



Yesenia Bermudez  
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## Viruses

*Today we will be learning about viruses! In the first activity, we will learn about what a virus is, what is the goal of a virus, and why it's so contagious. In the second activity, we will learn about how washing our hands can help us kill viruses. Lastly, we will be making our own DIY hand sanitizer to help us keep our hands clean.*

### Material List

- Writing utensils
- Crayons/markers
- Storybook template
- Water
- Black pepper
- Hand soap
- 2 plates
- ¼ cup of rubbing alcohol
- ½ cup of aloe vera gel

### Key Words

- Virus
- Host
- Replicate
- Lipid(fat) coating
- Soap molecule
- Protein

## 1. Storybook – Viruses 101

Duration: [7 MIN] – Link to video\*: [Storybook about viruses](#)

Today we are going to learn about viruses! Does anyone have an idea why schools, stores, restaurants and many public places are being closed right now? It's because of the coronavirus and how highly contagious it is. The coronavirus is an example of a virus. But why are viruses so contagious and how do they operate? Well that's what we are going to learn about now! (*\*You can find a storybook template as well as the instructions in a separate PDF document. You can print it, color it and follow along with the linked video.*)

- What is a virus?
  - Virus = a very small, non-living particle that can infect people and make them sick.
  - Structure:
    - Protein spikes = are spikes around the virus that are made of protein and serve to protect the virus.
    - Capsid = is the protective coat (outer layer) of the virus that is made up of proteins and lipids (fats).
    - Nucleic Acid = single or double strands of RNA or DNA information = carries genetic information that makes us sick.
- How is a virus activated?
  - When it enters a host, which is any living organism. For example, it can enter the human body through the eyes, mouth, or nose.
- What is the goal of the virus?
  - The goal is to multiply and replicate viruses. This happens when a virus goes inside our cells, the nucleic acid enters the nucleus of the cell and starts replicating viruses.
- Why are viruses so contagious?
  - Because they can float through the air, survive in water and can be found anywhere and if we touch it with our hands and then touch our eyes, nose or mouth, the virus can easily enter our cells.

## 2. Demo: Why is it so important to wash our hands?

Duration: [3 MIN] – Link to video: [Why it's so important to wash our hands](#)

In the previous activity, we learned about the nature of a virus and why it is so contagious. Since we can't physically see viruses with our own eyes, we are going to see a demonstration that allows us to imagine the viruses. We are also going to be able to see the effect that soap has on the virus, so make sure you write down your predictions before the demonstration and your observations after the demonstration!

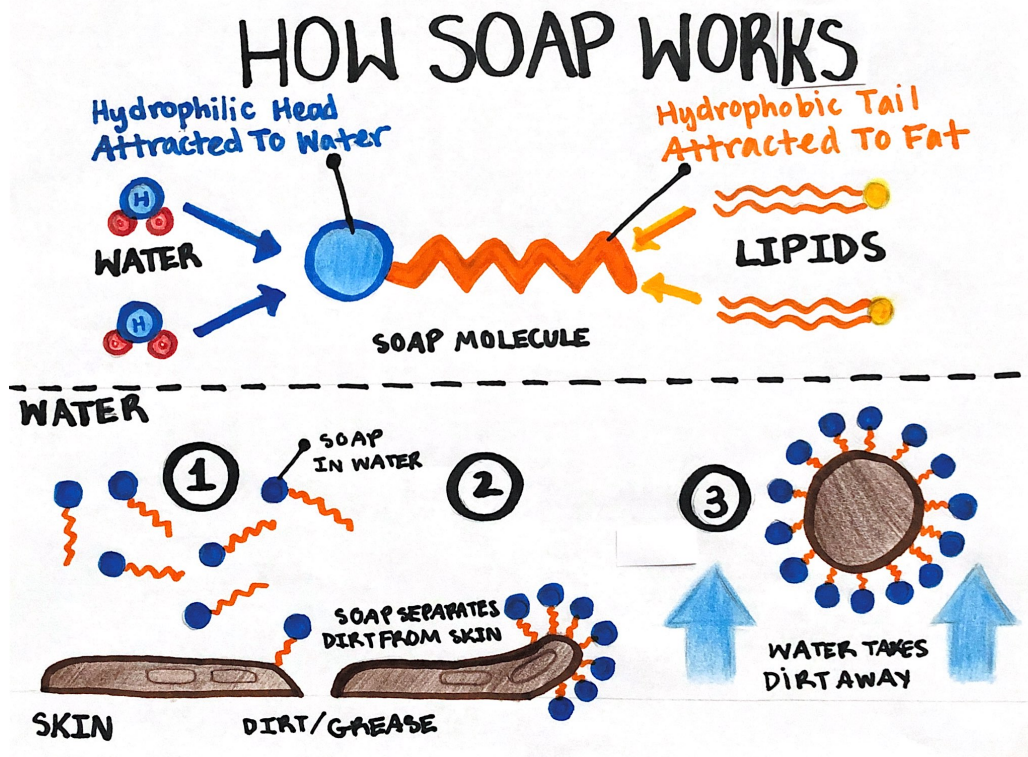
Preparation: (Activity 2 cont.)

- Pour water and black pepper in a plate.
- In a separate plate, pour hand soap.

Demo Instructions:

1. Explain that the pieces of pepper represent viruses on surfaces that they touch.
2. Have a student put their pointer finger inside the plate with water and black pepper. When they take out their finger, ask them what they see. Are the viruses moving? Point out that their finger now has viruses (black pepper) on it.
3. Now have the student put their virus finger in the soap plate.
4. After that, have them re-insert their finger into the plate with water and black pepper and ask them again: Did the viruses move? The answer should be yes, they moved away from the finger that had soap on it.

What did we just learn?



- Soap keeps germs and viruses away. The reason behind that, is that viruses have a lipid (fat) coating on the outside and that coating is broken down with the tail attracted to fat of a soap molecule, as shown in the drawing. This show us how important it is to wash our hands to prevent getting infected by a virus!

### **3. DIY Hand Sanitizer**

Duration: [2 MIN] – Link to video: [DIY Hand Sanitizer](#)

We just learned the importance of washing our hands and keeping them clean to prevent getting infected, right? So, what is another substance besides soap that we can use to disinfect our hands? Hand sanitizer! We are going to be making our very own hand sanitizer and it is very simple to make!

Instructions:

1. Pour 1/4 cup of rubbing alcohol into a bowl.
2. Pour 1/2 cups of Aloe Vera gel into the same bowl.
3. Mix the ingredients together.

Can anybody guess what the killing agent is in our hand sanitizer? Rubbing alcohol! The alcohol, like the soap, breaks down the capsid of the virus and targets the protein in the RNA virus making it too weak to infect anyone.

### **Conclusion**

In this lesson, we learned about what a virus is, how it spreads and the effects it has on us. We also learned that soap has the power to kill viruses because it breaks down its lipid coating. Lastly, we learned that the active ingredient in hand sanitizer is alcohol because it denatures the protein in viruses.