

VOLUME 16 • SEPTEMBER 2022

# EARTH ROOT

## PLASTIC POLLUTION

Types of plastic pollution

How to prevent plastic pollution

How pollution look over our oceans



# About E-magazine

“Earth Root” is an open access e-magazine in the discipline of Environmental sciences published by Earth Root Foundation. The aim of the e-magazine is to provide information and upgradation of knowledge about environmental issues on wider scale and to share ideas and resources to the readers. Using essential knowledge people can lead a healthy life, which is more sustainable and can connect with ongoing efforts for stopping catastrophically the climate change. E-magazine caters to all related environmental aspects ranging from big issues like climate change, renewable energy and pollutants in the atmosphere to the health of human and living beings on Earth. We also take topics of water resources and efforts and measurement to provide optimum use of it; including large scale atmospheric circulation linked with oceans and ecology.

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**KEEP**  
*the*  
**SEA**  
**PLASTIC FREE**



# ASSOCIATION OF ENVIRONMENT, MICROORGANISMS AND HUMAN BEINGS: THE ECOLOGICAL BALANCE

*Dr. Chander Shekhar Singh*

Associate Professor, Department of Linguistics,  
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The science of ecology deals with the relationship or interaction of organisms and the environment. In the nineteenth-century people started accepting the importance of studying the effect of the environment on life and living beings. Reiter (1865) was the first to combine the Greek terms Oikos [house] and logos (study of) to form the term ecology. The English naturalist Mivart (1894) coined the term hexicology and defined it as “devoted to the study of the relations which exist between organisms and their environment and regards the nature of the locality the frequent, the temperature and the amounts of light which suit them, and their relations to other organisms as enemies, rivals, or accidental and involuntary benefactors”. Hughes and Walker (1965) have defined ecology as “study of the relationships between organisms and their environments”

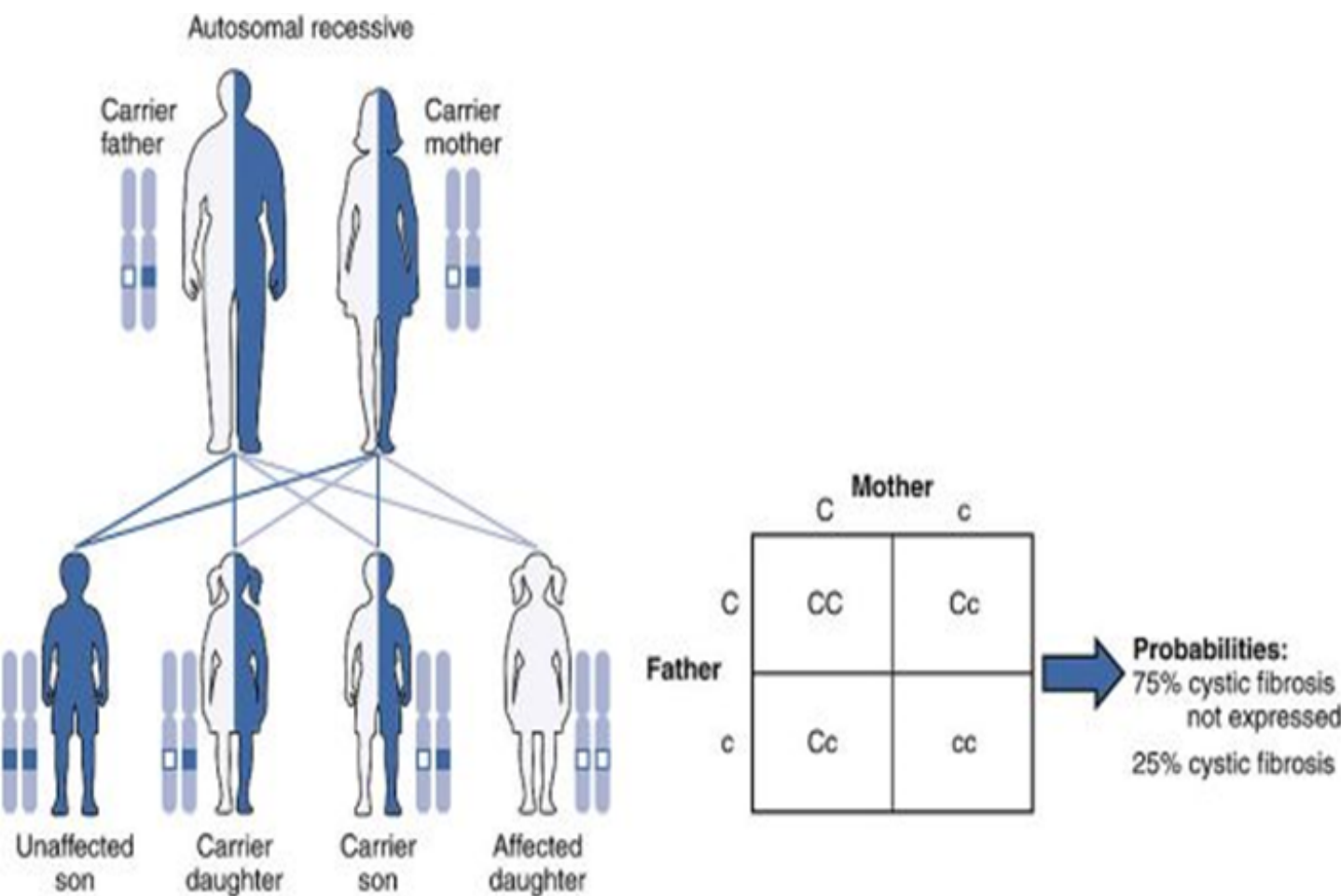
[Verma 1977: A textbook of Plant Ecology. Delhi: Emkay Publication pgs. 1-3).

It is observable from the above definitions that there is a close association between the environment and living organisms. Each biological system along with the interacting environment gives rise to a well-designed system that refers to the Individual, the Population, and the Community biosystems. The interaction of individuals or their populations with the environmental complex forms and the similar interaction of communities with the environment constitute a complex system of biosphere. It has been realized now the fate of human beings is directly linked to the ecological balance of the biosphere.





The external biophysical environment has an intense influence on the human's internal body environment provided that the two are in equilibrium and due to that the human beings are in good physical shape but whenever the equilibrium between the two (i.e. between human's external and internal environments) is disturbed, the human body is not able to work efficiently and it is said to be in diseased condition. The word 'disease' literally means lack of ease and comfort. 'Disease' can also be defined as going away from the state of health and comfort. The disease may be spread by any imbalanced interaction in the environment which may also include our household products and containers.





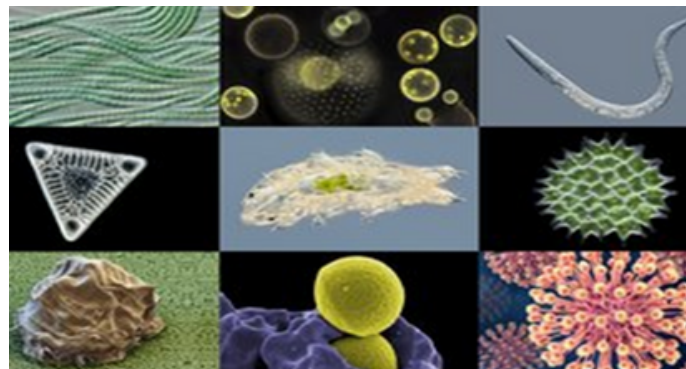
2. Acquired diseases- Acquired diseases are those which develop after birth. Acquired diseases can be further classified into two major categories:

a. Non-communicable diseases

b. Communicable diseases

a. Non-communicable diseases- Certain acquired diseases are not transmitted from human to human, even through any agency, they are known as non-communicable diseases. Some of such common diseases are- deficiency diseases, degenerative diseases, etc.

b. Communicable diseases- Communicable diseases can be spread from one person to another by direct contact, through water, food, air, or animals. Human beings are suffered from these diseases due to the invasion of the body tissues by any living parasitic organisms. Such organisms are- viruses, bacteria, fungi, protozoa, and worms. The common examples of communicable diseases are- tuberculosis, pneumonia, typhoid, malaria, etc. When communicable diseases suddenly spread on a large scale it becomes an epidemic.



[Source- <https://www.micropia.nl/en/discover/microbiology/microbes/>]

One of the major alarming problems we are facing is the uncontrolled change in the association equations among the environment, microorganisms, and human beings. There can be several factors involved in such changes but the most serious and disturbing factor is the human population. From the available data of different surveys, we observe that the human population is increasing terrifically and this is demolishing the proper and balanced interaction or association among the environment, the microorganisms, and the human population. Now, this is our responsibility to maintain a stable relationship between the living and nonliving members of our biosphere so that we will have a balanced association.

[Note- selection of photographs and technical support by Manikarnika Kaur (my daughter)]



# EDUCATION THROUGH ART

*Mehak Tiwari*

*Shyama Prasad Mukherji College for women, University of Delhi*

Explore Delhi in your way

To disseminate information regarding plastic pollution, plastic being a menace and cleanliness, the government and artists decide to take up the responsibility and educate civic citizens in some civic sense. Whether it's a wall painting, or whether it's an artistic model, or an art exhibition since as popularly said and believed "when words fail, art speaks."



A model of the 'tree of the future' is installed near charkha museum which signifies that if we don't stop the overuse of plastic and what we are doing as a result of climate change and global warming this is the result which will be ripped. As you sow, as you reap!!

Location - Connaught Place, Palika Bazaar parking road, New Delhi, India.



Wall and street paintings are also institutionalised so that before doing anything wrong our conscience can't make it done.



Credits - Times of India



Credits - Times of India

# HOW TO PREVENT PLASTIC POLLUTION

*Ritika Sen*

*Freelance content writer*

Plastic pollution is described as the cumulation of plastic objects and particles in the environment. Plastic has become a constant substituent of daily life. 'Be it the toothbrush used in the starting of the day, the mobile phone kept along the whole day or the lights used in the night for the light!' all is made up of plastic nowadays. So, for a quick conclusion one can make is that Planet Earth itself is now 'Plastic Positive'.

Since it is plastic so one major point anyone can think of, is its recyclability. Plastic products take hundreds of years to biodegrade. Although many initiatives are being taken to recycle, reduce and reuse plastic but still it is beyond the actual goal. It's not possible to completely vanish plastic from human lives but how to live with it without disturbing the environment is the actual practice meant to learn.



SOURCE- freepik.com

## HOW CAN WE PREVENT IT?

The simplest answer to this question is that we need to find another better alternative to plastic on a day-to-day basis. The basic principle of the 3Rs is meant to be followed as much as possible.



SOURCE- istockphoto.com

**1.Reduce** - Try not to use single usage plastic products like plastic straws, cups or plates or those packed food containers coming with online food ordering for daily basis. Use cloth bags for carrying groceries. Avoid buying plastic utensils instead opt for other alternatives as much as possible.

**2. Reuse** - Plastic products can be used in such a way that one does not end up buying another plastic. Plastic bottles as flower pots, and containers for storing items such as jewelry. Lots of DIYs are also available over the internet for creatively reusing plastic.

**3. Recycle** - One cannot recycle plastic fully at home but at least plastic products which cannot be reused can be put in the right recycling container.

**"It's in our hands whether to take earth out of plastic or plastic out of earth"**





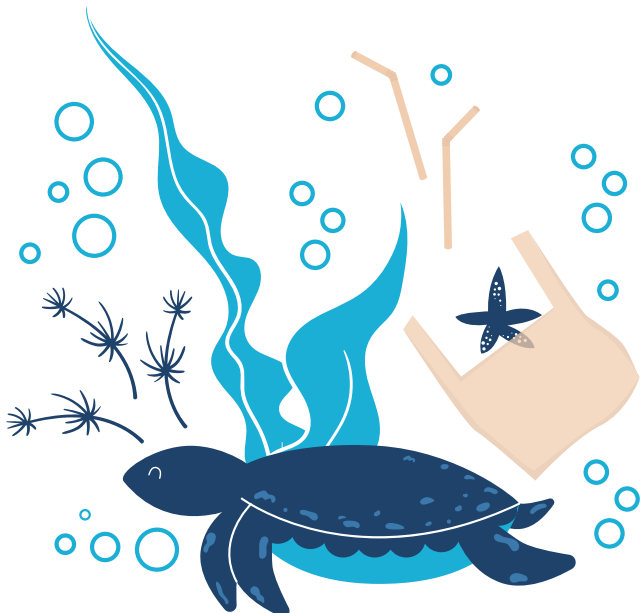
# PLASTICS IN DEPTH: HOW POLLUTION TOOK OVER OUR OCEANS

*Aditi Avasthi*

Shyama Prasad Mukherji College

**"The ocean is a mirror reflecting the world."**

As of today, our oceans are facing deterioration. The fauna and flora have been adversely affected by the plastics, and heavy metals caused by the use of chemical fertilizers, herbicides, insecticides, and effluents from industries, marine vehicles, etc. Most of the oxygen on the earth is provided by the oceans. It is believed that life originated from the oceans and it provides habitat to millions of organisms. The ocean contains many important seaweeds that are very nutritious to humans. The oceans are being exploited needlessly as a resource. Overfishing is disturbing the aquatic ecosystem. Excess carbon dioxide in oceans causes the pH to rise which is lethal to the aquatic animals. Biological magnification is occurring and high amounts of microplastics and heavy metals like mercury are getting accumulated in the fishes and other marine organisms, which are in turn very harmful for organisms up in the food chain like humans.



## FACTS

- Plastics consistently make up 80% of all marine debris studied.
- There may now be around 5.25 trillion macro and microplastic pieces floating in the open ocean. Weighing up to 269,000 tonnes.
- 100,000 marine mammals and turtles and 1 million sea birds are killed by marine plastic pollution annually.



There is a dire need to take action to protect our oceans. We should make use of biodegradable and non-hazardous alternatives. We need to raise our voice and create awareness before it's too late and save the oceans. The deeper and ethical reason is that, not only will it benefit humans, but, each species and each organism has its own importance and deserves to live. It's crucial that we leave behind majestic, beautiful and therapeutic stretches of oceans for our future generation. The oceans are not just merely sources of revenue or just another one of the ecosystems that we got to save. There's a part of our being. Industrial effluents should be treated and overfishing controlled. We as individuals should urge the government to make amendments to the laws and provide even more protection to our oceans.

## MEDIA COVERAGE : PLASTIC HEIST

*Mehak Tiwari*

Shyama Prasad Mukherji College for women, University of Delhi

Plastic Heist inspired from famous web series Money heist which was in trend at Netflix is a project instituted by HCL Foundation and Noida Authority through its initiative Clean Noida under the purview of Chakachak Market having Those in Need as its implementing partner. Intends to carry out works and services to implement effective solid waste management in Noida city. This initiative aims to transform the city into a litter and waste-free region, covering all RWAs and urban villages.

Major focus areas of the project are as follows  
Capacity building of relevant stakeholders,  
Intensive behaviour change campaigns,  
Awareness drives  
Technological solutions.

In order to be more convincing, engaging and conversing the project named Plastic Heist came up, where volunteers dressed in money-heist outfits conducted various activities including raising awareness, organising plastic collection drives, and doing social experiments in the markets regularly regarding single use plastic waste. Ambassadors dressed in the same theme went to the shops to steal the single use plastic and give shopkeepers and buyers a lesson to avoid using the same. Awareness was spread through different means including the theme song as well, “Bella Ciao” replaced with ‘Plastic Hatao’ video on the effects of plastic usage, plays, unique dressing concept and many other engaging methods. For the good efforts, businesses and communities would be recognized that are leading the way to

Zero Waste. By means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that ultimately threaten the environment or human health. In order to formally recognize these initiatives, the Clean Noida project will be rewarded under the Sustainable Business Recognition initiative. All businesses recognized under this initiative will be certified by NOIDA Authority and Clean Noida being Sustainable Businesses in Noida.

The project instituted Nukkad Natak (street play), Video showcasing through LED van, Batter system (exchanging plastic bottles and get one cloth bag etc.) Plastic waste Art installation at premium markets, plastic human models depicting world with plastic theme at world environment day and the one of the most key noticing and amazing thing during the entire campaign was a sculpture of Mahatma Gandhi with 1000 kg of plastic waste was made by an award winning artist Mr. Sandeep Panwar in order to convey the theme of Swacch Bharat - 'Ek kadam Swacchta ki aur'. This was instituted and inaugurated by Dr. Mahesh sharma , MP Gautambuddha Nagar and Ms. Ritu Maheshwari (Sr. IAS and CEO of Noida Authority) This 20 feet statue is called as Marching Bapu and is located at sector 137, Noida to be witnessed by all.









# MOVIE RECOMMENDATION: A PLASTIC OCEAN

*Manisha Mani*

Packaging technologist



Source: [makingoceanplasticfree.com](http://makingoceanplasticfree.com)

A movie is an art of storytelling with action sequence widely cherished among the society for entertainment and conveying thoughts among the masses. The movie sometimes depicts the heart wrenching stories of the prevailing social causes and environmental issues. Such movies are used as political tools for cultural influencing and spreading awareness about the improvisation of the marginalized section of society. Plastic pollution is one such eminent environmental issue that is documented into movies to have real social impact.

A Plastic ocean is an adventure documentary shot on more than 20 locations from 2012 to 2016. Produced by jo Ruxton and Adam Liepzieng with executive producers Sonjia Norman and Daniel Auerbach the movie has a run time of 1 hr 40 minutes depicting the marine life and devastating effects due to accumulation of plastic debris spread across the ocean. Explorers Craig Leeson and Tanya Streeter and a team of international scientists reveal the causes and consequences of plastic pollution and share solutions.

The movie starts with an introduction to alarming conditions of one of the largest sea mammal whale , due to ingestion of cosmic amount of plastic. Tanya Streeter a sports champion dives below the Indian ocean and finds 6 m2 plastic sheet inside a whale like a bolt from a blue. The research revolves around some statistical facts about the plastic in the ocean. Of total plastic waste that goes into the landfill half of the plastic consist of single use plastic that is washed ashore. About 8 millions tonnes of plastic is dumped into the world's ocean every year and almost 50% of marine debris sink into the ocean.





Source: simacollection.com

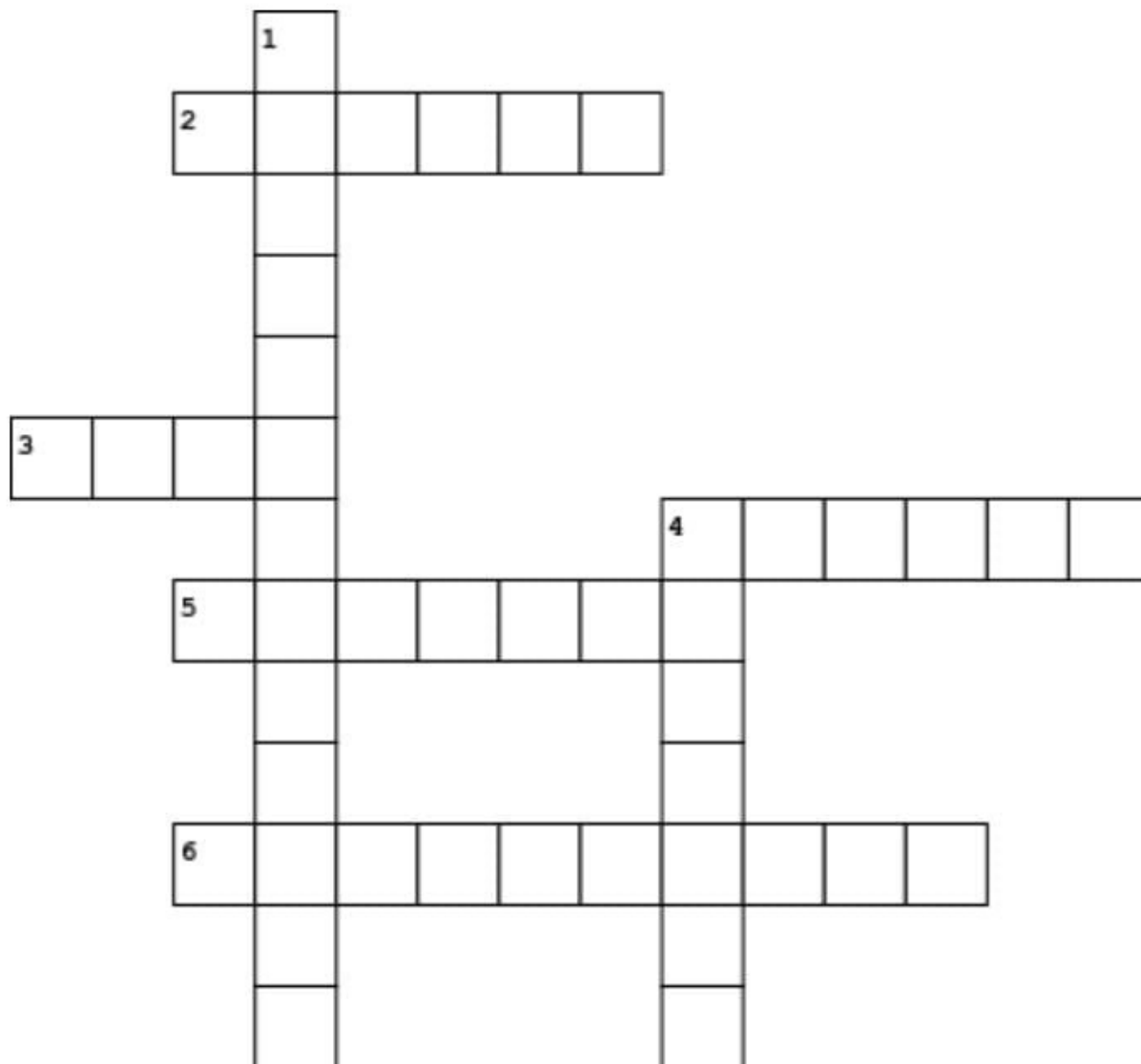
5 Trillion fragments of microplastic are photodegraded by sunlight accompanying washes through waves and chemical degradation by salts. These microplastic have rough surface with possible threat to marine animals like toxic poison pills. Two explorers studies to find that seabirds are particularly vulnerable to this type of pollution and are widely observed to ingest floating plastic. An estimated of 90% of all sea birds has swallowed plastic at some time in their lives. Dolphin is one of those endangered species that ingest plastics in some of the immeasurable quantity. When aquatic animals like sea planktons and fin whales eat animals with microplastics a micro toxin enters the animal body which are assimilated to form phthalates a plastic derivative that can cause metabolic ,immunogenic and endocrinal disorder to further genotoxicity and cell apoptosis, resulting in the growth and development of organisms being blocked.

They also try to introduce ways to mitigate plastic pollution, plasma gasification being one of them. They focus on the reduction of the use of plastics containing leachable, BPA, and single-use plastic. The purpose of the movie is to spread awareness about plastic pollution and inculcate a sense of a sustainable marine ecosystem working toward a circular economy



Source: theconversation.com

# CROSS WORD



## Across

- 2. Rubbish in the street
- 3. A site for depositing garbage; landfill
- 4. Bits and pieces of rubbish and trash
- 5. Any matter that is longer wanted or needed; trash
- 6. Something that is designed to be thrown away after you have used it once or a few times.

## Down

- 1. Extremely small pieces of debris in the environment resulting from the disposal and breakdown of consumer products and industrial waste.
- 4. To decompose or to break down into basic elements

## BICYCLE RALLY



*Earthroot foundation celebrated 75th independence day by organising an eco-friendly cycle rally exhibiting ultranationalism and awareness toward the pollution-free environment.*

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