

Being a Germ Scientist (4th Grade)

This is a longer lesson; it can be split into two parts and taught over two days.



HAND-WASHING OBJECTIVES CHECK LIST

Students will be able to:

- perform** proper hand washing techniques.
- express ways** they can **remember to wash their hands regularly**.
- explain** the **importance** of washing hands.
- identify** that fruits and vegetables fit in the food groups of MyPlate and are healthy.

MATERIALS AND INGREDIENTS

Bins	Teacher Provides	Will be Delivered
<p><u>In Kitchen Bin</u></p> <ul style="list-style-type: none"> - cutting board (teacher only) - chef knife (teacher only) - large bowl <p><u>In Paper Goods Bin</u></p> <ul style="list-style-type: none"> - spoons/forks* (if needed) - paper plates* (if needed) 	<ul style="list-style-type: none"> - activity sheets copies* - text “Being a Scientist” copies* (or use overhead) - small handful of confetti (small pieces of paper from a hole puncher) (optional) - napkins* 	<ul style="list-style-type: none"> - book “Germs Make Me Sick” by Melvin Berger - seasonal fruit or vegetable - family letters*

*one per student

EXPERIMENT MATERIALS

Bins	Supplies	Materials
	<ul style="list-style-type: none"> - tape for keeping Petri dishes securely closed - paper towels* 	<ul style="list-style-type: none"> - 2 Petri dishes (use at room temperature and store red side up) - hand soap

*one per student

Reinforcing Colorado Comprehensive Health Standards

Fourth Grade, Standard 2. Physical and Personal Wellness. 1. Apply knowledge and skills in lifelong healthy eating. 3. Apply knowledge and skills related to health promotion, disease prevention and health maintenance.

While INEP nutrition lessons focus on the Colorado Comprehensive Health Standards, you will find you may utilize lessons to reinforce physical education, mathematics, reading, writing & communicating, science & social studies standards for your class.

SET-UP

Copies:

- Make copies of Petri dish experiment activity sheet (each student), text “Being a Scientist” (each student) or plan to use the text on an overhead device and Handwashing word search.

Work area:

- Students will work individually at their desks.
- Have nutrition table ready for lesson materials and ingredients.

Food-prep:

- Wash seasonal fruit or vegetable for snack. Cut and divide the fruit or vegetable into appropriate number of pieces for the class. Use plates and spoons if needed.

Other-prep:

- Have a small handful of confetti ready to use in beginning of lesson. (**Note:** make confetti with small bits of paper or with a hole punch.)
- Petri-Dishes **IMPORTANT**
 - Have your two Petri dishes ready for the experiment.
 - Take Petri dishes out of the fridge an hour before using-red side up.
 - *Plan to tape the Petri dishes shut while the germs grow. To dispose of Petri dishes properly keep them taped shut securely and throw away in trash.*
- Have soap and paper towels ready for hand washing.
- Have the book *Germs Make Me Sick* ready to read to the class.

Useful Information about Petri dishes:

Petri dishes should be refrigerated and stored upside down (red side up) until they are ready to be used. The experiment works best when the Petri dishes have been set out at room temperature (70°F) for one hour before the experiment. The pink gel that covers the bottom of the dish is an ideal medium for bacteria to proliferate. For best results, after the Petri dishes are imprinted with bacteria, set them upside down at room temperature (above 70°F) to promote bacteria growth. Have students observe the growth of germs after a couple of days or more. Discard dishes as soon as students have recorded their observations. If dishes are kept more than a week, the germs will quickly multiply as they absorb the food that is available. Therefore, there will be little difference between the two dishes that are being compared. This could be confusing for students. **Note:** The growth rate of germs depends on the room temperature. If the

room is colder than 70°F, it may take longer than a couple of days for the germs to become visible.

INTRODUCTION WITH STUDENTS



Let's Wake Up Our Brains! Brain Boost Exercise!

Run those Germs Off- Repeat to get your heart going!

- ♥ Run, run, run in place
- ♥ Run those germs off
- ♥ Jump, jump, jump in place
- ♥ Jump those germs off
- ♥ Jog, jog, jog in place
- ♥ Jog those germs off
- ♥ Hop, hop, hop in place
- ♥ Hop those germs off
- ♥ Wash, wash, wash those germs off
- ♥ Good –Bye Germs!!

Now that our minds are ready to go, let's get started on our nutrition lesson.

- Begin the lesson by having your students get ready to hear a story. Hold the confetti secretly in your hand. When you have your students' attention fake sneeze into your hand and let the confetti fly everywhere.
- Ask them what they know about how and why we get sick.
- Ask students how they feel when they get sick.
- Read the book "Germs Make Me Sick" to the class.
- **Refer to the Key Behavior on the board and tell students that it is important to wash their hands regularly to get rid of nasty germs that are everywhere. It is also important to "Make half their plate fruits and vegetables", to help them get the fruits and vegetables they need to fight off germs inside their bodies.**
- Ask students to tell you who reminds them to wash their hands (parents, teachers, grandparents, the nutrition program etc.).
- Tell students that it is important to listen to their parents, teachers, etc. but that over the next few days they are going to be scientists and prove why it's important to wash their hands regularly.
- Explain that scientists start out by asking questions. Then they form a **hypothesis** about their question. Their **hypothesis** is what they think the answer to their question will be based on what they already know.
- For example, a scientist could have a hypothesis that says I think that washing your hands with soap and water gets rid of germs because my mom told me so or I think that hand washing will get rid of germs because they said so on the news.
- We already know that our parents tell us to wash our hands to get rid of germs. We think that is true. But to know if it is true or not, we conduct an experiment.
- An experiment is the next step for the scientist is to test their hypothesis.
- Tell students that today they will perform an experiment to test their hand washing hypothesis.

PROCESS

- Step 1: Read the text “Being a Scientist” to together as a class.
- Step 2: Pass out the “Being a Scientist” activity sheet to each student. As a class, come up with science question together. Science Question: **“Does washing your hands with soap and water get rid of germs on your hands?”**
- Step 3: Have students discuss their different hypotheses, for example, *“I think I will find more germs growing from an unwashed hand and fewer growing from a hand washed with soap and water. I think this is true because I wash my hands regularly and never get sick.”* Or *“I think this is true because my mom told me so.”* Have them write their hypothesis and why they think it is true on their activity sheet.
- Step 4: Show students the Petri dishes. Explain that they are used in science laboratories to grow all kinds of tiny organisms including germs. Explain that the pink gel in the dish is the food needed for the germs to grow. Tell students that they will be used in today’s germ experiment.
- Step 5: **Experiment, Part One:**
- ✓ Remind students that we all have germs on our hands.
 - ✓ Pick a volunteer and have him/her shake hands with a few students.
 - ✓ Have the volunteer put their (right) hand on the doorknob, phone and desk.
 - ✓ Ask the class if they think that student’s hand has germs on it.
 - ✓ Have the volunteer press his/her (right) fingers firmly on the agar (pink jelly) of one of the Petri dishes.
 - ✓ Explain to the class that the student volunteer put invisible germs from his/her fingers onto the dish.
 - ✓ **Tape closed**, date and label the first dish “unwashed hand”.
 - ✓ Store it upside down (gel side up) and at room temperature.
 - ✓ Ask the students what they think will happen inside the Petri dish.
- Step 6: Do a demonstration of how to wash hands thoroughly. **Note:** If there is no sink in your classroom, go through all the steps.
- ✓ use warm water and soap
 - ✓ rub all parts of your hands
 - ✓ dry hands with a clean towel
- Remind students that it takes time to wash hands thoroughly, at least 20 seconds of rubbing and washing. Sing the **“ABC” song** as you wash your hands.
- Step 7: **Experiment, Part Two:**
- ✓ Have a volunteer wash his/her hands thoroughly at the sink.
 - ✓ Have the class sing the **“ABC” song** as he/she washes.
 - ✓ Have the student press clean fingers firmly against the agar in the second Petri dish.
 - ✓ **Tape closed**, date and label the dish “washed hand”.

- ✓ Store it upside down (gel side up) and at room temperature.
- ✓ Ask the students what they think will happen inside the Petri dish.
- ✓ Tell them you will let the germs grow for a couple of days then check to see what has happened.

Step 8: Pass out Handwashing Word Search. As students begin this activity have small groups of students wash their hands well at the sink.

Step 9: After students have finished washing their hands, pass out the snack. Tell students that eating fruits and vegetables every day helps keep our body healthy and more able to fight off germs that get into our bodies.

Step 10: **Let's Eat, Let's Talk.** While students are eating ask them what they learned. Help students think of things they can do to make sure they remember to wash their hands regularly. Ask and discuss the questions in the box **Make Health Happen.**

Step 11: After a couple of days, have students observe the two Petri dishes and have them record their observations and complete the activity sheet. Discuss with students the results of the experiment.

IMPORTANT: *Do not* wait more than a couple of days to observe as the germs will continue to grow in both dishes and you will not be able to see a difference between the two.

IMPORTANT: Keep the tape around the petri dishes and throw them away after observing.

Make Health Happen

What stops you from washing your hands when you should?

What causes colds, stomachaches, and the flu?

How can you make sure to remember to wash your hands after you go to the bathroom or before eating?

BACKGROUND INFORMATION

It is important for students to learn about germs, the tiny organisms, or living things, that can cause disease. The term “germs” refer to bacteria, viruses, protozoa, and fungi.

Germs are found in the air, water, plants, animals as well as inside and outside our bodies. Many kinds of germs are helpful, such as the bacteria found in our gut that aid in digestion. However, there are also harmful germs that can cause infections.

The spread of harmful germs is preventable through simple public health measures such as covering your mouth when coughing, getting vaccinated, and washing your hands.

Washing your hands with soap for at least 20 seconds is one of the easiest and best way to get rid of germs.

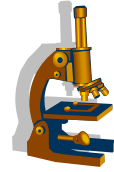
Students should wash their hands before eating, before preparing food, after going to the bathroom, after blowing their nose, after playtime, and after touching a pet.

Traditional soap vs. antibacterial soap: Antibacterial soap has become a popular alternative to traditional soap because it contains certain chemicals that kill bacteria. Although this sounds beneficial, researchers concluded that antibacterial soaps are no better at preventing illness than washing hands with plain soap and water outside of healthcare settings. In school settings, using traditional soap is the cheapest and best option.

What about hand sanitizer? Soap and water are your best bet, but hand sanitizers also kill germs. They work best when they contain at least 60% alcohol and your hands do not have dirt on them. They do not kill all germs but are a good solution when soap and water is not an option.

Hand washing before any cooking or food preparation is required and particularly important in nutrition classes. Foodborne illness caused by germs can be prevented by establishing good hand washing habits and wearing disposable gloves when handling food. **Note:** In some nutrition lessons, students prepare uncooked dishes, such as salads to share with other students. For those food preparation activities, students are required to wear plastic gloves on both of their hands. When wearing plastic gloves, the student should not touch anything but the ingredients and utensils.

Being a Scientist



Everyone says that washing your hands with soap and water will help get rid of nasty germs that cause colds, vomiting, diarrhea and the flu. But how do we know this is true?

For hundreds of years scientists have been asking questions about the world around them. Then they try to answer the questions by doing experiments. One day a scientist asked the question, “**Does washing your hands with soap and water get rid of germs?**”

To answer this question scientists devised an experiment to grow germs from unwashed and washed hands. They had to repeat their experiment many times to make sure it was right.

For their hand washing experiment, scientists used **Petri dishes** to grow germs. Petri dishes contain a pink jell-like substance called **agar**. If you put germs on agar, they will eat the agar and multiply. As they multiply into hundreds of thousands of germs they become **colonies** of germs. A single germ is invisible to the human eye but a colony is easy to see because of the large number of germs that make up the colony.

The scientists thought they would see more germs growing from an unwashed hand and fewer germs growing from a hand washed with soap and water. This was their **hypothesis**. They **experimented** many times and finally came to their **conclusion**. What is **your** hypothesis and why? What do **you** expect to see when you perform this experiment?

Glossary

Petri dish – flat plastic container with cover

agar – food for germs

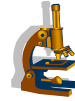
colonies – groups

hypothesis- an idea based on what you already know and what you want to prove through an experiment

experiment – a way to prove something or test your hypotheses

conclusion – what you decide from your experiment results

Siendo un Científico



Todos dicen que lavarse las manos con jabón y agua ayuda a eliminar esos horribles gérmenes que causan resfrío, vómito, diarrea y gripe. ¿Pero como sabemos si esto es cierto?

Por miles de años, los científicos han hechos preguntas acerca del mundo que los rodea. Ellos entonces tratan de contestar estas preguntas haciendo experimentos. Un día un científico hizo esta pregunta. “**¿Será que lavarse las manos con jabón y agua elimina los gérmenes?**”

Para contestar esta pregunta, los científicos hicieron un experimento donde cultivaron gérmenes de manos sucias y manos limpias.

Para el experimento de lavarse las manos, los científicos usaron **placas de petri** para cultivar gérmenes. Las placas de petri contienen una sustancia como gelatina rosada que se llama **agar**. Si pones gérmenes en el agar, ellos se lo comen y se multiplican. Cuando se multiplican en cientos o miles se convierten en **colonias**. Un solo germen no se puede ver, pero una colonia es fácil de ver debido a la gran cantidad de gérmenes que forman la colonia.

Los científicos pensaron que verían muchos gérmenes en la placa que provenía de una mano sucia y pocos gérmenes en la placa de una mano limpia lavada con jabón y agua. Ésa fue la **hipótesis**. Experimentaron muchas veces y finalmente llegaron a una conclusión. ¿Cuál es **tú** hipótesis y porqué? ¿Qué esperas ver **tú** cuando realices este experimento?

Glosario

Placa de Petri – un contenido de plástico con tapa

agar – comida para los gérmenes

colonias – grupos de gérmenes

hipótesis - una idea basada en lo que ya sabes y lo que deseas probar por medio de un experimento

experimento – una manera de probar algo o probar tu hipótesis

conclusión – lo que decidiste basado en los resultados de tu experimento.

Being a Scientist



Scientist: _____ Date: _____

Science Question: _____

Hypothesis: I think _____

I think this is true because I already know _____

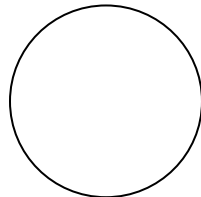
Experiment Materials:

2 Petri dishes, 1 unwashed hand, soap, water, 1 washed hand, marker, tape

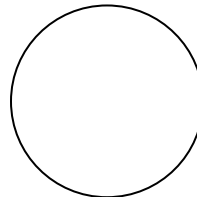
Experiment Steps:

1. _____ will shake hands with 2 people and put their hand on the door and then press his/her right fingers on the Petri dish marked "unwashed hand".
2. _____ will then, wash his/her hands well with soap and water and then press his/her right fingers on the Petri dish marked "washed hand".
3. We will tape the Petri dishes shut, label them, and wait 48 hours.

Results. Look at Petri dishes after 48 hours and draw what you see.



unwashed hand



washed hand

Conclusions:

Siendo un Científico

Científico: _____ Fecha: _____

Pregunta Científica: _____

Hipótesis: Pienso que _____

Yo pienso que esto es cierto porque yo sé que: _____

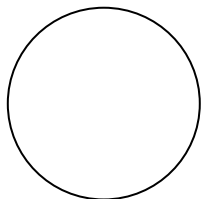
Materiales para el experimento:

2 Placas de Petri, 1 mano sucia, jabón, agua, una mano limpia, marcador, cinta adhesiva

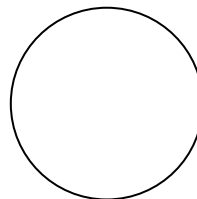
Pasos para el experimento:

1. _____ saluda con dos personas y toca el pomo de la puerta y entonces presiona tus dedos en la placa de petri que dice "mano sin lavar."
2. _____ será entonces, lava tus manos bien con jabón y agua y presiona tus dedos de la mano derecha en la placa marcada "mano lavada."
3. Le ponemos cinta adhesiva a las Placas de Petri cerradas, escribiremos la condición, y esperaremos 48 horas.

Resultados. Observa las Placas de Petri después de 48 horas y dibuja lo que ves.



Manos sucias



Manos limpias

Conclusiones:

Being a Scientist Answer Sheet (Teacher Only)

Science Question: Does washing hands with soap and water get rid of germs?

Hypothesis: I think washing your hands with soap and water will get rid of germs.

I think this is true because my mom and dad tell me it is.

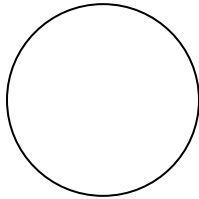
Experiment Materials:

2 Petri dishes, 1 unwashed hand, soap, water, 1 washed hand, marker, tape

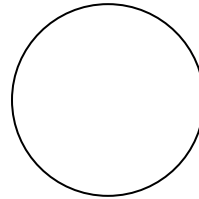
Experiment Steps:

1. Nina will shake hands with 2 people and touch the doorknob and then press her fingers on the Petri dish marked “unwashed hand”.
2. Nina will then, wash her hands well with soap and water and press his fingers on the Petri dish marked “washed hand”.
3. We will tape the Petri dishes shut, label them, and wait 48 hours.

Results. Look at Petri dishes after 48 hours and draw what you see.



unwashed hand



washed hand

Conclusions: I think that my hypothesis was right because the Petri dish with the unwashed hand grew more germs than the one with the washed hand.

Siendo un Científico (Profesor solamente)

Pregunta científica: ¿El lavarse las manos con jabón y agua hace que te liberes de los gérmenes?

Hipótesis: Pienso que lavándome las manos con jabón y agua conseguiré librarme de los gérmenes.

Pienso que esto es verdad porque mi mamá y papá me lo dicen.

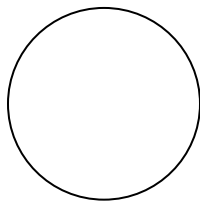
Materiales del experimento

2 placas de Petri, 1 mano sucia, jabón, agua, 1 mano limpia, marcador, cinta adhesiva.

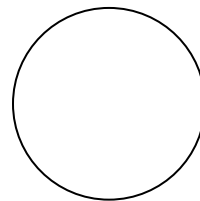
Pasos del experimento:

1. Nina va a saludar con dos personas y después presionará los dedos en el plato de Petri que dice “mano sucia”
2. Nina será entonces, se lavará las manos bien con jabón y agua y presionará sus dedos en la placa de Petri marcada “mano lavada”
3. Le ponemos cinta adhesiva a las Placas de Petri cerrados, los etiquetaremos, y esperaremos 48 horas.

Resultados. Mire los platos de Petri después de 48 horas y dibuje lo que usted ve.



Mano sucia



Mano limpia

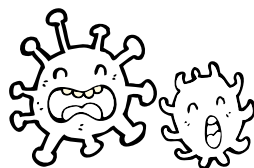
Conclusiones: Pienso que mi hipótesis es correcta porque la placa de Petri con la mano sucia tuvo más gérmenes que la de la mano lavada.

Family Letter: Handwashing

Dear Families,

Today, your student learned the importance of washing their hands regularly for at least 20 seconds. They practiced singing the song (below) while they washed their hands. If they wash while they sing the whole song, their hands will be clean.

Studies show that practicing regular handwashing reduces the number of school absences from viruses, colds, flu, and stomachaches in children.



Let's sing this song together before we eat using the tune of "wheels on the bus"!

This is the way you wash your hands, wash your hands, wash your hands.

This is the way you wash your hands, for 20 seconds at least.

Lather up and rub-a-dub-dub, rub-a-dub-dub, rub-a-dub-dub.

Lather up and rub-a-dub-dub, for 20 seconds at least.

One more time before you're done, before you're done, before you're done.

One more time before you're done, now 20 seconds a piece.

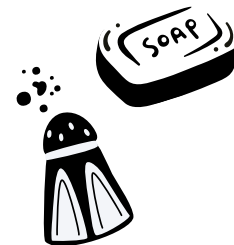
Wash your hands regularly!

To keep from getting sick, washing your hands will do the trick!

Science: See Soap in Action!

Materials: pinch of black pepper, soap, and shallow dish filled with water

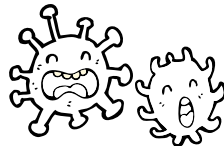
1. Add the black pepper "germs" to the water.
2. Children stick their fingers into the water.
3. Pepper "germs" will stick to fingers. Rinse fingers.
4. Children put fingers in soap before putting them in the bowl of "germs".
5. Have the children watch as the "germs" scatter away from the soap.



Queridas familias,

Hoy, su estudiante aprendió la importancia de lavarse las manos regularmente por lo menos por 20 segundos. Cantaron la canción que mencionamos mas adelante mientras se lavaban las manos. Si se lavan las manos mientras cantan la canción completa, sus manos estarán limpias.

Estudios de salud muestran que lavarse las manos de forma regular, reduce el número de ausencias escolares por virus, resfriados, gripe y dolores de estómago en los niños.



¡Vamos a cantar esta canción juntos antes de comer con la melodía de "ruedas en el autobús"!

A lavarse, du ru ru du ru las manitas, du ru ru du ru

A lavarse, du ru ru du ru ¡Las manitas!

Con jabón, du ru ru du ru con jabón, du ru ru du ru

Con jabón, du ru ru du ru ¡Con jabón!

Restregando, du ru ru du ru las manitas, du ru ru du ru

Restregando, du ru ru du ru ¡Las manitas!

Enjuagando, du ru ru du ru las manitas du ru ru du ru

Enjuagando, du ru ru du ru ¡Las manitas!

A secarse, du ru ru du ru las manitas, du ru ru du ru

A secarse du ru ru du ru, ¡Las manitas!

¡Lávese las manos frecuentemente!

¡Para evitar enfermarse, lavarse las manos hará el truco!

Ciencia: ¡Ver el jabón en acción!

Materiales: pizca de pimienta negra, jabón y plato poco profundo lleno de agua

- Agregar la pimienta negra "gérmenes" al agua.
- Los niños meten los dedos en el agua.
- Pimienta "gérmenes" se pegará a los dedos. Enjuague los dedos.
- Los niños ponen los dedos en el jabón antes de ponerlos en el tazón de "gérmenes".
- Haga que los niños observen cómo los "gérmenes" se alejan del jabón.

