

EPISODE NO-18

Water Pollution

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Artists:-

1. SomeshPapa(By profession a journalist)
2. Vasudha.....Mummy (Working in MNC)
3. Amaiyera..... Daughter
4. Rohit..... Son
5. Waseem.....Somesh friend working with an NGO.

Opening Part of Title Song & Announcement

In this episode listeners will learn about different aspects of pure water. Different traditional techniques used in purifying water will also be discussed. Standards parameter for pure water will also be highlighted. Our listeners will also know the techniques used for purifying water.

Part of title song continues

Scene:- It is Sunday morning, routine time at home and mutual discussion among family members.

Somesh:- Vasudha...are you listening me? Since long.... Rohit and Amaiyera are insisting for some picnic.

Vasudha:- Yes, they are also telling me about their tentative programme and outing schedule. Even on Sunday you remain too much busy. It is doesn't seem good when you fail to spare time for your family.

Somesh:- It is not only me but all Press Reporters are passing through the same situation. Anything can happen at any time and we have to rush to report the incident for coverage in our newspaper. Even a small happening is considered to be equally important and we have to cover it. My job is not like your MNC job. You can work at home during emergency time. But I have to go in the field to report the events.

Amaiya:- Somesh...Have you gone through the news of Water Exhibition in the Gandhi Bhawan? My colleagues were telling about it. One of them has visited it.

Somesh:- Yes Amaiya, you are right. I also saw the news that one exhibition on water conservation, its quality and purity is going on in the City Hall. One of my friends Mr. Waseem is also associated with it.

Amaiya:- It is good. We have to go there to see the latest technology and methods that have been displayed in the exhibition.

Rohit:- Papa can you tell me something more about the picnic?

Somesh:- My dear son this exhibition is very close to Gandhi Park. First we are going to visit the exhibition and after that we shall enjoy our picnic in the park. Is it fine?

Amaiya:- It is fine papa. Your planning is good.

Rohit:- Let me first tell all this to mummy.

Scene change..... Rohit is proceeding in second room

Change over music.##### Sound effects of car/horn/streets etc.#####

Rohit:- Papa! How far is Gandhi Bhawan from here?

Amaiya:- Oh! See...that signboard..... It is Gandhi Bhawan. We have arrived on the site of exhibition ground. It seems to be a nice place.

Somesh:- O.K. Children....this is the place where exhibition is going on.

Somesh:- Wait...Rohit...wait.....see there.....that is the exhibition hall. I mean the venue of Exhibition.

Vasudha:- First of all we should try to find Waseem Bhai. He will be of great help and can explain everything in better way.

Rohit:- Yes mummy, I have so many questions in my mind. It will help me in my project work.

Amaiya:- O.K. Rohit.... that is fine. Let's have a meeting with Waseem uncle.

Somesh:- See.....see.....Waseem is there. Hello.....Hello..... Waseem!

Waseem:- Hello Somesh! Good morning. It is surprise to see you here. Hello Bhabhi Ji! How are you?

Vasudha:- Namaste Bhai Sahib!

Waseem:- Hello children.....how are you? Looking smart.

Rohit & Amaiyera:- Good morning uncle. We are fine uncle and what about you (laughing)

Waseem:- It is good that you are here to see the exhibition.

Somesh:- I frequently visit such exhibitions for coverage and reporting.

Waseem:- I am not talking about you Somesh. That is only for my young friends.(Laughing). It is nice that children are going to see all these. They can have so much information on water and its purification.

Rohit:- Uncle please helps us. Can you explain the technology that has been used in water purification and its harvesting?

Waseem:- Why not? Come with me.

Somesh:- Let's go.

#####(Scene change and Change over Music)#####

Rohit:- Wonderful! See this poster. Water distribution system has been explained so nicely on this poster. Simple to understand it.

Amaiyera:- See that quote.....After oxygen it is water which is essential for life. About 70% of our body weight is water. Scientists are of the views that life had been originated in water. That is why its importance is beyond imagination.

Rohit:- Look there.....It is written that 71% of our Earth is covered with water. But only 3% of that can be used for drinking purpose. What a surprise? Most of this pure water is available on polar regions in the form of glaciers. For human consumption very limited quantity of water is available.

Vasudha:- Rohit note down all these useful information.

Somesh:- Waseem you may agree with me. Availability of drinking water is going to be limited day by day. On the other side, polluted water is causing serious health hazards.

Waseem:- Yes Somesh...you are right. World Health Organisation study says that the incidents of cholera will be down by 90% and that of dysentery will be down by 50% worldwide, if we can use pure and hygienic water.

Rohit:- But it is difficult to recognise the purity of water by naked eyes.

Waseem:- Rohit! This is the reason that we put up this exhibition. From here you will come to know which water can be used for drinking purpose and which is not. You can also learn about the pollutants that are causing water pollution. What

are the traditional techniques that can be used for water purification? Here you will also find the latest technologies that have been used in water purification.

- Rohit:-** Uncle! These are the information that I needed for my school project.
- Vasudha:-** Presence of pollutants change the very basic nature of water. Even physical, chemical and other properties of water change due to the presence of soluble materials in water. This is one cause of water pollution. Water pollution can be of many types such as physical pollution, organic and non-organic pollutions. Pesticides and fertilisers are also great sources of water pollution.
- Waseem:-** Those materials which change colour, taste, odour and flavour are behind the physical pollution. Some changes its colour and other changes its odour and taste. Sometimes taste of water also change.
- Vasudha:-** Hello children !.....see these posters. It is written that pure water is colourless, tasteless and having no odour. Water is made of carbon and hydrogen. Pure water PH is in between 7 and 8.5. Negligible amount of salts and other materials are present in pure water.
- Rohit:-** Uncle! What do you mean by PH?
- Waseem:-** Rohit, we can assess the purity of water from its PH. To show its acidity or alkalinity, PH has been used. PH scale is in between 1 to 14. When PH is less than 7..... This means water is acidic in nature and when it is more than 7 this means it is alkaline in nature.
- Amaiya:-** Rohit see here...What is written? Natural water may contain potassium, sodium, Magnesium, Calcium, Fluoride, sulphate, carbonate, bi-carbonate, nitrate etc. The salty taste is due to the presence of these salts.
- Waseem:-** Yes children. That is why the taste of water is different at different places. This is due to the presence of different salts in it.
- Vasudha:-** Children...see there. Water is of two types. In one type there is nothing like fluoride, sulphate, carbonate etc. in it. This type of water is soft and sweet water.
- Amaiya: -** Uncle! How can we easily test the water at our level?
- Waseem: -** In sweet or soft water soap will dissolve easily and will give enough foam. Where as in hard water soap will not give enough foam. Do you know the reasons of its hardness? Due to routine works like cleaning utensils, taking bath and washing clothes are also the reasons for water pollution. The chemical products that have been used in day to day use caused lots of water pollution.

- Waseem:-** The sewerage waste is also one of the main reason of water pollution. This includes toilets waste of human excreta from houses and offices. There are both organic and inorganic wastes in it. The main contents of this solid waste are organic in nature. Even diseases microbes are also present in it. The faecal wastes of men and animals that have been left in open are also polluting water resources.
- Somesh:-** Even industrial waste is also polluting our water resources. This includes acid, alkaline, salts, fats, oils, metallic elements and even hazardous chemicals. Industries like paper, sugar, textile, leather, beverage, drugs, food processing, colour dyeing and fertiliser industries produces large quantity of wastes, which cause water pollution.
- Waseem:-** You will be surprised that even agricultural waste also causes water pollution.
- Rohit:-** Agriculture and farming too cause water pollution. Surprise!
- Somesh:-** Rohit, to have good harvest, farmers are using new technologies. They are using pesticides and fertilisers.
- Waseem:-** Nitrogen is the main content in most of the chemical fertilisers. The excess amount of nitrogen gets drained into water. It increases detoxification. This raises anaerobic bacteria in it. As the biological waste break, the oxygen content in water decreases. This lead to less number of living organisms in water, results water pollution.
- Somesh:-** Do you know? In most of the pesticides and weedicides mercury, lead, chlorine, phosphate, arsenic etc. are found. Mismanagement and wrong methods of farming causes soil erosion. Soil erosion is increasing day by day. Mud and soil sediment are also great reasons of water pollution.
- Waseem:-** High temperature from thermal power plants is also a great reason of water pollution. In nuclear power plants the heat tubes are cooled down by water circulation. Water from rivers and reservoirs is used for this purpose. After cooling process, this water is left in water reservoirs. This cause thermal effects which reduce the oxygen in water and increase the salts contents.
- Somesh:-** Occasionally you might have heard about the leakages of oil in water. This caused so many death of fishes. This is all due to oil pollution of water. This type of pollution is reported from oceans and seas. Oil leakage from ships causes this type of pollution. This reduces the oxygen content in water and many living organisms die due to suffocation.
- Amaiya:-** Look at this poster. The causes of water pollution have been shown in it. There can be dust, sand and dirt in the polluted water. Appearance of water is different due to pollutants. In technical terminology it is known as total suspended solid or TSS. This unit is used to measure the impurity of water.

The light that can be passed is assessed to measure purity and transparency of water.

- Rohit:-** Oh so much impurity in water! Then how can we purify such polluted water?
- Vasudha:-** Rohit in our country, we are using traditional technology since long.
- Somesh:-** Waseem ! Do you remember any such technology? In my childhood it was written all over the walls in our village “Use water after filtering and have Guru (teacher) after proper assessment”
- Waseem;-** Yes Somesh! Water filtration by using cloths is a simple and old tradition in our society. It was in common uses in our homes.
- Vasudha:-** During epidemic, water must be used after boiling.
- Somesh:-** It should also be kept in mind that the water containers should be properly cleaned before water storage.
- Amaiya:-** Mummy do you remember? Our grandmother was using Tulsi leaves in boiling water..... I mean Bacillus leaves.
- Vasudha:-** Yes my son! You are right. The Tulsi leaves killed micro-organisms and bacteria that found in water. Not only Tulsi but many others herbal products were used for water treatment.
- Waseem:-** In our Vedas I mean in Ayurveda....Many such techniques have been mentioned for water purification. Many herbal leaves and seeds were used in water treatment. One such example is the use of seeds of Sahajan trees.
- Somesh:-** In our traditional knowledge there is complete description of water purification. It also tells about the assessment of water purity.
- Rohit:-** But why are we not using those Technologies these days?
- Waseem:-** My friend! This is a tragedy for us. We never encourage our traditional knowledge that was so common in earlier days. We are blindly following the modern technology.
- Amaiya:-** See! One more new technology has been mentioned on this poster. Here water purification is done through filtration. Stones pellets are placed at the bottom then small gravels and finally sand is put on the top for water filtration. Water gets purified through this process of filtration.
- Somesh:-** The typical smell and odour were removed by using specific techniques. Water has been sprinkled over coke to remove its smell and odour or similar impurities. In this process water is passed through active charcoal. By doing

this dissolved carbon dioxide and hydrogen sulphide gases are removed from water. Some particles are getting precipitated and removed by simple process of filtration.

- Rohit:-** For water purification some chemicals are also mixed with it. Is it right?
- Somesh:-** Yes...you will find all these information later on in the second part of this exhibition. Small algae are destroyed by copper sulphate. Bacteria and micro-organisms are removed by chlorination and by bleaching powder. Even by ozonisation we can kill micro-organisms in water.
- Vasudha:-** Waseem Bhai...In rural areas which chemicals are used in the wells for water purification.
- Waseem:-** Bhabhi Ji...It is popularly known as Kaak.....I mean Potassium permanganate. It is added in the water of wells and ponds. We can destroy bacteria by this process. Even by using ultra-violet rays, we can destroy microbes in water.
- Somesh:-** Even some salts like Phittkari I mean alum are also used for water purification.
- Amaiya:-** See....Here the process of water purification has been described systematically.
- Somesh:-** My dear son! In this process water is passed through a complex process. In it Phoric sulphate, phoric chloride and lime are used for water purification.
- Rohit:-** But how can we distinguished between clean and impure water?
- Vasudha:-** To know the purity of water we have to approach some labs. Even at our home we can do it by using some specific kits.
- Somesh:-** When technology was not available some people were so expert in recognising the nature and purity of water. They were capable to judge water by seeing its nature and the surrounding habitat.
- Waseem;-** Our water can be clean and good in taste but it may not be fit for our day to day use. These days' modern techniques are used for water testing. This is because new pollutants are causing great harm to water.
- Somesh:-** Even by measuring dissolved oxygen in water, we can judge the purity of water. In our country some standards and some parameters have been laid down for drinking water. For example the dirt should not be more than 25ppm in drinking water.
- Rohit:-** Uncle! What do you mean by ppm?

Waseem:- Rohit! ppm is that limit of a substance which is one tenth of a million. I mean part per million. 25ppm mean 25 in ten lakh....Is it clear?

Rohit:- Now it is clear Waseem uncle.

Waseem:- Similarly the hardness of pure water should not be more than 600 ppm. Its PH should be in between 6.3 to 9.2. Elements like chloride, arsenic, cadmium, chromium, lead and mercury should not be more than the prescribed limit. It should not cause any harm to human health. If it crosses this limit, it will cause health hazard. Heavy elements and nitrate products are causing long term side effects, particularly to young born and senior citizens.

Vasudha:- In West Bengal, Bihar, Jharkhand and U.P. the Arsenic problem in drinking water is causing serious problems among the natives. It is causing skin diseases and cancer problems.

Rohit:- Here you can see the techniques that have been used for water purification. Sediment filtration process is very simple technique. In this process, the pores size is less than 20 micron. This removes all sediments and suspended particles from the water. Copper sulphate is also widely used to remove suspended particles from water.

Waseem:- Council of Scientific and Industrial Research ...I mean CSIR labs have also developed certain filters which can remove such types of impurity from the water.

Vasudha:- Children ...come here...Here you can know about the bacteria that are found in water. Biological impurities of water are caused by the presence of fungus, bacteria, protozoa, pathogens, micro-organisms, parasites or their eggs. Collectively they are known as micro-organisms or germs. Germs infected water causes health hazard. But thank God...their treatment is easily available these days.

Somesh:- In our country lots of health problems are created by consuming infected water. When microbe's infected dirty water is used, it causes typhoid, dysentery & vomiting and typhus etc.

Vasudha:- This poster shows that even today about 1.6 million people died worldwide due to consumption of infected water. It also affects our economy and employability. The world community is stressing to provide pure drinking water to all by the year 2030.

Somesh:- In our country NITI Ayog is working on it so that drinkable pure water can be made available to all.

Waseem:- For this traditional and modern techniques are to be used. It is beautifully depicted on that poster.

Rohit:- Wow! All these information will be of great help to me. My project will be one of the best.

Waseem:- Rohit! These information are not only for your project. You can share all these with others also. By doing this you can tell them the importance of pure water.

Vasudha:- Yes...Good things are to be shared with your friends and other people too.

Somesh:- If it is water...then it is to be shared with one and all. Only then we can share the invaluable gift of our Nature.

Musical Effect

Closing Announcement

Closing Part of Signature Tune

Science Quiz:-

Question 1. Name any three microbes that are found in water.

Answer:- Bacteria, protozoa and pathogens or their eggs.

Question 2. What do you mean by PPM?

Answer:- PPM means part per million.
