

Bay Area Scientist in Schools Presentation Plan

Lesson Name Good Germs, Bad Germs

Presenter(s): Shapira Lab

Grade Level: 2 **Standards Connection(s):** Observing samples with senses, describing samples, comparing samples, and communicating observations orally.

Next Generation Science Standards:

2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <p>Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)</p> <hr/> <p>Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence. Scientists look for patterns and order when making observations about the world. (2-LS4-1)</p>	<p>LS2.D: Biodiversity and Humans</p> <p>There are many kinds of living things in any area, and they exist in different places on land and water.</p>	<p>Patterns</p> <p>Patterns in the natural and human designed world can be observed and used as evidence. (2-LS4-1)</p>

Common Core Standards:

ELA/Literacy –

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). **(2-LS4-1)**



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W.2.8 Recall information from experiences or gather information from provided sources to answer a question. **(2-LS4-1)**

Mathematics –

MP.2 Reason abstractly and quantitatively. **(2-LS4-1)**

MP.4 Model with mathematics **(2-LS4-1)**

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems. **(2-LS4-1)**

FOSS Connections:

Second Grade Module: Plants and Animals (Bacteria presented as a different kingdom)

Abstract:

Did you know that germs are very, very small and that when they grow together you can see them? There are different kinds of germs – good and bad, and different germs do different things. Some types of germs are good for you and help you stay well, others can make you sick, so your body has ways to tell the difference between good and bad germs. We keep the good ones, and if a bad one enters, our body will fight it to keep you healthy. Germs live both inside and outside of our bodies in different quantities. This lesson will have students use agar plates to analyze different places where germs might live in our bodies.

Vocabulary/Definitions:

3 – 6 important (new) words

- **Germs/bacteria:** tiny living things in and outside of our bodies that can make us sick or keep us well
- **Cultures:** growing of microorganisms (germs) in nutrients
- **Colonies:** Groups of organisms or microorganisms that have grouped together
- **Enzymes:** microscopic proteins made to help start reactions in your body (like breaking down your food, or killing bad bacteria)

Materials:

What will you bring with you?

- Agar plates
- Worksheets
- Sharpie markers
- Q-tips
- Anti-bacterial wipes or alcohol

Classroom Set-up: *Student grouping, Power/Water, A/V, Light/Dark, set-up/clean-up time needed*

- Set up students into groups of three so each student has a chance to spread a material on the agar plate.
- Students should have pencils to fill out worksheets.



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Classroom Visit

Day 1:

1. Personal Introductions: 5-10 Minutes

Hi my name is _____ and I am a scientist at UC Berkeley. My work involves _____. I love science because _____.

Topic Introduction: 10-15 Minutes

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

Today we are going to learn more about germs. There are many types of germs and some can help you and some can make you sick. Have any of you ever been sick? [engage kids] What did it feel like? How did you get better?

What are germs? [define germs] When you think of where germs live, what kinds of places do you think of? What are some things that germs can do besides get us sick?

Today, we are going to learn about where germs can live in your body. To do that, we are going to grow our own cultures [define cultures] using special plates that will help grow the germs. The things we are going to use to grow our germs might seem gross, but they are important to know where germs live in our bodies and how they can transfer to others.

I am going to divide you into groups of two and each person is going to smear one thing on the plate. We will need to label our agar plates with our names and what sample they are. One person in each group will touch one agar plate with their hands and touch the other agar plate AFTER they have wiped their hands with an antibacterial wipe. The other student will touch one plate and then swab their spit on it and put only a sample of spit on the other plate. Each group will have a total of 4 plates.

Now, I am going to divide you into groups and each group will gather around a table. When we are finished, we will come back and discuss what we have learned.

2. Learning Experience(s): 10-15 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.

- Hand out agar plates and Q-tips to the groups of students. Have students/teacher decide who will spread what on each plate.
- Students will take turns touching agar plates, touching and then spitting, etc.



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Day 2:

3. Wrap-up: Sharing Experiences and Building Connections 15-25 Minutes

Putting the pieces together – how will students share learning, interpret experience, build vocabulary? Interpretation would have to be a day or two later. I could take the plates with me to incubate them, or if we could find a place to incubate them at school that would be better

We will now do questions one and two on our worksheets. This is called a hypothesis, or an educated guess. We must explain why we think our answer is correct. For question 3, we will look at the plates and we will draw what our plates look like now that our colonies have had time to grow.

What did you notice about your samples? The samples created colonies. Each colony has started from ONE bacteria that was on your hand. You can't see one bacteria, but when they grow and become many you can see a colony (they can move away so they stay tight together). Germs can grow VERY fast.

Which sample had the fewest germ colonies? Why? The spit sample had the fewest. There Which one had the most? Why? The one we touched without sanitizer. Discuss germs in your gut and what they do.

How many good germs do you think you have in your body? About 100 trillion! (give out a sticker to the closest guess?) What is a trillion (how many pennies you need to have to fill up the TransAmerica building in SF.)

What are some ways that our germs can travel? How can we prevent ourselves from getting sick? Travel through our spit, snot and poop. We can wash our hands, cover our mouths, etc.

4. Close: 5 Minutes

How can kids learn more? Thanks and good-bye! Clean-up.

Germs are all around us. Think about places in your classroom and home that you touch often with your mouth or hands.

TOTAL 30-45 per day Minutes



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Follow-up – After Presentation

ELA Activity:

Ask teacher and kids to write a letter about what they learned.

Read “How Lou Got the Flu” and use story ordering worksheet:

<http://www.nchealthyschools.org/docs/lessonplans/2/grade2-202.pdf>

Things to be aware of in the future: washing hands after playing in dirt, throwing away tissues into which you have blown your nose, exercising and eating veggies to stay in good health.

Mathematics Activity:

Create a variety of physical “germ” models and have students sort and classify the different types of germs. Count colonies and see who has the most on their plates.



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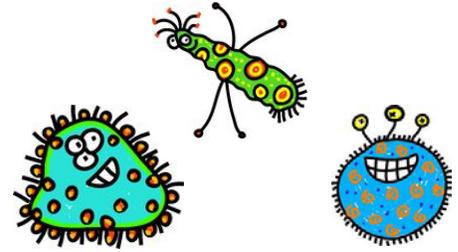
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Name _____

Good Germs, Bad Germs



1. Which of the samples do you think will have most germs? Why?

2. Which of the samples do you think will have the least germs? Why?

3. Directions: In the boxes below, label and draw what each of your samples look like.

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4. Do you think we have more good germs or bad germs in our bodies? Why?

5. How many good germs do you think live in your body?



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