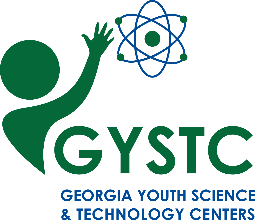
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**In-Class Field Trip:**

**Glo-Germs**

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| **Estimated Time: 1 class period** | |
| **Core Ideas (GSE Standard(s) and elements):**  **S5L4. Obtain, evaluate, and communicate information about how microorganisms benefit or harm larger organisms. (Clarification statement: Possible microorganisms could include Tardigrades, Lactobacillus, Probiotics, Rotifers, Salmonella, Clostridium botulinum (Botox), E-coli, Algae, etc. Students are not expected to know these specific microorganisms. The list is provided to give teachers examples.)**  a. Construct an argument using scientific evidence to support a claim that some microorganisms are beneficial.  b. Construct an argument using scientific evidence to support a claim that some microorganisms are harmful. | |
| **Science and Engineering Practices**  Engaging in Argument from Evidence  Construct and/or support an argument with evidence, data, and/or a model.  Obtaining, Evaluating, and Communicating Information  Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts. | **Crosscutting Concepts**  Systems and System Models  A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. |
| **Authentic Scenario (Phenomena):**  Show students the slow-motion video of someone sneezing: <https://www.facebook.com/ChathamCounty/videos/slow-motion-sneeze/556767678313367/> | **Vocabulary:**   * bacteria * virus * harmful * beneficial * prevention |
| **Guiding Questions:**  What kinds of harmful and beneficial microorganisms are found in our daily lives?  How are microorganisms harmful and beneficial?  How can microorganisms be controlled? |
| **Materials Needed:**  For teacher:   * spray bottle filled with water * meter sticks * Glo Germ Kit (gel and blacklight) * four index cards labeled Do Nothing, Wash Hands with Water Only, Wash Hands with Water and Soap, Use Hand Sanitizer * Whiteboard * Dry-erase markers | **Safety Considerations:**   * Eye contact: Flush eyes with water immediately and continue to flush until discomfort is eased. Contact a physician if irritation persists. * Skin contact: Immediate medical attention is not required. Wash off with soap and water. * Inhalation: Immediate medical attention is not required. Move to fresh air. * Ingestion: If accidental ingestion occurs, dilute with fluids (milk or water) and treat symptomatically. |
| **Technology Integration:**   * Device with Internet access |
| **Literacy Connections:**   * *Germs, Germs, Germs* by Bobbi Katz | |

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| **5E Stage** | **Student Activities**  How will students engage actively in the three dimensions throughout the lesson?  **Teacher Activities**  How will the teacher facilitate and monitor student learning? |
| **Engage** | Gather all the students to stand in a group. Pointing the spray bottle at the group, spray (mist setting). Have the students raise their hands if they felt water land on them. Those who didn't feel water will use a meter stick to measure the furthest distance the water traveled.  Explain that when you sneeze and don’t cover your mouth, droplets can travel anywhere from 6 to 27 feet from your nose.  Show the video: How do germs spread (and why do they make us sick)?  <https://www.youtube.com/watch?v=yxonJTWhBJQ> |
| **Explore** | Put the students into 4 groups. Randomly hand out an index card labeled with directions to each group: Do Nothing, Wash Hands with Water Only, Wash Hands with Water and Soap. Give each student a dime-sized amount of Glo Germ Gel to rub into their hands. Explain that today we’re pretending that these tiny particles in the lotion are bacteria or “germs.” Have the students follow the directions on their cards.  Have students gather around an area in the room. Close the blinds and turn off the lights. Have one group at a time tell the class what they did. Use the blacklight to shine over the students’ hands. Be sure to point out where the most germs were on their hands (the students will be amazed at what they see).  Once all groups have gone, allow each student to thoroughly wash their hands.  Gather the students and discuss which method was best to prevent the spread of germs. On the board draw two large hands and color where germs were found the most (under the nails, in between the fingers, and on the front and back of the wrists are usually the worst). |
| **Explain** | Use the PowerPoint to discuss microorganisms with students. Students will learn that microorganisms are both harmful and beneficial.  A microorganism or microbe is a living organism that is so small that it is invisible to the naked eye. Normally, they can only be seen with a microscope that magnifies the image of the organism. Microorganisms include bacteria, fungi, viruses, and protozoa. While most microorganisms are single-celled, some are multicellular. The study of microorganisms is called microbiology.  *Microorganisms are found almost everywhere. Most of them are beneficial but some are harmful and can cause disease and even death. Harmful microbes, called pathogens or germs, can infect living things, and cause a variety of sicknesses and diseases. For example, salmonella* *is a group of bacteria that causes typhoid fever, food poisoning, and other illnesses.*  Keeping our hands clean through improved handwashing is one of the most important steps we can take to avoid getting sick and spreading germs (pathogens) to others. Many diseases and conditions are spread by not washing hands with soap and clean, running water. Hand sanitizer doesn't replace soap and water if your hands are dirty, but along with regular hand washing, it helps fight many important germs. |
| **Elaborate** | Discuss common objects that would traffic germs between people at home and in the classroom, i.e., telephones, computer keyboards, mice, remotes, doors, and faucet handles, and list them on a whiteboard. Take 1-2 minutes and have the students move around the room to touch such objects in the meeting room if they are available, particularly those that are dark colored since these colors portray germs most distinctly. Expose those objects to the light and observe them as a whole group. |
| **Evaluate** | * Have students turn to a partner to discuss how microorganisms can be controlled and not passed on from person to person in the classroom, at home, at restaurants, etc. Have students answer the discussion question: In what ways are microorganisms HARMFUL to humans? Students should use evidence from the lab activity to back up their claims. * Post-Test |