current conservation

kids

Painting the Tree of Life

A couple of years ago, some of us, who were then in Class VIII, created a mural of the Tree of Life on a wall in our senior school in Rishi Valley. This mural is a symbol of our learning and understanding Charles Darwin's Theory of Evolution. The Tree of Life describes the evolutionary relationships between all living beings on this planet. Darwin often used the image of a tree to express his theory of evolution.

"The affinities of all the beings of the same class have sometimes been represented by a great tree. I believe this simile largely speaks the truth. The green and budding twigs may represent existing species; and those produced during former years may represent the long succession of extinct species"

From Chapter IV of Charles Darwin's "On the Origin of Species"

The idea of evolution was introduced to us by our biology teacher. As we progressed through the lesson our teacher suggested that we paint our version of the Tree of Life on a wall in our classroom. A few of us enthusiastically took up the idea but decided that we would like to create a larger version on an empty wall in the senior school. We first painted the background yellow, and on that we then drew the skeleton of the tree with chalk. We used different shades of browns, greens and yellows, and also brighter colours like red, purple and blue for the rest.

We chose the branches, and the kinds of life forms to be included, in consultation with our biology teacher. At the base of the tree is a red seed in which we drew a double helix, to signify that all life evolved from DNA.

Above this we drew three branches to represent the three Domains — the Monera (Bacteria), Archaea and Eukaryotes. Bacteria (on the right of the trunk) are shown by *E.coli*. We decided to paint several species of Archaea (on the left of the trunk) as these aren't usually shown in text books. The branch points also indicate that Bacteria speciated before Archaea. Above these one sees the great variety of Eukaryotes, with almost all the major groups. These include fungi, insects, and plants (ranging from ferns to flowering plants) and major Chordate orders such as birds, amphibians, reptiles, and mammals. The few dry leaves that are shown fallen on the ground are meant to represent extinct species, indicating that there have been many dead-ends in evolution.

"Of the many twigs which flourished when the tree was a mere bush, only two or three, now grown into great branches, yet survive and bear the other branches; so with the species which lived during long-past geological periods, very few have left living and modified descendants"

From Chapter IV of Charles Darwin's "On the Origin of Species"

One of our favourite images is of the dinosaur, and it is also a reminder that this once mighty group of animals was completely wiped off the face of the earth 65 million years ago. The mural has a background of water droplets to signify that water is the medium for all life.

The mural progressed slowly and we got into conflicts with each other as our ideas and artistic sensibilities clashed at many points. Yet this project helped us learn to work as a group and respect each other's thoughts. Since we were in a boarding school, we could choose to work outside school hours and most of the work was done on weekends. It took a whole term (4 months!) with lots of paint, sweat, and touching up to complete our masterpiece!

The Tree of Life, while simple in conception, speaks to us intuitively, and in it lie buried many deep ideas regarding our origins and connections to all beings in the natural world. It remains the best way to explain how life on this planet developed. We hope this piece encourages you to draw your own version of the Tree of Life.

A R Sharada, **Gouri Nandana** and **Aura Guha** are now in Class XI.


"....FROM SO SIMPLE A BEGINNING ENDLESS...
...FORMS MOST BEAUTIFUL AND MOST...
CHARLES DARWIN

Turtle song

April is the cruellest month, breeding
Hatchlings out of dead sand, mixing
Instinct and survival, stirring
Baby ridleys into juvenile frenzy.

Hatchling to right of them,
Hatchling to left of them,
Hatchling behind them
Fumbl'd and flounder'd;
Storm'd through the egg shell,
Srambl'd up while others fell,
They that had jostled so well
Came thro' the jaws of sand
Up from their incubatory spell,
All that was left of them,
Left of one hundred.

When old age shall this eon waste,
Thou shalt remain, in midst of other woe
Than ours, a flagship to man, to whom thou sayst,
"Beauty is turtle, turtle beauty," – that is all
Ye know on earth, and all ye need to know.

Deepthi R

She crawls in beauty like the night
Of cloudy climes and starless skies;
And as steals across the bight
Salty tears trickle from her eyes
Hiding her eggs away from sight
She the prowling dog denies.

The fluorescent tide washed the beach clean
A darker night was never seen
The wind blew soft and then the clouds it tore:
And the mechanised boats came trawling-
Trawling-trawling-
The mechanised boats came trawling, right up to the shore.

Kartik Shanker is an evolutionary ecologist with a love for both mountains and marine life, and an occasional writer of children's fiction. If he had a choice, he would spend all his time visiting cool places, looking for turtles & diving at reefs, or hanging out with students, talking about science.

Madhuri Ramesh is a political ecologist who likes to write random things. She is working on her PhD with the Ashoka Trust for Research in Ecology and the Environment (ATREE) and also works with Dakshin Foundation on marine governance.

The coral diver: a day in the life of a marine biologist

I live on a small island called Havelock, in the Andamans, and I work in a SCUBA diving school for a living. Using my background in marine biology, I conduct research on coral reefs around Havelock and take people out diving to introduce them to some of the many living jewels of the sea.

Corals are colourful animals, related to jellyfish, that slowly but carefully build the limestone structures that form reefs, on which a diversity of other marine life thrives.

A majority of the corals around the Andaman Islands died in one dramatic episode in 2010, in a phenomenon called "mass bleaching". This also happened to other corals in the Indian and Pacific oceans. We know that corals were bleached and killed at that time due to warming of the oceans and increasing carbon dioxide in the atmosphere. What we do not fully know yet is: How are coral reefs recovering? And why are some reefs recovering faster and others slower?

Through my research around Havelock, I am trying to answer these questions. I survey damaged coral reefs to study how much new coral is growing back, and what species these are. I also try to find out whether there are any factors that might prevent coral from recovering smoothly.

Preparing for a day of fieldwork diving is very similar to getting ready for a day in the forest, except that my dive buddy and I load up a boat instead of a jeep! We wear neoprene wetsuits beforehand but set up our SCUBA gear and research equipment on the boat. We never forget to carry food, water, and emergency medical kits.

Using a handheld GPS, we navigate to a mooring line above our dive site, Minerva. Once anchored, my dive buddy and I help each other carefully put on our SCUBA gear. Before jumping into the water, we split the load of all the research tools that need to be taken so that our descent to the bottom is smooth. We want to avoid having a camera floating up this way or a measuring tape sinking down that way!

Once at the bottom there is no time to waste, because our full tank of air will allow us a dive time of one hour at most. My buddy gets to work, reeling out the 30-meter long tape over the reef that we are surveying. I place a 1-meter square frame, called a quadrat, over the coral. Then hover above it to photograph the coral—and everything else—that lies within the outlines of the square frame. With the tape to guide me, I collect this photographic data every ten meters along the measuring tape. We survey several such transects to make sure we have sufficiently covered the dive site.

Illustrations: Shruti Kabo

In the last ten minutes of the dive, we swim over and check on the data loggers we had previously placed at Minerva. These loggers have sensors that automatically measure temperature and light intensity underwater for months on end, and the data loggers store all that information. We regularly visit them, with a toothbrush in hand, to scrub off sand and algae that settle on the sensors and interfere with their working properly.

Within an hour of finishing our dive, we are back on land, rinsing off salt from our SCUBA and research tools with fresh water. After a hot lunch and an afternoon nap to get over post-dive drowsiness, I am ready to start processing my quadrat photographs of coral. This part of fieldwork is almost as exciting as the actual diving itself (if it did not involve hours of computer work!). I still thoroughly enjoy analysing my quadrat photos—identifying different corals and measuring their sizes. The next step would be to look at whether temperature and light intensity in Minerva and other dive sites make a difference to how these animals are recovering. This is when I get to really start answering my research questions, by documenting coral recovery. Someday this information could enable us to help reefs in crisis!

Chetana is an aspiring marine biologist interested in studying coral reef ecosystems. When in the Andaman Islands, she spends a lot of time spreading awareness about marine ecosystems, when not diving in the company of bizarre marine animals!

Coral reefs look like underwater mountains but are actually animals! They occur in shallow tropical waters around islands and in coastal regions

Corals are amongst the earliest multicellular animals on earth and are most closely related to jellyfish and sea anemones. They all have stinging cells to eat microscopic plankton floating in the water

Most corals live in colonies, and these can grow into huge structures underwater over a period of hundreds and thousands of years.

Coral colonies are made of tiny tubular creatures called polyps, which form large colonies by budding to form new polyps, which further form new polyps...

Corals produce a stony skeleton made of limestone. Each species of coral has its own building pattern. They come in an amazing variety of shapes including boulders, branches, tables, vases, fingers and mounds!

Corals are associated with tiny single-celled plants called algae. The algae produce food through photosynthesis and provide food for the colony they live in. These algae also give corals their brilliant colours

Coral reefs support a high diversity of fish and other marine creatures and are sometimes considered the marine equivalent of tropical rainforests.

To grow, corals and their associated algae need clean and clear water which is not too warm or too cold.

High temperature, acidification, or pollution can all kill corals and their associated algae, leaving dead limestone skeletons. This is called 'bleaching'

Shruti Kabo