



# YALE NATIONAL INITIATIVE

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Curriculum Units by Fellows of the National Initiative  
2014 Volume VI: Microbes Rule!

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## **The magic of microbes may save our lives!**

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by Maria Orton

This unit was written for high school chemistry classes in an urban setting in order to tie Biology and Chemistry together. This unit also addresses both the Common Core Standards and the Next Generation Science Standards. The law of conservation of matter tells us that matter cannot be created or destroyed but that it rearranges the pieces we start with to get a new configuration using every single one of our original pieces. The hygiene hypothesis tells us that the reason we get sick is because we live in a world that is too clean. Since our immune systems do not train as hard as they did in our ancestors, thanks to discoveries like antibiotics and vaccines, our immune systems tend to overreact and attack harmless microscopic objects like pollen and pet dander resulting in allergies. This unit not only shows how microbes can cause disease and inflammation but also identifies how integral they are to our own survival. In addition it also shows the parallel between how atoms get rearranged in a chemical reaction to how microbes interact within our bodies to produce an allergic reaction or an asthma attack. Students will identify the problem presented, analyze all possible solutions in order to determine which solution is the best choice, and then practice extending their analytical skills to identify what new problems will arise as a result of the solution chosen.

(Developed for Conceptual Chemistry and Scholars Chemistry, grade 10; recommended for Chemistry/Conceptual Chemistry, grade 10, and Advanced Biology, grades 9 and 11)

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