errors that may occur as a result of improper requisition handling and explain quality assurance procedures to monitor for them.
6. Describe procedures that should be followed for the quality control of phlebotomy equipment.
7. Explain why expired tubes should not be used.
8. Define delta check and explain its use in quality assurance.
9. List nine patient activities that may affect laboratory test results and give at least one example of a test affected by each.
10. List at least four blood collection sites that may lead to sample contamination and list six sites that may result in pain or injury to the patient.
11. Discuss at least two errors that may result from improper tourniquet application.
12. Explain the risks of failing to cleanse the puncture site carefully and discuss one method to monitor for such errors.
13. Describe precautions that must be taken when iodine is used as a cleansing agent and list at least two laboratory tests that can be affected.
14. Discuss at least eight precautions that must be taken in collecting and labeling specimens.
15. Explain the phlebotomist’s role in ensuring a positive patient perception of the level of care received.
16. Explain the steps to be followed in the case of an accidental needle stick and describe quality assurance procedures that may be used.
17. Discuss the monitoring of variables during sample transport.
18. Explain the effects of sample-processing variables on sample quality (e.g., separation times, centrifugation).
19. Describe how refrigerators and freezers are monitored.
20. Explain how multiple aliquots prepared from a single sample should be handled.

Point-of-Care Testing Chapter 19

1. Define point-of-care testing and explain its advantages and disadvantages.
2. Discuss the importance of quality-assurance activities in point-of-care testing.
3. Describe the testing principle and clinical usefulness of:
   1. Hematocrit
   2. Hemoglobin
   3. Prothrombin time
   4. Activated coagulation time
   5. Glucose
   6. Cardiac troponin T
   7. Cholesterol
   8. Blood gases and electrolytes
   9. Occult blood
   10. “dipstick” urinalysis
   11. Pregnancy testing
4. Describe the major features of an electrocardiogram and outline important points of patient preparation.