



Why study birds?

Adithi Muralidhar and Anand Krishnan

Today one may come across many tour operators who will entice you with pictures of alluring birds to get you to visit a national park or sanctuary. More parents are taking their kids on nature walks and bird watching trails. More adults are spending their weekend watching birds or photographing birds. A quick browse on the Internet will yield a variety of activities for children around birds! It seems that the urban populace is increasingly making time to spend amidst nature and know more about birds.

As a teacher, you may have observed that there are sporadic references to birds and topics relevant to the study of birds across the CBSE science curriculum from classes 6-9. In some chapters like "Diversity of living organisms" (class 9) and "Conservation of plants and animals" (class 8), there are explicit sections on Aves and bird migration respectively. In other chapters/classes, birds feature when discussing about food chains, similarities of shape between a bird and an airplane, food sources, etc. So it would be interesting to plan some lessons around birds. Accompanying this task is an interesting question to

ponder: *What can one learn from birds? Why study them?*

In this article, we try to list out the different aspects associated with studying birds and the diverse skills and discoveries one can expect when carrying out activities around birds.

What can human beings learn from studying birds?

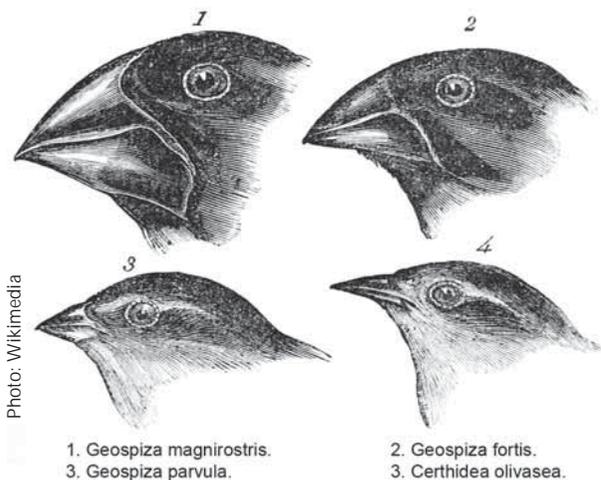
Birds as indicators

We live in a rapidly changing world. Humans have modified the world's environment in drastic ways, and India is no exception. Our population is the second largest in the world, and its impact on the environment is rapidly increasing, impacting biodiversity severely. For example, vultures have declined drastically in recent years owing to the veterinary drug Diclofenac, which is toxic for them. Following this decline, some studies have tried to draw parallels between the increase in the number of stray dogs (which feed on decaying flesh that is

The diet of gulls and terns comprise of fish.

now uneaten by the vultures) and the incidences of rabies across India. As another example, in the olden days of coal-mining, a caged canary (bird) served as an indicator of air quality, to warn miners of the presence of excessive poisonous gases.

Today, as some of the best-documented animals on the planet, birds serve as indicators of environmental change; seabird health informs us about fish populations, for instance. Birds can also tell us a lot about the history of the places they lived in. For example, the beaks of the famous Darwin's finches underwent a transformation because of extreme environmental changes. These environmental changes reduced the available food, and the birds eventually evolved new beak shapes to consume different foods like tougher seeds, insects, etc. Their diversity thus is another indicator of the history of environmental changes, in this case, that of the Galápagos Islands. So, by following birds and learning about them, we are trained to notice changes in bird behaviour and their presence and absence. This knowledge is critical to maintain healthy, lively human habitations.



Variation of beaks in Darwin's Finches

Birds as teachers

Nature and specifically birds have informed and inspired many human inventions and innovations, and they may serve as a source for many others. To provide a few examples, the invention of flight was directly inspired by the capabilities of birds. The simple physics problem of how birds transmit their complex songs is solved in a manner similar to many modern-day information technology systems. The extraordinary diversity of birds is reflected in their diverse beaks, which serve as probing tools, crushing tools, wood-chippers, insect-catchers, and many

Did you know?

National Geographic announces 2018 Year of the Bird Campaign, a year-long effort dedicated to celebrating and protecting birds. National Geographic and more than 100 organizations like National Audubon Society, Cornell Lab of Ornithology, BirdLife International, come together to examine how our changing environment is impacting birds around the globe!

more. This diversity is achieved using only bone and keratin (the material that makes up our fingernails)!

In essence, birds have evolved many survival mechanisms and tools millions of years before humans invented them, solving many simple design problems that we struggle with even today. As a last example, the eyes of birds possess capabilities that are far superior than our own. Most birds can see colours and portions of the light spectrum that we cannot. Falcons can see a small rabbit moving on the ground from hundreds of feet away. The possibilities of learning and inventing things inspired from birds are innumerable. Take the classic example of the Japanese engineer who was responsible for designing of the Shinkansen Bullet Train. He was inspired by the beak of a kingfisher (bird) to redesign the front part of the bullet train, which made the train a more efficient and energy saving one!



Collared Kingfisher from Andaman & Nicobar Islands. Hunting for food, the kingfisher needs to dive into the water and catch fishes. Its beak is well suited for this.

The role of birds in ecosystems

Although we are commonly taught about birds as pests and eaters of crops, did you know that birds are also valuable parts of many habitats? They play critical roles in maintaining forest ecosystems by eating fruits and dispersing seeds. Birds like Sunbirds (which have thin long curved beaks), Leafbirds, White-eyes, help in pollination, and may thus benefit the farmer by helping spread her crop. Many birds eat harmful insects and serve as biological pest

control, protecting crops from harm. Sadly, in the era of pesticides, many farm birds are being poisoned and are disappearing from their regular habitats. How might we save birds on farms, and how does this benefit people? Additionally, some birds can be apex predators while others are opportunistic scavengers. Their role in the ecosystem food web is of paramount significance.



Egyptian Vultures scavenging on carcass

Lastly, it is interesting to note that many philosophers and scientists who have tried to make meaning of human beings' relationship with nature and all living things, have cited an aesthetic (beauty) dimension to valuing nature. Human beings are often filled with wonder by the physical beauty of nature, and derive a sense of fulfillment and satisfaction when amidst it. This however, is a debated topic and subjective, to say the least. Whether your students will enjoy their time in nature observing birds, only time will tell.

Develop skills associated with scientific literacy

By learning to observe and study birds, a student learns basic life skills in observation and inference (*How many birds did you see? Were they at different heights or in different trees? What might this mean?*), and paying attention to detail (*Do birds of the same species look different? How are they different from each other? Can you tell their songs/sounds apart?*). This will also help improve assimilation and retention of information. Historically, natural history sciences and many other sciences like astronomy, largely depended on systematic, prolonged and meticulous observations. Even today, many studies in ethology (science of animal behaviour) are observation driven. Such an activity provides a good opportunity to hone those useful skills! Moreover, as children, we have often listened to stories where birds are the central

characters. In these stories, we hear phrases like "proud as a peacock", "eagle eye", "wise as an owl", "the clever crow", etc. In real life though, birds are much more, they play crucial roles in our ecosystem and lives as described in the above section.

Observing birds and documenting their behaviour trains a student in several areas: writing, maintaining logs, organizing information, accurate scientific reporting, etc. In a broader vision, an activity around observing birds aims to reestablish our fading connection with nature, which benefits health and wellbeing (See Children & Nature Network and IUCN-CEC Report, 2012), and inculcates awareness of the diversity of living things. Students can also learn to make connections of a single species with its immediate environment. Knowing where and when you find certain birds may encourage school children to learn more about geography and climate. It may also encourage understanding of the various habitats birds occupy (from deserts to rain forests). Finally, because birds are conspicuous, beautiful, well-known and found in almost every corner of the world (including our gardens and schoolyards!), they are ideal subjects for undertaking a simple study!

References

- Bradbury, J.W. and Vehrencamp, S.L. (1998). *Principles of animal communication*. Sunderland MA: Sinauer Associates.
- Children & Nature Network and IUCN-CEC. (2012). *Children & Nature Worldwide: An exploration of children's experiences of the outdoors and nature with associated risks and benefits*.
- Dvornich, K., Petersen, D., & Clarkson, K. (2011). *Fostering outdoor observation skills: Preparing children for outdoor science and recreation*. Washington, DC: Association of Fish and Wildlife Agencies' North American Conservation Education Strategy.
- Markandya, A., Taylor, T., Longo, A., Murty, M. N., Murty, S., & Dhavala, K. (2008). Counting the cost of vulture decline – an appraisal of the human health and other benefits of vultures in India. *Ecol. Econ.*, 67, 194-204.
- Subramanya, S., & Radhamani, T. R. (1993). Pollination by birds and bats. *Current Science* 65(3), 201-209.

Note: This is the first article of a four-part series on a learning unit on observing birds, developed as part of the Vigyan Pratibha Project. For complete information on this unit, visit <https://vp.hbcse.tifr.res.in/>

Adithi Muralidhar is a Scientific Officer at the Homi Bhabha Centre for Science Education, TIFR, Mumbai. She can be reached at < adithi@hbcse.tifr.res.in > .

Anand Krishnan is an Ornithologist and Bioacoustician, currently a DST-INSPIRE Faculty at the Indian Institute of Science Education and Research (IISER), Pune. He can be reached at < anandk@iiserpune.ac.in > .