

# **Community in the Classroom Presentation Plan**

Lesson Name Microbe-Body

Presenter(s) Daniela Goltsman, Karelyn Cruz, Pepper Yelton, Candice Allister

Grade Level 4th Standards Connection(s) Life Science (microorganisms)

## **Abstract:**

*Your opportunity to tell teachers and kids what's going to be fun and interesting about your visit!*

Microorganisms are extremely important to our lives. They are everywhere and can be good or bad for the human being. Good microbes are involved in the production of food (cheese, bread, wine, beer ect), help plants grow, cycle nutrients in the environment and they even help us digest the food we eat. Bad microbes can make the plants, animals and human being sick. Today we are going to use a microscope to see yeast, an example of a microbe. Yeast can “eat” different type of sugars to produce energy and live. They like some type of sugars better than others and they produce gas as a “waste” product. We will see how much gas yeast produce as they “eat” different types of sugars.

Our goal for this experiment is to expose the students to the world of microorganisms and teach them their importance in the environment and in our body. We will talk about food digestion and use yeast as an example (even though yeast is not in the human gut) for energy production.

## **Vocabulary/Definitions:**

**Microscopic** = too small to be seen with your bare eyes

**Microscope** = Instrument used to see microorganisms

**Microbe** = a microscopic organism, such as bacteria or yeast.

**Bacteria** = a very simple type of microbe (some live in your intestine)

**Yeast** = a more complex type of microbe (some are used to make bread, beer, and cheese)

**Digestion** = the breakdown of food and its incorporation into the body (some of this is done in our body by microbes)

## **Materials:**

2 zippered, plastic bags per group (3-4 students)

1 teaspoon of rapid rise yeast extract per bag

Warm water

Sharpies

Paper cups

Paper towels

Sugars: regular sugar cane sugar, Splenda, sweet ‘n Low (saccharin), Equal (aspartame), soda or any type of juice

## **Classroom Set-up:**

Groups of 10 students, access to warm water

1. Each group will have 4 plastic bags; one for the control (water and yeast ) and three for the different types of sugar. Two – three students from each **sub group** will be in charge of each bag.

## **Before experiment:**

Have 3 separate paper cups per group, each containing one of the following:



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1. 1 teaspoon of sugar, artificial sweetener or (for the juice use half a cup)
2. half a cup of warm water
3. 1 teaspoon of rapid rise yeast extract
4. Also prepare 4 bags before the experiment for station 3
  - a. 1 with sugar
  - b. 1 with artificial sweetener
  - c. 1 with juice
  - d. 1 control
5. Prepare microscope and slide of yeast
6. Copy pictures of human digestive system

## Classroom Visit

### 1. Personal Introduction: \_\_\_\_\_ **5** \_\_\_\_\_ Minutes

*Who are you? What do you want to share with students and why? How will you connect this with students' interests?*

Brief description of where we come from and what we do as a graduate student.

### Topic Introduction: \_\_\_\_\_ **10** \_\_\_\_\_ Minutes

*Big Idea(s), vocabulary, assessing prior knowledge. What questions will you ask to learn from students?*

What are microbes? What they do and how they look like?

Introduce vocabulary and give brief introduction about what microbes are, where they live, what they do and talk about yeast as an example.

Create a hypothesis, e.g. What type of sugar will the yeast "eat" faster?

Introduce the concepts of digestion and energy production.

1. **Microbes** are very small, single cell, organisms that we are unable to see with the naked eye. We use an instrument called microscope that magnifies the image of microbes in order to be able to see them and study them.
2. Microbes are **everywhere**. There are "good" microbes, which are those that help us, and other animals, to digest the food, and others that help plants to grow healthy. There are also "bad" microbes like those that cause us to get sick (stomachache, common cold). This is why it is important to study which microbes are good, and which ones are bad.
3. Microbes, called **bacteria, are involved in digestion** (\*there are good bacteria and bad bacteria). The good bacteria that live in your intestines (mainly in the large intestine) that make certain vitamins (like folic acid and biotin), and digest things like lipids, carbohydrates and proteins.
4. In our experiment we will use yeast as an example of a microbes. We will see how these microbes can use different types of sugars to obtain energy to live and produce gas as a waste product.

### 2. Learning Experience(s): \_\_\_\_\_ **30** \_\_\_\_\_ Minutes

*Demonstrations, hands-on activities, images, games, discussion, writing, measuring... What will you do, what will kids do? Describe in order, including instructions to kids.*



## Experiment:

2. Sub divide the class in three groups (~10 students per group).
3. Each group will have 4 plastic bags; one for the control (water and yeast ) and three for the different types of sugar. Two – three students from each sub group will be in charge of each bag.
4. The student will add the sugar, followed by the water and at the same time they will add the yeast extract.
5. De-gas the bags by “squeezing” all the air out and then close the bag.
6. Mix the content

## While we are waiting to see the gas develop

- We have 3 stations of teachers (rotate groups of 3-4 students 5 minutes at each station)

### Station 1: Microscope Viewing of Yeast

1. students look at yeast through microscope
2. Microscopes magnify pictures so we can see very small things
3. Explain that yeast is an example of a microbe but they don't live in our intestine (Bacteria live in the intestine)
4. They are very complex microbes that can do all sorts of things (make bread, beer, and cheese)

### Station 2: Digestion

1. Point out areas in the body where microbes are working (stomach, mouth, teeth)
  - a. There are microbes in your stomach and intestine that help you digest your food (breakdown your food into small particles)
2. “Good vs. Bad Microbes Game”
  - a. Have six items on the table (yogurt, bread, cheese, moldy fruit, picture of a virus, fake teeth with microbes on them)
  - b. Organize into good and bad microbes
  - c. Identify why each was grouped into good and bad (ie. What makes microbes on your teeth bad?)—good microbes in your body help digest food, such as yogurt and bread.

### Station 3: Looking at Gas Formation in the Bags

1. Show students prepared bags with gas in them
  - i. Most gas = sugar bag, then Artificial sweeteners, then Water Control
2. Ask students which bag they think will have most gas in it
3. Explain that artificial sweeteners contain simple, easily broken down sugars in small amounts so they form gas fastest (artificial sweeteners cannot but still taste sweet (100-1000x sweeter than sugar)
4. ...But, the factories that make artificial sweeteners add simple sugars to their packets as well (to make them taste less sweet, dilute the sweet taste)
5. Therefore artificial sweeteners should form less gas over time (because they have less sugar than regular cane sugar)

## 3. Wrap-up: Sharing Experiences and Building Connections 5 Minutes

*Putting the pieces together – how will students share learning, interpret experience, build vocabulary?*

1. Ask them what they learned
2. Talk about applications for microbes: clean up of pollution, making other food (cheese, wine, beer etc), nutrient cycling



#### 4. Close:

2 Minutes

*How can kids learn more? Thanks and good-bye! Clean-up.*  
Recommended websites:

<http://www.microbeworld.org/microbes/>

<http://www.fossweb.com/CA/index.php>

TOTAL 50 – 60 Minutes

### **Follow-up – After Presentation**

*Suggest students write a letter explaining “How we learned about \_\_\_\_\_?”*

*List or attach examples of activities, websites, connections for additional learning.*

*Attach worksheets, hand-outs, visuals used in classroom presentation.*

We will like to have feedback from the students and the teachers about our performance and the learning experience.

