



STEM
SUMMIT

VOLUNTEER INSTRUCTIONS BIOLOGY



[Training Video](#)

Welcome to Biology! Thank you for volunteering your time and sharing your talents.

Goal: In this module, you will have the students perform three different lab tests to diagnose which illness is present and who is sick. Through performing these Lab Tests, students will experience what it is like to be a Lab Technician. Feel free to offer your perspective, real-life examples, and experiences as you go through the tests with them.

Introduce yourself and briefly share your career/education background.

Opening Comments: Tell the students that apparently one of them is sick and that they are going to do some lab tests to diagnose the illness and figure out who is sick.

Activity #1- What is the diagnosis?

Have students take turns reading the **SYMPTOMS CHART** and tell them that the illness is one of the three listed on the chart, but they'll be using the process of elimination to determine which illness it is.

LAB TEST 1: URINALYSIS

Ask if anyone is familiar with this test. Select a student to record the results on the **URINALYSIS DATA CHART** using a dry erase marker.

- Show the students the simulated urine.
- Tell the students that by using a special test strip, they can determine if glucose or protein is present in the urine sample.
- Take one test strip out of the container. Pass the test strip around so the students can see the strip before dipping into the urine sample. Point out the protein and glucose squares.
- You will then dip the test strip into the simulated urine. Pass the strip around again with the empty test strip container. Ask the students if they notice any changes in color on the test strip and compare it to the label on the container. Remind them they are trying to see if glucose or protein is present in the urine. After everyone has had a chance to look, ask them what they found. The student keeping track of the results should mark with a + or – on the chart. (Result should be protein is present).
- Have the students look over the **SYMPTOMS CHART** again to see if any of the illnesses can be eliminated (Diabetes).
- Discuss HYDRATION using the **DEHYDRATION URINE COLOR CHART**. This chart shows how urinalysis can indicate the hydration level of a person. Dehydration can be a symptom of an illness (Strep Throat and Mono).

Review with the students that by doing the first test, they were able to eliminate diabetes as the illness because glucose was not present in the urine. Explain that it is common that more than one test is needed to figure out what their illness is. Now they will do another test.

LAB TEST 2: LATEX AGGLUTINATION

This type of test is used to determine if bacteria or antibodies are present (like a throat culture).

- Starting with the **SPECIMEN** (milk), students will use the pipette marked with an S and put a nickel-sized drop in their petri dish.
- Students will then use the pipette marked with an R and put a nickel-sized drop of **REACTANT** (vinegar) on top of the SPECIMEN already in their petri dish.
- Have students observe what happens to the specimen when the reactant is added. You can have them gently swirl the petri dish. They should notice curdling or **COAGULATION** which indicates a bacterial infection.
- Have the students review the **SYMPTOMS CHART** to see if one of the illnesses includes coagulation (Strep Throat). Based on this test, the students should determine they have strep throat.

Now that the students know what their illness is, they will do a test in **EPIDEMIOLOGY** to see who is sick and how the illness can be transmitted.

Activity #2- Who is sick?

LAB TEST 3: EPIDEMIOLOGY

- Ask the students if they have heard of epidemiology and to think of a real-world example where it is used.
- Give each student a numbered test tube, keeping them in order as you go around the table. Tell them this is a (simulated) saliva sample they would provide to be tested. Also give them each a pipette.
- Going around the table, have each student use their pipette to draw a sample from their test tube and put in their respective numbered spot in **Row A** of the testing well.
- Students will continue to exchange samples until several rows are complete.

The reveal: You will add only a FEW drops of the indicator into each sample in the testing well starting with Row A. Immediately the person that is 'sick' will turn pink and then as you proceed placing a few drops in the subsequent rows of the testing well, the students will see how the person who was 'sick' spread the illness to the others that they shared their sample with.

Conclusion: Discuss with students what they just learned through the activities. Point out the QR code that has more in-depth information about careers and education in the Biology field.

End of the Day:

- **JA staff and student volunteers will restock and pack the bins, so all items should be left on your table.**

Thank you for making a difference today!