



**Solve For
Tomorrow**

SPARK DECK

SAMSUNG



Solve for Tomorrow SPARK DECK

This deck of cards contains tools— Sparks —to help you start ideas for the Solve for Tomorrow competition. You can use them however you want.

Shuffle them

Share them

Read them aloud

Keep the cards that really intrigue you,
and ignore the ones that don't.

You'll see inspirational quotes and stories from past Solve For Tomorrow participants, methods for brainstorming and developing ideas, and Sustainability Prompts to ignite your thinking about problems that need your ideas, inventions, and solutions.

Find your spark.

Today We Solve

What is SUSTAINABILITY?

Our global resources are finite, and when we use these resources, the way we use them has an impact on the future.

Simply put by the 1983 UN Commission on Environment and Development, we need solutions to meet "the needs of the present without compromising the ability of future generations to meet their own needs"¹.

At Samsung, we know

Changes Start from Small Steps.

Small changes matter.
When we all come together,
these changes can make a difference.



SUSTAINABLE AGRICULTURE

Twelve thousand years ago, humans developed agriculture. Our society changed as we established civilizations. Populations skyrocketed, and eventually, farming industrialized. Now, the impacts of unsustainable practices are felt around the world.¹⁰

WHAT ARE YOUR IDEAS TO:

Nurture the presence of organisms that control crop-destroying pests?

Minimize tilling and water use?

Encourage healthy soil?

Replace pesticide use?



SUSTAINABLE AIR

In 2019, 99% of the world's population was living in places that did not meet the World Health Organizations air quality guideline levels.

CAN YOU INVENT A
SOLUTION TO MAKE:

Waste management
and industrial
activities cleaner?

Reclamation
of existing air
pollution cleaner?

Clean power generation?

Energy-efficient
homes?

Transportation cleaner?



SUSTAINABLE CITIES

Designed for cars, built around industry, dense with population, cities are centres for smog, land degradation, waste mismanagement, and many more challenges to sustainability.⁷

WHAT CAN YOU INNOVATE TO IMPROVE:

Public transportation
or the carbon impact of
city transportation?

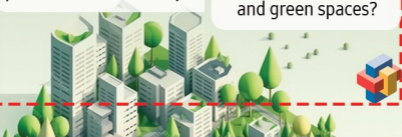
Urban planning or
city management?

Carbon emissions
of buildings?

Adoption or efficiency
of sustainable or
renewable energy?

Waste management
practices and efficiency?

Conservation of water
and green spaces?



SUSTAINABLE EATING

We can all make individual choices to eat
and live in a more sustainable way.

WHAT COULD BE INVENTED TO HELP:

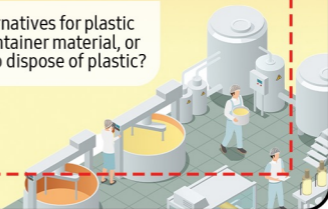
Reduce the negative
impacts of out-of-season
produce farming,
shipping, and retailing?

Increase bee,
native wildlife and
plant populations?

Find new ways of reducing
or managing food waste?

Reduce the carbon
footprint of meat, fish,
or dairy production?

Create alternatives for plastic
as a food-container material, or
better ways to dispose of plastic?



SUSTAINABLE ENERGY

Humans are stubborn! To encourage adoption of sustainable or renewable energy sources, we need to make these things more efficient, or more affordable, or more accessible.

WHAT WOULD YOU BUILD, INVENT
OR CREATE TO IMPROVE ANY OF
THESE THINGS (OR ALL OF THEM)?

SOLAR

GEOTHERMAL

WIND

HYDRO

OCEAN

BIOMASS



SUSTAINABLE FASHION

Fashion is fast, and sustainability is forever.
How can we make these two work together?

WHAT WOULD
YOU CRAFT TO:

Reduce the carbon
emissions generated
by manufacturing
and shipping?

Reduce
clothing waste?

Reduce plastic use
in garments?

Reduce the impact
of microfibers released
through washing?

Reduce
manufacturing water
usage and pollution?

Create new types of
sustainable materials, design,
and manufacturing methods?



SUSTAINABLE FISHING

More than one third of the Earth's population relies on seafood as a source of protein. Seafood, on average, also has a lower carbon-footprint than land-based animal proteins. But overfishing, unregulated fishing activities, and excessive bycatch are putting this resource and the ocean ecosystem at risk.³

WHAT COULD YOU DEVELOP TO:

Limit overfishing or improve fishing techniques?

Limit loss of fishing gear, or retrieve lost gear?

Provide alternative methods to grow and harvest seafood?

Measure or manage fish stock?

Limit impact on sensitive habitats and species?



SUSTAINABLE FOOD

Our food waste problem isn't just about what you scrape off your plate. We also waste food during processing and transport, at supermarkets, in restaurants and kitchens, and at home.⁴

WHAT COULD
WE CREATE TO:

PROCESS

CONSERVE

REUSE

SELL

TRANSPORT

SAVE



SUSTAINABLE FORESTRY

Wood is a crucial material for countless products we use throughout our lives. Fortunately, when managed properly, Earth's forests can be sustainable.

WHAT COULD WE CREATE TO:

Better protect areas of conservation and biodiversity?

Improve forest management and harvest plans?

Preserve forests of high conservation value?

Refine logging techniques?

Prevent forest conversion?



SUSTAINABLE HOUSING

Think of housing through the stages of its life:

DESIGN

CONSTRUCTION

USE

END-OF-LIFE

HOW COULD WE:

REDUCE

Material Waste?

REDUCE

Operating Costs?

IMPROVE

Thermal Comfort?

IMPROVE

Occupant Health?



SUSTAINABLE LAND

Beyond ensuring the things we produce and consume are sustainable, we must strive to keep the land we live and grow on sustainable. Human activity has led to land becoming less fertile and in some cases, turning into desert.⁵

WHAT CAN YOU CONCEIVE THAT WILL:

Mitigate, adapt to, or manage the effects of drought?

Promote sustainable land management or contribute to land degradation neutrality?

Protect or promote biodiversity?

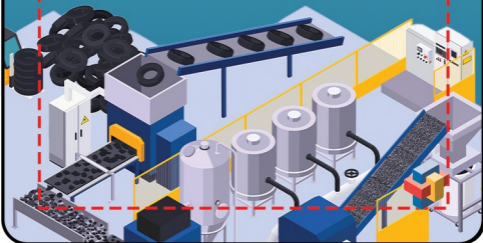
Reverse land degradation or desertification?



Solve for **SUSTAINABLE MANUFACTURING**

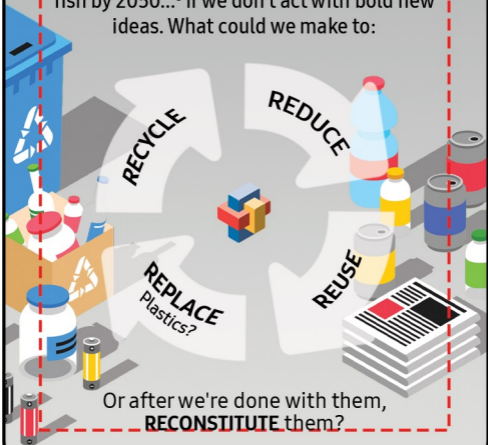
We'll continue to need manufactured products. But can we manufacture them using environmentally and economically sound processes? How do we reduce negative environmental impacts? How might we conserve energy and natural resources?

**DO YOU HAVE AN
IDEA THAT ADDRESSES
THESE CHALLENGES?**



SUSTAINABLE PLASTICS

There will be more plastic in the oceans than fish by 2050...⁶ if we don't act with bold new ideas. What could we make to:



Or after we're done with them,
RECONSTITUTE them?

SUSTAINABLE POPULATION

A UN Global Sustainable Development Goal is to "ensure universal access to sexual and reproductive healthcare services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes."

Managing population growth can contribute to long-term sustainability.⁸

WHAT WOULD YOU IMAGINE TO:

Contribute to the access and adoption of effective contraception methods?

Create more affordable family management tools?



SUSTAINABLE SOIL

Soil contamination originates from the improper disposal of waste. Unsustainable agricultural practices, mining, illegal dumping, and littering are responsible.¹³

WHAT CAN YOU INVENT TO:

Reduce soil contamination from these sources?

Make easier, more affordable, or more efficient recycling and composting options available?

Encourage tree planting and cultivation?

Clean soil, groundwater, waste, or litter?

Mitigate the impact of urbanization?



SUSTAINABLE TRANSPORTATION

Transport systems have significant impacts on the environment, accounting for between 20% and 25% of world energy consumption and carbon dioxide emissions.⁹

WHAT CAN YOU CONCEIVE TO:

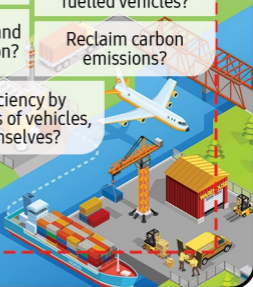
Modify the environment
in which vehicles operate?

Provide
alternatives to
fuelled vehicles?

Change how we access and
use public transportation?

Reclaim carbon
emissions?

Improve vehicle efficiency by
changing fuel use, parts of vehicles,
or the vehicles themselves?



SUSTAINABLE WATER

According to the UN, access to safe water, sanitation and hygiene are the most basic human needs for health and well-being. Billions of people will lack access to these basic services in 2030, unless progress quadruples.²

WHAT CAN YOU MAKE TO IMPROVE WATER:

QUALITY

ECOSYSTEMS

DESALINATION

POLLUTION

USE

EQUITY

ACCESS

SANITATION



KWL CHART

Use a KWL Chart to guide your research on a topic:

What do you **KNOW**?

What do you **WANT**
to know?

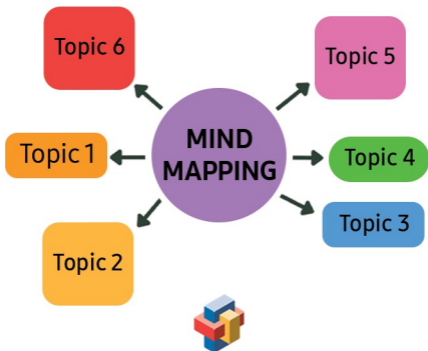
What have you
LEARNED through
your research?



MIND MAPPING²⁹

This method provides a framework for visualizing the relationships between things.

1. Put a central idea or topic inside a circle.
2. Draw a line out from the circle and connect it to another circle with a related idea inside.
3. Repeat, and group the more closely related ideas by making their circles the same color.



Q-CHART

Use a Q-Chart to collect and create divergent and convergent questions about a topic. Think deeply and share your understanding, to help you figure out what more you need to research about the topic.

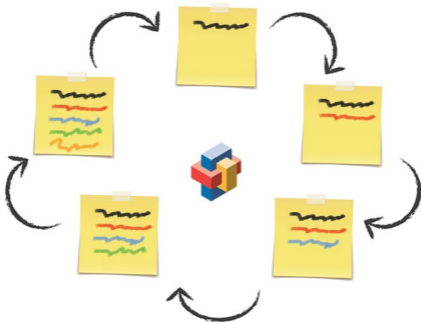
| | IS | DID | CAN | WOULD | WILL | MIGHT |
|-------|-----------------------------------------|-----|-----|------------------------------------|------|-------|
| WHO | | | | | | |
| WHAT | Data Gathering | | | Predicting/ Probing | | |
| WHEN | | | | | | |
| WHERE | | | | | | |
| HOW | | | | | | |
| WHY | Analyzing Synthesizing Evaluating | | | Creating Imagining Inventing | | |
| WHICH | | | | | | |



ROUND ROBIN²⁹

This method provides a framework for visualizing the relationships between things.

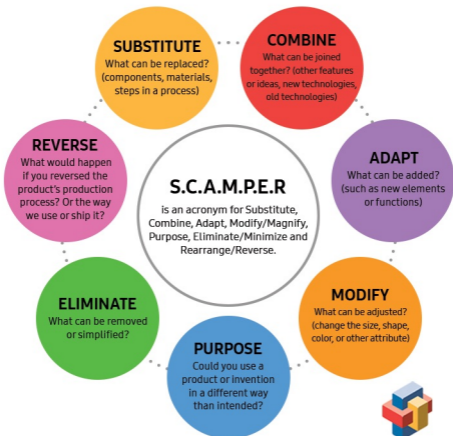
1. Choose your topic, question, or problem to address.
2. Participants arrange themselves in a circle. The first participant writes the idea on paper.
3. The paper moves around the circle, with each participant adding an idea to the paper in turn.
4. When the paper reaches the end of the circle, a moderator reads the paper's ideas aloud.
5. The moderator leads a group discussion of what has been documented/shared on the paper.



S.C.A.M.P.E.R²⁹

This technique is used to develop ideas from existing products, inventions, or solutions that could be more sustainable.

Consider your problem, and:

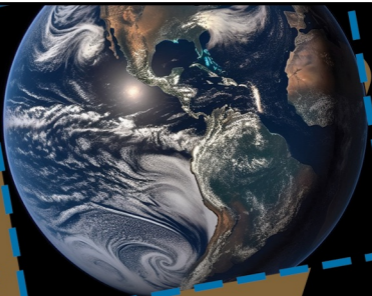




CRAPTACULAR ENERGY

Scientists around the world are testing ways to turn **chicken, cow and other livestock manure** into **biogas**. This **emerging fuel** could be a viable option for **transitioning from fossil fuels to complete decarbonization**.

Tests are also under way to use **human waste!**²⁰ You know what they say: "**A good idea can come from anywhere.**"



CHRISTOPHER COLUMBOZO

An accurate measure of **Earth's circumference** was known for **over 2,250 years**. **Erastotenes** of **Ancient Greece** calculated it, **likely using shadows and the Sun's angle**.

Still, **1,700 years later**, Christopher Columbus **rejected these calculations** and believed the **Earth to be one third smaller** than it actually is. He set off without enough funding or supplies to reach Asia.¹⁵ The lesson? **Be bold, but let science guide you.**



FOREST GROOMING

In Canada, wildfires have grown more intense and frequent. But traditional approaches can give modern firefighters preventative tools to lessen wildfire impact.

Low-intensity or **"Cultural" burns** are an **indigenous technique** to **periodically groom forests** and **remove fuel** that **would feed catastrophic fires**. An understanding of our relationships with **Earth's ecosystems holds many keys to sustainability.**¹⁶



GREAT CANADIAN BAG-ALLS

Did you know the **first plastic garbage bags** were invented by Canadian inventors **Harry Wasylyk and Larry Hansen in 1950**? These bags were a big step forward as a practical solution for managing waste. But now they're a big problem to solve, given their impact on landfills, oceans and the climate.

In 1970, Another Canadian inventor - **Dr. James Guillet** - developed the **first biodegradable garbage bag**, which decomposes in direct sunlight.¹⁹

What Canadian invention can you develop to improve on old innovations?



SHARE THE RIDE

Modern bike-sharing systems with **solar-powered wireless payment terminals** were a **Canadian invention**. This combination of technologies not only solved for human transportation **needs in cities**, but also **our environmental needs**.¹⁸

What's your idea to help **both humans** and **the environment**?



SOLAR FOR SO LONG

The **first solar cells** were invented over **100 years** ago by **American Charles Fritts**. Now, we use them in **countless devices** to **power batteries with sustainable, renewable energy**.

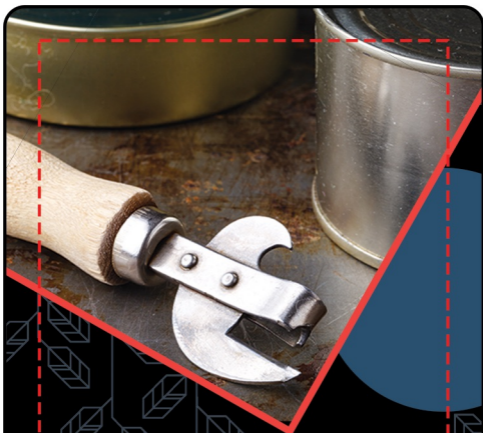
The **solar revolution** is just getting started.²¹ How can you **use renewable energy** to **improve our lives**.



STICK IT TO PLASTIC

At 16 years old, **Boyan Slat** founded **The Ocean Cleanup**, after scuba diving and noticing there were more **plastic bags** to **see than fish**. He **concepted, tested, and developed technological solutions**.

Now, the organization has **deployed multiple 'megaprojects'** in **rivers and oceans** around **the world**, with the **goal of removing 90%** of **floating ocean plastic by 2040**.¹⁷



YES YOU CAN

The can opener was invented **48 years** **after the can.**¹⁴ Don't assume the **best ideas** have **already been thought up.**

Solve for Tomorrow Winner:

AUSTRALIA



Meg Phillips

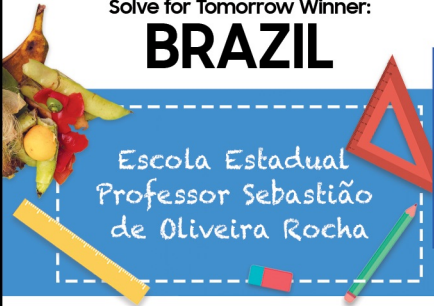


Meg Phillips' entry, the RFID Roadkill Reducer, proposed an on-road system to warn animals of approaching cars. Tasmania's reputation for natural beauty and unique wildlife is juxtaposed by its reputation as the world's roadkill capital. It was the perfect opportunity for innovation.²⁶



Solve for Tomorrow Winner:

BRAZIL



Escola Estadual
Professor Sebastião
de Oliveira Rocha

Sustainable School Technology Linked to Arduino solved the problem of high food waste in the school environment. A team of four students from Escola Estadual Professor Sebastião de Oliveira Rocha developed a biodigester that transforms discarded food into biogas, to be used in the school's stove. A calculator to help cooks prepare the proper amount of food was part of the solution.²⁷



Solve for Tomorrow Winner:

CANADA



Mount Allison team:
Project Enviroot

The Enactus Mount Allison team created Project Enviroot to address the orange peel waste problem on campus. With plans to leverage Samsung technology to dry out discarded orange peels, they blend the peels and mix it with an adhesive, resulting in a sustainable, non-toxic solution that can be used to replace all the softboards on their campus.²²



Solve for Tomorrow Winner:

INDIA



Aman Verma and team from Maharajganj, Uttar Pradesh, conceptualized JALRAAJ, a heavy water filtration plant that converts saline seawater into drinking water using renewable energy sources such as sunlight and wind. A vital feature of this filtration plant will be its portability, making it easier to transport and use in remote locations.²⁴



Solve for Tomorrow Winner:

SINGAPORE



Team MNKS x CO₂

Team MNKS x CO₂, winner of the post-secondary category, conceptualized a biofilter for vehicles. They used a biofilm made of genetically modified *E. coli* bacteria to convert environmentally harmful carbon dioxide emissions into oxygen.²⁸



Solve for Tomorrow Winner:

UNITED KINGDOM



Sandhurst, Berkshire
Kiara Taylor



Kiara Taylor, 24, from Sandhurst, Berkshire, was awarded 1st place in the 18-25 category with ReGrow. Her project repurposes e-waste to make a low-cost irrigation system aimed at farmers in Ghana to help increase their crop yield.²³



Solve for Tomorrow Winner:

USA

An illustration of various art supplies on a blue background. It includes a yellow paint tube with a brush tip, an orange paint tube with a brush tip, a red triangular ruler, a green pencil, and a small red and blue eraser. The text "Bloomington South" is written in a white, chalk-like font inside a dashed white rectangular border.

Bloomington
South

A team from Bloomington South created a heat-reflecting white paint. They called their invention TEMP Mural, which they marketed as a way to reduce the impact of global warming by engineering mural art using highly reflective, climate-positive barium sulfate.²⁵



Solve for Tomorrow Winner:

VIETNAM



The Eco Warriors
team from Hanoi

The Eco Warriors team from Hanoi won the High School Category with a machine to mitigate waste created from the pandemic's widespread use of plastic masks. By melting and remoulding mask plastic, the team demonstrated that a plastic pot could be created from recycling in just one and a half minutes.²⁸



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