COVID-19 Sparks Community Action

hhmi | BioInteractive

Scientists at Work
Student Worksheet

INTRODUCTION

This activity explores concepts shown in the Scientists at Work video *COVID-19 Sparks Community Action*. The video is about a group of students, scientists, and volunteers who came together to help their community during the COVID-19 pandemic.

By watching the video and doing this activity, you'll investigate the structure and spread of the virus that causes COVID-19. You'll also discover how this information can inform public health recommendations for diseases like COVID-19. Finally, you'll reflect on how collaboration and science can help society, including your own community.

PROCEDURE

Answer the following questions based on the information provided and what you learned from the video. You may want to use the video's transcript as a reference.

1. The SARS-CoV-2 virus is made up of three main types of molecules. One of these molecules (not shown in the video) is RNA, the virus's genetic material.
   a. List the **two** other types of molecules that make up the virus.

   b. Which part of the virus do soap and hand sanitizer disrupt?

   c. How does this disruption affect the virus's ability to cause an infection and spread to other people?

As shown in the video, SARS-CoV-2 replicates in the nose, throat, and lungs. The virus is carried out of the body in liquid particles when a person breathes, talks, or coughs. These particles help the virus spread in multiple ways, such as through:

- **Droplets:** SARS-CoV-2 may spread to people who breathe in droplets (relatively large liquid particles that are about 5–10 µm) carrying viruses. Since droplets are relatively large and heavy, they quickly fall out of the air and can carry viruses only over short distances (less than 6 feet). Due to their larger size, droplets are effectively trapped by most masks.
- **Aerosols:** SARS-CoV-2 may spread to people who breathe in aerosols (smaller liquid particles that are less than 5 µm) carrying viruses. Since aerosols are relatively small and light, they can carry viruses over longer distances (more than 6 feet). Due to their smaller size, aerosols are *not* effectively trapped by masks with looser weaves, including some cloth masks. Aerosols are more effectively trapped by masks with tighter weaves, like the ones made in the video.
- **Touching:** SARS-CoV-2 may spread to people who get liquid-particles carrying viruses on their hands (for example, by getting coughed on or by touching contaminated surfaces) and then touch their mouth, eyes, or nose. This can transfer viruses from a person's hands into their body.

2. The video shows several methods used to reduce the spread of SARS-CoV-2 among people, such as shutting down labs and other nonessential facilities, cleaning hands regularly with soap or hand sanitizer, and wearing masks. Fill in the table below to indicate whether each method would be effective or not effective

at keeping the virus from spreading via droplets, aerosols, and touching. Briefly describe your reasoning for each choice.

	Droplets	**Aerosols**	**Touching**
Shutting down nonessential facilities			
Cleaning hands with soap or hand sanitizer			
Wearing a mask with a *loose* weave			
Wearing a mask with a *tight* weave			

3. Some public health officials have suggested wearing masks with multiple layers or layering multiple masks on top of each other. How might these practices help reduce the spread of SARS-CoV-2?

4. Another method to reduce the spread of SARS-CoV-2 is **social distancing**, the practice of staying at least 6 feet away from other people in public places. Based on what you've learned about how the virus spreads, why do you think social distancing was set specifically at 6 feet?

5. Public health officials have recommended using all the methods described above — for example, washing hands/using hand sanitizer *and* wearing masks *and* social distancing. Why might combining these methods, rather than just picking one, better reduce the spread of SARS-CoV-2?

6. In the video, making and distributing hand sanitizer and masks required collaboration among many groups. Describe **three** of the groups involved in this collaboration and their contributions to the project.

7. As of April 2021, this collaborative project has distributed 45,000 masks and 6,400 gallons of hand sanitizer. If the project hadn't happened, how might that have impacted this community?

8. In one or two sentences, explain how the scientists in the video adapted to respond to a societal need.

9. Consider the needs of your community. Describe one way in which your community could be improved (in terms of health, safety, etc.). How could your community's members, including scientists, collaborate to fulfill this need?