



Pearson Interactive Labs for Microbiology

ASEPTIC TECHNIQUE

METHODS/TECHNIQUES:

- Liquid culture to nutrient agar plate and slant
- Liquid culture to nutrient broth
- Lab safety and disinfection protocols

CONCEPTS:

- Aseptic transfer
- Growth media

ANALYSIS/INTERPRETATION:

- Results of successful or unsuccessful aseptic transfer
- Errors and misconceptions
- Clinical applications

MICROSCOPY

METHODS/TECHNIQUES:

- Using a compound light microscope
- Lab safety and disinfection protocols

CONCEPTS:

- Calculation of total magnification
- Oil immersion

ANALYSIS/INTERPRETATION:

- Errors and misconceptions
- Clinical applications

SMEAR PREP

METHODS/TECHNIQUES:

- Heat-fixing a smear
- Smear prepping from broth and solid cultures
- Lab safety and disinfection protocols

CONCEPTS:

- Acidic and basic dyes
- Cellular morphology
- Staining/smear preparation

ANALYSIS/INTERPRETATION:

- Errors and misconceptions
- Clinical applications

STAINING: Simple stain from broth and solid cultures

STREAK FOR ISOLATION

METHODS/TECHNIQUES:

- T-streak method
- Quadrant-streak method
- Lab safety and disinfection protocols

CONCEPTS:

- Bacterial colonies
- Isolation streak

ANALYSIS/INTERPRETATION:

- Results of isolation streaks
- Errors and misconceptions
- Clinical applications

GRAM STAIN

METHODS/TECHNIQUES:

- Decolorization
- Heat-fixing a smear
- Stain and counterstain application
- Lab safety and disinfection protocols

CONCEPTS:

- Cell anatomy
- Gram-positive and Gram-negative bacteria

ANALYSIS/INTERPRETATION:

- Results of Gram-stained specimens
- Results of stains
- Errors and misconceptions
- Clinical applications

STAINING: Gram stain

ACID-FAST STAIN

METHODS/TECHNIQUES:

- Decolorization
- Stain and counterstain application
- Lab safety and disinfection protocols

CONCEPTS:

- Cell anatomy
- Infection identification through tests

ANALYSIS/INTERPRETATION:

- Results of stains
- Errors and misconceptions
- Clinical applications

STAINING: Acid-fast stain (Ziehl-Neelsen) method

METHODS/TECHNIQUES:

- Decolorization
- Stain and counterstain application
- Lab safety and disinfection protocols

CONCEPTS:

- Endospores and vegetative cells

ANALYSIS/INTERPRETATION:

- Results of stains
- Errors and misconceptions
- Clinical applications

STAINING: Endospore stain

PHYSICAL CONTROL OF MICROBIAL GROWTH

METHODS/TECHNIQUES:

- Plating bacteria using a cotton swab
- Using a dry-heat oven and autoclave
- Lab safety and disinfection protocols

CONCEPTS:

- Colony counting
- Control of microbial growth

ANALYSIS/INTERPRETATION:

- Errors and misconceptions
- Clinical applications

CHEMICAL CONTROL OF MICROBIAL GROWTH

METHODS/TECHNIQUES:

- Plating bacteria using a cotton swab
- Using a serological pipette
- Lab safety and disinfection protocols

CONCEPTS:

- Colony counting
- Control of microbial growth

ANALYSIS/INTERPRETATION:

- Errors and misconceptions
- Clinical applications

TESTS/MEDIA: Dey-Engley agar

ANTIMICROBIAL SUSCEPTIBILITY TESTING

METHODS/TECHNIQUES:

- Measuring zones of inhibition
- Plating bacteria using a cotton swab
- Lab safety and disinfection protocols

CONCEPTS:

- Antimicrobial drug zone diameters

ANALYSIS/INTERPRETATION:

- Antimicrobial drug resistance
- Errors and misconceptions
- Clinical applications

TESTS/MEDIA: Kirby-Bauer test and Mueller-Hinton agar

SERIAL DILUTION AND ENUMERATION

METHODS/TECHNIQUES:

- Spread plate method
- Serial dilution
- Using a micropipette
- Using an L-shaped spreader
- Lab safety and disinfection protocols

CONCEPTS:

- Bacteria concentration calculation
- Colony counting
- Viable plate count

ANALYSIS/INTERPRETATION:

- Errors and misconceptions
- Clinical applications

BIOCHEMICAL TESTS: GRAM POSITIVE

METHODS/TECHNIQUES:

- Solid culture to nutrient agar plate
- Lab safety and disinfection protocols

CONCEPTS:

- Infection identification through tests
- Selective and differential media
- Unknown specimen identification
- Use of controls

ANALYSIS/INTERPRETATION:

- Results of biochemical tests
- Errors and misconceptions
- Clinical applications

TESTS/MEDIA:

- Bile Esculin agar
- Blood agar (hemolytic patterns)
- Catalase test
- DNase agar
- Mannitol salt agar (mannitol fermentation and halotolerance)
- Phenylethyl Alcohol agar

METHODS/TECHNIQUES:

- Adding test reagents
- Agar slant to broth media
- Solid culture to nutrient agar plate
- Lab safety and disinfection protocols

TESTS/MEDIA:

- Citrate agar and MacConkey agar
- Methyl Red – Voges Proskauer (MRVP) broth
- Nitrate broth and Urea broth
- Phenol red carbohydrate broth
- Sulfur indole motility (SIM) agar

CONCEPTS:

- Use of controls
- Infection identification through tests
- Selective and differential media
- Unknown specimen identification

ANALYSIS/INTERPRETATION:

- Results of biochemical tests
- Errors and misconceptions
- Clinical applications

IDENTIFYING THE UNKNOWN: MYSTERY MICROBE 1**METHODS/TECHNIQUES:**

- Adding test reagents
- Agar slant to broth media
- Solid culture to nutrient agar plate
- Lab safety and disinfection protocols

TESTS/MEDIA:

- Citrate agar
- MacConkey agar
- Methyl Red – Voges Proskauer (MRVP) broth
- Ornithine decarboxylase broth
- Oxidase test
- Sulfur indole motility (SIM) agar
- Urea broth

CONCEPTS:

- Use of controls
- Dichotomous key
- Selective and differential media
- Unknown specimen identification
- Infection identification through tests

ANALYSIS/INTERPRETATION:

- Results of biochemical tests
- Results of Gram-stained specimens
- Errors and misconceptions
- Clinical applications

STAINING: Gram stain**IDENTIFYING THE UNKNOWN: MYSTERY MICROBE 2****METHODS/TECHNIQUES:**

- Solid culture to nutrient agar plate
- Lab safety and disinfection protocols

TESTS/MEDIA:

- Catalase test
- Coagulase test
- DNase agar
- Mannitol salt agar (mannitol fermentation and halotolerance)

CONCEPTS:

- Dichotomous key
- Infection identification through tests
- Selective and differential media
- Unknown specimen identification
- Use of controls

ANALYSIS/INTERPRETATION:

- Results of biochemical tests
- Results of Gram-stained specimens
- Errors and misconceptions
- Clinical applications

STAINING: Gram stain

Pearson Interactive Labs allow students to see how different techniques interconnect while reinforcing important concepts.

- Dr. Katherine Rawls, Lab Author and Professor at Florida State College at Jacksonville