The Power of the Question

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Students who have excelled academically in a range of disciplines have done so because they have succeeded in answering questions posed by their teachers in the humanities, in the social sciences, and in sciences, mathematics, and engineering. Yet, I urge you to consider the importance of asking instead the right question. It is my contention that posing a new question may be the more valuable pursuit – for it is by questions that we probe the unknown and discover new paths to take for ourselves.

The question is a little understood element of human cognition. Nevertheless, some question is at the center of every scientific and technological advance, and fundamental questions underlie every humanistic quest to comprehend the world about us. The question is a central aspect of both learning and knowledge creation. Yet, students often seem to value more the answer than the question.

I cannot tell you how many times students have come up to me in a beginning chemistry course and asked me to tell them the answer to a problem. When I inquire what process they are attempting to use to solve a problem, I am told that this is not important – but what is important is the correct answer. I think quite the opposite. The quest to answer a question is where the learning takes place, not the answer itself.

I feel so strongly about this matter that I have been involved in an activity called MoleClues*, a play on the word ‘Molecules’, in which we invite students under the age of 18 to pose questions. The ‘we’ refers to the Molecular Frontiers Foundation of which I am the President. The inaugural awards of the annual Molecular Frontiers Inquiry Prize for youth took place on Friday, May 30th, 2008 at the Royal Swedish Academy of Sciences, Stockholm – also the home of the science Nobel Prizes. This competition, which some have nicknamed the “kid Nobel,” is meant to foster inquisitiveness and creativity in young people around the world. It is open to anyone, from anywhere, so long as the participant is under eighteen years of age.

Children as young as eight from all over the planet participated in the competition via the free science-discussion Molecular Frontiers website (www.molecularfrontiers.org) where they

* MoleClues (www.moleclues.org) is a new website designed for young people to explore science through virtual environments that illustrate the importance of molecules in daily life. The site offers an on-line community where visitors can connect with young peers from all over the world and encourages youth to ask questions to expert scientists.
could chat with young scientist mentors or their peers in an environment that was designed around our moto: Curiosity–Creativity–Honesty–Knowledge. The competition entrants, in addition to asking a short question related to molecular science, had to explain to the judges why they thought theirs was an important question, where they have already looked for the answer, why they were unsatisfied with the answers they received, and what they suggest scientists do to obtain better answers. The winning entries sounded simple at first glance, yet quickly made for furrowed brows among the world-caliber scientist jury. For instance, Vladimir Leopards, age 15, wondered “Why aren’t plants black?” noting that since black absorbs more sunlight than green, why haven’t plants evolved to take advantage of this extra energy available for photosynthesis? Katie Osborn, age 14 asked “What are emotions?” and described an experiment to check for a hereditary component to emotional responses that she hoped would explain why people constantly tell her that she “responds just like her mother.”

I just wanted to share two of the ten winning questions with you. The point is that questions propel the world of inquiry and you should never underestimate the power of a simple question in organizing human endeavors. When you ask a question, you develop ownership of the question, and this sense of ownership is nothing like what you get from an answer. Today, we are drowning in information; no one person can know all knowledge – and the real power comes from the question, which organizes knowledge and directs us to the unknown. Life is not about answers; it is about questions, and the quest to find solutions to stated problems.

We all begin at an early stage in life, often the age of 3 or 4, by asking repeatedly “Why, why, why?” – meaning that we want to know why certain things are the way they are. Many parents find this annoying and tiresome and call this childish behavior – but I urge you to retain this child-like approach to learning. I think its power is undeniable. The right question at the right time can make all the difference as we stumble along the path of life. It is by questioning that we examine how well we really know something and discover what we still need to learn. It is an essential part of the joys of the life of the mind.

Richard Zare, Professor of Chemistry at Stanford University was elected Foreign Fellow of the Indian Academy of Sciences in 2008. This article is adapted from a talk given by him to Phi Beta Kappa initiates at Stanford on June 13, 2008. Phi Beta Kappa is an honour society to which only students with the highest levels of academic achievement are admitted.