ATL TINKERING MARATHON : FOCUS AREAS
(OCTOBER 2 – OCTOBER 31, 2017)

Einstein believed that creativity is an output of a 'combinatorial play' thinking process. He constantly combined and recombined ideas, images, and other various thoughts into millions of different combinations. So, 'Combinatory play' refers to the process of innovation by drawing on new combinations of existing data, perceptions and practices. There are thousands of existing innovations which can and should be further developed to make them cheaper, faster and more durable. So, the question here is "How can we take what we have and make it better?" In our ever-changing world, there is a need to build on these existing structures and concepts in order to make them more accessible and appealing to the general public.
So, here is a chance for all of us to test and showcase to the world how Innovative we are, and propose novel, innovative solutions to India's community and social problems, with the Atal Tinkering Marathon.

1. **Clean Energy Technology**

240 million people in India do not have access to electricity, while the rest still receive highly spotty supplies of it. Thus, the **Government of India launched the 24x7 - Power for All initiative** to combat this major problem for India, as the low penetration of electricity causes people to resort to other options such as diesel generators which are not only costlier but also worse for the health of our environment. It is important for us to find ways to not only provide those without electricity, a constant supply of electricity, but it is also important for us to focus on greener sources of electricity such as solar energy, and more.
So, let us develop solutions which will help India achieve its mission of achieving 'Power for all'.

Examples of problem statements

- Find ways or devices that can help houses/offices monitor their energy usage and possibly reduce energy consumption
- Find new ways energy can be stored and further utilized through day to day activities in rural areas
- Find ways to install solar energy in rural areas that do not have access to electricity
- Find ways to use natural energy sources for producing mechanical and electrical energy

2. **Water Resources**

India has about 4% of the world's freshwater but also 18% of the world's population. Water demand is on a high due to rapid urbanization and industrialization along with the traditional demand for agriculture. By 2030, India will be able to meet only 50 per cent of its projected demand of water at the current rate of demand and supply. Currently we are able to store only 6% of the annual rainfall we receive. Agriculture consumes 83 per cent of India's water

resources, leaving only 17 per cent for domestic and industrial use. The **Government of India has launched the National Water Mission** to help correct this unbalanced sustainability equation, as the urgency to manage the water resources is enormous and the pressure builds up. So, let us develop solutions which will help India achieve goals for 'National Water Mission.'

Examples of problem statements

- Find ways to produce clean/ pure drinking water
- Find ways to sustainably harvest and store natural water
- Find ways to supply water for smart agriculture with decreased dependence on ground water resources
- Find ways to improve efficiency of urban water management
- Find ways to improve the water quality for domestic demand

3. **Waste Management**

With an ever-increasing population, one major problem every country faces is, "What shall we do with our waste?" It is becoming more and more critical for the health of our environment to find ways to recycle this waste and find ways to decompose parts of it rather than leave huge pieces of land become junkyards that becoming breeding grounds for various diseases. The **Swachh Bharat Mission, launched by Government of India** is just one step to combating this problem, as more than 62 million tonnes of solid waste is generated annually in India. Only 43 million tonnes (MT) of this waste is collected out of which only 12 MT is treated and remaining 31 MT is dumped in landfill sites. India suffers from insufficient and inefficient waste management infrastructure. The world is increasingly moving to a more environment friendly and circular model, where the resources are used for as long as possible and maximum value is extracted from them whilst in use, and then products and materials are recovered and regenerated at the end of its life.

Examples of problem statements-

- Find ways to support Swachh Bharat Mission through effective urban waste management systems
- Find ways to use organic waste to green cities and fuel small and affordable household biogas plants
- Find ways to convert 'Trash to Cash'
- Develop a solution for managing the waste developed in households,
- Develop a system that efficiently parses the waste collected in homes,
- Develop a solution that helps gather waste from home in a more organized and efficient manner
- Find Ways to convert plastic to fuel
- Ways to segregate wastes in water bodies and clean up the water bodies

4. **Healthcare**

In India 70% of the population has relatively limited or no access to healthcare facilities and services. More importantly, rural areas suffer a lack of proper data bases as well as trained professional to address preventable diseases. Thus, there is an essential need to improve existing healthcare facilities in order to make them easier and more feasible to access. The **Swasth Bharat Mission launched by the Government of India** is tackling various facets of this problem to ensure better healthcare services for all individuals, but there are still many hurdles to cross as India still ranks 154th on the Global Healthcare Rankings List.

Examples of problem statements-

- Find ways to support Swasth Bharat mission by designing a more efficient and feasible system to document individuals
- Find ways to improve transportation and communication between hospitals
- Develop systems to diagnose basic illnesses, which require limited human intervention to operate
- Health care Monitoring devices
- Technology Devices to Assist handicapped and visually challenged people

5. **Smart Mobility**

In accordance with the **Paris climate accord,** the Indian Government said that within 13 years 100% of all the new trucks and cars in India must be electric vehicles. The industry produced a total 25,316,044 vehicles including passenger vehicles, commercial vehicles, three wheelers, two wheelers and quadricycles between April 2016 and March 2017 alone. "The question here would be to look for alternative energy sources to revolutionize the automotive industry or to further improve its input to output conversion rate." This would be an incremental step forward to combatting Climate Change, which is currently one of the most pressing international issues due to its global impact and shaping our future.

Examples of problem statements-

- Finds way to reduce emissions produced by transport vehicles
- Find ways to use alternative energy resources to power transport vehicles, such as solar energy, electricity etc.
- Develop alternative methods to make existing engines more efficient
- Develop alternate skeletal structures for automotives to make them more efficient
- Develop methods to make transport vehicles more accessible and safe

6. **Agri-Tech**

Currently, around 51 % cent of India's total workforce is engaged in agriculture and its allied sectors, like forestry, fisheries, and so on. For most of the 21st century India is expected to remain an agricultural society. One cannot underplay the role of agricultural growth in improving rural incomes and securing India's food and nutritional needs. Our population is expected to be 1.4 billion by 2020. The increasing population, coupled with growing income will generate increased demand for food grains and non-food grain crops. The new initiatives in the form of **National Food Security Mission**

and Rashtriya Krishi Vikas Yojana launched by the Ministry of Agriculture are aimed at rejuvenating this sector.

Examples of problem statements -

- Find ways to create alternative irrigation methods to make allocation of water resources more efficient
- Improve existing methods of poultry and livestock rearing to increase output and reduce the input resources required
- Develop alternative storage materials which are more feasible and durable than existing materials
- Create alternative designs for tractors/ harvesters to make them more productive and/or increase their range of services

Please note that the Example of Problem statements provided here are only for REFERENCE. Schools are encouraged to go identify their own problems under the 6 Focus areas.