



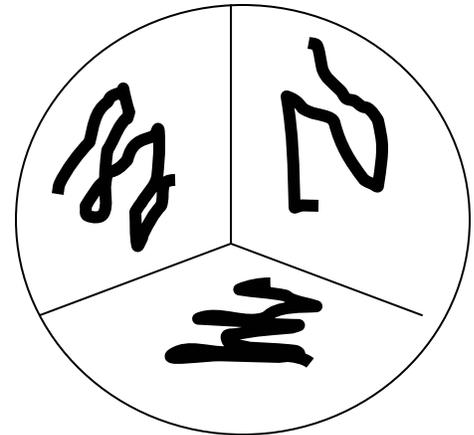
Unknown Project

The class will be divided into 4 groups. Each group will be given an unlabeled plate (see figure 1) that contains a 3 cultures of the following organisms

The usual suspects:

Figure 1

Escherichia coli
Enterobacter aerogenes
Salmonella typhimurium
Shigella flexneri
Pseudomonas aeruginosa
Staphylococcus aureus
Staphylococcus epidermidis
Proteus vulgaris
Bacillus cereus
Lactobacillus plantarum
Serratia marscescens



Your Mission

The unknown consists of three of the bacteria that we have previously used in lab. Your mission, should you choose to accept it, (actually you have no choice but to accept) is to isolate, culture, and identify the microorganisms in your unknown, and save the world. – Like all good scientists you must be able to support your conclusions by categorically ruling out each of the other microorganisms, and proving that your test results are valid.

Once you are handed your unknown culture there are no other plates of that culture to be used for tests. Therefore it is your responsibility to make sure that you take care of your cultures. Treat them as your first born child. Make sure that you maintain fresh cultures (in broth or on agar) for each of your experiments. Also you must practice aseptic technique to prevent contamination.

In order to maximize the efficient use of time and personnel available you will be working in groups of 2. Each group of two should always have an activity assigned to them by the group to perform on each class meeting. This may include inoculating fresh media to maintain your pure cultures, writing up results, writing requests for media- or setting up experiments.

Day 1

On day one you will perform Gram stains of your three organisms. Inoculate new growth media for tests to be performed on day 2. Be careful to practice good aseptic technique, because contamination at this stage will inevitably lead to misleading results in all

subsequent experiments- even if you perform those experiments correctly. In addition you can inoculate any of the prepared media present.

Day 2

You will read your results from day 1 and plan your investigation. You need to determine which tests you wish to run, which days to run the tests, and whom will conduct each test. Each test needs to be duplicated to account for errors, or inconclusive results, and appropriate controls should be run to facilitate interpretation of your results.

Hand in a list of tests you wish to run on day 3

The media will be prepared based upon your requests, therefore you need to provide details of how many test tubes or plates of each type of culture you require including controls.

for example:

6 Phenol Red Broth tubes with Lactose
6 tubes or MRVP broth

Day 3/4

You will run biochemical tests, record your results and maintain your pure cultures. You can perform any of the tests that we have done in lab, or any test that you choose from the lab manual (e.g. SIM, Nitrate reduction, It is your responsibility to preorder media and materials for tests and controls)

Day 5

On the final day you will read your final results and clean up the lab. The Group Project and Individual Lab Write Up will be handed in on **Thursday May 1** and the identity of the unknown organisms will be revealed.

Grading.

Group Project

The objective of the write up is that some third party (not you guys, or myself) would be able to follow the steps you took to identify your unknown organism.

Each group will hand in the following;

1. A comprehensive table of results. All of the results of all of the experiments carried out by the group. It should be organized in the order in which you completed the tests. Use the format of table on the last page of the Unknown

Instructions sheet. As you will, most likely have identified your organism by this point- you can fill in the name of each organism, or provide a key. Separate results from combination media like SIM, and into each individual component; (Sulfur reduction, motility, and Indole). (5)

2. One dichotomous key showing the key tests that allowed you to rule out the other Usual suspects, and identifying your three unknown organisms. (see Figure 2 for an example). This must be on one side of paper, although it could be landscape formatted. (5)

There should be no mistakes with the scientific names of the organisms- any errors will result in deductions.

3. A discussion of your results. You need to interpret your results, and discuss some of the issues that you faced during the project. This is where you discuss conflicting results, and where mistakes were made, and support your conclusions for the identity of your unknowns. Do not just simply list what you did each day. This is the culmination of all the work you have done in lab over the semester. You should demonstrate your knowledge of the correct use of scientific names, pay particular attention to spelling of species names. (5)

4. Conclusion. Identify your unknown organisms

Group Project is worth 15 points

Peer Assessment-

Each individual's contribution to the group project will be assessed by all other group members. Each individual will be assigned a % of the overall group assessment grade based upon participation in all aspects of the group project.

Individuals Formal Lab Write Up

Each Individual will select one of the experiments conducted by your group. For your chosen experiment you will conduct some research and hand in a formal lab write up. This is intended to be a stand alone piece of work that should make sense without referring to any additional information. and explain how the results of this test helped to identify your unknown organism(s).

Each Lab Write up must contain the following sections each with its own heading.

Introduction: Based upon your research you must explain to the reader the background of the experiment. When was it first performed?, what is its objective? You should cite sources in this section and include full references in the Reference Section. Also link this test to your unknown project, why did your group chose to perform this test? For example, it would help to eliminate some of the usual suspects. (5)

Materials and Methods: Briefly list any reagents used (including media recipes) and describe the techniques used to perform the experiment. The objective of this section is to explain to the reader what you did to get your results. Include incubation time and temperatures. (4)

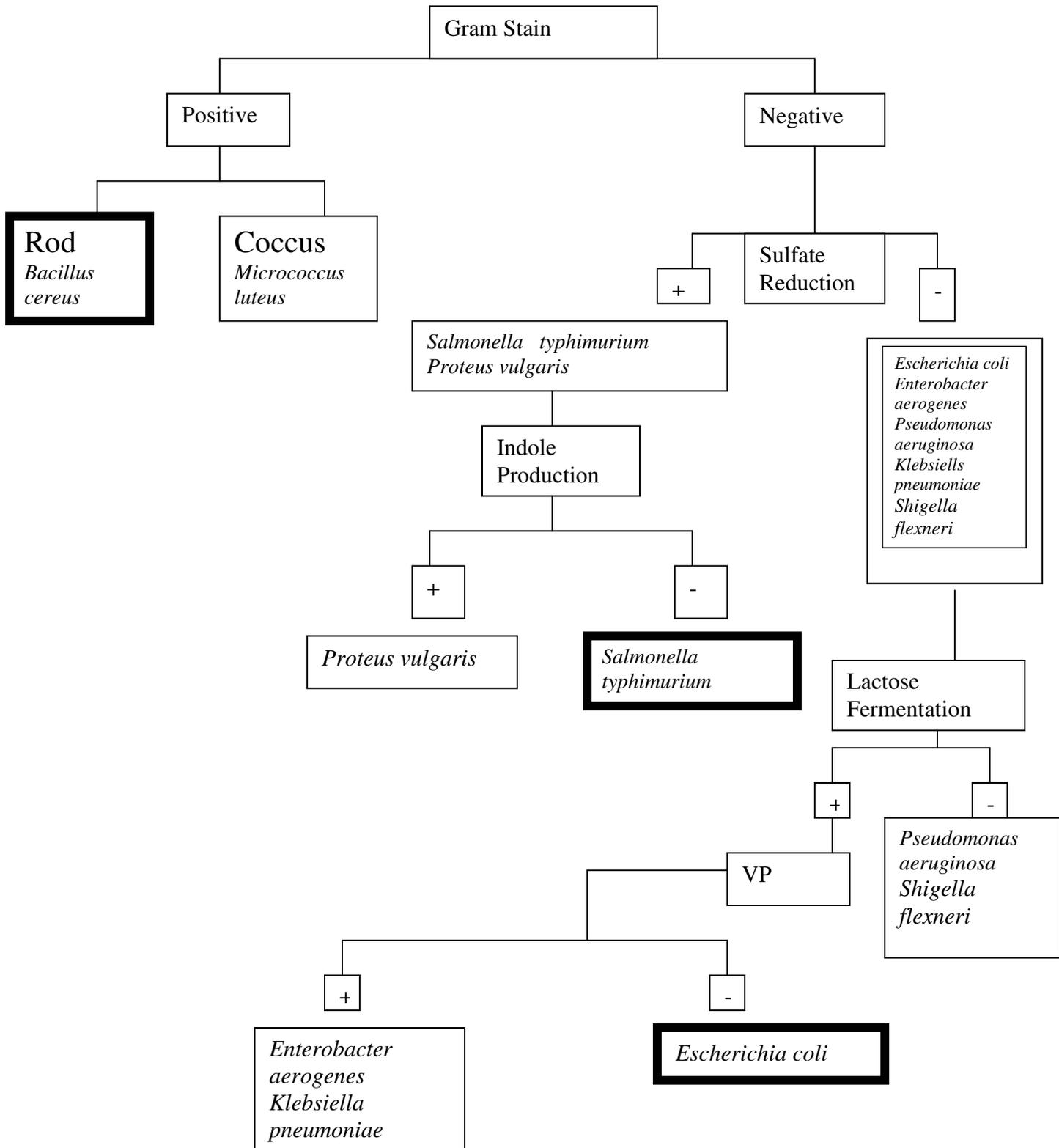
Results: A brief section featuring a table or chart stating the results of your experiment. Leave any interpretation of the results to the next section. The table should make sense on its own without reference to the discussion section. Include the name of the unknown organism. (4)

Discussion: Interpretation of results. Explain the meaning of the results. Also you can discuss anything that may have affected your results (if results are not what you expected). How did the test help your group to identify the unknown organism(s). (5)

References: List in alphabetical order the works cited in the Introduction, Materials and Methods, and Discussion Sections. (2)

Individual Lab Write Ups are worth 20 points

Figure 2



I can only grade what you hand in. It is therefore the responsibility of each individual to keep their notes up to date.

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Example of Comprehensive Table of Results. Include results of all experiments conducted.

Organism	Gram Stain	Catalase	Lactose Fermentation	Citrate	MR	VP
<i>Pseudomonas aeruginosa</i>	-	-	-	+	-	-
<i>Bacillus subtilis</i>	+	+	-	+	-	-
<i>Escherichia coli</i>	-	+	+	-	+	-

Have Fun!

Unknown Rubric

<i>Category</i>	<i>Points</i>
Comprehensive table of results	5
Correctly written dichotomous key	5
Detailed interpretation of results	5
Individual Write up of one experiment	20
Total	35

If any individual wishes to hand in their own write up independently from that of their group they can do so.