

Innovators

Springdales, Dhaula Kuan, New Delhi

3rd EDITION

**THERE IS NO OTHER EARTH
CHOOSE PLANET OR PLASTIC!**



**SPRINGDALES
SCHOOL, DHAULA KUAN**

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FORWARD

*“Plastic churning away on ocean floors
Destroying marine life without a pause –
Eight million pieces a day in the seas
When will our conscience awake and appease?”*

*The human race waits and watches this disaster
Where technology and chemicals have become the master
Plastic pollutant so toxic is at our command
In landfills and waterways, as per our demand.....*

*Greenhouse gases adding to the carbon increase
As our greed for more plastic will never cease
Plastic keyboards and devices we have no dearth
Each day we plunder and erode the earth !*

*It's time to act and to be morally aware
that the demon of plastic will leave the planet threadbare*

*Let's wake up in time before it's too late
and come up with solutions to seal our fate
An epidemic turned endemic is our greatest harm
To save ecological collapse and bring back the calm !”*

Dear Readers,

This brochure stands testimony to the work of our young Innovators in their work for the goals of Sustainable development. Their projects showcase through assemblies and inventions their concern for the planet and their own future!

This issue dedicates itself to “Climate Change” and “The Planet and Plastics”.

With warm regards,



**Dr. (Mrs.) Jyoti Bose
Director
Springdales Schools**



Change Is The Order Of The Day!



We have been addicted to single use or disposable plastic. Plastic trash has become curse of the modern living. If we don't change now, our oceans will contain more

plastic than fish.

Ocean plastic is estimated to kill millions of marine animals every year. Marine species of all sizes from zooplankton to whales now eat micro plastics confusing it with food. Bisphenol – A (BPA) is used in making plastic bottles and food packaging material. Over a period of time, the polymer chains enter the human body and disrupt the various hormonal mechanisms.

The United Nations theme “Beat Plastic Pollution” and Sustainable Development Goals were translated into action by the students of Springdales School. Myriad of activities were organized including various awareness campaigns like #GiveupPlastic, #SaveMarineLife, #HealThePlanet, #ZeroWasteSchool.

We started with classroom discussions followed by school assemblies and then moved on to Global Collaborations through Skype Meetings, Online Bulletin Boards - Padlets and used other game based platforms like Kahoot !

Experts from various fields were invited to raise awareness about Global Plastic Waste

Crisis. They discussed the role plastic industry has played in moving the economy forward and the best that can be done to prevent Plastic Pollution become a next catastrophe.

Students made Posters, wrote slogans and made a sculpture of fish depicting the pathetic condition of marine life in our Oceans. All these activities help them develop a deeper understanding of the problem.

Through our 3rd edition of Innovators, we share stories, events, experiments and showcase Springdaliens in Action working to address this Global Crisis, Educating and Pledging to eliminate Single Use Plastics and preventing them from making their way into our Oceans and landfills.

I take this opportunity to thank Mrs. Bose for being an encouraging and an inspiring mentor and my colleague Mrs. Nidhi Maan for her untiring support throughout the journey. Lastly, I would like to thank all my students who had been the real pulse of this entire project. I am sure all of us will continue with our journey to heal our Mother Earth for...a journey of thousand miles begins with a single step.

Mrs. Mandeep Sukhija

#ChangeMaker

Educator and Facilitator

Springdales School, Dhaula Kuan,

New Delhi, India.

EARTH DAY CELEBRATION

END PLASTIC POLLUTION – SAVE MARINE LIFE

Plastic pollution is poisoning our oceans and lands injuring marine life and affecting our health. Springdales School, Dhaula Kuan, Organised a special assembly on 26th April 2018 to raise awareness by providing the information with the aim to change human attitude and behavior about using and recycling Plastics. Plastics were invented in 1907 and soon they become omnipresent in our daily lives. All these years we were using plastics because of their benefits like weight, colors, easy to store and we knew little about the dire consequences of using plastics on human health and marine life. Plastics are made by non-biodegradable hydrocarbon molecules ,derived from refining of oil and Natural gas.

During the entire week, the Environment Club of Springdales School Dhaula Kuan started a #GiveupPlastics Campaign. The studies reveal that by 2030 there will be more plastics in the ocean than the marine life. Students pledged

to give up plastic water bottles, Plastic tiffin, pencil pouches, straws, hairbands and disposable cutlery, plastic bags, food wrapping etc.

Students also came up with the sculpture of fish with lots of plastic bottles inside the stomach of fish highlighting the terrifying level of pollution in our oceans.

Students shared there views about the importance of environment conservation and encourage the audience to adopt sustainable life styles.



ACTIVITIES TAKEN UP AT DIFFERENT LEVELS

- Poster making activity for class V1
- School Assembly to bring awareness on the theme-“Beat Plastic Pollution” – Senior School
- Data collection on how much plastic we use everyday – Middle school
- Activity sheet - What do the Recycle Numbers in the triangle mean? - Middle School
- Creating a list of plastics used at home with different resin Identification Code – Middle school
- Starting a Campaign #GiveUpPlastics #Save Marine Life # Heal the planet #Zero waste school-senior school
- Invited an expert to talk about Toxicity of heating food in plastic Containers and long-term use of plastics – class 11
- Involving students in creating a Sculpture of Fish affected due to pollution in the oceans.
- Organised a Ganga River Cleaning activity with volunteers.
- Let children suggest or come up with Innovative ideas of dealing with Plastic Recycling.
- Collaborate with educators from the other countries to share best practices through Skype.
- Sharing Best Practices Using Online Platforms like Padlets and Kahoot.



SUSTAINABLE ACTION FOR EVERYONE

By Anudhii Sundaram

Close to 48 years ago, on 22 April 1970, the first earth day was celebrated when millions of people took to the streets to protest the negative impacts of 150 years of industrial development. Around the world, smog was becoming deadly and evidence was growing that pollution led to developmental delays in children. Biodiversity was in decline as a result of the heavy use of pesticides and other pollutants. Global ecological awareness was growing. And today, earth day is seen as the largest civic-focused day of action in the world.

From poisoning and injuring marine life to the ubiquitous presence of plastics in our food to disrupting human hormones and causing major life-threatening diseases and early puberty, the exponential growth of plastics is threatening our planet's survival. Bearing this in mind, the theme chosen for the earth day this year is to 'End Plastic Pollution'. This theme aims to educate millions of people about the health and other risks associated with the use and disposal of plastics, including pollution of our oceans, water, and wildlife, and about the growing body of evidence that plastic waste is creating serious global problems.

Under the garb of development, mankind has recklessly used the scarce resources and caused severe damage to the environment. However, we can refurbish what we have damaged by walking on the path of sustainable development. Sustainable development not only meets the needs of the present, but also

ensures a healthy and happy life for our future generations, who are entitled to harbour a safe environment. And as students, we bear a larger responsibility of reducing pollution of any form, curbing exploitation of vital resources and promoting efficient use of alternative sources of energy.

Let us realise that an increase in the



temperature of oceans would lead to stronger hurricanes and storms, direct exposure to UV rays would cause mutation, cancer and vandalise property, rise in sea level would trigger tsunami and floods, droughts would lead to deaths out of thirst and hunger, and animals would succumb to erratic climate pattern creating an imbalance in the ecosystem. In a nutshell, man would bear the brunt of his indifference and callousness towards nature if he still does not fully wake up to the reality of the deteriorating environment. The enormity of environmental problems might seem daunting and dispiriting, but a joint and persistent effort can repair our environment and ensure a secured and serene life for us as well as the posterity.

PLASTIC WASTE-WHERE ARE WE NOW?

By Vani Kant



baggies to store sandwiches for lunch, unbreakable soda bottles, disposable razors and shampoo bottles – Unless specifically requested, even the bags we use to carry home our goods are often plastic,

To humans, these are items of comfort, if not necessity. But to marine animals, they can be a floating minefield. Did

you know that it is estimated that by 2050, 99% of all seabirds will have ingested plastic.

From cell phones and computers to bicycle helmets and hospital IV bags, plastic has moulded society in many ways that make life both easier and safer. But did you know that the amount of plastic manufactured in the first decade of this century completely eclipses the total production of plastic the entire last century?

Every year we produce 335 million tons of plastic—a majority of which is for one-time use products such as straws, bags etc. \$80 billion is lost to plastic packaging every year. These plastic products are highly harmful for the human body. Research shows that heating food in plastic containers is a cause of cancer. Chemicals produced whilst heating plastic may be carcinogenic. Bisphenol, a type of plastic found in container and bottle linings may slowly leach into our foods and drinks, causing hormonal imbalances, illnesses and even heart diseases.

Individually wrapped snack cakes, plastic

In 2010, a California grey whale washed up dead on the shores of the Puget sound. Autopsies indicated that its stomach contained a pair of pants and a golf ball, more than 20 plastic bags, small towels, duct tape and surgical gloves. There is actually more microplastic in the oceans than stars in the milky way! Human disregard towards waste management continues to be a major cause of marine debris and environmental degradation at large and if we do not take responsible steps to preserve our planet now, the situation will only get worse with growing population and standard of living.

I would like to conclude by quoting Marlee Matlin, who's humbling words remind us of the need of the hour and the essence of human life, she says, "The Earth does not belong to us; we belong to the Earth."

CHOKING MARINE ECO SYSTEM

By Sparsh Goel

Fish may be actively seeking out plastic debris in the oceans as the tiny pieces appear to smell similar to their natural prey.

The fish confuse plastic for an edible substance because micro plastics in the oceans pick up a covering of biological material, such as algae within days or weeks, a process known as bio-fouling that mimics the smell of food. This algae produces and emits DMS, an algal based compound that certain marine animals use to find food.

Plastic debris in the oceans, ranging from the microscopic to large visible pieces, is recognized as a growing problem as it does not readily degrade and hundreds of thousands of tones are dumped in the sea annually. Larger pieces have been found in the intestines of whales and seabirds, where they are thought to be potentially fatal, while the smallest pieces have been detected in the guts of even juvenile fish and molluscs. Numerous species of fish eaten by humans have been found to contain plastic, and the effect of eating these on human is still unknown.

UNDERSTANDING PLASTIC RECYCLING SYMBOLS

By Ashneet Kaur Sukhija

Have you ever given a thought how much plastic you use in your home or Kitchen.

You probably have an entire cupboard full of stuff, including reusable plastic containers that you use to store and to reheat leftover food.

And why not, after all, plastics are handy, lightweight, they store easily, and they're cheap.

But do you know what are these plastics? They are made from an array of organic and inorganic compounds. Substances are often

For Example:

Bisphenol-A (BPA) is added to make it clear and hard and Phthalates are added to make plastic soft and flexible.

On heating, the toxins and chemicals leach from plastics into our food and cause diseases like- hormonal imbalances, diabetes, hypertension and cancers etc.



added to plastic to give them shape and stabilize them.

When it comes to plastic food containers, some are safer than others. Through my video presentation, I will be telling you more about the kind of plastic and the 'resin identification number' located in a triangle on the product.

So, Let' s try to understand different kinds of plastics.

Find out how safe is your plastic

1: Polyethylene Teraphthalate (PET)

It is lightweight, clear and smooth, commonly used for bottled water or soft drinks.

It is safe for a single use and should never be heated.

This kind of plastic degenerates into its contents over time.

You must 'Crush The Bottle After Use'.

Do Not Reuse

VERDICT→ Moderate hazard

#2: High-density Polyethylene.

This is the thicker, more opaque plastic found in milk and water jugs, juice bottles, detergent, shampoo, and motor oil containers, and toys.

Unlike #1, these are safe to refill and reuse.

VERDICT→ Low hazard

#3: Polyvinyl Chloride (PVC)

They contain Phthalates that can carcinogenic.

Polyvinyl chloride can cause reproductive problems in animals and humans

Among the few items this category of plastic is found in, are peanut butter jars.

Polyvinyl chloride containers may have the symbol "V" on them.

VERDICT→ High hazard

#4: Low-Density Polyethylene – Safe

Frozen foods packaging grocery bags, plastic food storage bags, bread bags, frozen food packaging bags, plastic wrap, dry cleaning bags, and garbage bags.

Type 4 plastic does not contain any known harmful chemicals.

VERDICT→ Low hazard

#5: Polypropylene - Safe

Polypropylene containers do not leach harmful chemicals into foods or liquids.

They commonly contain yogurt, medicine, drinks, ketchup and medicines.

Type 5 plastic is flexible, hard and semi-transparent and has high resistance to solvents.

Polypropylene containers may have the symbol "PP" on them.

VERDICT→ Low hazard

#6 and 7 Polycarbonate

You should avoid type 7 plastic containers because they may contain bisphenol

Type 7 plastics often have the symbol "PC" or "Other" on them.

You will find polycarbonate plastics in 3- and 5-gallon water-cooler bottles; hard, plastic reusable water bottles; and to-go coffee mugs. Manufacturers use polycarbonate for these purposes because it is virtually shatter-proof.

VERDICT→ High hazard

SAFER PLASTICS

#1 polyethylene terephthalate,

#2 High Density Polyethylene, #4 Low Density Polyethylene, #5 Polypropylene are deemed the 'safer' plastics.

1 PETE	2 HDPE	3 PVC	4 LDPE	5 PP	6 PS	7 OTHER
?	✓	✗	✗	✓	?	☠
OK for single use applications	Releases virtually no chemicals	Releases 2 toxic chemicals	At risk of leaching chemicals	Relatively safe, doesn't melt when heated	OK for single use but releases carcinogenic substances when heated	Most dangerous form of plastic

GLOBAL STRATEGIES FOR RECYCLING PLASTICS

By Sancia Sehdev

Today, India is independent but still dependent. We are aware, we know our duties, but we hesitate to take responsibility. We are a country that can't manage its own waste. We always need a hand to help us to sit and stand, a shoulder to lean upon.

Its time that we ask ourselves, can we stand up and do something? The answer is yes. Rather than sitting about, pondering over our problems, talking about it and then going back to our businesses, we can take action. Learning from others is better than doing nothing to solve the problems like waste management, which are eating away the planet with each passing minute.

Here we have Sancia Sehdev to reinforce the idea and present her case study on the different techniques of plastic waste management used in diverse countries like India, Sweden, France and Rwanda.

Recently around 200 countries signed a UN Resolution in Nairobi to eliminate plastic waste. Many countries have participated in the fight against plastic pollution and taken remarkable steps to reduce the plastic menace.

In Sweden, for example, 99% of waste is recycled. Sweden has, over time, developed large capacity and skill in waste treatment. In 2014, it even imported 2.7 million tonnes of waste from other countries, to burn and turn into energy. Sweden has banned the use of microplastics in cosmetic products and using plastic bottles that cannot be recycled is prohibited.

France has become the first country in the world to ban plastic cutlery. It has also outlawed plastic bags and aims to half its plastic usage by 2025. Countries like Bangladesh and Rwanda have banned plastic bags. Anyone offering them in Kenya risks 4 years in prison or fine of upto



\$40000. China has banned imports of plastic waste, while the European Union has launched a "plastic strategy" aiming to raise the proportion recycled from 30% to 55% over the next seven years.

On the contrary, India generates around 56 lakh tonnes of plastic waste annually, where Delhi alone accounts for 9,600 metric tonnes per day. To reduce plastic menace, the Green Tribunal suggested a ban on single-use plastic. However, currently in India, there is only one law in place—No manufacturer or vendor can use a plastic bag which is below 50 microns.

Over the years, several waste to wealth mechanisms have been adopted to recycle plastic in innovative ways. Given India's huge daily generation of over 15000 tonnes of plastic, the prospects of conversion to fuel are abundant. The Indian Institute of Petroleum has also developed a unique process of converting plastic waste to gasoline and diesel while Ashwath Hegde from Bangalore has developed an organic plastic, which can be burnt, dissolved, and even eaten without causing and side effects.

Plastic pose a serious threat to our ecosystem, but the situation is not something we can give up on. What the world needs is more practical solutions, more innovation and more eco friendly practices. Together, playing our roles, we can make a difference!

AN OCEAN OF PLASTIC — IT'S TIME TO TURN THE TIDE

By Maulik Behl and Neelaksh Sati

If you look around you, you'll probably see plastic of some sort. You probably have things in your school bag made of plastic. Much of the food and drinks come in plastic containers — like bags or bottles. Most toys are plastic. Plastic is everywhere... and I do mean everywhere! This is because people make it in large quantities because it is so useful in just about everything people do.

Unfortunately, some of the same properties that make plastics great for consumer goods make them a problem pollutant. Plastic's durability comes in part from the fact that unlike paper or wood, it doesn't biodegrade, or break down naturally. Instead it just fragments, or breaks into pieces over time. Those tiny pieces, known as microplastic, can potentially stick around for hundreds or perhaps even thousands of years.

From the ice-covered Arctic to the tropical waters of the Pacific, all of Earth's oceans share one thing in common: plastic pollution. The millions of tons of plastic waste floating in the oceans is a time bomb that threatens to poison the marine ecosystem.

Unfortunately, many marine animals mistake some types of plastic for food and eat them. Turtles often die because the plastic they eat blocks their digestive system so they starve.



Marine mammals (like dolphins) often get trapped by plastic nets or ropes and either drown or starve to death: "ghost fishing". Great and rare sea birds like albatrosses also get tangled up in old fishing gear and die. Around 400,000 marine mammals die every year due to plastic pollution in oceans. The list of horrible facts about plastics goes on and on.

Plastic pollution doesn't just hurt marine species. When animals eat these plastic pieces, the toxins are absorbed into their body and passed up the food chain. As plastics break apart in the ocean, they also release potentially toxic chemicals such as bisphenol A (BPA), which can then enter the food web.

Despite the vastness of Earth's oceans, plastic pollutants are turning up everywhere, from the deep sea to the Arctic ice pack. Shockingly, researchers estimate that by 2050 the oceans will contain more plastic—by weight—than fish. As these degrading plastics leach potentially toxic chemicals into the seas, they pose a serious threat to ocean animals, as well as to humans.

SKYPE INTERVIEW WITH SCIENTIST

DR. PRITI MAHESH, CHIEF PROGRAMME COORDINATOR, TOXIC LINKS

The clock has struck. Its time that we take action, interact with the policymakers and the leaders to tackle the problems being faced by the world at large and look for their solutions. Because time waits for none, and before we know it, it might take away everything we have along with it. We have to do each and everything in our capacity because this time, it

Dr. Priti Mahesh advocated to Recycle, Reuse and Refuse to create a sustainable future.



- Recycle plastic bottles
- Reuse plastic bags to minimize the daily consumption of single-use plastic.
- Promote the use of jute bags, cloth and nylon bags
- Create awareness in your society.

not about me, he or she, its about we.

Students of the springdales school had a skype meeting with principal scientist at 'Toxic Links'- Dr. Priti Mahesh. She explained the link between toxins and plastics and how our mariane system is affected by the plastics in the oceans.

- Use organic cutlery for social gatherings.
- Carry your own water bottles and avoid buying packaged drinking water.
- Give up plastic wraps.
- Reuse glass jars.
- Refuse personal care products with plastic micro beads.
- Refuse plastic Straws.
- Stand up, speak out, and take action against plastic pollution.



#GIVEUPPLASTICS CAMPAIGN

An Initiative by the students of Springdales School



Students of the Springdales started Give up plastics Campaign. Campaign included 10 points that we all can do -to stand up, speak out, and take action to stop plastic pollution.

1. Stop buying plastic bottled water. Get a reusable bottle and refill it.
2. Just say no to single-use plastic grocery bags. Bring your own bags wherever you shop.
3. Learn the facts about plastic pollution. That "floating continent" of plastic garbage in the Pacific Ocean is only the tip of the iceberg. Plastic doesn't biodegrade; it photodegrades, meaning it breaks up into smaller and smaller pieces, creating a plastic soup in our oceans..
4. Refuse plastic straws in your drink. Get used to saying "No, straw please," when dining out. Ask local restaurants to serve straws only on request. You can leave this card at your table.
5. Give up plastic wraps and bags. Purchase alternatives or reuse glass jars. Thousands of chemicals are used in food packaging and can migrate into the food or liquid they hold.
6. Choose clothes made with natural fibers whenever possible. Synthetic clothes shed small plastic fibers when washed that pollute rivers and oceans.

7. Refuse "styrofoam" food and drink containers. "Styrofoam" or polystyrene is carcinogenic to animals and is a probable human carcinogen.

8. Photograph plastic pollution wherever you live.

9. Refuse personal care products with plastic microbeads. Toothpastes and face and body washes can contain tiny plastic beads that end up in our waterways. Learn more about the products that contain microbeads and what you can do to stop this pollution.

10. Make your voice heard! Keep talking to your friends, relatives, and neighbours about plastic pollution and our environment.



GLOBAL PARTNERSHIPS TO SOLVE THE CRISIS

Sharing the Best Practices

The Earth day celebrations at Springdales witnessed the participation of schools from various countries like Portugal, Sweden and Ukraine .We had Skype meetings with School of Solone No1 ,Ukraine and video exchange with students of HTS Hassleholm Technical School Sweden.



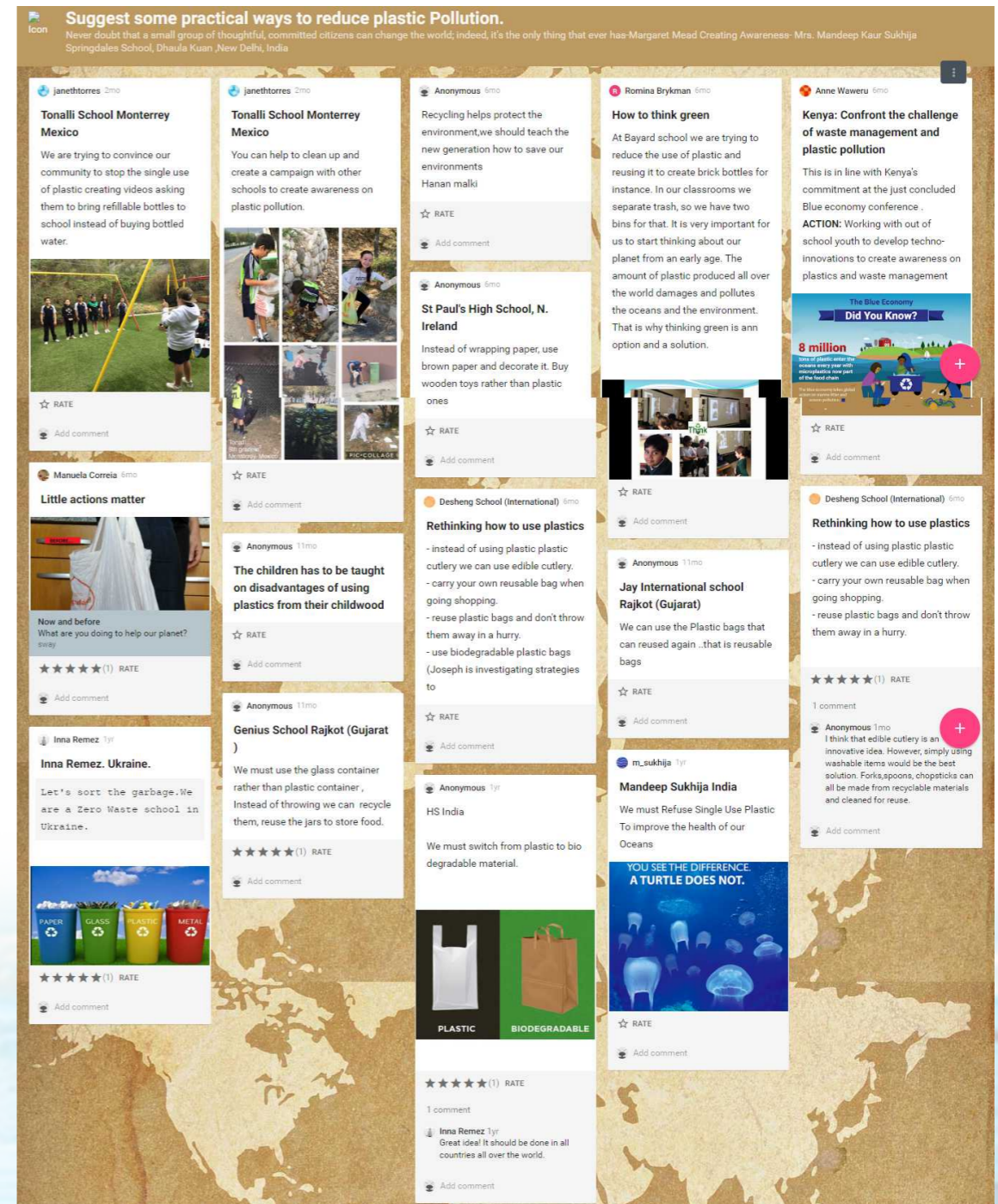
ONLINE BULLETIN BOARDS -PADLETS

A tool for Global Collaboration

With the purpose of collaboration and reaching beyond the boundaries of classrooms, members of Vasundhara Club created an online bulletin board where students and teachers across the globe shared their ideas of reducing plastic waste. Students from Ukraine,

Ireland, Portugal, Mexico, Kenya and many Indian schools in Rajasthan, Gujrat etc shared the images and links, websites, files on the Padlet, created by the Students of Springdales seeking solutions to the Global Plastic waste crisis.

https://padlet.com/m_sukhija/ercala3ecbdp



IINNOVATORS IN ACTION

MENTORING SESSION WITH SCHOOL ALUMNI

Professor, Gautam Bhairali, IISC, Bangalore

Students of Std. X, XI and XII Interacted with Scientist Professor Gautam Bhairali, Indian Institute of Science, Bangalore on 16th April 2018. Students discussed various projects with Prof. Bhairali who gave his expert ideas on Designing, Prototyping and Executing an idea into a successful product.

He also discussed about KYPY and the preparation required to get into IISC.



COMMUNITY DAY CELEBRATIONS

Working with children from the Sri Ram JJ Cluster

To maximize the impact of Atal Tinkering Labs by extending innovation to children in the community who do not have access to formal educational institutions, The Community Day was celebrated at Springdales School Dhaula Kuan on 16th April, 2018.

The purpose of this initiative is to provide these children with the same educational tools as the students in Atal Tinkering Labs to enable them to become problem solvers. The students participating in these interactions include disabled children, street and working children, and girls from the weaker sections of society.

Around 25 students from community attended the workshops conducted by STEM teachers. Mrs. Vandana Punj had demonstrated interesting experiments like Acid-Base testing using Litmus paper and Magical Pen writing



using the electrolysis of Potassium Iodide. Mrs. Mandeep Sukhija and Mrs. Nidhi Maan demonstrate the simple electrical circuits like Glowing LED using breadboards to them.

Our school students mentored the community students and inspired the spirit of innovation and problem solving through tinkering with emerging technologies. They also visited the workshop area of our innovation laboratory where our students explained various STEM models based on IoT and sensors to them.



STUDENTS' INNOVATOR BOOT CAMP

Report by Seher Taneja

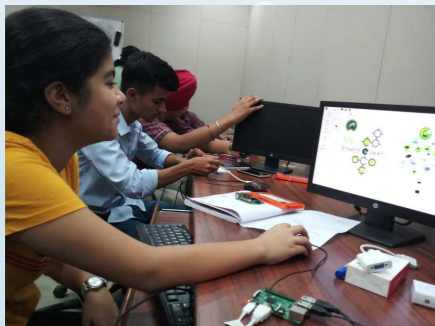
The purpose of this program was to connect students with industry partners in order to further develop their prototypes with the objective of making them marketable products and to provide mentorship to the students regarding other various aspects of creating a startup/product.

Someone has rightly said, "Never stop dreaming. Yesterday's dream can become the reality of tomorrow and the innovation of the future." Little did I know that my prototype, Pratihtha Ek Pahal, A New Dawn in Sanitation would make its way to the top 30 of the Atal Tinkering Marathon and would give me an opportunity to live my dream to work for the underprivileged of my country. I was invited for a student innovator program to be held between mid-May – August 2018. A group of 6 teams each from the top 30 was attached with their industry partner in order to further develop their prototype with the objective of making them into marketable products. My group included teams from Jaisalmer, Phillaur, Arunachal Pradesh, Assam and Meghalaya. After a series of Skype calls with my guide Ms. Mandeep Sukhija and me to discuss my project, a boot camp was conducted from 25th - 28th June at Ajay Kumar Garg Engineering College Campus to further hone our innovative skills & learn from the best in the Industry under the mentorship of Stratasys.

I attended the 4 day camp with my teacher and co-guide, Ms Nidhi Maan at Ajay Kumar Garg Engineering college, Ghaziabad. The program began with a power point presentation of each prototype followed by a design thinking session to build an improved prototype. This was followed by Virtual prototyping & coding test. We built a CAD model and learnt the latest technologies like 3D printing, robotics and internet of things (IoT). along with advanced rapid prototyping technology, physical prototyping & laser cutting. We were explained intellectual property rights and patentable features of each project were discussed.

We were so deeply immersed in the creative process and imbibed the best practices of technology innovation on our journey to become #studentpreneurs.

It was indeed a unique learning experience where a very brilliant team of mentors worked to bring our ideas to life and I feel equipped to contribute to The New India which is poised to become the innovation capital of the world. Big or small we must re-invent, challenge and rethink.



TINKER FEST IGNITING THE SPARK OF INNOVATION

Empowering Students with STEM Skills

On 29th July 2018, Springdales School Dhaula Kuan organized Tinker Fest in Atal Innovation Laboratory. Workshops on Robotics, Arduino, IoT sensors, Electronic Circuits and 3D printing were organized for middle and senior school students. These workshops were organized in collaboration with the students from Delhi Technological University. A virtual Science Tour to Dinosaur Park, Pune was also organized



through Microsoft Skype Class in collaboration with the Science Park mentor Mr. Ranjitsinh Disale appointed by Government of Maharashtra. An app development hands on session using MIT App Inventor was also organized with the help of Class X students.

Workshop on Electronic Circuits was organized for class IX and X students. They worked on circuits using breadboard, Arduino and IR sensors. Workshop on Robotics was organized for middle school students and they learnt basics of Line Follower Robot. Workshop on 3D printing was organized for Class IX in which they designed 3D objects using SOLIDWORKS

software and used CURA to convert and save files in proper format.

In Virtual Tour to Dinosaur Park, students learnt interesting facts about Dinosaur, explored the park to see some of them in a story based video, learnt features of these fearsome creatures like teeth and skin and discovered how these pre-historic animals ruled Earth for 160 Million years.

In MIT App Inventor app development session, students learnt to make

'Calculator App' with basic features like addition, subtraction, multiplication and square root. They also learnt to design apps to study and analyze experimental results for experiments like Ohm's Law, Resistors connected in series and Parallel.



SYNTHETIC BIOLOGY WORKSHOP

Introducing Genetic Engineering

On 20th July 2018, iGEM IIT Delhi conducted a workshop on “Synthetic Biology”. Around 50 students from Class XII, XI and X attended the workshop.

Team iGEM demonstrated interesting experiments to the students.

Students extracted Potato DNA and then learnt the Intermixing of genes with different characteristics in E Coli Bacteria.

Students had hands-on experience on both the experiments. Later, they were also briefed about the course pattern and structures in different streams Offered at IIT like Biotechnology, Biochemistry and Chemical Engineering etc.



UNDER WATER ROBOTICS WORKSHOP

Introducing Hydrodynamics and Mechanical Designs

DTU AUV team from Delhi Technological University conducted a workshop “Design and Development of the Autonomous Underwater Vehicle” for students from std. VIII to Std. XI on 20th July 2018.

An Autonomous Underwater Vehicle (AUV) is a highly compact customizable robot which travels underwater without requiring input from an operator, pre-programmed to collect data, as per the program embedded in it. These vehicles can be used for performing underwater communication, detection of faults in oil pipelines, climatic conditions for marine life etc.

Apart from briefing about different parts of the AUV, DTU team also discussed about the role of different engineering fields like Mechanical to



design vehicle frame, shape and hydrodynamics, Electronics for circuitry used, Computers & Software for programming, embedded and remote communication requirements.

It was a good learning experience for our students as they got hands on experience of working of underwater vehicles. Such experiences will help them in future to decide the stream/ subject for the higher education.



RESEARCHER FROM HARVARD BUSINESS SCHOOL

Studying effectiveness of the ATAL TINKERING LABS

Mr. Fulton Christopher Eaglin a RESEARCHER FROM Harvard Business School, Boston, Massachusetts, U.S.A along with a team from NITI Aayog visited Springdales School, Dhaula Kuan on 8th August 2018 to understand the effectiveness of Atal Tinkering Laboratories, and to sharpen its value propositions in years to come.

The school showcased various innovative projects carried out by students from Std. VI to Std. XII. Mr. Chris discussed with students about the Process of Developing Idea into a Prototype. He was keen to know about journey of Innovation over last year. His survey focused on involvement of various faculties and mentoring required for honing the skills of students to encourage innovation at school level. He also wanted to know about the Constraints of time and curriculum at school level.



THE INSPIRE – MANAK AWARD 2018

7th National Level Exhibition And Project Completion

It is a matter of immense pride that Ashneet Kaur Sukhija, student of Std VIII, was selected among top 100 students in the country for developing an innovative model and prototype of Mobile Digital laboratory developed especially for Indian farmers titled, 'Garduino- An Automated Gardening Device' by the INSPIRE MANAK Award Program, a flagship scheme of Department of Science and Technology, Government of India and National Innovation Foundation. Her model was showcased at 7th National Level Exhibition &



Project Competition held at IIT Delhi on 14th and 15th February 2019 and was awarded a cash prize of Rs 7000/- and a certificate of participation. The project was developed to assist the farmers with the techniques of obtaining real time results of soil testing so as to raise farm productivity and to promote sustainable agriculture practices in keeping with the UN Sustainable Development Goals 1 and 2, namely No poverty and Zero Hunger.



Earlier, In September 2018, her project Garduino was selected at State level for which she was awarded a cash prize of Rs 10,000/- to develop the prototype of her idea.



Ashneet also attend the Mentorship Programme at IIIT-Delhi on 7th and 8th January, 2019. The objective of the two-day Workshop was to facilitate the INSPIRE innovators to interact with the experts and mentors so as to add value to their innovations for better competition at the national level competition.



VISIT BY FISHER FOUNDATION

Understanding working of the ATAL TINKERING LABS

Mr. and Mrs. Fisher visited Innovation Lab on 29th October and interacted with students and discussed their innovative projects based on STEM. The guests were highly impressed by the quality of work that our students are doing in the field of Science and Technology.



DESIGNING WATER ROCKETS

Workshop to Inculcate Design skills

Students of Std IX and X attended hands on Water Rocket making Workshop on 23rd October under the expert guidance of Mrs. Mandeep Sukhija.

Water rocket workshop is specifically designed to provide the right knowledge to the aspiring students who want to pursue Rocket Science. Water rockets can arouse and develop their curiosity, which can extend the horizon of their learning and experience beyond science.

Students worked in different teams and designed water rockets. The rockets were tested in terms of maximum range, maximum height and maximum flight time. Apart from learning about flight mechanism, projectile motion and machine designing, students learnt team work and leadership.

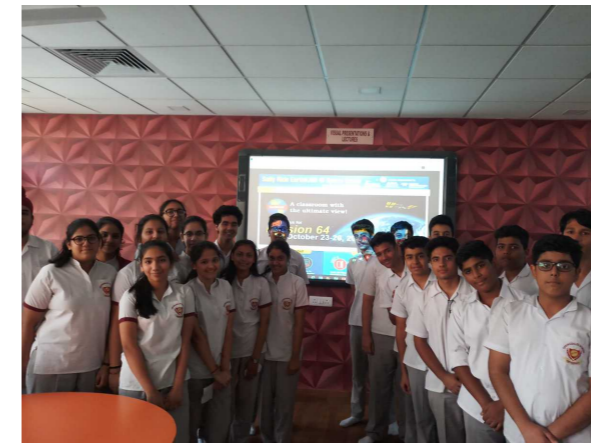


SALLY RIDE EARTHKAM

A Project With International Space Station

The project involved taking pictures by participating in the NASA project to see the Earth from the SPACE.

Sally Ride ISS Earthkam is an **international educational programme** of NASA through which students can receive stunning images of the Earth from a digital camera mounted at a



window in the International Space Station (ISS). This programme was started by Dr. Sally Ride, the first American woman in space and was originally called kidSat.

Every year **4-5 Earthkam missions** take place in which Science Department of Springdales School Dhaula Kuan holds workshops where students are guided by teachers to **select locations of geographical and environmental interest**, based on **weather and orbit checking**, and through a software, interface submit requests which are sent to ISS. ISS captures images of the locations and makes high-quality images available for download. Images have been taken of regions of interest in **Geography, Environment, Ecology and Natural Disasters**.

Depending on how the images are used, Sally Ride Earthkam provides support in teaching Earth science, Space Science, Environmental Science, Geography, Social Studies, Mathematics, Communications, and Art.

Students learnt about ISS, and how to select regions based on climatic and environmental importance. This is a multidisciplinary project and students learnt about software and additional skills. **Also, students joined in a NASA outreach programme simultaneously with schools around the world.**



BOEING ENGINEERS INSPIRE FUTURE STEM LEADERS

A Talk By Aeronautical Engineer from BOEING

An interactive session for a group of 40 students from classes VIII to XI was organised in Innovation Laboratory on 14th December, 2018 with Mr. Zaid Alami, an Aeronautical and Astronautical Engineer at the Boeing Company based in Seattle, WA. The Boeing Company is the largest aircraft manufacturer in the world. His expertise is in experimental flight testing, aircraft operations, technical troubleshooting, maintenance and new airplane design. Prior to Boeing, Zaid worked at Sikorsky Aircraft, founded by Igor Sikorsky, the inventor of the first mass produced helicopter. Zaid was a Rotors and Transmissions Engineer working on the BlackHawk, SeaHawk and the Sea Stallion



helicopters. Zaid earned his engineering degree from Purdue University Located in West Lafayette, IN. He's been in India for the last three months.

Mr Zaid talked about various challenges faced by innovators in designing machinery parts like cranes to construct ultra-high buildings. He emphasized that more Girls and Women should participate in STEM. Students interacted enthusiastically with the speaker and discussed many current techniques Boeing aircrafts are using to make perfect flight dynamics.



Overall the session inspired students to think critically and motivated them to choose aerodynamics as a potential future course of study.

INTER UNIVERSITY ACCELERATOR CENTRE VISIT

A group of students from std. XI and XII visited Inter University Accelerated Center on the occasion of their 29th foundation day on 19th December 2018.

Our students got an opportunity to see the accelerators present at the centre along with many other facilities. There was also a demonstration of experiments in the IUAC lounge where they observed and understood concepts such as magnetic levitation with superconductors, gyroscopic effect, Peltier effect, and the famous Van de Graff experiment demonstrated by various professors and

scientists. They also visited the control room of the accelerators, the microscopy room, and the gamma detector array. It was an extremely enlightening experience, and the students left the center learning so much more than what they came with.



SINGAPORE INTERNATIONAL SCIENCE CAMP

An Experiential Learning at National University of Singapore

To ignite scientific minds and to initiate teamwork, creativity and enthusiasm through involvement in various science activities, a group of 8 students from std. 10 along with Mrs. Nidhi Maan attended an educational yet fun trip Singapore International Science Camp from 27th May to 1st June. This camp is organized by National University of Singapore. It was a 5 day long science camp where around 80 students from 6 different schools across India took part and our students got an experience of what living in a world class university looks like. All days were tightly packed with workshops like Genetic engineering to learn bacterial transformations using heat shock technique, Laparoscopic surgery on pig intestine, Microsoft hololens, Chemistry of perfumes, 3D printing, Singapore biggest water treatment plant 'Newater' visit and many more sessions. Apart from these



sessions, students also visited Universal Studio, Garden by the Bays, Singapore flyer and Marina Bay sands area. Our student Khushi Jain got best essay Gold medal for the topic 3D Printing and Sancia Sehdev got best essay gold medal for the topic Genetic Engineering. Also, in Science Quiz, team with our student Vidur Uberoi won Silver Medal and team with Gauresh Kapoor won Bronze Medal. This trip gave students an exposure to what studying and living in one of the world's top universities would be like. It was a truly wonderful experience.



INTELLECTUAL PROPERTY RIGHTS

Empowering Faculty and Students

On 9th January 2019, during the winter staff seminar at Springdales School



Dhaura Kuan, a session on “Innovations and Inventions: Understanding Intellectual Property Rights” by Ms. Shuchi Agarwal, Founder and Managing Partner, IPNEETI was organized for the teachers of Science and Mathematics Departments in Innovation Lab. Ms. Shuchi provides counseling on Indian patent prosecution, asset management,



litigation support, patent commercialization, trademark, copyright and design matters.

Ms. Shuchi talked about the importance of patenting the research done by students at school level. she explained that numerous patents, copyrights and trademarks can be taken with single prototype or design. She also discussed the importance of protecting IPR's as it rewards the inventor and encourages him/her to innovate and it provides protection against copycats. It also provides business advantage by raising capital and position in the market.



SIR C.V RAMAN AWARD

Raman Young Scientist Innovator award

Jay Kakar, a student of Std VI was selected as one of the Finalists for the National Round of Raman Young Science Innovator Award, 2019 for his project “Scintillating Fluids” amongst 5625 entries received from all over India His project was showcased at National Finals held at Bangalore on 24th February at Sir C.V.Raman 's home in Malleswaram .He was commended by the judges and guests with his improptu working model of the contraction of the bicep muscle and the elbow joint at the venue. Another experiment under REST category “Refraction of Light- Twinkling of

Stars” submitted by Mrs. Nidhi Maan was also selected for National Finals.



CBSE NATIONAL SCIENCE EXHIBITION

Springdales School, Dhaura Kuan participated in CBSE Regional Science Exhibition under the themes Resource Management and Mathematical Modeling at the State Level on 17th and 18th January, 2019. Both the teams got selected at the Regional level and participated at the National level Exhibition on 8th and 9th February, 2019.



devices were installed in the river with real time monitoring to issue warnings to the state authorities.

Under Mathematical Modeling Theme, Krisha Kapoor and Pratham Mittal of std. XI presented their model 'Artificial Eclipse Imaging System' to obtain images of extra solar planets which are located in the habitable zone of their stars but cannot be detected with the existing telescopes.

Under Resource Management Theme, Khushi Jain of std. X and Ashneet Kaur Sukhija of Std. VIII presented their model 'Ganga River Cleaning' by creating various monitoring stations spread across different cities like Haridwar, Kanpur, Allahabad, Patna and Jharkhand. The live data was recorded by the turbidity sensors, pH sensors, temperature sensors and every 15 minutes, the monitoring stations can send the data to IOT hub of municipal corporations of each city. The



KAZAKHSTAN DELEGATION VISIT

Hands on activities in the Innovation Lab

Innovation Lab at Springdales School, Dhaura Kuan hosted a Delegation from Kazakhstan on 15th February, 2019. The delegation was headed by Mr. Beisembayev Gani, Leader of the Kazakhstan National Federation of UNESCO Clubs along with Kazakhstan school students and teachers.

They interacted with our students in Innovation Lab and discussed their STEM based projects, like Smart Dustbin, Pyrolysis

from plastic waste etc. The Kazakhstan school students also attended hands-on session on Simple electronic circuits in the laboratory. They were also briefed about the investigatory projects done by our senior students.



INSPIRE MANAK AWARD 2019

State Level Exhibition And Project Completion

In January 2019, Department of Science and Technology, selected the project, Growbot by Sancia Sehdev among the top 10,000 projects in India under the Inspire -MANAK scheme at State level. A sum of Rs. 10,000 was allocated to develop the project further, and it was showcased at the State Exhibition, which was scheduled for February 2019.



GrowBot is a conceptualized novel plant-growing robot and an all-in-one robot for agriculture aimed at allowing people with no prior knowledge of farming to grow their own food at home.

The GrowBot has its own inbuilt system of irrigation, fertilization, pest control, and artificial light. It is programmed in a manner, such that it has its own database of plants and their requirements, and can automatically grow edibles with minimum human interference. It is connected to an app on the phone of the user, and on detecting any activity that requires human involvement (such as refilling the water tank once it gets empty), notifies the user. Thus, with the help of the GrowBot, even a person who is not interested in gardening or does not have the time for it can easily grow vegetables inside their homes.

institution under the honour category for organising Largest agglomeration of 1500 students to create awareness regarding a "Sustainable Future."

Two day festival – Hamara Paryavaran included display of hands On Science projects and Experiments, Interactive workshops On best out of waste, Recycling of Paper and other farm activities.

Students were encouraged to enact instances from the lives of great scientists who challenged the norms of the society and rose to

the greater heights. The students represented themselves as ISSAC Newton, Archmedes, Nikola Tesla, Graham Bell, Thomas Edison, Rosalind Franklin and Kalpana Chawla. This innovative activity enabled students to relate to great personalities, identify the obstacles and how they overcome these with their convictions and dedication. The unprecedented examples set by these eminent personalities inspired our students to rise above the odds and follow their dreams and passion.



SCIENCE AND ENVIRONMENT FESTIVAL

Creating Awareness on Sustainable Future

"You don't learn to walk by following rules. you learn by doing and by falling over"- Richard Branson. This is the essence of Education at Springdales where emphasis is laid on learning by doing. In an endeavour to promote the scientific temperament and a spirit of inquiry, the students are encouraged to observe, question, explore, rationalize, derive, innovate and conclude.

The school offers a wide platform to its students to think out of the box by organising exhibitions and festivals of Science.

March 16, 2019 marked an important epoch in the history of Springdales Schools as the jury of World Book of Records included the esteemed



ACTIVITY SHEETS- "EARTH CANNOT DIGEST PLASTICS"

COUNTRY: _____ NAME OF THE SCHOOL: _____ NAME OF THE STUDENT: _____ GRADE: _____

Activity 1: Calculate your Plastic Foot Prints!!

List the Plastic items that you use everyday/weekly

Now, it is time for you to start cutting out on plastic. While recycling is important but it is not a perfect process. It can never be done efficiently. Remember, recycled plastic will always end up in the landfills regardless of the bin they were put in. Calculate the plastic waste that you and your family generate every week.

ITEM	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	TOTAL PER WEEK
Plastic bottles								
Plastic cups								
Straws								
Plastic Cling Films								
Plastic plates								
Food container								
Food packaging								
Plastic grocery bags								
Medicine bottles								
Diapers								
Yogurt pots								
Plastic juice bottles								
Plastic bags								
Plastic spoons								
Other Plastics								



Replace Plastic by Biodegradable material and save Planet #BeatPlasticPollution

@MandeepSukhija

ACTIVITY SHEETS- "EARTH CANNOT DIGEST PLASTICS"

COUNTRY: _____ NAME OF THE SCHOOL: _____ NAME OF THE STUDENT: _____ GRADE: _____

Activity 3: Suggest some activities that you can carry out on every day basis that reminds you of 5 R's- Rethink, Refuse, Reduce, Reuse and Recycle.

Rethink -

Refuse-(Example)
I refuse to use plastic Cups

Reduce-

Reuse-

Recycle-

@MandeepSukhija

ACTIVITY SHEETS- "EARTH CANNOT DIGEST PLASTICS"

COUNTRY: _____ NAME OF THE SCHOOL: _____ NAME OF THE STUDENT: _____ GRADE: _____

Activity 2: Small Plastics, Big Problems!!

Understanding Micro Plastics and finding solutions to it.

Understanding the Problem:

Q1. Why is there so much plastic in the ocean? Where does it come from?

Q2. What are things that you can personally do to prevent plastic litter from polluting the ocean?

Q3. What are micro Plastics?

Q4. How do micro Plastics get it into the ocean?

Q5. What is the Problem with the micro plastic?

Q6. Is there any Microbe that can reduce the micro plastic and break it down into completely consume it.

Finding Solution to the Problem:

Q1. What solutions did your group decide for reducing micro plastics in the oceans?

Q2. What makes you choose this particular solution?

Q3. What evidence does not support your solution?

Q4. Costs of your solution:

Q5. Benefit of your solution:

Q6. Is your Solution Sustainable?

@MandeepSukhija

ACTIVITY SHEETS- "EARTH CANNOT DIGEST PLASTICS"

COUNTRY: _____ NAME OF THE SCHOOL: _____ NAME OF THE STUDENT: _____ GRADE: _____

Activity 4: It's time to Collaborate!

Earth cannot digest Plastic- Record Your Responses in the following Padlets and Share your Ideas

1. Suggest some Practical ways to reduce plastic Pollution
Source: https://padlet.com/m_sukhija/ercala3ecbdp
2. Refuse single Use Plastic
Source: https://padlet.com/m_sukhija/34cp99q2nf3c
3. Innovative ideas to deal with Plastic Waste
Source: https://padlet.com/m_sukhija/innovation