i wonder...
REDISCOVERING SCHOOL SCIENCE

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Editorial

Darwin's theory of 'evolution by means of natural selection' is among the most defining contributions to our understanding of the rich diversity of life as well as the origins and evolution of species. In fact, biology makes so much more sense when it is viewed through the lens of evolution. But what is equally, if not more, important is the process that Darwin employed to arrive at, refine, and popularise this theory.

Darwin used the classic scientific method — systematic observation and deep reflection on observed patterns — to formulate a hypothesis. He used experimentation and further observation to modify, fine-tune, and validate his hypothesis, and arrive at a comprehensive theory. In Darwin's case, this entire process was driven by a burning curiosity to better understand nature. This curiosity led him to explore fields as diverse as geology, zoology, botany, taxonomy, anatomy, palaeontology, and even sociology. He learnt by reading the works of experts in these fields, and bolstered this knowledge with first-hand observations of nature. It was this ability to connect knowledge from diverse fields with observations of the natural world that led Darwin to his hypothesis.

The high point of this process was Darwin's circumnavigation of the globe on board the HMS Beagle — he spent these five years making prolific observations of diverse terrains, flora, fauna, and fossils. For the next two decades, Darwin painstakingly collected evidence to prove his theory, and plug every possible gap or objection to it that he could think of. In this process, he befriended and learned from such diverse sets of people as dog breeders, farmers, gardeners, zoologists, botanists, taxonomists, palaeontologists, geologists, explorers, and museum curators. He cultivated flowers to understand their breeding behaviour, and bred several varieties of pigeons to study their lineages. Recognising taxonomy and anatomy as his weaknesses, he set himself the task of improving his understanding of these fields by studying, dissecting, and classifying the barnacles that he had collected on his journey. This task took eight years! He even dabbled in embryology to get a better understanding of comparative anatomy.

Darwin's personality played almost as important a role in his success as his method. His determination and tenacity helped him smell out and follow any trail with the potential to lead to new evidence for his theory. He sought new information and specimens through regular correspondence with a vast number of people across the world, some from as far away as India, the Americas, and Australia. In the mid-19th century, this would entail waiting patiently for as long as two years to get a reply. It was his friendly, helpful, and collaborative attitude that helped Darwin create a vast globe-straddling network of support.

As science educators, we have much to learn from Darwin's life to help guide our students in their journey to become successful scientists. We can ignite a student's curiosity to explore nature, enable them to reflect deeply on what they observe, and help them explore natural phenomena through perspectives from different fields. A science teacher is the best person to encourage students to persevere in their scientific quest without losing the ability to enjoy the journey of exploration. Another important role that a science teacher plays is to inculcate critical thinking in students by constantly encouraging them to question the how and why of every 'fact'. Last, but not the least, science teachers need to guide their students to become collaborative learners.

A great science teacher is quite possibly the most important ingredient in the making of a successful scientist. After all, if it weren't for the initial encouragement of his professor John Henslow, Darwin's theory of evolution might never have come to be.

RamG Vallath
Editor