

Mastering Microbiology - Micro Lab Explorations

Let's talk about Micro Lab Explorations in Mastering Microbiology. These work great as a pre-lab tool, as a post-lab assessment, as a refresher for students who need to review a procedure, and even as a potential lab replacement. You and your students can review them in the study area and they can be assigned from the Item Library. Let's explore Gram Stain to see how these branching activities work.

I love how students can make mistakes and learn from their errors. Down here we see the graded questions that students will be assessed on once they've completed the exercise. Let's open the branching activity. We start with learning objectives and a real world scenario. In Gram Stain we're asked to identify the potential cause of a seven year old girl's urinary tract infection. We have Decision Point knowledge checks along the way. Students see clear instructions, walking them through common lab procedures. Cover the smear with crystal violet for 30 seconds. Wash the slide carefully with distilled water. Let's look at what happens at the molecular level when crystal violet is added to the smear. Crystal violet penetrates the cell wall and cytoplasm.

The next video explains the function of Gram's iodine. Cover the smear with Gram's iodine for 10 seconds to one minute. Your instructor will advise you on the required time based on the reagents used in your lab. Wash the slide by letting distilled water wash over the smear. Wash the slide until the water runs clear. Let's look at what happens at the molecular level. Moving on, we see how decolorization affects the stain. We'll skip that video.

This Decision Point is one of the hallmarks of Micro Lab Explorations and likely a common problem in your own lab. Students commonly over or under decolorize. They can make that error here, deal with the consequences and learn from their mistakes. We will make a mistake so you can see that. As we play this video, we're asked whether we've decolorized enough. Click stop if you think we're done or continue to decolorize more. As that finished, I actually still see some purple being rinsed out. We really should keep on decolorizing, but let's make a common error my own students make. I'll click stop to move on to the next stage of the process. This video shows on a molecular level what safranin does as a counter stain. I'll let you watch that later. The real story here is the microscopic image the student sees is just under decolorized. The control slide with a mix of Gram-positive and Gram-negative is entirely purple. That's bad. If the student answers that the patient has Gram-positive rods in her urine, we get some critical feedback about what a control is supposed to look like and a reminder that we probably under decolorized. We're told to start over and brought back to the decolorized step. This time, I'll say continue to keep on decolorizing. That appears clear. We will stop decolorizing. And at the next step, our control slide looks as expected. This time I'll report with confidence that the patient has Gram-negative rods in her urine.

We're then asked what might be an appropriate antibiotic based on the results of our Gram Stain. And our boss tells us that we did a great job for our young patient. Micro-Lab Explorations are waiting for you and your students.