Wizards of Wright

Lesson: Virus Invasion

Background Info for Wizards:	Viruses are infectious agents that can spread quickly from human to human. We have learned over the last few years; just how dangerous they can be. Luckily, we do have ways to protect ourselves. For example: washing our hands, wearing a mask when we are sick, and maintaining good social distancing. In this lesson, students will learn how fast viruses spread and the importance of handwashing. Before beginning the lesson, make sure the teacher is aware that students will come in contact with Glo Germ gel and hand sanitizer. Make sure the teacher is not aware of any student that shouldn't participate because of health/skin sensitivity/allergy issues.
Materials:	five numbered cups five numbered baggies (Pour the powder in the baggie into the corresponding cup when you are ready to begin.) - baggies/cups #1-4 will have 3 teaspoons of baking powder in them - baggie/cup #5 will have 3 teaspoons of baking soda in it teaspoons (1for each group and 1 for demonstration) 20 oz of vinegar in a squeeze bottle with bent tip numbered group signs 2 plastic cups for a demonstration – 1 with 3 teaspoons of baking powder, and 1 with 3 teaspoons of baking soda (baggies/cups #6 and 7) 1 bottle of Glo Germ Gel 1 bottle of hand sanitizer 1 roll of paper towels 1 black light

Lesson Time: ***70-85 minutes***	Introduction: 10 minutes Guided Lesson #1: 10 minutes Student Activity #1: 20-30 minutes Wizard Demonstration: 5 minutes Student Activity #2: 20 minutes Conclusion: 5-10 minutes
Learning Targets:	Students will learn how easy it is for a virus to spread. Students will discuss viruses and the role of Biotechnology Engineers, who use technology to fight viruses. Students will learn the importance of keeping their hands clean to prevent the spread of viruses.
Introduction for Students: 10 minutes	**Say to the students:** Today we are going to talk about viruses and how fast they can spread. Lately, you have probably heard the word virus a lot. What do you know about viruses? (Call on a few students.) **Say to the students:** Some types of viruses include: the Influenza virus, the common cold virus, Chicken Pox, and yes, even the Corona virus. **Ask students:** Who can tell me what a microscope does and what it is used for? (Call on a few students.) - A microscope is a tool that scientists use to make very tiny things look large so they can study them. **Ask students:** Would anyone like to see what a virus looks like under a microscope? Walk around showing the students pictures of the viruses. Continue to remind them that these are photographs taken of the virus under a microscope, and that none of these viruses are this big. (You may want to put a small dot on the board and tell the students that even that dot is bigger than a virus.)
Guided Lesson #1: 10 minutes	**Say to the students:** From our hair - to our heart - to our toes, we are made up of tiny cells. Cells use a small part of our DNA to produce proteins for important jobs like carrying oxygen and contracting muscles. These proteins are nutrients that our body needs to grow and repair our cells. Viruses are tiny particles that can attack those cells, they are also made of protein.

	Viruses attack the cells of living things. They take over the cell and use the information from the cell to create more viruses. Thankfully, Biotechnology Engineers and scientists called Epidemiologists work hard to find vaccines to fight viruses. **Ask students:** Can anyone tell me what a vaccine is? (Call on a few students.) Due to their recent association with vaccines, you may get some interesting answers. Try to steer them back to the question of what is a vaccine? - A vaccine is a medicine that reprograms your cells, so that the virus cannot attack them. A lot like programming a computer! - A vaccine is a type of medicine that doesn't make you better. Instead, it keeps you from getting sick in the first place. It does this by teaching your body to fight off germs like viruses and bacteria. - Vaccines are like putting on a seatbelt when you get in the car. The seatbelt keeps you safe if you should get in an accident, and by putting it on no matter what, you will always be prepared for the worst. Vaccines help your body be prepared for the disease if you come in contact with it. **Ask students:** What have you learned about how viruses spread? (Call on a few students) - Viruses spread quickly through the air from coughing, sneezing, and touching objects that someone with a virus has touched. **Ask students:** What are some ways that we can protect ourselves from viruses? (Call on a few students) - Briefly discuss the importance of hand washing, social distancing, wearing a mask when you are sick, coughing or sneezing into your elbow, staying home when you are sick, and not putting your hands in your mouth, nose, and eyes.
Student Activity #1: 20-30 minutes	**(Students will be working in 5 groups for this activity. Ask the teacher if the groups have already been created. If not, wait while he or she does this. If this is a large class, these may end up being large groups.)** ***Reminder:*** *five numbered cups* *five numbered baggies* *(Pour the powder in the baggie into the corresponding cup when you are ready to begin.)*

	- baggies/cups #1-4 will have 3 teaspoons of baking powder in them *- baggie/cup #5 will have 3 teaspoons of baking soda in it* **Say to the students:** Today we are going to pretend that we are at a party! But 1 group at the party has a cold. Sometimes when we go to parties, or get together with friends, someone might be sick, and have a virus we can catch, and no one even knows it. Today, we are going to pretend we are in that situation. **Say to the students:** Each group will receive 1 of these cups. Although they look identical, one group is different. One group will be carrying the "cold virus". When directed, each group will visit with 2 other groups at this party. When you visit each group, you will put 1 spoonful of your powder into the other group's cup. Think of it as sneezing without actually sneezing. You are "spreading germs." Pass materials out to the groups: - 1 pre-filled plastic cup to each group - a numbered group # sign to each group - a spoon **Remember which group has the cup with the baking powder.** **Say to the students:** I will let you know when you may get up and walk over to other groups. Make sure that everyone in your group gets a chance to participate. - *Have group 1 visit groups 2 & 3 to put 1 spoon of powder into their cup.* - *Then have group 2 visit groups 3 & 4 and put 1 spoon of powder into their cup.* - *Then have group 3 visit groups 4 & 5 and put 1 spoon of powder into their cups.* - *Then have group 4 visit groups 5 & 1 and put 1 spoon of powder into their cups.* - *Lastly, have group 5 visit groups 2 & 3 and put 1 spoon of powder into their cups.* When the students are finished visiting groups, and everyone is seated again, walk around with the vinegar. **Say to the students:** I am now going to test each group's cup for the cold virus. I'm going to be adding a little bit of vinegar. As I test it,

	if we see a reaction, we know your group has been in contact with the cold virus. Put 1 squeeze of vinegar into each cup. They should all have a chemical reaction. They love watching this reaction, so time permitting, walk around and put a second squeeze of vinegar into each cup. Once the fervor has died down, explain to the students what happened. **Ask students:** Who can tell me what the 3 forms of matter are? - Solid, liquid, and gas **Say to the students:** What we saw was a chemical reaction, and it consisted of bubbles. Bubbles are always a sign of the form of matter that is gas. - A mixture of baking soda (a solid) and vinegar (a liquid) created carbon dioxide (a gas). Use cups #6 and #7 for your demonstration cups. Show the class that if only baking powder was in their cup, there would be no reaction by squeezing vinegar into your cup of baking powder. Then squeeze vinegar into your cup of baking soda to demonstrate the chemical reaction. **Say to the students:** Raise your hand if you think that your group started with the "cold virus." - Let the students know which group had baking soda and which groups had baking powder at the beginning of the activity. - Ask the groups to raise their hand if they received a visit from the group with a cold (baking soda) at the party. **Say to the students:** Even though your group did not visit with the group with the cold, all groups had a chemical reaction in their cup. **Ask students:** Why do you think this would happen? (Call on a few students.) - Hopefully a student will be able to explain that when they mixed their powders together, some of the baking soda was transferred to other cups. **Ask students:** Even though all groups had the cold virus in their cup, does it mean that they would definitely get a cold? - Have the students give a thumbs up for yes and thumbs down for

	no. - The correct answer is no. - It just means that there is now a **chance** to get a cold. **Ask the students:** What would be different if the person with the virus had not come to the party while feeling sick? (Call on a few students.) Review with the students that viruses spread quickly. Ask them to review the different ways to protect ourselves from viruses.
Wizard Demonstration: 5 minutes	**Say to the students:** When you listed off some things, we can do to not spread viruses and germs and one of your answers was washing our hands. That's a great answer! Washing your hands is so important that I want to explore that further and do an experiment that shows the importance of washing our hands. Show the students the bottle of Glo Germ that you are going to use. Explain to the students that glo germ is a product that contains small pieces of plastic that we will pretend are germs. These pretend germs will glow under a black light. A black light is a light that gives off ultraviolet light (or UV light). **Show them.** Put a dime-sized amount of glo germ on your hands and demonstrate rubbing your hands together. Then turn out the lights and shine the black light on your hands to show the students what they will see when they do the activity. Point out to students that you aren't touching things around the room or any of them. Then rub hand sanitizer on your hands, wipe with a paper towel, and use the light again. Show students your new results.
Student Activity #2: 20 minutes	Go around the room and put dime-sized amounts of glo germ on each student's hands. Have them rub their hands together. Ask the teacher to turn out the lights and follow behind you with the black light and shine it on the students' hands. (Enjoy the reactions.) Make your second trip around the room, and this time put a quarter-size amount of hand sanitizer in each student's hand. Have them wipe them with a paper towel. Again, ask the teacher to follow

	behind you with the black light and shine it on the students' hands. On their second time under the black light, they will see less "germs". *You may have students that are sensitive to hand sanitizer. In this case, the teacher will send these students to wash their hands with soap and water.* Some students may need more hand sanitizer, or a trip to the sink to use soap and water. Let the teacher make that decision. Time permitting, you may do an extra round of hand sanitizer to see if there are any "germs" left. **Ask students:** Who can explain why there were less "germs" on their hands after using hand sanitizer?
Conclusion: 5-10 minutes	Review with students to see what they learned today. 1. What is a virus? 2. What do viruses do to your cells? 3. What are some examples of a virus that spreads easily? 4. How do scientists know what viruses look like? 5. Does anyone remember what an Epidemiologist does? 6. What is a vaccine? And what does it do? 7. How do viruses spread? 8. What are some ways that you can protect yourself from viruses? 9. Who can explain the chemical reaction we saw in our activity?

Information and graphics credited to: *https://www.ducksters.com/science/biology/viruses.php;*
https://kids.britannica.com/kids/article/DNA/390730;
https://www.ducksters.com/science/biology/immune_system.php , https://www.gloqerm.com/;
https://www.quora.com/What-are-some-real-pictures-of-different-types-of-viruses;
https://th.bing.com/th/id/OIP.eUlweiGNAJjf0OiutNEBrwHaEK?pid=ImgDet&rs=1;
http://digitalstampdesign.blogspot.com/2017/05/free-frame-border-clipart-image-download.html;
https://kidadl.com/education-learning/protein-facts-explaining-what-they-are-how-they-work-to-kids-and-parents;
https://thinktv.pbslearningmedia.org/resource/lsps07.sci.life.stru.cellprotein/how-do-cells-make-proteins/;
https://kidshealth.org/en/kids/word-virus.html;
https://www.parents.com/health/coronavirus/how-to-explain-vaccines-to-kids/;
http://clipart-library.com/computer-virus-clipart.html