



- Engaging laboratory learning experiences based on modern pedagogies.
- Educational background information that fully prepares students for completing the labs.
- Clearly defined procedures, mirroring on-campus laboratory coursework.
- Comprehensive assessments bring meaning to experiment results and build critical thinking skills.



Choose our Signature Microbiology LabPaq below or configure your own!

EXPERIMENT	MICROBIOLOGY LP-2222-MB-03
Antibiotic Sensitivity - Kirby Bauer Diffusion Test	●
Aseptic Technique and Culturing Microbes	●
Bacterial Enumeration - Dilutions and Plate Counts	●
Bacteria Identification through Functional Media - Motility Testing	●
Bacterial Morphology and Staining Techniques	●
Biochemical Testing for Microbial Identification - Carbohydrate Fermentation Testing	●
Biochemical Testing for Microbial Identification - Methyl Red, Voges-Proskauer, and Catalase Testing	●
Environmental Influences on Microbial Growth - Salt Tolerance and pH Testing	●
Fomite Transmission	●
Food Safety	●
Microbiology Laboratory Preparation	●
Microscopy for Microbiology	●
NUMBER OF EXPERIMENTS	12

Experiment	Student Hands-On Activities
The experiments on this page require <i>E. coli</i> and/or <i>S. epidermidis</i> microbes provided with "Aseptic Technique and Culturing Microbes."	
Antibiotic Sensitivity - Kirby Bauer Diffusion Test	 <ul style="list-style-type: none"> • Test <i>S. epidermidis</i> for susceptibility to three antibiotics. • Measure zones of inhibition on a Kirby Bauer diffusion plate. • Microscopically examine the reproductive structures of <i>Penicillium</i>.
Aseptic Technique and Culturing Microbes	<ul style="list-style-type: none"> • Apply aseptic technique to transfer microbes between media forms. • Examine microbial growth on solid and liquid media. • Create pure cultures of <i>E. coli</i>, <i>S. epidermidis</i>, and <i>S. cerevisiae</i> and isolate individual colonies.
Bacterial Identification through Functional Media – Motility Testing	<ul style="list-style-type: none"> • Apply aseptic technique to inoculate motility agar tubes with <i>E. coli</i> and <i>S. epidermidis</i>. • Differentiate between positive and negative growth patterns in motility agar. • Analyze experimental results to determine the motility of two bacteria species.
Bacterial Identification through Selective and Differential Media	<ul style="list-style-type: none"> • Culture a series of microbes on tryptic soy, MacConkey, and EMB agars. • Compare colony morphology and color between <i>E. coli</i>, <i>S. epidermidis</i>, and unidentified microbes growing on selective and differential media. • Analyze experimental results to determine metabolic pathways of microbes.
Bacterial Morphology and Staining Techniques	 <ul style="list-style-type: none"> • Create smears using direct and negative staining techniques. • Prepare Gram stains from <i>E. coli</i>, <i>S. epidermidis</i>, and <i>S. cerevisiae</i> cultures. • Compare simple and differential stained specimens using microscopy.
Biochemical Testing for Microbial Identification – Carbohydrate Fermentation Testing	<ul style="list-style-type: none"> • Apply aseptic technique to inoculate fructose, glucose, and mannitol broths with <i>S. epidermidis</i> and <i>S. cerevisiae</i>. • Differentiate between positive and negative growth results using phenol red indicator and Durham tubes. • Analyze experimental results to determine metabolic pathways of microbes.
Biochemical Testing for Microbial Identification – Methyl Red, Vogues-Praskauer, and Catalase Testing	<ul style="list-style-type: none"> • Apply aseptic technique to inoculate MR-VP broths with <i>E. coli</i> and <i>S. epidermidis</i>. • Differentiate between positive and negative test results using methyl red and Barritt's reagents. • Use hydrogen peroxide to perform catalase testing on <i>E. coli</i> and <i>S. epidermidis</i>.
Environmental Influences on Microbial Growth – Salt Tolerance and pH Testing	<ul style="list-style-type: none"> • Apply aseptic technique to inoculate a series of NaCl and pH broths with <i>S. epidermidis</i> and <i>S. cerevisiae</i>. • Differentiate between positive and negative growth results in liquid media by observing turbidity. • Analyze experimental results to determine the approximate osmolarity and pH ranges of two microbes.



= Microscopy is included in this lesson: choose from a 600X microscope with optional oil immersion lens or the HOL Virtual Microscope.

Experiment	Student Hands-On Activities
The experiments on this page do not require the microbes provided with "Aseptic Technique and Culturing Microbes."	
Antiseptics and Disinfectants	<ul style="list-style-type: none"> • Create dilution series for an antiseptic and for a disinfectant in nutrient broth. • Calculate dilution factors. • Determine the minimum inhibitory concentration of mouthwash and bleach for <i>S. cerevisiae</i> growth in liquid media.
Bacterial Enumeration - Dilutions and Plate Counts	<ul style="list-style-type: none"> • Create a series of <i>S. cerevisiae</i> culture dilutions. • Identify viable plates by counting individual colonies. • Calculate the CFU/ml of microbes from an original sample.
Fomite Transmission	<ul style="list-style-type: none"> • Collect microbes from household surfaces and culture them on solid media. • Observe the morphology and abundance of cultured microbes. • Simulate the transmission of an infectious disease using chemical substances.
Food Safety	<ul style="list-style-type: none"> • Collect microbes from fresh food sources and culture them on solid media. • Observe the morphology and abundance of cultured microbes. • Analyze experimental results to determine the effectiveness of food storage and preparation methods.
Hand washing and Normal Flora	 <ul style="list-style-type: none"> • Collect microbes from washed and unwashed hands and culture them on solid media. • Prepare Gram stains from isolated colonies and view with a microscope. • Analyze experimental results to determine the effectiveness of hand washing.
Microbiology Laboratory Preparation (included with all kits)	<ul style="list-style-type: none"> • Create a calendar for managing microbiology assignment due dates. • Select an incubation site for culturing microbes. • Apply microbiology safety protocols to provided scenarios.
Microscopy for Microbiology - Use and Function	 <ul style="list-style-type: none"> • Calculate the total magnification and field of view for the lenses of an optical microscope. • Examine prepared slides of common microbes under a series of lenses. • Prepare and observe wet mounts of prokaryotic and eukaryotic cells.
Ubiquity of Microorganisms	<ul style="list-style-type: none"> • Collect microbes from the body and household environment and culture them on solid media. • Apply streak plate techniques to isolate individual colonies. • Compare the morphology and abundance of cultured microbes collected from various locations.



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