



Maggie's Activity Pack

Name _____

Date _____

Women in Science, Dr. Rita Colwell: Turning Old Clothes Into New Hope

Everyone knows that we need to water to survive. Clean water for drinking and raising crops is essential in any part of the world. Water, especially clean water, is becoming scarce. Sadly, diseases found in water are common. Millions of people, especially children, get sick each year. Bacteria, viruses, or parasites can cause waterborne diseases. These diseases can be mild and people may be sick for just a few hours or days. But some of these diseases can be very serious. These are often found in areas where modern water and sewage treatment facilities have not been built. One of the most serious waterborne diseases is cholera. Cholera occurs worldwide. It is especially serious in areas where floods occur and people come into contact with contaminated water.

People who study small organisms like bacteria are called microbiologists. Dr. Rita Colwell from the University of Maryland is a famous microbiologist. She works to protect people from cholera. Her work has saved lives of many people who don't have clean water.

Dr. Colwell first started her studies in the ocean. She discovered that cholera outbreaks also occurred when the number of plankton in the ocean increased. Plankton are small, sometimes microscopic, plants and animals that live in water, like algae. They provide food for fish and other sea creatures. They are considered to be a necessary part of lakes, rivers, and oceans. However, Dr. Colwell discovered that cholera outbreaks are found when plankton blooms are so large that they can be seen in the ocean with satellites. She used these images to see where these blooms are located. This was important. She knew that cholera bacteria are often in or on plankton floating in the water.

Then Dr. Colwell and her colleagues went to a country where cholera has had a terrible impact on people, Bangladesh. This is an Asian country that has a history of floods. The floods have left millions of people homeless and sick. To add to these problems, many people were sick with cholera. Using their understanding of the culture, Dr. Colwell and her colleagues set out to find a solution. They knew the people needed clean water.

Knowing that the tiny cholera bacteria attach to the larger plankton, they tried experiments to filter the water. With more than 40,000 people involved in her study, Dr. Colwell discovered an amazingly simple solution, the sari. A sari is traditional clothing made from a long piece of cotton. It is worn by women in South Asian countries, including Bangladesh. Women throughout the countryside have sari cloth. Dr. Colwell found that this cloth, folded to make eight layers, provides a good water filter for removing cholera organisms from water. Women began folding their sari cloth to filter water. The amount of cholera in their communities was reduced by nearly one half. Older, washed sari cloth becomes soft and the size of the pores becomes smaller. The bacteria on the plankton have a difficult time passing through the eight layers of folded cloth. What an important use for old clothes! This simple, cheap, and practical solution is helping people. It is saving lives. For her work, Dr. Colwell was awarded the 2010 Stockholm Water Prize, a major international award for water-related activities.

Matching

Match the words from the article with their definition.

- A. plankton 1. _____ a country in south Asia

- B. microbiologist 2. _____ tiny plants or animals that live in water

- C. cholera 3. _____ traditional clothing worn by many women in parts of Asia

- D. sari 4. _____ a scientist who studies very small organisms

- E. Bangladesh 5. _____ a serious disease that people get from bad water

Using the Facts

Use the information from the article to answer the questions.

1. How are old clothes saving lives?

2. How did big pieces of technology help find tiny bacteria?

3. Dr. Colwell’s work shows that scientists need to understand the local community. Do you agree with this statement? Explain your thoughts.

Dear Colleague,

For some of our students, the problem of clean water may be an unfamiliar worry. They do not realize that many children around the world need to travel long distances to find water and that this water may not be clean. I have seen children scooping drinking water from a brown river. I have witnessed children leaving school to pump water from an outside well. I have watched as children rolled in water next to resting cattle, mouths open, gulping the water they shared with these animals. Clean water is not readily available and sometimes not even understood in many parts of the world. Adequate sewage facilities can be one of the reasons female students stop attending school around 12 years of age. Clearly this is an issue we should integrate into our existing curriculum.

"But how do we have time to do this?" This is a question I know many teachers ask, especially in our current climate of needing to align all we do to "the standards." I believe water issues are a natural fit with these standards and can be a way to engage, motivate, and develop critical thinking skills. Let me give you a few examples by relating water issues to three different state standards in three different subject areas.

In Virginia, the Standards of Learning (SOLs) require a social studies unit on Mali in third grade. A key component of this unit is to teach children about the geography and physical characteristics of Mali. A specific goal asks children to consider the problems the people of Mali may experience due to lack of water. This activity can help children understand the many issues that lack of clean water may have on a community.

The Illinois State Standards in Reading, Substrand 1.B.2c require that upper elementary students "Continuously check and clarify for understanding (e.g., *in addition to previous skills*, clarify terminology, seek additional information)." Certainly this article would help teachers in Illinois meet this reading standard. Additionally, nonfiction can engage reluctant readers in a way that fiction may not.

In Florida, SC4. E. 6.5 (science) states that fourth graders should investigate how technology and tools helps humans to observe very small and very large things. Certainly, the experiences of Dr. Colwell who used large satellites orbiting the Earth to observe the phenomena of tiny plankton is a wonderful example of this standard in our real world and shows how these tools can be used to improve the human condition. There are so many ways this activity, and our weekly WAPs can help you to meet your state's curricular requirements.

The issue of water is one near and dear to our hearts at Maggie's Earth Adventures. Our founder works in many areas to promote clean water education and the development of clean water delivery and sewage facilities. I have worked with friends in Asia to support school wells. To help your students better understand the role of water in our world, I also suggest two wonderful books highlighting clean water issues: *Ryan and Jimmy: And the Well in Africa That Brought Them Together* by Herb Shoveller and *A Drop Around the World* by Barbara Shaw McKinney.

Happy reading and happy teaching,
Kathy

Answer Key:

Matching

1. E
2. A
3. D
4. B
5. C

1. Scientists found that old sari cloth can filter out harmful bacteria. Bacteria have a hard time passing through the fabric.
2. Dr. Colwell used images from satellites. These showed her large areas where plankton floated. She knew cholera could be attached to plankton. Dr. Colwell used big instruments like satellites to find something very tiny.
3. Dr. Colwell needed to understand the typical clothing worn in the area. She needed to know that people did not have access to clean water technologies. She found a way they could use what is an everyday item to protect their health.

Goals:

Students will read an article about the work of Dr. Rita Colwell who made many key discoveries about clean water and cholera. Her finding that the traditional sari can be folded to act as a water filter has helped many people in developing countries drink cleaner water. A follow-up activity requires students to use scientific vocabulary and to clarify their understanding of the science in the text. This WAP is available on the primary and intermediate levels. An Emergent Reader activity is also available. These WAPs correlate with Content Standard G, History and Nature of Science, Science as a Human Endeavor of the National Science Standards.