

A grayscale illustration of a laboratory setting. A hand wearing safety glasses is using a pipette to dispense liquid into one of the slots of a centrifuge rotor. The rotor has several other slots, some of which are empty, and one on the right has a cap. The background shows the interior of the centrifuge with some lights.

CENTRIFUGE SAFETY

PHHS Pathology

Objectives

At the completion of this module, the participant should be able to correctly:

- Describe the physical and exposure hazards for a centrifuge
- Discuss the guidelines for before, during, and after centrifugation
- Identify how to balance a rotor with different number of tubes
- Explain how to decontaminate a centrifuge

Centrifuges

- A centrifuge is a common tool in the laboratory.
- It uses centrifugal force to separate substances according to particle size and density differences.
- Has great potential for injuring users if not operated properly!



Centrifuge Hazards

Hazards by centrifuges include:

⦿ Physical hazards

- Mechanical failure or stress
- Sample imbalance causing machine movement
- Metal fatigue
- Corrosion of rotor

⦿ Exposure hazards

- Sample container breakage causing aerosols that are harmful if inhaled
- Aerosolization of biological, chemical, or radioactive materials



Centrifuge Safety

- 90% of all centrifuge accidents are the result of user error!



- Each user should be properly trained on operating procedures

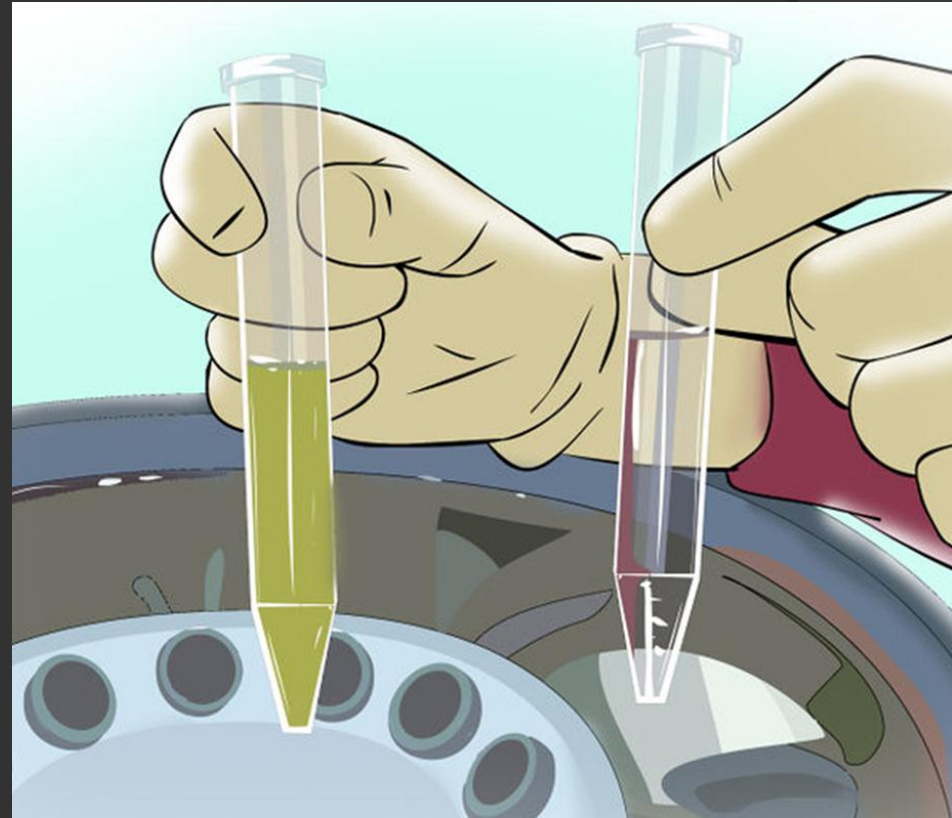
Before Centrifugation Guidelines

- Wear appropriate PPE
- Inspect centrifuge
 - Ensure centrifuge bowls & tubes are dry
 - Ensure spindle is clean
 - Use matching sets of tubes & buckets
 - Ensure O-ring is not cracked or worn
- Inspect tubes before use
 - Check for cracks/defects
 - Follow manufacturer's filling limits
- Inspect environment
 - Ensure that work surface is level and firm enough to support equipment

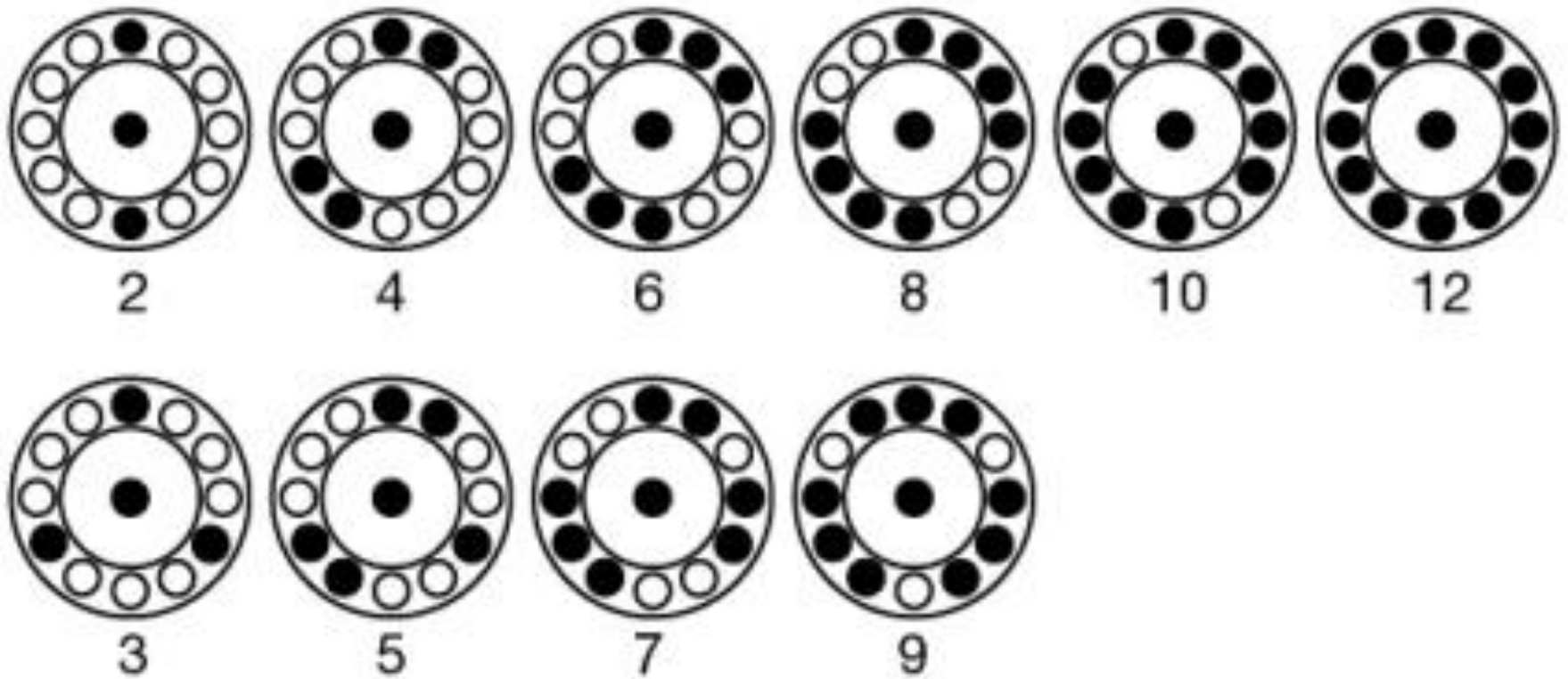


Before Centrifugation Guidelines

- Balance tubes in rotor!
 - Ensure that the rotor is balanced with equal and opposing tubes
- Cap each tube &/or bucket before centrifugation
- Close & lock lid before starting centrifuge



Rotor Balancing



Frothingham, R. (1999, February). Centrifugation without a balance tube. American Biotechnology Laboratory, 17, 84/

NOTE: These images represent tubes with equal volume!

During Centrifugation Guidelines

- Keep lid closed at all times during operation
- Don't exceed safe rotor speed according to manufacturer
- Don't leave centrifuge until full operating speed is reached, and appears to be running safely without incident
- Stop centrifuge immediately if an unusual condition (noises or shaking) begins and check load balances

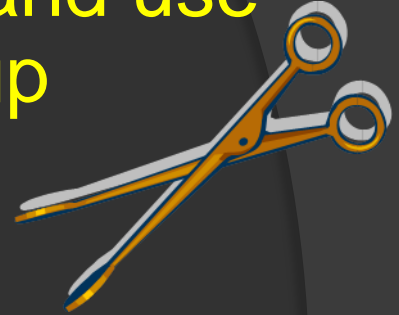
After Centrifugation Guidelines

- Allow centrifuge to come to a complete stop before opening cover
- Wear appropriate PPE
- Allow aerosols to settle (30 minutes) or open in a Biosafety Cabinet
- Check inside centrifuge for possible spills & leaks
- If spill occurs, use appropriate decontamination and cleanup procedures

**Report all accidents
to your supervisor
immediately!**

Decontamination of Centrifuge

If spill occurs, report to your supervisor and use appropriate decontamination and cleanup procedures



For general purposes, when tube breakage occurs:

- Remove broken glass with tongs or forceps
- Absorb spilled sample with gauze
- Clean equipment with hospital disinfectant and allow to air dry before reuse