

Script 31:

Beauty in Variety: Conserving Biodiversity

This episode explains what Biodiversity means and explores its importance. It includes reasons behind fall in biodiversity and what it means for us. It also includes some of the measures taken to conserve biodiversity.

Characters

Ravi: Young boy. Class Six

Rita: His elder sister: Class Eight

Papa: Adult male

Ma: Adult female

Headmaster: Adult male

Teacher: Adult female

Ashutosh: Young boy aged about 20. Voice must be youthful.

The family is driving to the Zoological Park . Sounds of traffic, honking etc.

Rita (in a teasing tone): Ravi, you have been dancing with excitement all the way here and you barely slept last night...make sure to keep away from the monkeys...they may like you to join them.

Ravi: (a little angrily) And what about you? You charged your camera and emptied the memory card so that you could take many pictures...weren't you excited to come to the zoo? You only tease me all the time! And if I am a monkey...you are a monkey's elder sister too!!

Ma: Ok kids, if you begin to fight now, it will be difficult for your Papa to drive...so why don't you see if between the two of youyou can list animals whose names begin with A...and continue all the way to Z.

Ravi: I know an animal whose name begins with Z...Zebra.

Rita: There you go...beginning the alphabet with the last letter!!!

Ravi: Ma....

Papa: (Intervening before a fight starts) OK... Ok we are here! Let me park and then we will go get tickets.

Appropriate sounds. Lions roaring. Monkeys chattering. Elephants trumpeting. Vendors selling straw hats, cut fruits. People being noisy.

Papa: Four tickets please...thank you. Ravi..Rita..., this way everyone. Pass through the turnstile one by one. Ok, here we are. Where should we go first?

Ravi and Rita (simultaneously): Tiger...Lion.

Ma: We will see the tigers and the lions but, children, let us go and see the giraffe. I read that recently a giraffe has given birth and it is a rare event in an Indian zoo.

Rita: How, sweet we have a baby giraffe in the zoo...look how cute it is and how tall it is for a baby.

Ravi: Even so, it has a long way to go if it wants to be as tall as its parents.

All laugh.

Papa: It is always nice to see wild animals breeding and to hope the species will not die out.

Ravi: What do you mean species die out? Do you mean the animals will die?

Rita: No, he means the species will become extinct.

Ravi: Extinguished? Like a candle?

Ma to Papa: Now, look what you have done. Explain quickly or we will never be allowed to see any other animal in peace. **Laughs.**

Papa: No, no it is OK. Children should ask questions or else how will they learn?

Papa to Ravi: Ravi, when all individual animals or plants of a species, wherever they are in the world, die out we say the species has gone extinct.

Ma: So, no individual of this species are to be found in the wild or in captivity.

Ravi: Not even one?

Ma: No, not even one. For example the Indian cheetah is not found in India anymore.

Papa: And the Pink-headed duck, that used to be found in parts of the Gangetic plains of India and Bangladesh, has not been seen since the 1950s...it is thought that the species is extinct.

Rita: How many extinct animals are there? And I do not mean pre-historic animals like dinosaurs and all.

Ma: This is extremely difficult to answer because we do not know how many species there are in total, globally. But experts calculate that between 0.01 and 0.1% of all species will become extinct each year.

Papa: This may sound like a very low percentage but remember the number of species is thought to range between approximately 2 million to about 100 million.

Ma: So depending on which figures you chose to compute; extinctions per year cannot be less than 200. It may reach 100,000 species each year.

Papa: Remember species does not only mean the attractive animals that we are seeing in the zoo, it includes worms and insects and even microbes!

Ma: Yes, According to the International Union for Conservation of Nature (IUCN), globally about one third of all known species are threatened with extinction. It is estimated that 25% of all mammals will be extinct in 20 years time.

Rita: Oh! This sounds like a tremendous blow to biodiversity. How terrible!

Ravi: How does it matter if a few insignificant species disappear? How does it affect me? I don't understand why didi is being so dramatic about it. (*Suddenly reacts sharply*)...who is pulling my sweater...Oh it is a nail.

Ma: Stop struggling...stand still and I will free you from the protruding nail...you are lucky it did not scratch you. There!

Rita: But Ravi, the wool is unravelling. Put a pin to hold it because otherwise the knitted part will unravel badly. Or you better take it off.

Papa: This is actually the answer to Ravi's question...just one little pull at one point of his sweater has unravelled it to such an extent that he can't wear it anymore. Biodiversity is like that too...if one species goes, it makes the existence of other species that much more difficult.

Ma: Everything in nature is linked whether we realize it or not. We cannot damage even a single stitch in this enormous tapestry of life without damaging the entire picture. When we say biodiversity, we recognise that each species, no matter how big or small has an important role to play in the ecosystem.

Ravi: You keep saying biodiversity...biodiversity...what does it mean?

Rita: The term biodiversity is the shortened version of the words biological diversity. It was a term first used by E.O. Wilson in 1985. Very simply, you can think of it as variety in the number and richness of the species within a region although scientists have found it means a lot more.

Papa: Biodiversity also includes the variety of ecosystems for example, deserts, forests, wetlands, mountains, lakes, rivers, oceans, and agricultural areas. All living creatures in all ecosystems interact with one another and with the air, water, and soil around them.

Ma: It is getting cold and Ravi does not have his sweater, so let us go back home.

MUSIC

Next day ...sound of birds and cock crowing. SCHOOL begins School bell rings.

Headmaster: So, children, I hope you know that the United Nations has designated 2011–2020 as the United Nations Decade on Biodiversity. We have arranged for a trip to the local Bird Park which is a short drive from here.

Sounds of excited whisperings.

Headmaster: I can see that you are all very excited but before we get into the school buses let me ask you a few questions...Question one for Rita: Do you think biodiversity is the same everywhere?

Rita: No Sir, how can it be when habitats are so different. Biodiversity is unevenly distributed. Some places like rain forests have great biodiversity, the bottoms of oceans or icy areas have less. So, biodiversity varies globally and within regions.

Headmaster (*Happily*): Excellent answer. Yes, ocean biodiversity is 25 times lesser than terrestrial diversity. Biodiversity also increases as it moves from the poles towards the tropics...now I have a question for the kids....let me see...how Rita's brother answers. Ravi, are you ready?

Ravi: Yes Sir.

Headmaster: Can you name a few things we enjoy because of biodiversity? Apart from its sheer beauty and aesthetic appeal that is. Pearls that we use in jewellery come from oysters, you know. Pearls are beautiful and can be quite expensive too.

Ravi: Cereals, vegetables and fruit Sir.

Headmaster: Absolutely right. Do you know there are 80,000 species of edible plants on Earth, but 90% of the world's food comes from just 20 of these species?

Teacher: New edible plants on our dining tables could greatly add to global food security. We need greater biodiversity on our tables. If we depend on just a few crop plants and some epidemic wipes them out, global hunger will kill millions...But go on Ravi.

Ravi: Fish, meat and eggs from animals Sir. Medicines from plants, like...like ...*(as if thinking and suddenly remembering)* Tulsi and Neem.

Headmaster: Don't forget antibiotics such as penicillin! Antibiotics come from microbes and fungus! Some other medicines derived from plant biodiversity include aspirin for pain relief, taxol for cancer, and quinine for malaria.

Teacher: Even snake venom and leech saliva have medicinal use. A compound found in the liver of sharks has the potential to be used as drug to treat many diseases ranging from dengue and yellow fever to hepatitis.

Headmaster: According to one estimate 40% of all prescriptions are for medicines that originated from plants and animals. No one knows how many more cures will be discovered when we study more of the Earth's biodiversity. But go on, Ravi.

Ravi: Cotton and Jute from plants...wool from sheep...so clothing Sir! Paper also!

Headmaster: (*Claps*) You forgot Oxygen! (*Laughs*) But nonetheless, I am delighted with this brother-sister duo. They know about the gifts of biodiversity...about the diverse resources of biological origin.

Teacher: But just one word of warning...biodiverse as nature is, her gifts are not to be plundered or mindlessly exploited. We should take only what we need so that the future generations also get to enjoy all that we are enjoying today.

Ravi: My mother said if we kill all the animals of one species or kill all the plants of one species it will go extinct...so we cannot get anything from that animal or plant species. I think you are saying the same thing.

Headmaster: Ah yes! You have summed up the key to sustainability.

Ravi: Sustainability...I am sorry Sir, but I do not know what it means.

Headmaster: Sustainability means the ability to keep up something for prolonged periods of time. Sustainable practices help ensure that we meet all our development goals without damaging the ability of natural systems to provide the natural resources upon which we depend.

Teacher: This may be a new concept for you to grasp immediately but once we come back from the Bird park you will understand what we are saying...come now, children... Class by Class.... line up to get into the bus.

Sounds of bus engines and children climbing into the bus and being seated. Bus starts. Sounds of traffic.

Teacher: I am so glad we could manage to bring Classes Six, Seven and Eight to visit the bird park and that Dr Ashutosh will be there to show us around.

Headmaster: (*Enthusiastic voice*) Yes, children should be shown things, allowed to touch and explore not just told things in classrooms...(silence for a moment . *Sad voice*) But there is another reason why I am taking them here.

Teacher: What's the reason?

Headmaster: Ashutosh was saying that there is a proposal to allow a housing complex to come up on the site...currently no decision has been taken but the idea is floating around. I want the children to see the natural beauty of biodiversity before it vanishes.

Teacher: If that happens...these animals will lose their homes; their habitat will be destroyed. The loss of biodiversity is guaranteed. The bigger the species the more it is affected...also, those living in forests or oceans are more affected by habitat reduction...and this park is like a woodland area.

Headmaster: Yes, habitat destruction, climate change, pollution, pressure and over-harvesting because of human overpopulation are all factors behind biodiversity loss.

Teacher: Today, the air, water and soil are polluted too. It is a good idea for the students to get a first hand exposure and see for themselves how nature works. May be they will understand how multiple factors are responsible for biodiversity loss.

Headmaster: I plan to make the students write a Protest note and take it to the concerned authorities. Let us see.

Meanwhile Rita and Ravi are talking too. On the bus. So sounds of the bus's engine, traffic sounds will continue.

Ravi: What do you think we will see in the park?

Rita: Birds definitely, bees, butterflies, small animals...I saw a mongoose when I was there earlier.

Ravi (Wistfully): But no tigers.

Rita: You and your tigers! (*Laughs*) .But...you will find many friends in the Park ...there are monkeys there I think

The bus suddenly comes to a halt and the engine noise that had been continuing stops.

Sounds of children getting down

Sounds of birds chirping, doves cooing.

Teacher: How tranquil it is here...how green the shade of the trees...and look at the lichens growing on the bark of the old trees...oh! how peaceful. (Sounds of deep breaths) How fresh the air is! Come, children I see Dr Ashutosh has come to receive us. Please greet him.

Chorus: Good Morning Dr Ashutosh.

Ashutosh: Good Morning children, Ma'am ...Sir. I am so glad you could come. This way please. And children do not talk loudly because birds will be scared away. Feel free to wander around and come back in half an hour. Do not break branches or pick fruits, OK?

Headmaster: Ashutosh let us sit here under the bench. Tell me about your troubles.

Ashutosh: Sir, you are aware that this park is an oasis for biodiversity in this area...we have old trees, rare medicinal plants, ferns, epiphytes, creepers and orchids. Just to name a few...we have twenty six species of birds resident here and a few migratory species also. We have thirteen species of butterflies; eighteen species of spiders; three species of ants; rare planarians and two species of mammals.

Teacher: It is really a biodiversity paradise in a concrete city...I would never have thought so much biodiversity could thrive here...do you feed the animals?

Ashutosh: No, all the animals here are free-living. The natural cycles operate so well that no intervention is necessary. The old trees are host to a variety of insects that serve as food for the birds. And the different fruit trees provide enough fruits around the year for the frugivorous animals. Plus the fungal and unseen microbial wealth takes care of the recycling of nutrients...scavengers eat the dead animals and fungi breaks down what is left behind.

Teacher: I read last year they discovered a new species of butterfly from this park. This means not all the biodiversity here has been discovered and catalogued. So what is the problem?

Ashutosh: My problem is a microcosm of the problem faced by biodiversity everywhere. On the northern side of the park a shanty town has sprung up. People are encroaching on our area, they are stealing the fruits and trapping birds for sale. They break branches for firewood and the smoke from their chulhas is suffocating...it is polluting the park. I have found baby birds dead in the nests.

Headmaster: You will need better patrolling.

Ashutosh: Yes, but we have little funds to spare. Also, I have heard that they are planning to build a high-rise here which will threaten this Park. There will be a Mall attached and very big underground parking place too. They will chop down the trees! That will end everything here...it is a totally un-sustainable line of development that is being pursued.

Headmaster: This is exactly what we were discussing on the bus. Habitat loss is caused by deforestation, overpopulation, pollution and global warming...everything that you are fighting here...albeit on a much, much, smaller scale. And perhaps because it is on a small scale we can actually visualize it better and understand just why and how it is unsustainable.

Teacher: People do not realize that even if a small element of an ecosystem breaks down, the balance of the entire system is threatened. And when local ecosystems break down, how can the global network remain unaffected?

Ashutosh: People also do not realize that the biodiversity we see today is the fruit of billions of years of evolution...it is not manufactured in a factory! So when trawlers armed with ultrasound equipment track entire schools of fish and trap them without leaving even one breeding pair....why do we grumble when in the next years we catch very few fish? If this park disappears...just imagine how many animals and plants will die.

Teacher: We are emptying our oceans and plundering the land. We are chopping down forests at an alarming rate and also altering the nature of the denuded land.

Headmaster: Did you know, that an estimated 13 million hectares of forests were lost each year between 2000 and 2010 due to deforestation? Can you imagine, that in the richly biodiverse Amazon area around 17% of the rainforest has been lost in the last 50 years... mostly due to forest conversion for cattle ranching!

Teacher: Imagine destroying all that diverse and colourful wildlife and replacing it with cattle. Imagine losing all that green cover, interfering with the rain cycle and turning the rich land into denuded land---.is this sustainable practice!!!

Ashutosh: The saddest part is that for every 10% of forest loss, one to two major species become extinct. But when 43% of forest cover is reached; the rate of biodiversity loss jumps. Upto eight major species may be wiped out per 10% of disappeared forest.

Headmaster: And do you think human beings will not face the consequences of deforestation...that it will only be the mute animals?

Ashutosh: Of course not. Forests have a crucial role to play in fighting the ill –effects of climate change. Forests soak up carbon dioxide that would otherwise be free in the atmosphere. When we chop down forests we interfere with this function. It is estimated that 15% of all greenhouse gas emissions are the result of deforestation...how can we then avoid consequent global warming?

Teacher: How sad that global warming or climate change is impacting coral reefs and the associated community of organisms by altering ocean chemistry. Some coral reefs are dying because the oceans are becoming acidic!

Headmaster: The way nature works is subtle and often we cannot see what is happening. For example, how many of us realize that much of the carbon dioxide that enters the atmosphere dissolves into the ocean.

Ashutosh: Yes, it has been established that the oceans have absorbed about 1/3 of the carbon dioxide produced because of human activities since 1800 and about 1/2 of the carbon dioxide produced by burning fossil fuels.

Teacher: But tell me, how many common citizens or even students of science in schools know that as carbon dioxide in the ocean increases, ocean *pH* decreases that is, it becomes more acidic. With more and more carbon di oxide entering the ocean's waters ...acidification is happening...devastating creatures such as corals, sea-snails, clams, and sea- urchins.

Headmaster: Talking about Urchins....here come ours.

Sounds of children running. Excited sounds. Panting sounds as kids come closer

Teacher: Ok, children...sit down. You seem happy. Did you have a good time?

Children: (Chorus) Yes...we saw many butterflies and birds. And so many wildflowers. I had never known that wild flowers could be so pretty...We thought only garden flowers are pretty!

Ravi: I wanted to pick a flower but the guard said that the flower would die without setting seed and there would be no new plant. He said it was not a sustainable practice to pluck wildflowers. Then, I saw a banana. but again, the guard said that if we ate all the fruits the animals would starve to death. Again, he said it was not sustainable practice. I heard the word for the first time just an hour ago...but now I understand what it means.

Teacher (laughs): What DOES (*emphasis*) it mean?

Ravi: It means don't finish everything today. Keep some for tomorrow.

Everyone laughs

Ashutosh: This is an important lesson to learn. Overharvesting natural resources on a global scale leads to un-recoverable loss of biodiversity. It is an un-sustainable practice.

Rita: And we saw something incredible. A small bird was eating the termites on a tree when another bird....I think it was a Shikra... came and caught it.

Teacher: You were lucky to see a part of the food chain...when one organism is food for the other. It shows how everything in nature is inter-twined. What you have seen here in the park is happening all over the world on a scale that is almost impossible to fully comprehend.

Ashutosh: When the hunter bird will die, other animals such as the mongoose that lives in the park will eat its carcass. Fungus and microbes will break down the remains and release the constituents to enrich the soil.

Headmaster: If the termites die out...the small birds will starve to death. If all the small birds die out what will the hunter birds eat? Once the mongoose eat all the hunter birds that died of starvation...it too will starve to death....Can you appreciate how one element is linked to the other in nature? Unsustainable practices break the links of this chain...natural systems collapse.

Ravi: But we are only children, how can we help?

Rita: I know that government can make policies and that International Agencies are working together to help conserve biodiversity...but how can I, an individual...a student help?

Ashutosh: There is a burning need to conserve biodiversity. And since you are the future you have a huge stake in preserving biodiversity. To begin you must increase your knowledge of environmental issues. You can volunteer at an organization that works on conservation or restoration of habitat.

Teacher: See that your pets, especially cats, do not kill wild birds. Do not buy products made of animal parts even if you find them beautiful. If you buy such products it encourages poachers to trap more animals.

Ashutosh: And at home stress on the use of environmentally friendly products such as neem-based pesticides. Insist that hazardous materials are disposed off, safely. Chemicals that enter the sewer system end up contaminating freshwater and polluting the oceans.

Ravi: Can zoos be places of biodiversity conservation? I went to the zoo yesterday and there were many animal species.

Teacher (Softly) Ravi, a zoo is not an animal's natural habitat. It is kept in captivity. However, there are some zoos which specialize in breeding animals that have very low populations in the wild and then, they release the next generation back into the natural habitats.

Ravi: (Sadly) But there must be a proper un-degraded habitat for the animal to go back to. And what if it does not survive because again people attack it?

Ashutosh: Do not be sad children. I am hopeful that children as aware as you all will lead the fight against biodiversity loss and help conservation efforts and encourage sustainable practices.

Headmaster: Yes indeed. We will do everything possible to save the biodiversity of our bird park.

Teacher: Say Goodbye now.

Bye... bye and Thank you.

