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I Use Sanitizer; Why Do I Still Get Sick?

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Introduction

Stay Away From the Flu It is nice to get a flu shot it's true But if you can't here is what you can do Tiny droplets of flu are out for you Stay away from the droplets - stay away from the flu If someone is sick stay six feet away Or a sneeze or cough may spray droplets your way And don't touch your eyes or nose or mouth Cause droplets of virus come in by that route Your food can bring droplets of virus to you So, first clean your hands and I'll give you a clue Can't find a sink - don't know what to do Use hand sanitizer, always carry with you Place a dime size amount in the palm of the hand And rub over both hands the best that you can If these do not work, there is medicine too But you have to take it within two days of flu I hope this poem helps you not get the flu But if you do, try not to spread it too Coughing at someone just is not fair Cough or sneeze into a tissue with care And if there is no tissue that's okay too Sneeze away and down, your sleeve will do. [1]

With the Swine Flu scare this year hygiene and protection have been foremost in everyone's thoughts. Even the children are more conscious about germs and have a preoccupation with hand sanitizer. In every hallway in our school building is a sanitizer dispenser. An everyday occurrence is a child's need to use the sanitizer each time they walk past it, which could be as many as 10 times a day. They also feel that if they use the sanitizer they don't need to wash their hands during their bathroom break and that sanitizer can clean dirt, chalk, glue, and pencil marks from their hands. With this obsession with sanitizer I wonder why the children are still getting sick. Even the children are asking questions pertaining to why they have a cold or flu when they use the sanitizer all of the time. The burning question is: what other factors may influence the spread of germs? From a very young age we have all been taught to cover our mouths when we sneeze or cough, wash our hands before we eat and after we go to the bathroom and to clean up after making a mess. But, with all of the hygienic precautions we take why are we still getting sick? The seminar "Evolutionary Medicine" showed me the bigger picture as to why we get sick. Research suggests that all of our cleanliness is actually doing us harm. Our immune system is not developing the way it used to develop in previous generations. In our seminar we discussed this "Hygiene Hypothesis" which was a completely unknown subject to me but very intriguing.

Rationale

I currently teach third grade in a school in the Pittsburgh School District. When one talks about the inner city I can honestly say my school is the most "inner" of all schools in the district. Although there is now a High School in Downtown Pittsburgh I work at a school that is in the first community that is bordering the downtown area. Pittsburgh is located where the Allegheny and Monongahela Rivers meet, also known as the Point. The first community that can be reached without crossing any rivers is the Hill District. It is one of the oldest communities in Pittsburgh and has been through its trials and tribulations. The Hill District was the community where many of the freed slaves and immigrants took residency.

Many of the students come from state subsidized homes, many of which are in need of repairs. The children live with extended families and friends. The instructional program in my school is designed around the District's comprehensive curriculum. The fundamentals of reading, language arts, mathematics, science and social studies are stressed, and expectations are high for student learning and behavior. There were 171 students in the building (K- 5) this past school year, 170 African American and 1 multi-racial child. I was the only third grade teacher in the building and had an average of 23 children in my class. We had semi-inclusion in which 3 learning support and 2 emotional support children would be in my classroom at any given point throughout the day.

This unit is designed for all elementary school students and is designed so that the activities will be appropriate for students in kindergarten through fifth grade. Because I have core-curriculum demands in reading and math I will propose to my principal that I add this unit to my science or social studies class during National Public Health Week which is scheduled for April 7 th - 13 th , 2010. Currently, the third grade Social Studies curriculum that I teach is "Pittsburgh Neighborhoods". The book we use was written in the early 1980's. I supplement the curriculum with new and updated information including a unit about Pittsburgh's families. In this unit we learn about how the family has changed over time and how the changes have affected our lives. An addition to this will now include family size and immunity. I teach the Foss science curriculum which is a hands-on curriculum. The experiment I plan to do with this unit will fit right into the teaching strategies of the prescribed curriculum. As I present the unit I need to make a conscious effort not to embed my ideas and philosophies into the students, but make sure that they come away from the unit knowing how they get sick and how to keep themselves healthy using their own findings as proof. The students need to make an informed decision about how to stay healthy by doing their own investigations and experiments. They will need to get an understanding that there are many possible reasons that they get sick and that sometimes being overly sanitized can cause adverse conditions.

During the flu season we will learn about the Scientific Method and ask ourselves the question: Who gets the most ill in my house? Even though the children have not begun the unit the flu season is the best time to collect the data. This lesson will be based solely on the Scientific Method and data collection could take several months. We will create a study in which the students document the type, severity, and length of the illnesses each household member has over a given time period. I would like the students to see which member of the family is more susceptible to different viruses and infections. When the National Public Health Week arrives I will be able to pull out their data and use it, thus amazing the children as to how well prepared I had to be. We will begin the unit with a discussion on why the children think they get sick and what they think the sanitizer does for them. Using this discussion I will gain insight into what the children's misconceptions. We will then have a brief discussion on their immune system and good and bad germs. We will then explore

several reasons why people get sick. I will have them discuss the common ways that people get sick such as personal contact and airborne germs.

Using the research I have on the Hygiene Hypothesis we will learn the less common factors as to the why and how we get sick. Although the Hygiene Hypothesis researchers did not directly include flu and colds in their study I want to use the Hypothesis' methods to support our research on how and why we get sick. Other researchers took the Hypothesis one step further and developed the Old Friend's Hypothesis which I will also use for background information. Our research will use similar ideas and concepts to gain an understanding of other influences in passing germs, bacteria and viruses.

We will discuss and investigate why in large families the youngest sibling is less susceptible to asthma and infection. As a group we will organize the data and interpret the information in hopes to discover that children in school or daycare tend to get sicker than children that stay at home. The children should also notice that the older brothers and sisters and adults don't get as sick as often as they do. We will discuss that even though they might be getting sicker than their younger sister/brother they are in actuality helping them by strengthening their immunity to the bacteria or virus. We will then discuss ways to protect ourselves against getting sick. A question will be asked whether the children think that it is better to wash their hands, sanitize them or do both. Rather than telling them what I think, we will do an experiment for them to form their own conclusion. The experiment will involve an understanding of the proper technique of using soap and sanitizer, by using glitter as our medium. Glitter has the awesome ability to stay on the skin. Sanitizer will just spread it around the hand and it will take a long time to wash it off. The activity below will explain it more. The students will also study the effects of too much hand sanitizers. They will develop an understanding of why they still get sick with proper hygiene. As a cross-curricula activity the children will be given the poem that was provided at the beginning of this paper and we will form groups to discuss the poem and create a rap using the poem. By the end of the unit the children will have a better understanding of why they get sick, why it is good to have some germs hang around and the proper technique for keeping their hands clean.

Background

The immune system, which is made up of special cells, proteins, tissues, and organs, defends people against germs (also called bacteria or microbes) and microorganisms every day. In most cases, the immune system does a great job of keeping people healthy and preventing infections. But sometimes problems with the immune system can lead to illness and infection. Within our bodies we have germs. In 1865 it was first proven that germs were the cause of disease. Germs are tiny organisms that cannot be seen by the naked eye. Each germ typically causes only one disease; for instance, a germ that causes scarlet fever cannot cause malaria. There are two types of germ found either on our skin or in our bodies. 'Good' germs which our bodies need to stay healthy and 'bad' germs that make us ill. Modern trends have us not only killing the 'bad' germs but also killing off any trace of the 'good' germs. So what is so bad about the 'bad' germs? The bad news is that sometimes germs cause diseases that sicken or even kill us. Everyday bacteria, protozoa, viruses and fungi are all germs that are needed to enable a child's immune system to mature. The major point of the Hygiene Hypothesis is that the cleanliness of our modern environments does not train the immune system properly, and it ends up malfunctioning.

Depending on the grade level or the prior knowledge of your particular class a brief explanation might be

needed for the difference between bacteria, protozoa, viruses and fungi. The primary grade child (K-2) might be happy just knowing that some germs are good and some germs are bad, however, the intermediate children might ask what they all are. Bacteria are single-celled creatures that live just about everywhere on earth. They are so small that you cannot see them without using a microscope; they come in all sizes and shapes and can be good and bad for the human health. Viruses are not made of cells but need a host to survive. While bacteria can grow and reproduce on their own if they have enough food, viruses need to be inside the cell of a living thing. The virus must find a host and then its goal is to reproduce and spread. Most fungi are like plants because they are made up of many cells. Unlike plants fungi cannot makes their own food directly from sunlight, instead, fungi live rely on animals, plants and humans for their nutrients. Fungi love damp warm places like the cracks between your toes. Most fungi are harmless. Protozoa are not as small as bacteria. They are mostly single-celled, and have a nucleus. Some protozoa are parasites, in other words they live off of other things. Some protozoa actually eat bacteria and can be good because they also eat the waste of other organisms. Knowing how and why these germs harm us and how to protect ourselves from the 'bad' germs is the objective of this unit.

The Hygiene Hypothesis is a study that was developed to understand why certain children were at a higher risk to develop asthma. Throughout human life we have lived with dirt and microbes since the moment we were born. Our immune system evolved pathways to protect us. If these pathways are removed (as they are being removed today with all this cleanliness) part of our immune system will backfire. The hypothesis states that exposure to allergens in the environment early in life reduces the risk of developing allergies by boosting immune system activity. Conversely, relatively clean environment in early life would sway the immune system towards allergy-promoting responses. The hypothesis may explain the decrease of allergies in younger children of large families with 3 or more older siblings (due perhaps to repeated exposure to infection from older siblings); and the lower incidence of asthma and wheezing in children who go to daycare centers (where they are exposed to more infections).

Millions of people suffer from the sneezing and wheezing of allergies and asthma, and every year I see more and more of my students with inhalers. Our first thought is that perhaps the pollution is the cause but the Hygiene Hypothesis suggests otherwise. The story behind the hypothesis is in the late 1990s, Dr. Ericka Von Mutius, a health researcher, compared the rates of allergies and asthma in East and West Germany. Her hypothesis, as we all might assume, was that children growing up in the poorer, dirtier, and generally less healthful cities of East Germany would suffer more from allergies and asthma than youngsters in West Germany, with its cleaner and more modern environment. When, in 1999, von Mutius compared the disease rates she found it was exactly the opposite of her hypothesis. Children in the polluted areas of East Germany had lower allergic reactions and fewer cases of asthma than children in the West. What was going on? Von Mutius realized, there are many lifestyle differences between the former two Germanys, including family size and the more prevalent use of daycare for young children in East Germany. According to the Hygiene Hypothesis, the human immune system evolved two types of biological defenses. When one defensive system lacks practice fighting bacteria and viruses, perhaps from an overly sanitary lifestyle, the other system becomes too powerful and overreacts, as an allergic reaction, to harmless substances like pollen.

The Old Friends Hypothesis develops the Hygiene Hypothesis even further, it states that T regulator cells, cells that act to suppress activation of the immune system, only become mature and completely effective if they are stimulated by repeated exposure to microorganisms and parasites. This exposure occurs when coming in contact with a carrier. Living in an almost germ-free environment can make this T regulator cells less effective. T regulators are the generals of the immune system, they determine to a large degree the response of the immune system to various pathogens and antigens.

The Old Friends Hypothesis proposes that appropriate immune response is learned by repeated training of the T regulators through repeated exposure to microorganisms and parasites. The development of vaccines, hygienic practices, waste disposal, sewers, antibiotics and effective medical care have diminished or eliminated the prevalence and impact of many dangerous organisms, as well as relatively benign ones. This has been of obvious benefit and hundreds of millions of lives have been saved. However, our exposure to benign and apparently beneficial parasites and organisms has also been reduced as well. The central thrust of the theory is, therefore, that correct development of T regulator cells in individuals may depend on exposure to organisms such as helminths, which are parasitic worms. For this reason, helminths are used for worm therapy. Worm therapy emerged from the Hygiene Hypothesis. The idea is that because we are exposed to reduced immune-system stimuli, particularly growing up when our immune systems are developing, our immune systems do not develop properly. This parasitic infestation makes the T regulator cells more effective, therefore the helminths take a protective role in immunological disease development. Lack of exposure to sufficient benign organisms, particularly during childhood, is now accepted as the cause for the increase in immunological diseases and diseases for which chronic inflammation is a major component in the relatively sterile industrialized world.

The theory is that in today's society decreased family size has led to more cases of allergies and asthma. Families are getting smaller, children are not sharing bedrooms with other siblings, and they are staying inside most of the day. This results in the decreased contact between children and older siblings. Children are no longer exposed to natural microbes and infections at an early age so their immune systems are not prepared to fight off the infections later. In the past younger children were in contact with their unhygienic older siblings. It used to be that if one child had chicken pox, neighbors' children were brought in to be exposed to it. When one child had a contagious disease they could be sure of plenty of company. Now we keep our children away from the contagious diseases. The reverse of what our parents did. If a family has 5 or 6 children and the older siblings bring home viruses and infections the younger children are building their immunity. Imagine if the eldest of 5 children brought home a virus that gave exposure to his five younger siblings, strengthening their immune system. When the younger children began school and were exposed to the same virus they would have already built a resistance to it. With families getting smaller and cleaner the immune system suffers. That is why in the classroom today if one child get sick and shares the germs through personal contact or airborne germs there are some children that are more susceptible to being infected. If you look at the children that get sick after the first infection it is usually ones that are the oldest child in their family or the child who has no brothers or sisters. Using the sanitizer may stop the spread of the germ but then what happens to the younger siblings of the classmates? They do not get the immunity needed to protect them in later life.

The same theory can be associated with children that attend daycare or preschool at an early age. Many people think that a daycare is a breeding ground for viruses and disease which, in most instances, is true. Daycares today take pride in the clean, sterile, sanitized enriched environment. But this may be doing some harm to the immune system of a young child. Even though children who attend day care may appear to get sick more often than those who don't, this early exposure to illness seems to provide immunity and proper immune function for the future. While daycare children do tend to contract more infections early on, they also seem to build up their immunity by the time they start school, while children who were not in daycare tend to get sick often during the first few years of school. For the ever shrinking family it might be the place to build the resistance needed for later life.

Teaching in a school that is 99.6% African American I was intrigued to read the following information about African American children. As I read it I realized how true it was because many of the children in my building

use inhalers with improper technique, many of which also have poor or incorrect personal hygiene.

The hygiene hypothesis, however, cannot explain the higher rates of allergic asthma among poor African Americans in the inner city areas. Even with equal access to health care, black and Hispanic children are more likely than white children to have asthma and their outcomes are often worse, a U.S. study has found. [2] The study found a number of racial and ethnic differences. Compared to whites, black and Hispanic children were more likely to be diagnosed with asthma at all ages, and black children of all ages and Hispanic children aged 5 to 10 were more likely to have potentially avoidable asthma-related hospitalizations or emergency department visits. "Our findings with regard to treatment patterns were mixed," wrote Kate A. Stewart, of Mathematica Policy Research in Chicago, and colleagues. "Black children, who at all ages were more likely to have a diagnosis of asthma and to have poorer outcomes than white children, were also more likely to receive recommended asthma medications, and especially inhaled corticosteroids." The researchers also found that black children were less likely to be treated by an asthma specialist, who would be more likely to follow treatment guidelines, including proper use of asthma control medications. [3]

Viewed through the lens of the hygiene hypothesis the modern obsession or preoccupation with sterility, equating it with cleanliness and goodness, is revealed for what it is. It may not be beneficial to have a germ free environment.

Many people have a bottle of hand sanitizer in their car, on their desk, or in their home. We use it to clean our hands and kill the germs that could make us sick. But, what many don't know is that they might not want their hands to be too clean. Hand hygiene is one of the primary methods used to reduce the transmission of infectious agents. However, conflicting hand hygiene recommendations for different settings are causing confusion among the general public as to what is the best practice to follow or what products should be used for daily hand-washing and hand hygiene. Many people have the misconception that their immediate environment must be germ free. Well, this is only possible in a true germ-free chamber in a lab or in certain hospital settings. We live in a natural world that is full of microorganisms, living things that cannot be seen by our bare eyes. While some of the microorganisms can cause illness or diseases, others can be essential to our environment and wellbeing. Without good bacteria, we would be without our favorite yogurt, sauerkraut, or certain medicines! And without good bacteria or fungi, our earth would be full of biological debris. Furthermore, we should not forget that our normal, healthy body has various external barriers and internal mechanisms (immune system) to fight germs, as long as their numbers are not overwhelming. We also have bacteria living in and on our bodies that help protect us from the bad bacteria. So, understanding and learning how to control or deal with both the good and the bad microorganisms on our body and in our environment can help us make good use of those microbes, and at the same time, limit the spread of communicable diseases. The goal is to reduce the number of bad microbes to a level low enough for the body to reasonably fight off with its existing immune system.

The body parts of healthy humans and animals are host to a variety of microbes known as resident microbes. But through contact with other objects, the body also picks up other microbes known as transient microbes. A typical person's hand can carry 10,000 to 10 million bacteria, some resident and some transient. When humans or animals are sick or infected with specific microbes the number of microbes may increase. Many microbes are also present in the intestinal tracts of humans and animals; these are known as fecal microorganisms. A person's hands, arms, or fingers may become contaminated with fecal microorganisms after using the toilet. These must be removed by the mechanical friction of washing with soap and water or destroyed by the use of antiseptic solutions. The microorganisms from human and animal sources can be transmitted to hands, other people, foods, and anything else that the hand comes in contact with and vice

versa. This is why good hand washing is important for reducing harmful microorganisms on our hands and for reducing the risk of transferring harmful microorganisms to others. An important key factor in the effectiveness of soap is the length of time it is left on the skin and the concentration of the product.

The burning question is can hand sanitizer replace hand washing? The majority of alcohol-based sanitizers in the United States contain ethanol or isopropanol or a combination of these two products. Most brands also contain a moisturizer to minimize irritation to the skin. Alcohol works immediately and effectively to kill bacteria and most viruses. Alcohol solutions containing 60-95% alcohol are the most effective. Alcohol gels work by stripping away the outer layer of oil on the skin, thereby destroying any "transient" microorganisms present on the surface of the hands. After use, re-growth of bacteria on the skin tends to occur slowly, thereby effectively keeping "residual" microbes that reside in deeper layers of skin from coming to the surface. To be most effective, a dime-size dollop of alcohol gel should be rubbed into the hands for 30 seconds. If hands are dry after only 10-15 seconds, it is likely that not enough sanitizer was used. Hand sanitizers should primarily be used only as an optional follow-up to traditional hand washing with soap and water, except in situations where soap and water are not available. In those instances, use of an alcohol gel is certainly better than nothing at all. Experts suggest that you can't rely solely on alcohol-based hand sanitizers. Alcohol can kill bacteria but not necessarily clean your hands. That is, it does not remove dirt, which includes organic material such as blood or feces. Soap and water must be the first choice in restrooms. [4]

We all know the benefits of having the hand sanitizer sitting on our desk but I was surprised to learn that there are some negative effects of using too much sanitizer on the hands. First, exposing hands frequently to alcoholic hand sanitizer can have toxic effects on your body, in case they are ingested. Children are more vulnerable, as they love the strong smell and bright colors used in hand sanitizers, and I think about how many of my students still put their thumb or fingers into their mouth at an alarming rate. Now when I am supervising my children during the use of hand sanitizers I will make sure I tell them about the poisonous effects it has when their hands are put into their mouth. They will also be instructed as to how to use it correctly. The researched recommendation is that they should always use only a drop of sanitizer, rub it on their palms, back of hands, between the fingers, fingertips, and under the nails. I will try to buy hand sanitizers that have a foaming formula, due to the fact it dries faster.

Improper usage of the sanitizers can lead to more skin problems. The children should know to avoid hand sanitizer overuse if they have unhealed wounds or cuts on their hands. It might cause further skin irritation leading to itching, burning sensation, and skin rash. Hand sanitizers are flammable because of their alcoholic content, so always store them in a cool, dry place and keep them away from heat. A hand sanitizer also has a potential for abuse as an inhaler and regular sniffing of it gives a high. Considering these dangers of hand sanitizer overuse, it is wise to use them moderately.

Strategies

My classroom is based on positive self-image and mutual respect for anyone that steps through the door. Many of the children come into school with negativism and issues that affect not only their education but all of their peers' education as well. The environment must be such that the children focus these energies into their education.

Strategies that will be used throughout this unit will be active learning through exploration, hands-on activity, think-pair-share and active learning. We will also study the scientific method. Institutions of higher learning across the nation are responding to political, economic, social and technological pressures to be more responsive to students' needs and more concerned about how well students are prepared to assume future societal roles. Faculty are already feeling the pressure to lecture less, to make learning environments more interactive, to integrate technology into the learning experience, and to use collaborative learning strategies when appropriate. [5]

Exploration takes advantage of the desire to "discover" things. There are several types of exploration that can be targeted during this unit. The first is the guided exploration in which some limitations are placed on the problems and the responses. This can be used if limited time is available for the lessons. This type of learning gives the learner a choice of responses to a problem presented by the teacher. It can also be used with primary level students who haven't had enough experience to be successful with free exploration. Free exploration is the final type of exploration. In this type of teaching the teacher designs a task that allows the learner to work any way they wish and encourages a variety of responses.

Hands-on learning is learning by doing. It enables students to become critical thinkers, it makes them able to apply not only what they have learned, but more importantly, develops their process of learning, to various life situations. The importance of student investigation of basic scientific principles cannot be overstated. Hands-on learning is the only way students can directly observe and understand math. As students develop effective techniques for observing and testing everything around them, they learn the what, how, when, and why, of things with which they interact.

Think-Pair-Share is a strategy designed to provide students with "food for thought" on a given topics enabling them to formulate individual ideas and share these ideas with another student. It is a learning strategy to encourage student classroom participation. Think-Pair-Share encourages a high degree of pupil response and can help keep students on task.

Meyers and Jones (1993) define active learning as learning environments that allow "students to talk and listen, read, write, and reflect as they approach course content through problem-solving exercises, informal small groups, simulations, case studies, role playing, and other activities — all of which require students to apply what they are learning" Many studies show that learning is enhanced when students become actively involved in the learning process. Instructional strategies that engage students in the learning process stimulate critical thinking and a greater awareness of other perspectives. Although there are times when lecturing is the most appropriate method for disseminating information, current thinking in college teaching and learning suggests that the use of a variety of instructional strategies can positively enhance student learning. Obviously, teaching strategies should be carefully matched to the teaching objectives of a particular lesson. [6]

The scientific method is a process for experimentation that is used to explore observations and answer questions. Scientists use the scientific method to search for cause and effect relationships in nature. In other words, they design an experiment so that they can prove or disprove their hypothesis. Just as it does for a professional scientist, the scientific method will help the students to ask the question, construct a hypothesis, design, execute, and evaluate their experiment. Learning about the scientific method is almost like saying that you are learning how to learn. You see, the scientific method is the way scientists learn and study the world around them. It can be used to study anything from a leaf to a dog to the entire universe. The basis of the scientific method is asking questions and then trying to come up with the answers. The steps we will use

are: Question, Hypothesis, Experiment, Analyze data, Conclusions, and Discussion.

Classroom Activities

Activity 1: During Flu season; strategies: hands-on, exploration, active learning

In science class the children will be introduced to the scientific method of investigating. Rather than have them choose a question and hypothesis I will use the question: "Who in my house usually gets the sickest with the flu or cold?" The children will create their own hypothesis as to who they think is the sickest person. Using a prepared data sheet the children will first list all of the people that live in their homes. Over several months (or until enough data is collected) the children will be required to collect data on the students document type, severity, and length of the illnesses each household member falls victim to. Each Friday I will ask for data from the children and keep track on a classroom data sheet which will show illness by generations; grandparents, adults, older siblings or relatives, the children, and younger siblings or relatives. A second chart will collect classroom data on the type of illness. When enough data is collected I will have the children see if their hypothesis was correct by having them analyze their data. They will write a brief summary to share their results. All data will be collected and kept until National Public Health Week.

Activity 2: Class/pair share discussion and research: strategies: active learning

During this lesson we will start with a whole class discussion. I will ask: Why do you get sick? Talk with the class until you are familiar with their prior knowledge. Then ask: What does sanitizer do? Do not agree or confirm their responses just gather information as to their knowledge. Have partners then discuss together what they think their immune system is used for. After several minutes come back to the whole group and have each group share their responses. Repeat the pair share format to find out what the children know about good and bad germs. And, finally, discuss how a person can get sick (contact, airborne). We will watch the video clip on what is a germ. (http://www.colgate.com/app/LatherUpForGoodHealth/US/EN/Kids-Activities.cvsp) The children may not grasp how tiny a germ really is especially after seeing the above clip. An ideal visual is to log onto http://learn.genetics.utah.edu/content/begin/cells/scale/ Give each child a grain of rice. Using the site show them the picture of the grain of rice and compare the grain of rice in the picture to their grain. Then using the site show how much smaller a germ is than the grain of rice.

Germ research: Here is where the lesson might get tricky if you don't have access to a computer lab. During my research I found a site that will give the children the chance to do research by listening to a person reading the information about germs and hand washing. This site is ideal for differentiated instruction. Those students that are able to read independently can do so but, those that need additional support can click onto the speaker symbol to listen to the article being read to them. If it is impossible to use a lab the document can be printed and read or displayed on a central computer and shown on the screen using a projector if you are lucky enough to have one. This amazing site is: http://kidshealth.org/kid/talk/qa/germs.html# Have the children read/listen to the information and during their reading they should choose three big ideas from the article. Their big ideas can be 3 main ideas or 3 things that was new information to them. Use the think-pair-share strategy by having partners compare their three big ideas. They should then pick the 3 ideas that are most important. Then have two sets of partners (4 students) join together to do the same thing. Continue this method until you have just 2 big groups with 3 big ideas each. Discuss the three big ideas as a whole group. It

is very curious each time I do this because usually the two groups will have the same 3 big ideas which then become the class' list that can be posted on the wall. Depending on your time frame for this unit there are several other articles associated with this topic. The links to the other articles are on the bottom of each page of the site.

Activity 3: Analyzing the data: strategies: active learning.

Now it is time to revisit the scientific method project from the first activity. Hang the class charts on the wall and return the individual papers to the students. An opening question can be "Why do you think I saved this experiment?" After a brief discussion show the video clip about the immune system. This clip can be found on the site http://kidshealth.org/kid/htbw/_bfs_ISmoviesource.html. Using the background information I provided have and open discussion about new things we have learned about the immune system. Ask: So we know that the immune system receives virus germs, where do you think the virus comes from (contact, airborne)? The next step will be to introduce the Hygiene Hypothesis. The depth of discussion will depend on the age group you are teaching the two main points that need to be targeted with all age groups are first that family members can share germs and give each other immunity. The immunity can make it possible for a younger sibling not to suffer like an older child. The other point to make is that if your students attended a daycare at an early age they also can be immune from viruses and colds now. Next, direct everyone's attention to the charts. Ask questions about the data that was collected such as: Why do you think that fewer tallies are marked in the adult column? What do you think older siblings do for the younger siblings? Which age group has the most occurrences? Why do you think this happened? Classroom data will differ so questions will change according to what information was gathered.

Activity 4: Staying Healthy: Hand washing and sanitizer: strategies: hands-on activity, exploration, active learning.

The first part of this activity is to understand the difference between hand washing and sanitizing. Two choices of experiments can be done here. First choice was described above with glitter. This might be easier for the younger child because of the immediate results. It can be also used if materials are not available for the second experiment. A small amount of glitter should be placed into the palm of one hand and the children should be directed to rub it into their hands, as if it is dirt. The first experiment is to prove that sanitizer cannot remove dirt and that if you scrub hard enough with soap and water the glitter will be removed. This experiment illustrates how long it should take each time a child washes their hands. Have the children discuss what they found out with this experiment. They should realize that sanitizer should not be used to remove dirt or food left on hands and that if they need to remove dirt or food they should wash with soap and water.

The more elaborate experiment can be with petri dishes containing agar. You can get these dishes from the district but if you have budget restraints a science fair kit can be purchased at http://www.amazon.com/Petri-Dishes-Agar-Swabs-Science/dp/B000NNCI68 for $24.99. This kit will make 20 petri dishes so you will need to make sure you have enough for each child to have 2 dishes. It is suggested that you have children work in pairs to cut cost. Give each child a covered petri dish after several hours of in-school activities. Prior to cleaning their hands have the gently rub their fingers around the dish for several seconds. Place the lid on the dish and mark it with a 'B' for before. Have a third of the students use sanitizer to clean their hands and another third clean their hands with soap and water and then the third group clean with soap and water then sanitizer. Without touching anything else have the children again rub their fingers in a second dish. Close the lid and mark 'A.S.' (after sanitizer), 'ASW' (after soap and water) or 'ASWS' (after soap, water, and sanitizer) . Store the dishes in a warm area for several days, observations can be made each day. It

is important that the dishes remain anonymous so that no one is teased about being dirty. As you collect the dishes write a number on each pair to keep the dishes together. Have the children write a response as to what they see when comparing the two dishes. Discuss the results then have the children decide whether it is better to wash with sanitizer, soap and water or both.

The second part of the lesson will be a discussion on proper hand cleaning technique. Brainpop Junior (www.brainpop.com) has a great little movie clip on how to properly wash hands. If the class decides that they should do both soap and water and sanitizer this will need to be addressed separately because the movie clip does not suggest this technique. A classroom poster should be created to describe the steps everyone agrees to follow when cleaning their hands.

Activity 5: Read the poem and discuss

The final activity can incorporate language arts by reading and discussing the poem above. If the children are younger an easier poem is below. As an extension they can practice the poems by creating a rap to perform for the class. The older grades could write their own poems about being clean and staying well.

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 Wash the Bugs Away Tiny bugs, too small to see, Want to get inside of me. They
will make me sick in bed, That is why my mommy said . . . After the bathroom, after
play, I must wash the bugs away.
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Activity 6: Wrap up

As a class discuss what the children now know about staying healthy. I would like to have my class understand the following points: First they need to know that there are several ways to get come in contact with germs. Next they need to know how their immune system can be different from someone else just by family relationship. They also need to be able to make an educated decision whether it is better to wash their hands with soap and water, sanitizer, or both. The final point they need to understand is the proper washing technique.

Endnotes

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1. Public_Health_Networker :: Poem: Stay Away From the Flu; 2004, found on the wiki forum: http://www.newfluwiki2.com/diary/3647/poem-stay-away-from-the-flu
2. http://www.nlm.nih.gov/medlineplus/news/fullstory_99678.html
3. http://www.nlm.nih.gov/medlineplus/news/fullstory_99678.html
4. http://biology.about.com/od/microbiology/a/handsanitizers.htm
5. http://www.gmu.edu/resources/facstaff/part-time/strategy.html
6. http://www.gmu.edu/resources/facstaff/part-time/strategy.html

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In "Probiotics - Protection Against Infection" we find clear evidence for probiotics' ability to directly engage and defeat infectious microorganisms. We find new clinical proof of probiotics' ability to specifically boost the immune system while under attack. Here we find the scientific facts separated from the hype and the myths; and the amazing discovery that we can fight fire with fire, as long as we properly arm ourselves with the correct strategies for achieving and nurturing strong probiotic colonies.

Berry, Joy Wilt. *What to Do When Your Mom or Dad Says...Clean Yourself Up! (The Survival series for kids).* Weekly Reader Books ed ed. London: W Pub Group, 1982.

A perfect guide for children to read about keeping themselves clean.

Cebula, Catherine, Robert M. Goldman, and Ronald M. Klatz. *Infection Protection: How to Fight the Germs That Make You Sick.* New York: Diane Pub Co, 2002.

Infection Protection is your personal guide to the self-treatment of infections, too often misdiagnosed, that can make you sick for weeks, months, and sometimes for life. Infectious illness is poorly understood by doctors, yet more than 75% of Americans suffer from parasitic, bacterial, fungal, or viral infections manifesting as fatigue, depression, sinus problems, digestive disorders, premature aging, baldness, skin problems, periodontal disease, and more.

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An eye-opening exploration of the revolutionary new understanding of disease that may set the course of medical research for the twenty-first century.

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Findings from the field of evolutionary biology are yielding dramatic insights for health scientists, especially those involved in the fight against infectious diseases. This book is the first in-depth presentation of these insights. In detailing why the pathogens that cause malaria, smallpox, mad cow disease, tuberculosis, and AIDS have their special kinds of deadliness, the book shows how efforts to control virtually all diseases would benefit from a more thorough application of evolutionary principles

John, and Dalton. *Why Do We Get Sick? Why Do We Get Better? A Wellness Detective Manual*. Raleigh: Lulu.com, 2007.

No matter what you're told, what you've got, how bad it gets, never feel helpless about your health again. This book presents a workable model for how the different parts of you, physical, emotional and the deeper parts, interact with each other and how, when they are out of sync, cause symptoms.

Koella, C., and Stephen C. Stearns. *Evolution in Health and Disease*. 2 ed. New York: Oxford University Press, USA, 2008.

Evolution in Health and Disease describes how evolutionary thinking gives valuable insights and fresh perspectives into human health and disease, establishing evolutionary biology as an essential complementary science for medicine. Integrating evolutionary thought into medical research and practice helps to explain the origins of many medical conditions, including diabetes, obesity, cardiovascular disease, asthma, allergies, other autoimmune diseases, and aging.

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The book begins with a look at the causes of disease and their evolutionary influences. But the book mainly assesses the concept of adaptation by natural selection, and illustrates the ways Darwinian thinking can be applied to medical problems.

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The story of viruses and humanity is a story of fear and ignorance, of grief and heartbreak, and of great bravery and sacrifice. Michael Oldstone tells all these stories as he illuminates the history of the devastating diseases that have tormented humanity, focusing mostly on the most famous viruses

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It is the first book to consider the broader implications of the hygiene hypothesis in areas of medicine where it has not previously been applied. The approach is interdisciplinary, looking at manÃ¢™s microbiological history, at the biology of the effects of microorganisms on the immune system, and at the implications for chronic inflammatory disorders in multiple organ systems.

Ross, Tony. WASH YOUR HANDS! (Little Princess Books) (Little Princess Books). Revised ed. China: Kane/Miller Book Pub, 2006.

The Little Princess is constantly being reminded to wash her hands-after playing outside, frolicking with the dog, using the potty, and sneezing. After questioning why, she is told that germs and nasties can get in her food and make her sick.

Sachs, Jessica Snyder. *Good Germs, Bad Germs: Health and Survival in a Bacterial World.* New York: Hill And Wang, 2007.

A new paradigm for dealing with the microbial life that teems around and within us. Taking both evolutionary and ecological approaches, Sach explains why antibiotics work so well but are now losing their effectiveness.

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The Hygiene Hypothesis and Darwinian Medicine (Progress in Inflammation Research). 1 ed. Berlin : Birkhauser: BirkhÃƒ¤user Basel, 2009.

Turner, Keith. *H is for Hygiene*. 2nd ed. New York: Turngroup & H Is For Hope Books, 2007.

This book is designed to instruct and encourage children from 3 12 years of age on how to wash and maintain bodily cleanliness on a daily basis. The book highlights the importance of showering, shampooing, brushing teeth, and much more. The book concludes with a review list that a child can use daily to ensure that he or she has completed his or her daily hygiene tasks.

Verdick, Elizabeth. *Germs Are Not for Sharing (Best Behavior Series)*. Brdbk ed. Minneapolis, Minnesota : Free Spirit Publishing, 2006.

This book is a short course for kids on what germs are, what they do, and why it's so important to cover them up, block them from spreading, and wash them down the drain. Simple words complement warm, inviting, full-color illustrations that show real-life situations kids can relate to.

Internet resources

http://www.newfluwiki2.com/diary/3647/poem-stay-away-from-the-flu Use this site to access the entire poem about the flu.

http://www.hygienehypothesis.com/ This site has additional information about the hygiene hypothesis that is written for a non-medical person.

http://www.nlm.nih.gov/medlineplus/news/fullstory_99678.html This article gives additional information about asthma and African American children. It also has additional links to more information.

http://www.gmu.edu/resources/facstaff/part-time/strategy.html: This is the site that has the descriptions of the strategies that I used for my activities.