This article highlights and explains a thinking tool that we can use to understand ourselves, our local communities, and our planet. This thinking tool can help us solve our local and global environmental problems. This powerful tool is called Systems Thinking.

If you have not already done so, please watch the Systems Thinking video that is associated with this article. You may be wondering why people generally don’t use or know much about this powerful tool. The main reason is that when we encounter a situation, we tend to focus on details and then we jump to conclusions. Is that bush shaking because of a hidden danger or is it just the wind? Being able to quickly decide whether to fight or run away helped our ancestors survive amidst fierce predators and warring neighbors.

Systems thinking involves analyzing what is happening from different and larger points of view. It takes much more time develop bigger picture understandings of the phenomena in our world. Systems thinking also often leads to conclusions that challenge what we think is true or possible. This kind of thinking is most valuable in planning, strategizing, and figuring out what to do in challenging or new situations.

To really appreciate the power of systems thinking, I emphasize two words and one concept. The two words – “emergent properties.” The concept: a system generally has features or properties that are very different than those of its components. These system properties can be so different and unexpected that they seem to mysteriously emerge from how the parts interact with each other. Both the two-word phrase and the concept apply to very simple systems as well as complex systems.

 The video uses table salt as an example of a simple system that has properties that are very different than its parts (sodium, a highly reactive metal, and chlorine, a poisonous gas). The video expands that idea by showing that the taste of salt is an emergent property that requires both the salt and an organism that has the ability to taste salt. We take our senses for granted and don’t think about how and why we and other animals developed the ability to experience pain, tastes, odors, temperature, sounds, and images.

Systems thinking is especially helpful in understanding complex systems that involve lots of moving parts. Ant colonies provide a surprising example. An ant colony can have ant farms, baby nurseries, organized wars, and special food storage facilities. It operates as if the nest is aware of itself and plans how its members will have different jobs to meet the nest’s needs and solve any problems. Most people probably think the Queen Ant is in charge. Actually, she makes babies in a very isolated location, and knows practically nothing about how the nest operates as a whole. And there is no ant king.

The incredible organization of ant colonies results from the huge number of unthinking interactions among the individual ants inside and outside the nest. Each of those ants is instinctively obeying a set of ten or fewer simple rules that determine at any moment where it goes and what it does. Evolution has perfected these ant behavior rules and interactions so they result in the emergence of nest structures and colony behaviors that make ants one of Earth’s most successful organisms. The structures and behaviors of ant colonies are all examples of emergent system properties.

Human societies appear to be very different from an ant colony. We have leaders of countries, sports teams, and companies who are supposed to be aware of their whole system and who give orders about how things should be done. We are more top-down than an ant colony. However, what happens in a country, company or sports team is caused at least as much by the bottom-up cumulative effects of what its people do individually and collectively.

Life science teaches that we have inherited our senses, immune systems, and social behaviors from animal ancestors going back many millions of years ago. Native Americans and other indigenous people naturally recognize and honor their close relationship with other animals. Western societies have tended to emphasize our differences and even been repelled by the concept that we are animals. Science-based systems thinking can help us to change our attitudes and behaviors.

The systems thinking video explains how our global climate emerges from how Earth’s atmosphere, geosphere, hydrosphere, and biosphere interact with each other and with the energy input from the Sun. Our collective human behaviors are changing our planet’s climate in ways that endanger Earth’s web of life and human societies. Systems thinking teaches us that we can solve the climate change crisis by wisely implementing bottom-up and top-down actions that enable the emergence of a more stable planetary climate.