

Google Gemini Prompts

1. Collected biochemical data test results using Bergey's. Built a spreadsheet with the data returned from Gemini. A sample of these prompts are below
 - a. *"Use Bergey's manual of determinative bacteriology to create a key to identify bacteria using the following tests: hemolysis, amylase, utilization of mannitol, utilization of lactose, utilization of glucose, gelatinase, motility, indole production, hydrogen sulfide production, catalase, oxidase"*
 - b. *"Extract the data for ONLY gram-positive, catalase positive organisms using the following tests: oxidase, colony morphology, hydrogen sulfide production, indole, motility, gelatinase, glucose utilization, lactose utilization, mannitol utilization, and hemolysis"*
 - c. *"Extract the data for gram-positive, catalase positive, oxidase positive, gelatinase positive, glucose positive organisms using the following tests: oxidase, colony morphology, hydrogen sulfide production, indole, motility, lactose utilization, mannitol utilization, and hemolysis"*
2. Gemini built a JSON from the excel file I created. This was an abbreviated list with only 30 bacterial identities.
 - a. *"Please build a json from this file" [upload file]*

Gram stain	Catalase	Oxidase	Gelatinase	Glucose	Shape	Hydrogen sulfide	Indole	Motility	Lactose	Mannitol	Hemolysis
Negative	+	-	-	-	Bacillus	-	-	-	-	-	Gamma
Positive	-	+	-	+	Cocci	-	-	-	V	V	Alpha
Negative	+	+	-	-	Bacillus	-	-	+	-	-	V, often Gamma
Positive	+	-	-	+	Pleomorphic	-	-	V	-	-	V, often Gamma
Positive	+	V	+	+	Bacillus	-	-	+	V	+	Beta
Negative	+	-	V	+	Bacillus	+	-	+	+	V	V, often Gamma
Positive	+	-	-	+	Bacillus	-	-	-	-	-	Gamma
Positive	-	+	+	+							
Positive	-	-	+	-							
Positive	+	-	+	-							
Positive	+	+	-	+							
Positive	+	+	+	-							

Negative	+	-	+	+	Bacillus	-	-	+	+	+	Gamma	<i>Enterobacter cloacae</i>
Positive	-	-	-	+	Cocci	-	-	-	+	+	V	<i>Enterobacter faecalis</i>
Negative	+	-	-	+	Bacillus	-	+	+	+	+	Beta	<i>Escherichia coli</i>
Positive	+	+	-	-	Cocci	-	-	-	-	-	Gamma	<i>Micromonospora lutea</i>
Negative	-	+	+	+	Bacillus	-	+	-	-	-	Beta	<i>Pasteuria</i>
Negative	+	+	-	+	Bacillus	-	+	+	-	-	Gamma	<i>Plesiomonas shigelloides</i>
Negative	+	-	+	+	Bacillus	+	-	+	-	-	Gamma	<i>Proteus</i>
Negative	+	-	+	+	Bacillus	+	+	+	-	-	Beta	<i>Proteus mirabilis</i>
Negative	+	-	+	+	Bacillus	-	-	+	-	(weakly)	Beta	<i>Serratia marcescens</i>
Negative	+	-	-	+	Bacillus	-	-	-	-	V	Gamma	<i>Shigella</i>
Positive	+	-	-	+	Cocci	-	-	-	-	-	Gamma	<i>Staphylococcus epidermidis</i>
Negative	+	-	+	-	Bacillus	-	-	-	-	-	gamma	<i>Stenotrophomonas maltophilia</i>
Positive	-	-	-	+	Cocci	-	-	-	+	-	Beta	<i>Streptococcus agalactiae</i>
Positive	-	-	-	+	Cocci	-	-	-	+	-	Beta	<i>Streptococcus pyogenes</i>
Positive	+	V	+	+	Filamentous	V	-	-	V	V	Gamma	<i>Streptococcus albus</i>
Positive	+	V	+	+	Filamentous	V	-	-	V	V	Gamma	<i>Streptococcus coelicus</i>
Positive	+	V	+	+	Filamentous	V	-	-	+	+	Gamma	<i>Streptococcus griseus</i>
Positive	+	V	+	+	Filamentous	V	-	-	V	V	Gamma	<i>Streptococcus lividus</i>

3. Gemini built HTML script

- “Use this JSON file to create html code for a website. The website should have a welcome page that asks students to enter the results for the first five tests: gram stain, catalase, oxidase, gelatinase, and glucose. They should be able to check a box for each test and the expected result and then click a button to go to the next page. The second page should report the number of items in the json file that match their results. This page also prompts students to enter the results of the remaining tests with check boxes. Students press a submit button at the bottom to go to the next page. On the third page it will show the ID that matches their results with list of the test results for that ID. The second and third pages should have a back button as well.

[You can change the appearance by asking Gemini of elements you'd like to change, buttons to drop downs, buttons to images...]

4. Uploaded the html file to GITHub repository as index.html [note use personal github account, you cannot publish pages with NCSU github, you can easily view the page on github by navigating to this on your browser [https://\[github user name\].github.io/\[repository\]/](https://[github user name].github.io/[repository]/). Be sure to replace the bold text with your information
5. Manually uploaded images of test results and relaced the button with the image.

Originally:

```
<!-- Gram Stain -->
  <fieldset>
    <legend class="text-lg font-semibold mb-3 text-gray-800">Gram Stain</legend>
    <div class="grid grid-cols-2 gap-4">
      <div class="test-option">
        <input type="radio" id="gram-pos" name="gram-stain" value="Positive"
class="hidden" required>
        <label for="gram-pos" class="block cursor-pointer p-4 border border-gray-300
rounded-lg text-center hover:border-blue-400">
          <span class="text-2xl">  </span>
          <span class="block font-medium text-gray-700">Positive</span>
        </label>
      </div>
      <div class="test-option">
        <input type="radio" id="gram-neg" name="gram-stain" value="Negative"
class="hidden">
        <label for="gram-neg" class="block cursor-pointer p-4 border border-gray-300
rounded-lg text-center hover:border-pink-400">
          <span class="text-2xl">  </span>
          <span class="block font-medium text-gray-700">Negative</span>
        </label>
      </div>
    </div>
  </fieldset>
```

Images

```
<!-- Gram Stain (Updated with Images) -->
  <fieldset>
    <legend class="text-lg font-semibold mb-3 text-gray-800">Gram Stain</legend>
    <div class="grid grid-cols-2 gap-4">
      <div class="test-option">
```

```

        <input type="radio" id="gram-pos" name="gram-stain" value="Positive"
class="hidden" required>
        <label for="gram-pos" class="block cursor-pointer p-2 border border-gray-300
rounded-lg text-center hover:border-blue-400 h-full flex flex-col justify-between">
        <!-- Using previously uploaded image for Gram Positive -->
        
        <span class="block font-medium text-gray-700 pb-1">Positive (Purple)</span>
        </label>
    </div>
    <div class="test-option">
        <input type="radio" id="gram-neg" name="gram-stain" value="Negative"
class="hidden">
        <label for="gram-neg" class="block cursor-pointer p-2 border border-gray-300
rounded-lg text-center hover:border-pink-400 h-full flex flex-col justify-between">
        <!-- Using newly uploaded image for Gram Negative -->
        
        <span class="block font-medium text-gray-700 pb-1">Negative (Pink)</span>
        </label>
    </div>
</div>
</div>
</fieldset>

```

6. Continued to refine appearance asking Gemini to modify the visuals using particular colors

- a. "Can you update the colors in this tool to use any of these #eeddd2, #dcb49f, #aa7a5b, #754c29, #4d3527, #007e9a, #034a5a, #000000"

7. Run a check on JSON data to confirm different profiles

- a. "Using this JSON how many bacteria have the same profile?"

8. Some searches end up pointing to the same organism. Students may be confused when it says no match found but lists several potential organisms

- a. "On the 3rd page if more than one match is found, can it not say "No Match Found"?"

9. Added fourth page to be a google form embedded to collect 16S data.

- a. Started first with trying to collect data
 - i. "Is there a way to add on one more page in which users are prompted "After performing 16S rDNA sequencing and analyzing the results, what genus is your bacterium" and have a box for them to enter a word into? I'd like to have a way to save

entered data for all categories into a spreadsheet once they press the button a submit button at the bottom of the page"

- b. This was too complicated to use so I changed this to a google form
 - i. "For page 4 can you instead embed a google form for the 16s validation? Can you add this embed code <iframe src="https://docs.google.com/forms/d/e/1FAIpQLSde2ItVXapEDN37F6ak2cU1qLTkPFNdnDEpucfe73fncgdX7g/viewform?embedded=true" width="640" height="1029" frameborder="0" marginheight="0" marginwidth="0">Loading...</iframe>"

10. Wanted to provide an add a feature request box on page 4.

- a. "Can you also add a button at the bottom of page 4 with a link to this survey? Can you have the button labeled as "Add a Bacterium""

11. Updated the json file with expanded list of microorganisms.

- a. "Can you update the JSON and code with this new file?"