WHAT is science? There are many definitions and answers. The most common definition that has been put forward till now is that it is the continuous and concentrated effort of human beings to understand everything around us, how the natural world works, with evidences and observations.

Scientists work hard continuously and constantly with dedication and try to make new discoveries. It is a highly evolving discipline and new discoveries are being made each day and each new discovery changes our perceptions of looking at the world. Every branch of science – whether astronomy, biology, physics, chemistry or earth and geological sciences – is seeing newer advancements and scientists are adding lots of new literature. The old theories that were put forward long back are questioned with new evidences that do not fit in with the existing ones.

Such change is important to help in a better understanding of nature. However, it is achieved by constantly asking ‘Questions’, questioning every old belief and idea, finding out whether our current ideas are correct. Maria Mitchell, the famous American astronomer, when interviewed by a group of journalists about the reason for success in science candidly advocated that in order to progress in science one should learn to ask questions. He emphasized that young children should focus on How, Why and What. Simply put, it just means learn to question – “Question everything”.

If we look at the way how science is done and how science works besides what an appropriate scientific method is, we get to know that asking questions is an important pursuit in learning the fundamental facets of this discipline.

Many scientists are of the opinion that the scientific method is an orderly process of acquiring knowledge by asking intelligent questions. So science and the scientific method both rely on asking questions – questions of all kind. Some may be childish, some may be just appropriate, some at times inappropriate for the situation and some may be really intelligent ones. But science can never progress if we stop asking questions.

Questions are the life line for science to stay alive, perform and progress. Questions lead to improvisation and betterment of solutions to the common problems. Modern technocrats believe that asking questions lies at the heart of innovation.

Imagine, if young Isaac Newton, later known as the ‘Father of Gravity’, would not have asked the question, “Why does an apple fall from the tree on the ground”, where would we have been today in terms of our basic understanding of science. If he had not thought of seeking an answer to this question that nobody till then posed, we would never have been able to understand the Laws of Gravitation and many other aspects of modern physics.

Albert Einstein, the greatest physicist, posed another question that changed the perception of various things that were prevalent in physics: “What would happen if I rode a beam of light?”. This paved the path for the theory of relativity.

C.V. Raman, the Indian Nobel laureate wanted an answer to a simple question which probably everyone wanted to know: “Why the sky is blue?”

We can easily decipher that these scientists went a little far asking some pertinent and relevant questions. Their curiosity and inquisitiveness to seek the answers using experimental and observational approach helped them reach the formidable conclusions that were accepted as great concepts, theories and inventions of the time.

Richard Feynman, Nobel prize-winner and an accomplished scientist, known for his contributions to Physics, once said in one of his lecture series that asking the right questions takes as
changed, certain sections of the society became authoritarian. So, questioning an authority or even the thought of it would be considered as a rebellious attitude. Gradually, the tradition has died down and is at its lowest ebb.

When and how Indian students gave up their questioning ability is still a topic of debate and remains unresolved till now. But why did it die and why young students gave up questioning can be dwelled upon. What are its implications on students learning science and related streams can also be looked at.

One strong argument that is put forward by the majority of thinkers is that parents kill the instinct of young budding children knowingly or unknowingly. An average pre-school kid asks some 70-100 questions in a day: why the grass is green, why butterflies are so colourful, why one rose is red and the other pink, why milk is white, why sugar is sweet and lemon is sour, why my teeth are not like you, and so on and so forth. But an average parent gets pissed off with the volley of questions, he is put off and he shuts the child off. The parents discourage students from learning in a natural way.

A cursory look at these questions may not be enough to go into the depth of these. All these questions are based on strong scientific principles and concepts and if these are answered in a way that a young kid can comprehend, he will learn the real science behind it. Children who ask questions learn more rapidly than those who don’t as when they seek answers or when they get the answers, they learn about the cause and effect, they learn the basic concepts and relate these to the real world. By encouraging young brains to ask questions, we cater to the child’s inquisitiveness and help him grow and evolve as a better person. By stopping kids from asking questions they turn up to be meek and the learning ability subsides.

Another argument that is put forward is that science teachers especially are tight-lipped and create a hype about the subject. The picture they portray for a science student is that of a chariot-horse driving a bridegroom who has to see straight without tossing his head. This means that science students have to act like blind followers driven by that horse. So there is no scope for critical thinking or asking any questions. Asking questions is considered as a teacher’s prerogative, not the student’s. Teachers take the charge in the class and students are mute spectators. This is turning out to be dangerous for science learning.

The teachers need to understand that students should be trained and taught to ask good questions in a logical sequence. Teachers should accept that questioning should reside with the students and that this can help them unravel some mysteries. This will also enhance their cognitive, learning, analytical and critical thinking abilities. Students who ask questions are in charge of their learning and become co-constructors of the knowledge. Asking questions in science helps students to challenge the pre-conceived notions and ideas besides breaking the myths and superstitions that are prevalent in our society.

The framework can become a jumping-off point for further enquiry and help science students to retain information for longer durations. Thus, it is important that students should develop and work on increasing the art as well as attitude for questioning and be an equal partner in the teaching-learning process. Rewards in schools should not only be given for giving right answers in various tests and competitions but also for asking the right questions. This change in attitude and methodology of teaching is enough to transform our students into future scientists par excellence.

A change in mind set, that is prevalent more in South East Asia that elders cannot be questioned, has also to be cultivated. The young generation of India that is admired all over the world for their hard work and academic excellence are tainted to be blind followers. They have to come out of those clutches and be the future leaders and take charge of their own learning.

They need to have stars in their eyes and for that they need to question each and everything or else we will have a generation of Zombies and Robots who can be trained to do every possible task but without any thinking capability of their own.

Dr Monika Koul is Assistant Professor, Hans Raj College, University of Delhi, Delhi-110007