

Activity Title: Medical Lab Technology – Microscope Activity

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Overview

This activity introduces participants to the different types of blood collection tubes used by phlebotomists and medical laboratory professionals. Participants will learn the purpose of each tube type, understand why blood specimens must be collected in a specific order, and explore how blood samples are processed and analyzed in a laboratory setting.

Participants will also observe a blood smear under a microscope to gain a basic understanding of blood cell identification and laboratory analysis. This activity may be conducted as a standalone experience or as a follow-up to the Venipuncture Blood Draw Activity.

Careers Associated: Medical Lab Technician (MLT), Phlebotomy, Nursing (RN)

Supplies Required

General Setup

- Table for microscope and blood tube display
- Microscope (preferably with a display screen for group viewing)
- Blood smear slide
- Extension cord or power strip (if needed)
- Extra batteries (if applicable)

Demonstration Materials

- Laboratory tube holder
- Assortment of blood collection tubes, including:
 - o Gold
 - o Red/Gray Swirl (Tiger Top)
 - o Purple/Lavender
 - o Green
 - o Red
 - o Light Blue

- Gray
- Orange
- White/Pearl
- Handout describing blood collection tube colors, additives, and common laboratory tests
- Optional Materials: Blood collection tubes completed during the Venipuncture Blood Draw Activity

Time Required

- Setting up: Approximately 15 minutes.
- Instruction: Approximately 5 minutes.
- Activity: Approximately 20 minutes.
- Clean up: Approximately 10 minutes.
- **Total Time: Approximately 50 Minutes**

Learning Outcomes

By the end of this activity, participants will be able to:

- Distinguish common blood collection tubes and explain their purposes.
- Describe why blood specimens must be collected in a specific order of drawing.
- Identify basic blood cell structures observed under a microscope.
- Explain how phlebotomists and medical laboratory technicians work together to support patient care.

Activity

Prior to the session:

- Set up the microscope(s) on a table and place the blood smear slide on the stage.
- Focus the microscope, so blood cells are clearly visible before participants arrive.
- Arrange the blood collection tubes in a laboratory tube holder for display.
- If this activity follows the Venipuncture Blood Draw Activity, include completed sample tubes from that exercise as demonstration materials.
- Ensure all electrical equipment is connected and functioning properly.

Introduction

Engagement Question: “Has anyone here ever had their blood drawn? Did you notice that healthcare professionals often use several different colored tubes during the collection process?”

Explain that each blood collection tube contains specific additives designed for different laboratory tests. Because these additives can affect test results, blood specimens must be collected in a particular sequence, known as the **Order of Draw**. Proper tube selection and specimen handling are important responsibilities shared by phlebotomists and medical laboratory professionals to ensure accurate laboratory results.

Steps to the Activity

1. Blood Collection Tube Exploration

- Introduce each blood collection tube color and explain its purpose, additives, and common laboratory applications.
- Discuss the **Order of Draw** and explain how collecting tubes in the correct sequence helps prevent cross-contamination of additives and ensures accurate laboratory results.
- Provide participants with the blood collection tube handout and encourage them to compare the information to the tubes on display.

2. Microscope Observation

- Invite participants to observe the prepared blood smear through the microscope.
- Explain that clinical laboratories use significantly more advanced microscopes and diagnostic equipment; however, this microscope allows participants to observe the general appearance of blood cells.
- Discuss the basic components of blood, including:
 - o Red blood cells
 - o White blood cells
 - o Platelets
- Explain how medical laboratory technicians examine blood samples to assist healthcare providers in diagnosing and monitoring patient conditions.

3. Optional Integration

- If the Venipuncture Blood Draw Activity is conducted as part of the same session, complete that activity before beginning the microscope and blood tube discussion. Use the collected sample tubes as examples when discussing laboratory processing, specimen handling, and testing procedures.

Conclusion & Assessment

Assessment of Success: Successful completion of the activity is demonstrated when participants can...

- Correctly match blood collection tubes with their intended laboratory tests.

- Explain the purpose of the Order of Draw.
- Identify basic blood cell structures observed under the microscope.
- Describe how phlebotomists and medical laboratory technicians collaborate in the healthcare system.

Closing Discussion: Invite participants to share their observations and ask questions about laboratory careers. Discuss how medical laboratory professionals play a critical role in patient care, even though they often work behind the scenes. Emphasize that careers in medical laboratory science are especially rewarding for individuals who enjoy science, technology, problem-solving, and attention to detail.

Clean Up

- Remove and safely store the microscope and blood smear slide.
- Return all blood collection tubes and educational materials to their storage containers.
- Disconnect and store any electrical equipment, extension cords, or power strips.
- Restock supplies as needed for future sessions.

Blood Collection Tubes

Why are there so many colors?

Each color means there is a different chemical inside the tube. That chemical tells the blood whether to clot, stay liquid, or preserve certain parts. This allows the lab to run different medical tests.

Gold / Tiger Top (Red-Gray Swirl)

Chemical inside: Clot activator + gel separator

What happens to the blood: Blood clots, then the liquid part (serum) is separated.

Used to test:

- Cholesterol
- Hormones (like thyroid)
- Liver function
- Kidney function
- General health chemistry tests

Think: "Let it clot, then test the liquid."

Purple / Lavender Top

Chemical inside: EDTA (prevents clotting)

What happens: Blood stays liquid so cells can be counted.

Used to test:

- CBC (Complete Blood Count)
- Red blood cells
- White blood cells
- Platelets
- Anemia and infection checks

Think: "Purple = Cells."

Green Top

Chemical inside: Heparin (anticoagulant)

What happens: Stops clotting quickly; good for chemistry testing.

Used to test:

- Electrolytes (sodium, potassium)
- Troponin (heart test)
- Other emergency chemistry tests

Think: "Green = Chemistry machine."

Red Top

Chemical inside: None (glass) or clot activator (plastic)

What happens: Blood clots naturally.

Used to test:

- Drug levels
- Antibodies
- Some hormone tests

Light Blue Top

Chemical inside: Sodium citrate

What happens: Prevents clotting but allows clotting tests later.

Used to test:

- PT/INR
- PTT
- D-dimer

Think: "Blue = Bleeding & clotting tests."

Gray Top

Chemical inside: Sodium fluoride + potassium oxalate

What happens: Stops clotting and keeps sugar levels from changing.

Used to test:

- Glucose (blood sugar)
- Lactate

Think: "Gray = Glucose."

Orange Top

Chemical inside: Thrombin (fast clot activator)

What happens: Blood clots very quickly.

Used to test:

- Urgent (STAT) chemistry tests

White / Pearl Top

Chemical inside: EDTA + gel separator

Used to test:

- Viral load tests (HIV, hepatitis)
- DNA/RNA testing