

Episode 16  
The Ever Changing Environment

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Sound of moving bus (stops)

Suryaprakash	Manav, get up, we have reached Haridwar.
Manav	Didi, don't you think we have reached Haridwar very soon.
Srishti	Manav, you were sleeping in the bus that is why you feel a four-hour drive ended fast.
Manav	Didi, who told you not to sleep, why didn't you sleep? Were you counting stars at night?
Vasudha	Manav and Srishti, we are here to visit Haridwar. Both of you at least don't fight today.
Vivek	Mummy, without quarrelling they can't digest their food.
Suryaprakash	Vivek, today while roaming around Haridwar their food will get digested.
Vasudha	First let's take a dip in the river then we will go around the place.
Suryaprakash	Children, let us go towards the river bank. (scene change music, sound of the river)
Srishti	Aha, I am seeing so much water after so many days.
Vasudha	Srishti, this clear flowing water is adding to the beauty of this place.
Suryaprakash	Children, my ears were yearning to hear the sound of flowing water.
Vasudha	Yes, such clear, clean water. Where will we find fresh air in the city?
Suryaprakash	Don't just stand there and praise it, you will have to bathe in it too.
Manav	How will we bathe here, the flow of water is very fast here.

Srishti	Yes Manav, don't bathe in the river, what if you get carried away with the flow of water.
Suryaprakash	Srishti, why are you scaring Manav, I am with him.
Vasudha	Vivek, first we all will bathe till then you take care of the luggage.
Vivek	Mummy, I am here, you all have a bath.
Suryaprakash	Manav, you come with me. Srishti, you go with your mother.
Manav	Wait Papa, I have brought idol and flowers to immerse in the river.
Suryaprakash	Manav, from where did you bring this idol and flowers?
Manav	Papa, my friend Rajesh has given me this idol to immerse in the river.
Srishti	Your friend gave the idol to you and you brought it?
Manav	Didi, Papa always says that we should do other people's work.
Suryaprakash	Yes, you should do but only good work.
Manav	But what is the harm in immersing the idol? See so many people here are putting idols, flowers and leaves in the river.
Suryaprakash	Come on Manav, let us bathe first then we will talk.
Manav	The water is very cold, Papa.
Suryaprakash	Take one dip and get out and get dressed. And tell Vivek to come and bathe.
	(scene change)
Suryaprakash	Children, did you all enjoy bathing in the river?
Srishti	(laughing) Papa, we enjoyed but Manav is still shivering because of cold.
Vasudha	Manav, we will have something hot to drink now.
Suryaprakash	Yes, come on let us go towards the market.
Manav	Bhaiya, I didn't understand why Papa got angry about immersing the idol and flowers in the river.
Vivek	Manav, immersing idols pollutes the water.
Manav	Bhaiya, one day you were saying that all objects on the earth originated from here and will end here. Then how will immersing

	the idol pollute the river.
Srishti	Good Manav, I came to know today that you take whatever Vivek bhaiyya says very seriously.
Vasudha	One should pay attention to what our elders say.
Srishti	Even if it is wrong?
Vivek	Srishti, mummy didn't say that.
Suryaprakash	Children, one should believe what others say only after proper thought.
Manav	But isn't this true that except for the energy from the sun, nothing else comes to the earth from outside? All things are made here and come to an end here.
Vivek	Manav, what you want to say is that there were only mountains when earth was formed, which later changed to soil due to different complex phenomena.
Suryaprakash	Children, different elements on the earth keep changing from one form to the other.
Vivek	Yes, in nature this cyclic phenomenon in substances has been going on for millions of years.
Manav	Then bhaiya, what difference does it make immersing the idol in water, it will only get dissolved in the water.
Srishti	Manav, how will it get dissolved in water?
Manav	Didi, the idol is made from some element present on the earth, then why will it not dissolve in water?
Vivek	But Manav, the earth decomposes or brings about a change in only those elements that have been made by nature.
Srishti	Bhaiyya, nature made manav and manav made the idol, so somewhere nature is involved in making the idol.
Manav	Didi, I didn't make any idol, it was given to me by my friend.
Vasudha	Manav, Srishti isn't talking about you alone, she is talking about the whole of mankind. And the decorative plastic on the idol has

	been made by man. And now harmful things like artificial colours, plaster of Paris, lead and cadmium are used to make these idols which pollute the river.
Manav	Okay, now I understand that the river will get polluted on immersing the idol into it, but what harm will come from dispersing flowers and leaves into it? Flowers and leaves have been made by nature.
Vivek	Manav, it is right that flowers and leaves are made by nature but you didn't see what's going on in the river. People bring flowers in polythene bags and throw the polythene bags along with the flowers into the water. Now polythene isn't made by nature.
Vasudha	Man has made such products like plastic that are not degradable, which means products like plastic once made don't get destroyed easily.
Suryaprakash	And children, nature hasn't made any such object that can't be degraded. But there is no arrangement to destroy the plastic made by man.
Srishti	Yes that is right, for any substance to decompose there is a definite process that works and it takes years for such a process to evolve.
Manav	So nature has no process to decompose plastic?
Vivek	There is, but not completely. There are some organisms that can decompose plastic but it is a very slow process. By the time the first lot of plastics is destroyed by nature another lot is ready and that is why there are so many piles of plastic on the earth.
Manav	Alright, that is why there is so much plastic on the banks of the river.
Vasudha	Yes Manav, the river bank was looking so dirty because of the polythene piled up there.
Manav	But Bhaiya, you have said that there are many cycles in nature which continuously make and destroy various things. Then why

	hasn't nature developed some process to destroy plastic as well?
Vivek	Manav, it is not necessary that nature may have a process ready for decomposing every new product.
Srishti	Yes, in nature, the decomposition of products like wood and paper that can be decomposed by microorganisms proceeds fast. But the decomposition of plastics takes hundreds of years.
Manav	But why is decomposition of biological products easy?
Vivek	Because these products have been made through natural processes and also because nature has made arrangements for bacteria, fungus, termites and lakhs of different microorganisms that finish off these products and after changing them into their basic elements these microorganisms also die and get mixed up with the soil.
Srishti	Papa, I have also read that lakhs of years ago it was due to these organisms, which were buried under the surface of the oceans and the earth, that fossil fuels were made.
Vasudha	Petrol, diesel, coal, kerosene oil and natural gases are all examples of fossil fuels. These fossil fuels were made due to the decomposition of these biological organisms over lakhs of years.
Manav	This means that the fuel that we are using today is a changed form of organisms that got buried under the oceans or land lakhs of years ago.
Vivek	Yes Manav, besides we don't just get fuel from organisms that lie buried under the soil but several nutrients present in them keep getting recycled through the medium of the plants.
Suryaprakash	In nature, the recycling of leaves and paper continues like this.
Vasudha	Children, we are also going round and round Haridwar. Let's sit down somewhere and have some snacks.
Manav	Mummy, what have you got from home?
Vasudha	Besan laddoos and some namkeen along with some biscuits.

Manav, Srishti, Manav (all together)	Come on Papa.  Sound of scene change, chirping of birds)
Manav	Wow, there are such beautiful birds sitting on the tree.
Srishti	Yes, not only birds, there are rose flowers also of many colours.
Vasudha	Yes Srishti, there are many varieties of rose here.
Suryaprakash	Manav, do you know that many organisms have contributed in the beauty of these flowers?
Manav	How?
Vivek	Well, you know that to stay alive and grow living things require nutrients.
Manav	Yes, I know we cannot stay alive without food because it is food that provides various nutrients for our body.
Srishti	And Manav, the nutrients that we get from food are necessary for the various processes in the body.
Suryaprakash	Similarly, plants also require various nutrients.
Srishti	Papa, the plants obtain these nutrients from air, soil and water, isn't it?
Suryaprakash	Yes, it is through air, soil and water that plants manage to get essential nutrients for their growth from nature.
Manav	Papa, I know that plants utilize carbon dioxide present in the atmosphere in photosynthesis and in return give out oxygen which we take in when we breathe.
Vasudha	Manav, apart from carbon dioxide plants require other elements also for their growth and which they take from soil and water.
Vivek	And the soil gets its nutrients from the decomposition of substances such as leaves and dead animals.
Manav	This means that plants and animals grow helped by these nutrients and when they die the nutrients present in them return back to the

	soil from which new plants grow.
Suryaprakash	Yes Manav, in nature this cycle of life and death goes on.
Vivek	And in this manner in nature recycling of carbon containing and non-carbon containing substances continues.
Manav	But bhaiya, how are these substances formed in seas?
Vivek	Manav, you know that many rivers end up in the seas.
Manav	Yes bhaiya, these rivers carry a large amount of water every year into the seas.
Srishti	Bigger rivers like Ganga, Yamuna and Narmada and innumerable other smaller rivers carry with them various substances present on land into the seas.
Suryaprakash	These contain minerals and various types of nutritive substances.
Vivek	And all these substances reach the seas through the rivers.
Suryaprakash	These substances play a very important role in the seas.
Manav	How is that, Papa?
Suryaprakash	Well, the minerals meet the requirement of nutritive substances of the life forms in the seas.
Vivek	In this manner, seas also receive nutritive substances from land only, whether it is the sea shore or the sea bottom.
Manav	Bhaiya, when the area of the seas is three times that of land then it is obvious that the number of organisms in the seas would be more than on land?
Vivek	Yes, the number of organisms in the seas is much more than that on land.
Srishti	Many life forms of the seas such as coral reefs, moss, sponge and fishes are very useful for us.
Manav	Yes, fishes are the favourite food of many.
Suryaprakash	Yes children, fishes caught from the seas feed millions. And besides life on earth started from the evolution of moss only. Initially, from these mosses only large amounts of oxygen reached

	the atmosphere.
Manav	This means that substances that reach the seas from the land keep returning to the earth in different forms.
Srishti	Very good Manav, you have understood so fast.
Suryaprakash	Manav, remember one more thing that land plays a very important role in fulfilling the requirements of various nutrients of both seas as well as the environment.
Manav	Papa, fulfilling the requirement of the seas makes sense, but in the case of the environment, which includes the atmosphere too, what role does the earth play in the presence of various substances and gases?
Vasudha	Manav, unless you expand the area of your understanding you will not be able to understand even simple things.
Manav	What simple thing, Mummy?
Srishti	Even now you did not understand what Mummy is saying.
Manav	Didi, if you are more intelligent then you explain it to me.
Srishti	Manav, but you only pretend as if you are more intelligent.
Vivek	And in the process he is the one who comes to more harm.
Suryaprakash	Let it be Manav, I will answer your question. First you name two gases in the atmosphere that originate from plants.
Manav	Two gases—oxygen and carbon dioxide.
Suryaprakash	Oxygen is released during the process of photosynthesis in plants and carbon dioxide is released during the process of breathing of living organisms. And during the night plants release only carbon dioxide.
Vivek	Manav, there are other sources of these gases, we will talk about them later. First you tell me where do these plants and living organisms live?
Manav	That is so easy, even a child can tell. Most plants and living organisms live on land or in water.



Srishti	(laughing) You yourself are a child only Manav. You will be called grown up once you reach Vivek bhaiya's age.
Vasudha	Srishti, no matter how old children become they will always remain children in their parents' eyes.
Suryaprakash	Yes, that is true. But when children start distinguishing between right and wrong for themselves and the society then they are considered old enough.
Manav	Yes Papa, I have also started understanding a few things, like if most plants and animals live on land and in water then the gases in the atmosphere will have some relation with the earth.
Vivek	Yes Manav, you got it right. The requirement of gases of the atmosphere is mostly fulfilled by land only.
Vasudha	Children, when the earth was formed it was a ball of fire. Oceans and atmosphere came into being later.
Manav	The earth plays an important role in fulfilling the requirement of the environment and the seas.
Srishti	It is good that Manav has understood this fast.
Vasudha	Srishti, did you think Manav was stupid?
Srishti	(laughing) Not stupid, Mummy. Manav is faster than the supercomputer.
Suryaprakash	You can laugh at him now, but don't forget that it was <i>manav</i> only who had made the supercomputer, it is quite possible that our Manav also makes a supercomputer in the future.
Vasudha	Yes Srishti, my Manav is a diamond whose worth only a jeweler could know.
Srishti	Mummy, sometimes diamonds are found in mud also.
Manav	Diamonds in mud!
Suryaprakash	Yes Manav, diamonds are taken out from the ground only. They are polished later.
Vivek	Diamond is also a form of carbon which gets formed due to the

	high pressures and high temperature of the earth. Coal and diamond are both formed from carbon, only their composition varies.
Manav	Wow, this is a miracle!
Vasudha	Manav, the formation of diamonds is not a miracle, it is the result of natural processes.
Manav	But even then Mummy, this is no less than a miracle for me. While diamond is so expensive, coal is so cheap.
Vivek	Manav, in the eyes of nature no object is costly or cheap. As for the formation of diamonds, it depends on the manner in which carbon atoms are joined to one another. Which means that the formation of diamond depends on the specific composition of carbon atoms.
Suryaprakash	Okay Manav, at this stage let me tell you about the carbon cycle.
Manav	Carbon cycle! What sort of a cycle is this?
Vivek	This is one of the most important cycles prevalent on the earth.
Manav	Why important?
Vivek	Because life on earth is dependent on carbon. Carbon is such an atom that combines with other elements to form different compounds, which in turn make big molecules that are essential for life.
Suryaprakash	Children, you must be aware that carbon is the most abundantly available element on the earth.
Srishti	Not only on earth, carbon is one of the most widely available elements in the entire universe.
Vivek	On the earth carbon is found in the atmosphere, water and land.
Manav	Papa, in our body also the amount of carbon is almost 15 to 18 percent. I have read this in the book.
Suryaprakash	Yes Manav, carbon is found not only in our bodies but in the bodies of all organisms. Life on the earth is carbon dependent.
Vivek	And due to respiration in animals and decomposition the carbon

	present in nature is released into the atmosphere as carbon dioxide.
Manav	But what is source of carbon in animals.
Vivek	Manav, you are aware that all plants utilize carbon dioxide during the process of photosynthesis.
Manav	Yes, that is how they are able to prepare their food.
Srishti	Manav, then you must also be aware that plants are primary producers, that is, other organisms are dependent on them for their food.
Manav	Yes didi, not only us but all other forms of life are dependent on plants directly or indirectly.
Suryaprakash	In this manner carbon reaches other forms of life from the plants.
Vivek	And Manav, it is due to the property of carbon atoms to combine with atoms of other elements to form different compounds that carbon is present in most substances.
Srishti	Vivek bhaiya, carbon is released during volcanic eruptions also.
Vivek	Yes, the amount of carbon in the atmosphere also increases due to the burning of fossil fuels.
Manav	This means that the amount of carbon must be increasing on earth.
Suryaprakash	It is not like that Manav, with the help of the carbon cycle nature maintains a balance in its amount.
Vivek	Yes, plants utilize huge amounts of carbon dioxide during photosynthesis. Apart from this seas also convert carbon to carbon dioxide.
Srishti	It is due to this carbon cycle that the amount of carbon remains stable in nature even after conversion of carbon into various forms.
Suryaprakash	And in nature, just like the carbon cycle, oxygen cycle, hydrogen cycle and nitrogen cycle are also prevalent. Due to these cycles various substances keep getting recycled.
Manav	Oh, so many cycles! They make me feel giddy.

Srishti	Manav, if you are feeling giddy just by hearing their names, just imagine how nature maintains a balance between all these cycles.
Suryaprakash	Children, it is due to this unique balance of nature that life thrives on this earth.
Vasudha	And it is our responsibility that we don't interfere with these delicate balances in nature.
Manav	Papa, now I have decided to use polythene bags to the minimum, and I will ask my friends also to do the same.
Suryaprakash	Okay children, then let us go to the river shore and look at the unique beauties of nature.

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