

# National Chemistry Week 2023

## Soap versus Hand Sanitizer: Protecting Gotham City from the Pepper Virus

### Materials (For each individual demonstrator and student)

*Each table gets some water and 2 paper bowls per student. Volunteers will go around to distribute pepper, hand sanitizer and soap. Pepper should cover the surface of the water. One drop of soap and hand sanitizer should suffice.*

### Preparation Instructions for Demonstrators:

Lay out paper plates on the tables. Up to you how to distribute the pepper, hand sanitizer and soap. You could pour some into cups for each table to help themselves (older kids) or have three volunteers go around to each table to distribute pepper, hand sanitizer and soap as needed.

### Start Here:

Demonstrator: Hello, friends! We are now going to learn about viruses. Do you know what happened a couple of years ago? Think.. When you guys were all at home..

\*Wait for responses\*

Demonstrator: COVID. Yes, do you know how it got that name?

COVID is a shorthand for Corona Virus Disease. Do you know what a virus is?

\*wait for response\*

Demonstrator: Have you ever seen a virus? Do you know what it looks like?

\*wait for response\*

Demonstrator: Will you be surprised that it looks like something like a pepper flake. But it is very very tiny!

Demonstrator: So, let's imagine that we have a bad guy: The Pepper Virus and it wants to take over Gotham City! Can you imagine what this Pepper Virus looks like? Can you draw it for me in the worksheets in front of you?

\*wait, go around and encourage them\*

Demonstrator: Ok, so do you know who else lives in Gotham City?



## National Chemistry Week 2023

\* Batman and Robin

Demonstrator: Right! Do you think they can defend everyone from the Pepper Virus?

\*wait for response

Demonstrator: How do you think they'll protect us? Do you remember what your mom and dad said the most during COVID?

\*wait for responses\*

Demonstrator: Yes, they said to wash your hands properly and use hand sanitizer, right? Even now, it is always a good idea to be washing your hands properly.

Demonstrator: Which part do you like more? Washing your hands or using hand sanitizer?

\*wait for responses\*

Demonstrator: But which one is more effective in killing germs? Imagine that the soap is Batman and the hand sanitizer is Robin. Who do you think is going to win against the Pepper Virus. And why so?

\*wait for responses\*

Demonstrator: So, in science when you assume something before doing an experiment it is called a *hypothesis*. What is it called – Hypothesis! So please write your hypothesis in the worksheet.

\*wait\*

Demonstrator: Now let's put those hypotheses to test! So the volunteers with me will come around and sprinkle some viruses that is pepper flakes in the paper plates in front of you and then we will put one drop each of hand sanitizer and soap. Ready?

Demonstrator: And whatever you see in each of the plates will you write your *observations* in the worksheets? Yes?

\*go about doing the above\*

Demonstrator: So what did you guys see? Which one is better?

\*wait for responses\*

Demonstrator: So yes, Batman wins!! Hand soap works better at killing the germs. Do you know why?

\*wait for responses\*

Demonstrator: So, the outer skin of a virus is oily in nature and so they are not soluble in water. But soap also has the same type of surface on the outside. So like dissolves like. Just like you and your friends would go together to the same ice cream shop because you both like ice creams!



## National Chemistry Week 2023

But hand sanitizer has alcohol in it which only disperses the virus particles as you saw during the experiments.

Just like Batman has a number of gadgets to fight crime, hand soap has all the tools in the form of chemicals to fight deadly viruses.

Demonstrator: So friends, what did you conclude? Can you please write your *conclusions* in the worksheets?

What should you be doing from now to kill viruses?

\*wait for response\*

Thank you!



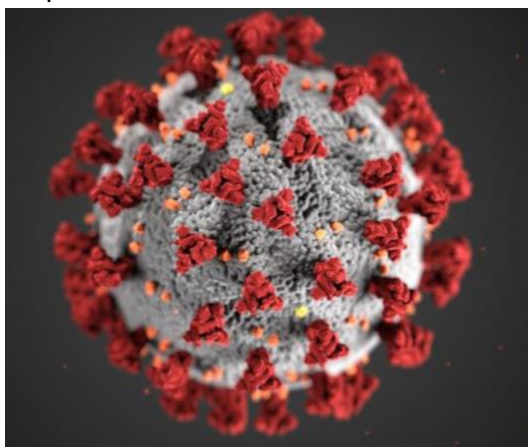
# The Healing Power of Chemistry

## The Chemistry of Hand Sanitizer and Soap

National Chemistry Week 2023: Worksheet

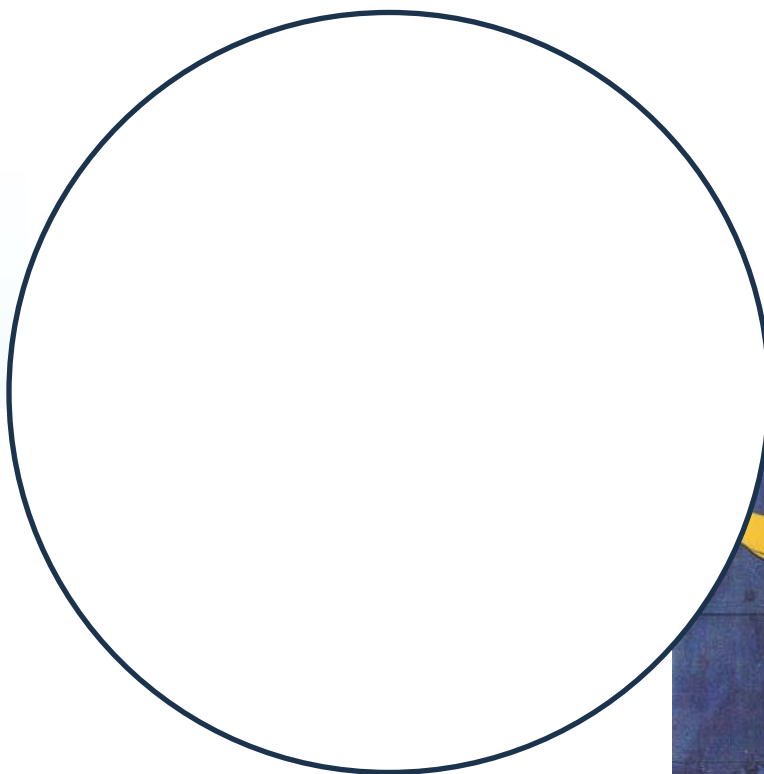
- 1) On your desk you have some black pepper. Pour some pepper onto a plate. Look carefully at one grain of pepper. What does it look like, how does it feel? You can smell it too but be *careful*, it might make you sneeze!!

In this experiment, we will pretend that the pepper is a new villain: The Pepper Virus! We will see how soap and hand sanitizer work to keep us healthy! Do you see the similarities between the pepper flake and this virus particle?



## National Chemistry Week 2023

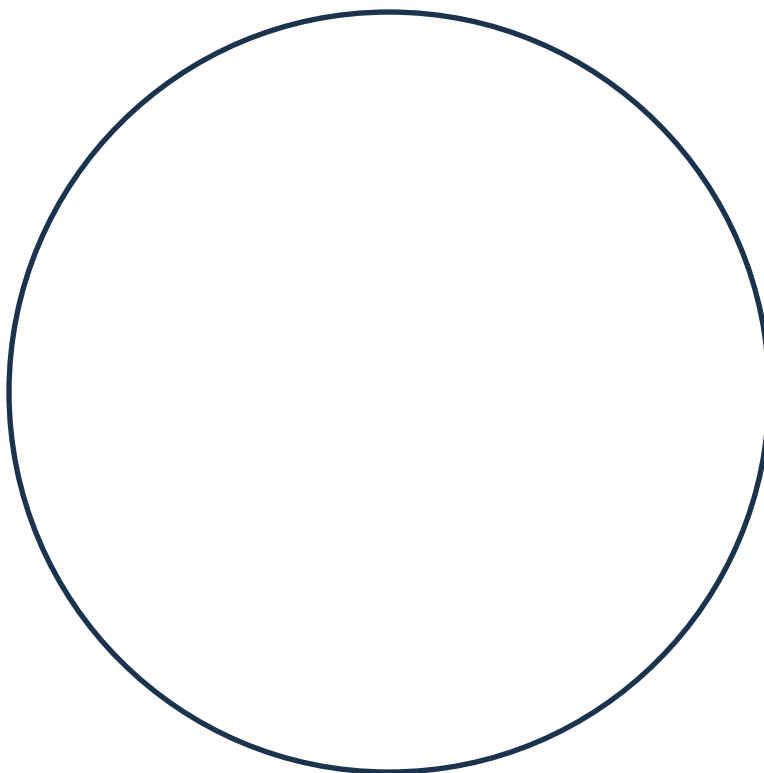
- 1) Use your imagination to draw the Pepper Virus attacking Gotham City! Can Batman and Robin save the day?



## National Chemistry Week 2023

- 2) Pour some water onto the plate and sprinkle black pepper on top.

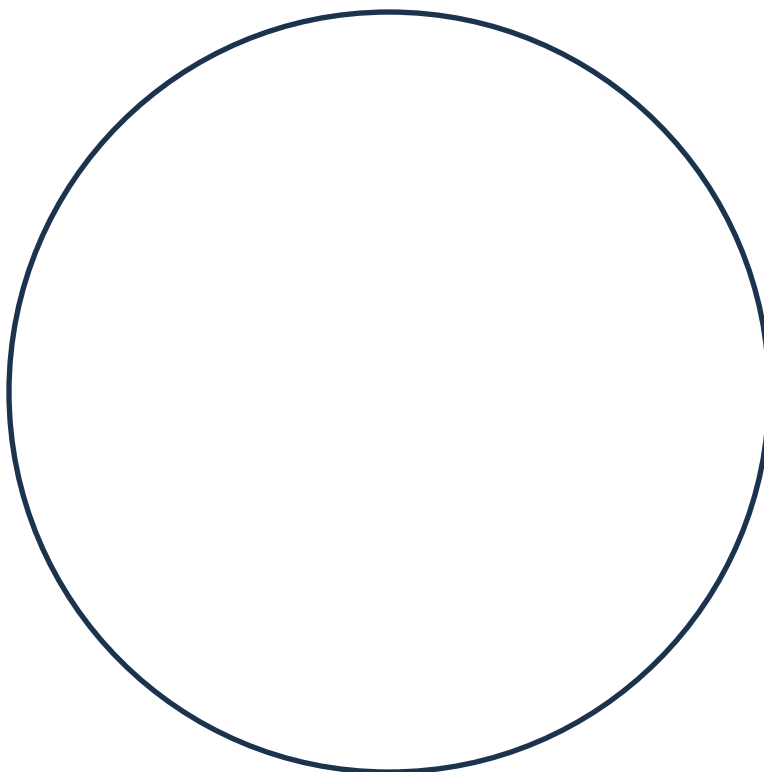
What does it look like? Draw your *observations* here.



- 3) Make a prediction or *hypothesis*...What do you think will happen when you add a drop of hand sanitizer to the pepper?

## National Chemistry Week 2023

- 4) Now, add a drop of hand sanitizer to the plate. What happens?  
Draw your *observations* here.

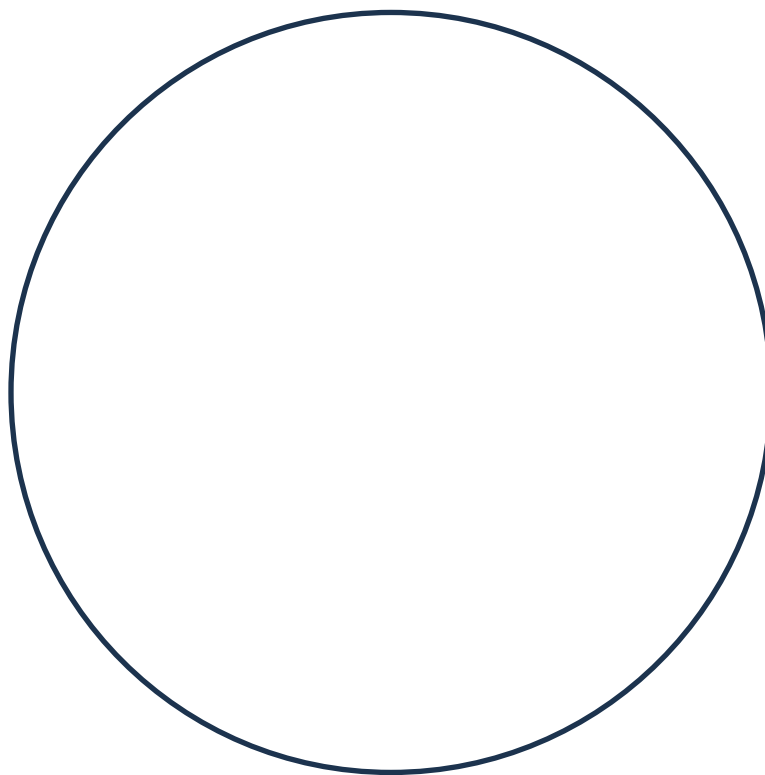


- 5) Explain in words what you observed. Was your *hypothesis* correct?

## National Chemistry Week 2023

- 6) How about soap? Do you think it will work better or worse or the same as the hand sanitizer to get rid of the *virus*? Write your *hypothesis* here.

- 7) Take a new plate and fill it with water and pepper. Add one drop of soap. What happens?





## National Chemistry Week 2023

- 8) Now compare the plates with soap and hand sanitizer. How are they different? How are they the same?
  
  
  
  
  
  
  
  
  
  
- 9) Finally, make your *conclusion*. Was your *hypothesis* correct? Is hand sanitizer or soap better at killing viruses? What would you rather use to wash your hands?



Clean up and wash your hands! Let's stay healthy!