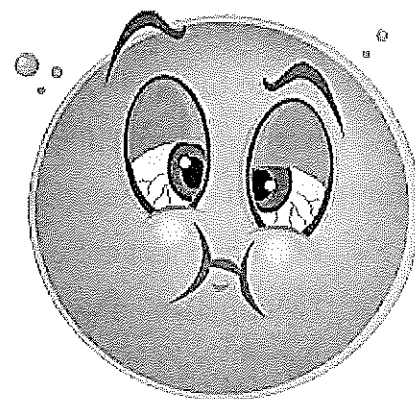


## The Vomit Lab

### Background

Patients “John Doe” and “Jane Doe” arrived at the VCU Medical Center Emergency Room at 10:00pm on Monday, September 11, 2017, complaining of stomach cramps, nausea, and diarrhea. Both their stomachs were pumped and the contents were saved for testing. Doctors believe food poisoning was to blame because both patients claimed to have eat at Taco Bell earlier that day, but neither has been able to remember specifically what he/she ate.



Doctors would like to test for whether they ate the same or different menu items from the restaurant. Luckily, several tests or **indicators** have been developed by biologists to determine the presence of different macromolecules – **carbohydrates**, **lipids**, **proteins**, and **nucleic acids** - found in food.

**General Question** – Did John and Jane eat the same type of food that caused their illnesses, or did they eat different foods?

**Specific Question** – Each group will test for the presence of a specific organic macromolecule in each sample.

Your group will be responsible for testing for \_\_\_\_\_

### Possible Tests/Indicators

#### Simple Carbohydrates (monosaccharides) – Benedict’s Solution

- Simple carbohydrates include simple sugars like glucose and fructose.
- Benedict’s solution changes from blue to green to yellow-orange-red in the presence of simple sugars.

#### Complex Carbohydrates (polysaccharides) – Iodine

- Complex carbohydrates include starch and cellulose and are commonly found in potatoes, beans, and grains. These are polysaccharides - long chains of simple sugars.
- Iodine turns dark blue in the presence of starch and cellulose.

### Proteins – Biuret Test

- Good sources of food protein include eggs, milk, and meat.
- The biuret test solution will turn from a light blue to purple if proteins are present.

### Lipids – Sudan III Test

- Lipids include fats and oils.
- When Sudan III is mixed with a substance, two layers will form in the presence of lipids. The top layer containing the lipid will be a pale pink-orange color.

### Nucleic Acid – Diphenylamine

- Meat and fish are especially rich in nucleic acids, including DNA and RNA.
- Diphenylamine will turn purple in color if DNA is present and green if RNA is present.

### Summary Chart – Complete using the information above.

Test Name	Macromolecule	Positive Color/Appearance

Identify which test/indicator your group will be using to test for the presence of your macromolecule:

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### Safety

1. GOGGLES MUST BE WORN AT ALL TIMES.
2. No eating, drinking, or applying cosmetics, including chapstick.
3. If you handle any chemicals, wash your hands with soap and water after class.
4. If any chemicals are spilled, notify a teacher immediately.
5. If any chemicals touch skin, immediately rinse off the affected area with plenty of water.
6. **Diphenylamine** is highly corrosive to eyes and skin, moderately flammable, and moderately toxic by ingestion and inhalation.
7. **Sudan III** is alcohol based – therefore, flammable and toxic by ingestion/inhalation.

Name \_\_\_\_\_ Block \_\_\_\_\_ Date \_\_\_\_\_

## The Vomit Lab

### BEGINNING THE INVESTIGATION

Begin the cycle of scientific thinking by summarizing your observations, asking a testable question, suggesting the most likely answer (hypothesis), and predicting what we should observe if the hypothesis is true.

**Observation:**

**Question:**

**Hypothesis:**

**Prediction:**

Why do you believe your hypothesis and prediction will be correct? What evidence can you give to support your hypothesis?

**Personal Experiences (life experiences that tell why you think your hypothesis is true):**

**Scientific Concepts (what we need to know about macromolecules and food):**

### DESIGNING A TEST

Materials

- **Indicator being used:** \_\_\_\_\_
- **At least three other possible materials: (Remember materials you saw in the Gizmo)**

Name \_\_\_\_\_ Block \_\_\_\_\_ Date \_\_\_\_\_

## The Vomit Lab

Make a general plan for collecting data. (Think about the activities you simulated in the Gizmo)

**What will you do? What will happen to the indicator if the macromolecule is present? What will happen if it is absent?**

**What kind of test will you perform to show the difference between a positive and negative test result?**

**What factors (at least 3) will be kept CONSTANT (the same) in the control and experimental groups?**

**List the variables**

- **Independent variable:**
  
- **Dependent variable:**

## PROCEDURE

**Make a detailed list of steps you expect to follow to test the sample for your assigned macromolecule. Revise and add details as needed after conducting the lab.**