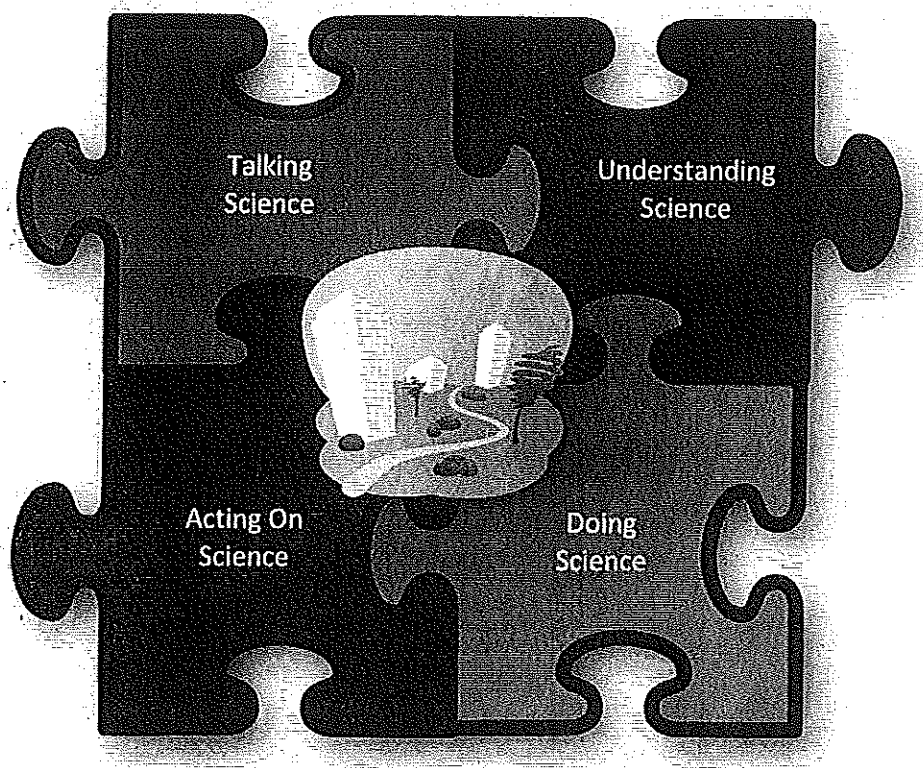


Four Ways of Knowing Urban Ecology



The Four Ways of Knowing Urban Ecology not only provide a conceptual knowledge base upon which students can build, but also provide a framework for using and communicating that knowledge. We have found the Four Ways to be a helpful guide for planning learning goals, selecting materials, shaping activities, and structuring assessments. They also connect very well to the new and emerging skills necessary to participate in scientific life in the 21st century.

Understanding Science provides the conceptual knowledge base for students to understand science content. Understanding science in the 21st century requires that we integrate the different fields of science and consider the social aspects of how scientific understandings are acquired and applied. With this interdisciplinary approach, Understanding Science provides a solid framework to help students develop the 21st century skill of systems thinking.

The goal of Doing Science is to provide students with inquiry-based authentic experiences of conducting research such as developing research questions and collecting and analyzing data. Through these experiences and activities, students develop a number of 21st century skills, including adapting to the real-world conditions of an outdoor study site or laboratory, working in collaborative teams, learning and developing non-routine problem solving skills, and self-management and self-development skills in order to conduct research and complete an authentic scientific task.

Talking Science is an important, yet frequently overlooked, Way of Knowing in the 21st century. Talking science involves learning to communicate scientific information differently to different audiences while maintaining fidelity to the findings and interpretations of science. This includes learning to use scientific argumentation to make claims backed by evidence utilizing appropriate scientific terms and concepts. This also includes learning to communicate scientifically-based knowledge to a non-scientific audience, such as peers, community members, and policy makers. Activities such as role playing various participants at a community meeting in which an environmental issue is discussed or engaging in scientific argumentation to make the case for a finding made in the field are examples of Talking Science. Such activities help students develop complex communication and social skills.

Acting on Science brings many of the 21st century skills together. There are many ways to act on science, but the action planning framework (Figure 2) is one systematic approach that we developed to address this Way of Knowing Science. The action planning framework provides a guided pathway for students to engage in having a positive impact in their school or communities.