

***MISSION BRIEFING* Mission Synopsis**

This synopsis is provided as an overview for TEACHERS. We advise teachers NOT to hand this out to the students prior to playing the adventure since much of the suspense will be eliminated.

The mission begins on the Arora II Spacecraft. An urgent transmission is coming in from Alpha, the Reconstructor Leader. He tells the student that he/she must terminate the repair mission of Eureka, the medical bot, and head to Prokaryon. A recent earthquake in the Eastern province has sent a flood of refugees into Prokaryon and, with them, a number of deaths due to a diarrheal disease. Because of these deaths, the fringe group, the Areloch, have demanded the closing of the refugee camps. The Areloch believe that the refugees are a stress on the local resources and a health hazard. Alpha tells the student to meet Beta, the chief medical officer, and Sirius, the local public health officer in Prokaryon. They need help to stop the mysterious diarrheal disease outbreak and end the conflict between the refugees and the Areloch.

While en route to Prokaryon, Eureka recommends that the student review important material about infectious disease on the spacecraft's computer. First, the student reviews the Germ Theory, with information on Louis Pasteur, Robert Koch, and Joseph Lister. These scientists were instrumental in showing the connection between microbes and infectious disease. Students will have to answer three questions about these scientists at the end of this section. Next, the student reviews the six types of infectious agents: bacteria, viruses, prions, fungi, helminthes, and protozoa. Unfortunately, there is a glitch in the Arora II's computer, so the student can only access detailed information on bacteria, and none of the other agents. The student can explore the structure of a bacterial cell, view an animation on bacterial reproduction, and play a game in which bacteria are classified according to shape.

Once at Prokaryon, Sirius meets the student and reports that tension over the refugee camp is mounting. It appears that the Areloch have been sneaking into the refugee camp to spy. In addition to the Areloch problem, the number of cases of diarrheal disease appears to have reached epidemic proportions. Sirius leads the student to the MedBay field station and shows a graph with the number of diarrhea cases reported in the last few weeks. The student is then asked to pick the date that indicates the start of the epidemic.

Eureka's repair alarm begins to sound, and Sirius asks the student to fix the bot while he goes to find Beta. To make the repair, the student must reconnect Eureka's loose data chips by matching scientific terms to their correct definitions. Once she is fixed, Eureka intercepts a transmission between Areloch members describing their plan to use robotic spiders (robo-spiders) to continue the surveillance of the refugee camp.

As the transmission ends, Beta and Sirius enter MedBay. Beta realizes that the Areloch are a problem, but reassures everyone that they have not stopped her work on the mystery disease. Beta shows the student slides made from samples of several patients' stool that contain *Vibrio cholerae*, the bacteria that cause cholera. The student is directed to view an animation on the mode of transmission, pathology, and treatment of cholera.

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Now that the cause of the diarrheal disease has been determined to be cholera, the source of the disease must be found. Sirius downloads epidemiological data on five of the patients who have cholera. After reviewing the material, the student should conclude that all five patients ate tomatoes and drank/bathed in the water of a nearby lake. The possibility that water could be the source of the cholera germs reminds Eureka of a classic epidemiological study from history. Eureka shows an animation where Dr. John Snow talks about how he used a case map to identify a water well as the source of a cholera outbreak in the 1800s. Similarly, Sirius has mapped the location of each suspected cholera case in Prokaryon. By examining this map, the student should conclude that most of the cholera cases cluster around the nearby lake.

Finally, a case control study is performed. In this study, the eating, drinking, and bathing habits of 50 refugees who contracted cholera (cases) are compared with 50 refugees who did not get the disease (controls). The only common thread with 96% of patients with cholera is the lake. Eureka chimes in that she observed some refugees using the lake as a bathroom and others using it for drinking and bathing water; therefore, the lake is probably the source of the cholera germs. Now all that needs to be done is put in place measures to prevent the spread of cholera and to convince the Areloch that the disease can be controlled as long as the refugees stop using the contaminated water. They send this information to Alpha and ask him to bring in more water after the lake is blocked. The student is able to play “Refugee Rampage,” a game where the student must lay down fences in order to block access to the lake. After the lake is blocked, Beta and Sirius stress the importance of clean water and washing your hands in order to prevent cholera. The mission ends with Alpha presenting a graph that shows how the number of watery diarrhea cases dropped after the access to the lake was blocked. The last image is a robo-spider crawling across the screen.

Scientist Biographies

John Snow (1813-1858) Famous for discovering that a water pump was the source of a cholera outbreak in London in 1854. Closing the pump stopped the outbreak.

Louis Pasteur (1822 -1895) Father of Germ Theory. Proved that microorganisms are responsible for fermentation. His series of experiments led to pasteurization - heating to kill microbes in liquids to keep milk and wine from spoiling.

John Lister (1827-1912) Applied Pasteur’s theory to human health and encouraged surgeons to sterilize their instruments and hands between patients.

Robert Koch is profiled in the teaching materials of Mission one.