Swinging Bucket Centrifuge Safety Scenario

Overview/Background

In this scenario, the user is tasked with centrifuging specimens with a swinging bucket centrifuge. The user must select the correct tubes, properly balance, and load the swinging bucket centrifuge. The Swinging Bucket Centrifuge Safety scenario is performed in the Specimen Processing Laboratory. In this scenario, the user will wear a gown, disposable mask, face shield, and gloves.

Objectives

- Properly choose filled tubes
- Properly load and balance tubes
- Properly close centrifuge
- Turn on centrifuge

Gameplay Flow

1. Scenario Intro
2. User retrieves three racks of tubes from starting scenario locations
3. User selects one correct tube from each rack
4. User loads specimens into swinging bucket centrifuge and balances
5. User closes the swinging bucket centrifuge lid
6. User sets and starts the swinging bucket centrifuge
7. Scenario complete

Scenario Intro

Disclaimer: This training activity emphasizes CDC laboratory best practices and safety recommendations and is not designed to provide laboratory-specific processes and procedures. Please refer to your supervisor and laboratory's standard operating procedures (SOP) for detailed guidance and site-specific equipment, location, and process recommendations.

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Introduction: A centrifuge is a device used to separate components of a mixture based on their size, density, the viscosity of the medium, and rotor speed. The specimen is kept in a rotor that is rotated about a fixed point, resulting in a solid force perpendicular to the axis. Centrifuge rotors fall into three types, fixed-angle rotor, swing-bucket rotor, and vertical rotor. Various centrifuges separate different molecules, but they all work on the sedimentation principle. Knowing how to load and operate them properly is important to the health and safety of you and your co-workers in the laboratory. Swinging bucket centrifuges are used for routine separation of particles such as blood specimens and other biological specimens. These centrifuges use a swing-bucket or fixed-angle type of rotors, that operate at room temperature with a maximum speed of 4000-5000 rpm. This training scenario will teach basic information on loading and operating a swinging bucket centrifuge properly. Always follow your laboratory's SOP and risk assessment.

Task: In this scenario, you are dealing with specimens from three different patients. Your task is to retrieve the tubes, select an appropriate specimen, balance the load in the swinging bucket centrifuge, and centrifuge specimens.

Personal Protective Equipment (PPE): laboratory coat, safety glasses, and nitrile gloves.

Swinging Bucket Centrifuge: Retrieve Specimens

Step 1: The first step is to retrieve the three racks of tubes from the refrigerator and place them on the benchtop.

Note: If you drop the racks of tubes, you have potentially contaminated not only the specimen but also potentially contaminated the floor or benchtop. In this case, you would follow your SOP, inform your supervisor or safety officer, and complete a laboratory incident/near-miss report.

Swinging Bucket Centrifuge: Retrieve Specimens

Step 2: Look closely at each patient's tubes and select three correctly prepared tubes with equal amounts of specimens. Place one tube from each patient into the green "Specimens to be Loaded" rack.

Caution: Selecting the appropriate tube is an important task. If the wrong type or a cracked tube is placed in the swinging bucket centrifuge, it could cause the tube to break inside the rotor slot, preventing the slot's use and potentially causing a hazard. If the tube is too full or not sealed properly, it may spill. If the tube hasn't been properly sealed, it could cause the tube to leak inside the rotor slot, potentially causing a hazard.

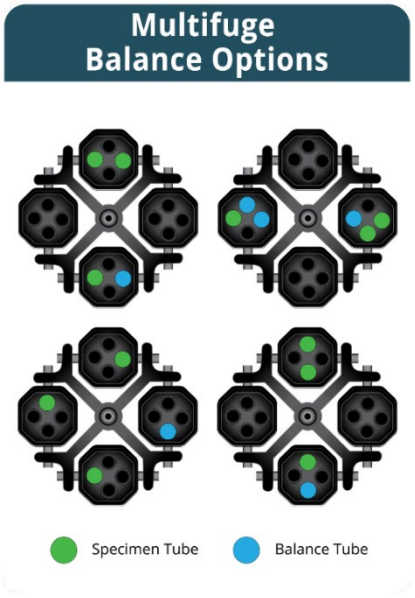
Note: If you drop a tube, you have potentially contaminated not only the specimen but also potentially contaminated the floor or benchtop. In this case, you would follow your SOP, inform your supervisor or safety officer, and complete a laboratory incident/near-miss report.

ACCEPT:

REJECT:

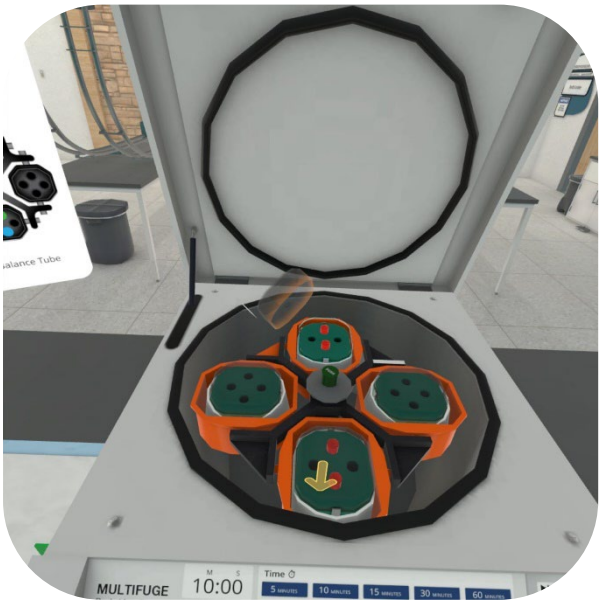
Swinging Bucket Centrifuge: Balancing

Step 3: Safe centrifugation requires balanced loading of the centrifuge rotor regardless of the number of positions. Unbalanced tubes can lead to permanent damage to the centrifuge and can be hazardous, particularly when operating at higher centrifugation speeds. To properly balance the centrifuge, we have added balance tubes. Balance tubes are used to balance out the weight distribution in a centrifuge when spinning unequal amounts or weights of specimens. The balance tubes are pre-set to be the appropriate weight. Load the tubes.



***Note**:* Tubes that are leaky or too full can lose their contents during centrifugation. If the specimen contains potentially harmful pathogens, the situation could become dangerous for you and your co-workers.

Step 4: Place the caps on each of the swinging buckets.



Step 5: Close the lid.

Swinging Bucket Centrifuge: Set and Press Start

Step 6: Set the centrifuge to run for 10 minutes at 5,000 RPM and press START.

Complete: Great job! You have successfully loaded the swinging bucket centrifuge. Some of the most common issues with centrifuging are loading incorrect and mismatched tubes, loading over or underfilled tubes, and not correctly balancing the tubes. You have completed the Swinging Bucket Centrifuge Safety scenario.

Scenario References and Acknowledgements

The content in this scenario was taken from the following references.

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