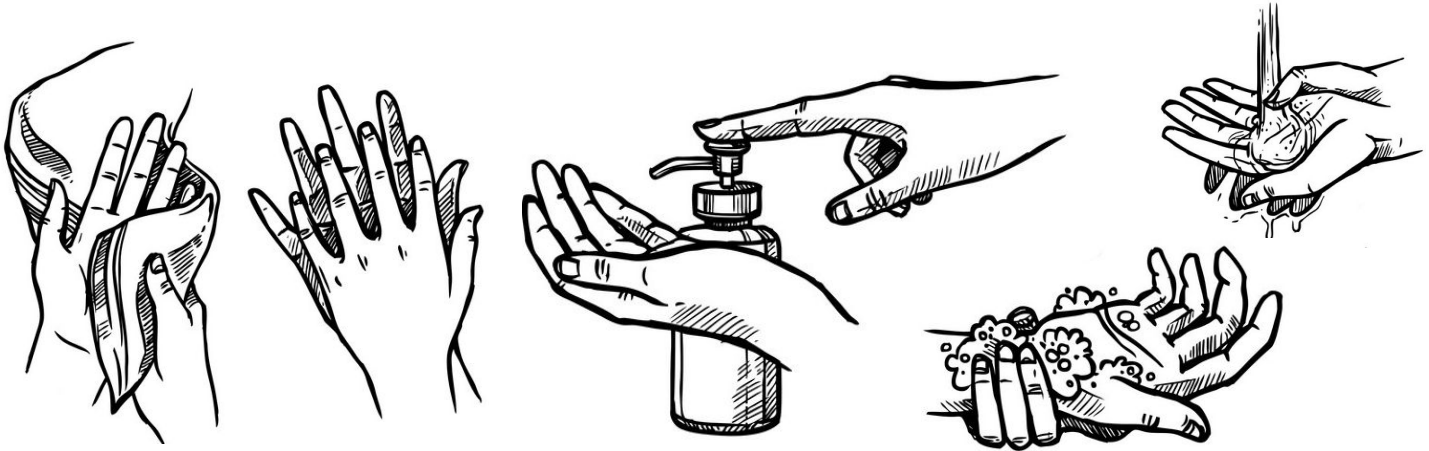


# WASHING YOUR HANDS TO PREVENT THE SPREAD OF DISEASES

LaCuKnoS Language Booster



## DESCRIPTION

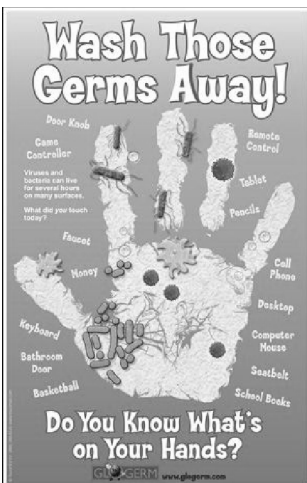
Throughout history, many people have died because they didn't know how to keep themselves and their homes clean to prevent the spread of diseases. The study of how diseases spread from one person to another, and how to prevent the spread of diseases, is called **epidemiology**. People who study epidemiology have helped us to develop good **hygiene** practices to stop **germs** from spreading.



Regular hand washing is one of the best ways to remove germs, avoid getting sick, and prevent the spread of microscopic, disease-causing organisms such as viruses and bacteria. Handwashing is quick, it's simple, and it can keep us all from getting sick. Handwashing is a benefit for everyone, except the germs.

Washing your hands well with soap and water is the best way to decrease the number of germs on your hands. If soap and water are not available, you can use an alcohol-based hand sanitizer that contains at least 70% alcohol.

Alcohol-based hand sanitizers can quickly reduce the number of germs on your hands, but sanitizers do not eliminate all types of viruses and bacteria. What makes hand washing effective in preventing the spread of viruses and bacteria? How can you tell if you have washed your hands well enough? In this activity we will investigate and compare different ways of washing your hands.



**Talk with your partner about these questions, then write your answers...**

- 1 What do you already know about how to wash your hands well?
- 2 Do you think some ways of washing your hands can be more effective in preventing the spread of diseases than other ways? Why or why not?

## DIRTY HANDS

### LaCuKnoS Science Investigation



#### Materials

Glo-Gel that simulates the presence of germs

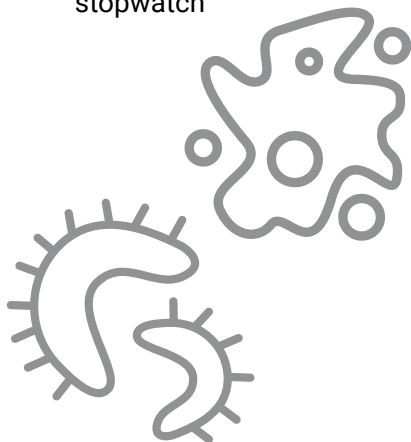
Ultraviolet light

Sink/Water

Paper Towels

Soap

A timer-on your phone or a stopwatch



Here are some alternatives for the dirty hand activity if you don't have access to Glo Gel:

1. Using Bread
2. Using Glitter (other options: watercolor, dirt/soil)
3. Using Gelatin

#### DESCRIPTION

In the following investigation you will practice **controlling variables** as you experiment with washing your hands to help prevent the spread of diseases. **Epidemiologists** are scientists who study the spread and cause of disease. They explore the ways in which diseases travel through a human or other animal population. They think about different variables that can help to better predict and control the spread of diseases.

One of the best ways to control germs is to learn how to properly wash your hands. Washing your hands for the correct amount of time and in the right way will kill most of the germs on your hands. This will reduce the chance that you will pass those germs to others around you. In this experiment, you will change the amount of time you spend washing your hands. Thus, the amount of time you wash will be the **independent variable**, or the thing you change intentionally in your investigation. Then you will measure how clean your hands are after washing. The **dependent variable** is the response to the changes you make to the independent variable. So, in our investigation, the dependent variable will be how clean your hands are after you wash them.

#### PROCEDURE

1. Get into lab groups of 4 students (Identify Student A, Student B, Student C, Student D).
2. Have each person in your lab group apply Glo-Gel to their hands. Spread Glo-Gel evenly over both hands, including the backs of hands and the skin next to and under the fingernails.
3. Place each students' hands under the ultraviolet light, taking turns. Group members should observe each other's hands to see the fake germs glowing.
4. Go to the sink where you will each wash your hands. Each student will need to be timed by another member of your group.
5. Wash your hands in the sink for these times: Student A for 5 seconds, Student B for 15 seconds, Student C for 30 seconds and Student D for 60 seconds.
6. After you wash, dry your hands gently with a clean paper towel.
7. Place your hands under the ultraviolet light again. Group members should observe and compare the cleanliness of the different pairs of hands.
8. Record your observations in the table using the "Cleanliness Scale" on the next page.

Bread: [iflscience.com/chemistry/this-teachers-neat-but-extremely-gross-experiment-for-her-students-has-gone-viral](http://iflscience.com/chemistry/this-teachers-neat-but-extremely-gross-experiment-for-her-students-has-gone-viral)

Glitter [thesoccermomblog.com/glitter-germy-hands-experiment](http://thesoccermomblog.com/glitter-germy-hands-experiment)

Gelatin: [steamexperiments.com/experiment/how-dirty-are-your-hands](http://steamexperiments.com/experiment/how-dirty-are-your-hands)



Student Name	Washing time (seconds)	Cleanliness Scale Rating
A		
B		
C		
D		

Cleanliness Scale (Description of how clean)	Symbol to use for rating
Very Dirty Hands (similar to before washing)	+++
Mostly Dirty Hands (less green than before)	++
Mostly Clean Hands (a few spots of green)	+
Very Clean Hands (no green glow)	--

**With your group, talk about and then write an answer to the following questions.**

**Look at your data table. Do you see any relationship between the amount of time spent washing (your independent variable) and the cleanliness of your hands (your dependent variable)?**

**Compare your group data with the data from the whole class. Are there differences between groups? If so, what might be the explanation? What other variables (besides how long you washed) could affect how clean your hands got?**



## DIRTY HANDS

### LaCuKnoS Investigation Summary

NGSS SEP: Planning & Carrying Out Investigations (Controlling Variables to Design a Fair Test)

What was your **Independent Variable** in the Dirty Hands investigation? (the variable you changed) How do you know?

What was your **Dependent Variable** in the Dirty Hands investigation? (the variable that changes in response to what you did) How do you know?

List two other variables that you needed to **control** (keep the same) so that you had a fair test

What language would you use to teach a 1st grader what you learned in the Dirty Hands investigation?

What language would an **Epidemiologist** use to describe what you learned in the Dirty Hands investigation?



## DIRTY HANDS

### LaCuKnoS Concept Cards

# Epidemiology/Epidemiología

The scientific study of the causes, spread, and containment of diseases within populations of humans and animals

La rama de la ciencia médica que trata la transmisión y el control de enfermedades





## DIRTY HANDS

### LaCuKnoS Concept Cards

# Germ/Germen

**A microorganism, or very very small living thing such as bacteria or a virus, especially one that causes disease**

**Un microorganismo, o algo muy pequeño, como las bacterias o un virus, especialmente uno que causa una enfermedad**





## DIRTY HANDS

### LaCuKnoS Concept Cards

# Hygiene/Higiene

The practice of keeping clean to stay healthy and to prevent the spread of disease

La práctica de mantenerse limpio para mantenerse saludable y prevenir la propagación de enfermedades





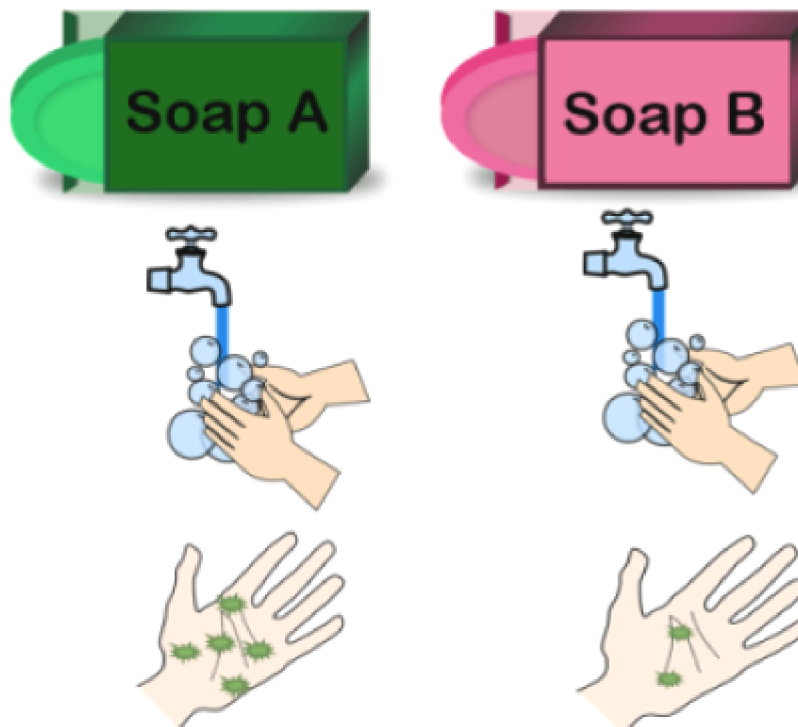
## DIRTY HANDS

### LaCuKnoS Concept Cards

# Variable/Variable

A variable is any factor, trait, or condition that can exist in differing amounts or types. An experiment usually has three kinds of variables: independent, dependent, and control

Una variable es cualquier factor, rasgo o condición que puede existir en diferentes cantidades o tipos. Un experimento generalmente tiene tres tipos de variables: independiente, dependiente y control







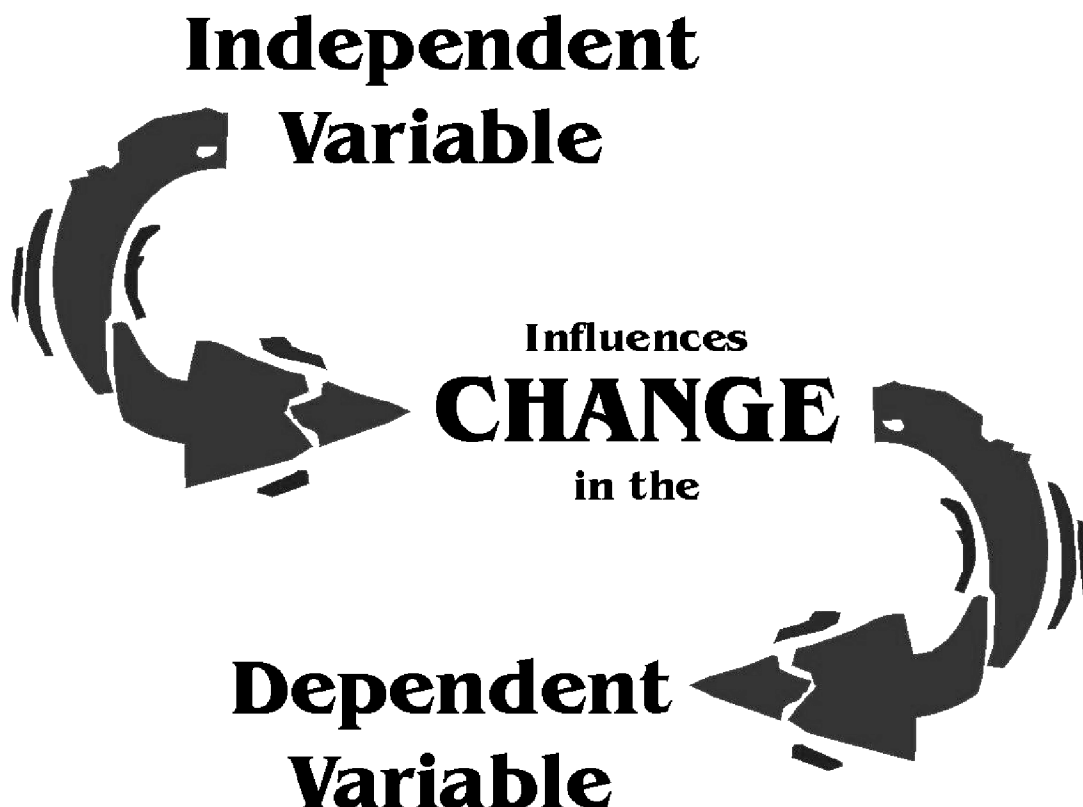
## DIRTY HANDS

### LaCuKnoS Concept Cards

# Independent Variable/ Variable Independiente

The independent variable is the variable that is changed or manipulated in a science experiment

La variable independiente es la variable que se cambia o se manipula en un experimento científico





## DIRTY HANDS

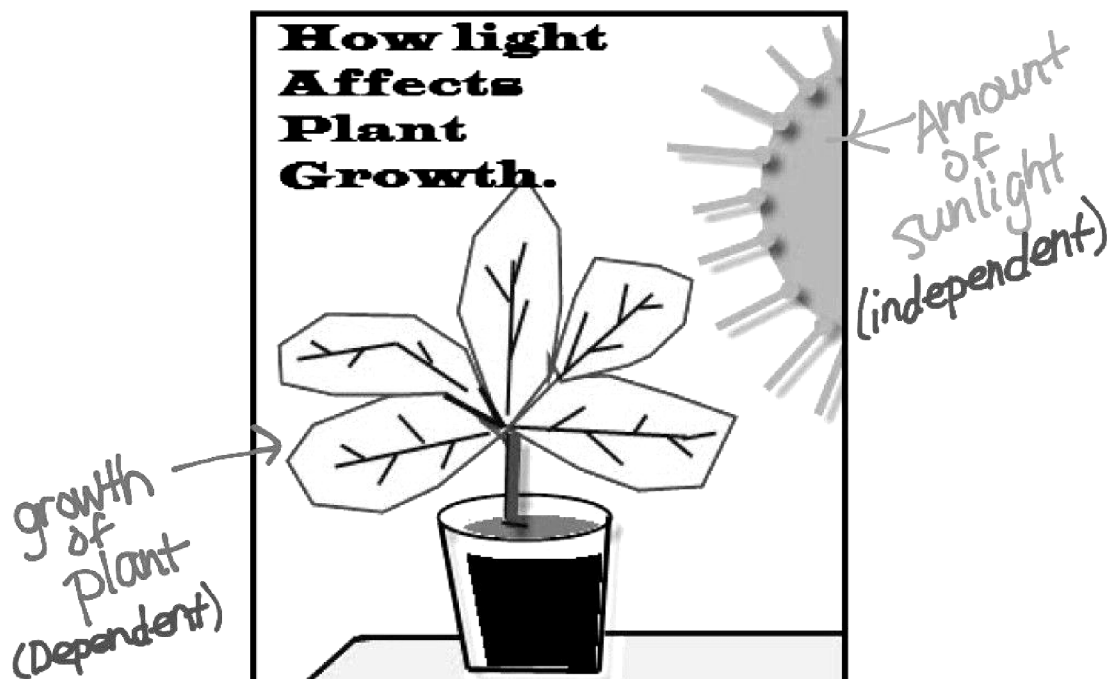
### LaCuKnoS Concept Cards

# Dependent Variable/ Variable Dependiente

The dependent variable is the variable that changes in response to the independent variable; the result in a science experiment

La variable dependiente es la variable que cambió en respuesta a la variable independiente; el resultado en un experimento científico

## INDEPENDENT & DEPENDENT VARIABLES





## DIRTY HANDS

### LaCuKnoS Concept Cards

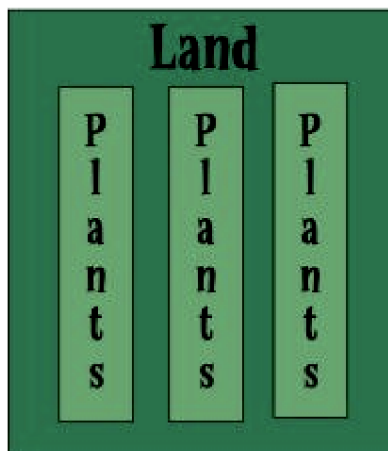
# Control Variables/ Variables de Control

The control variables are the variables or things that you do or keep the same in a science experiment to have a fair test

Las variables de control son las variables o cosas que usted hace o mantiene igual en un experimento científico para tener una prueba justa

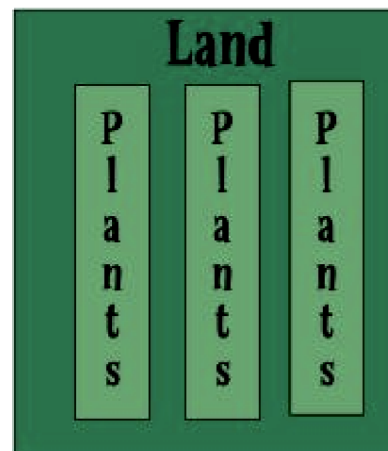
## Experiment

### Control Group



Soil, Water,  
Sunlight

### Variable Group



Fertilizer +  
Soil, Water,  
Sunlight