Young Inventors Challenge

STUDENT'S MANUAL

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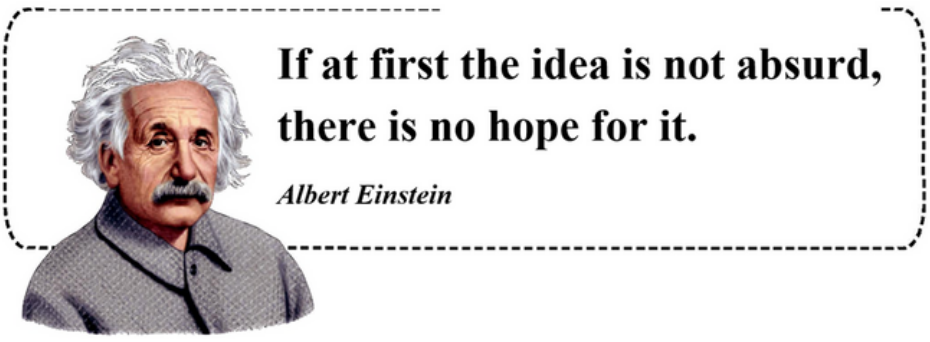
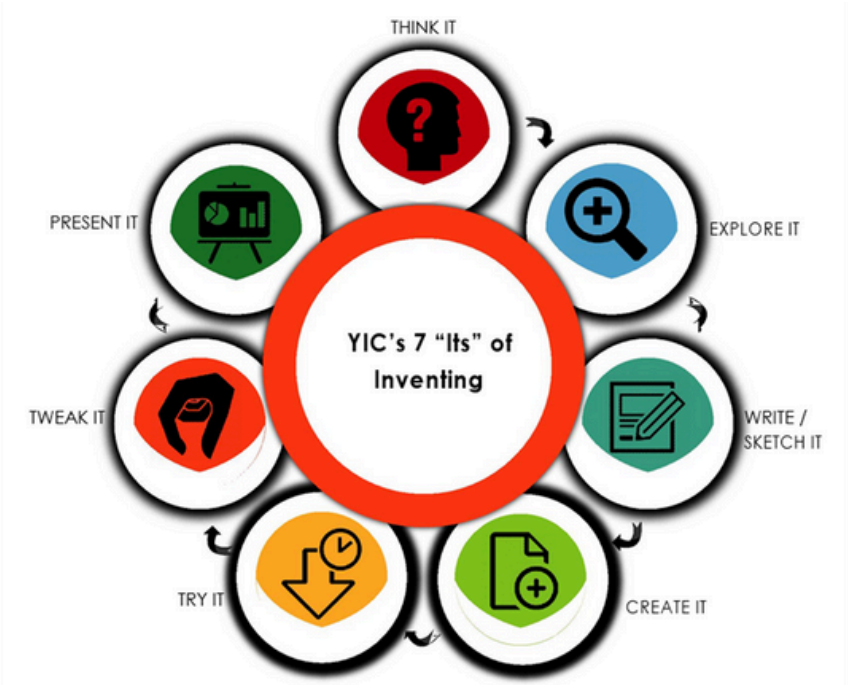


PART A: UNDERSTANDING INVENTION

i. What is inventing?

Inventing is the act of creating something (an invention) to solve a problem or to improve something. The invention may be a device or process. It may be a completely new idea. It may also be derived from a pre-existing model or product; in which case it is better known as an “innovation”. Nowadays, most “inventions” are actually innovations. YIC does not make a distinction between invention and innovation.

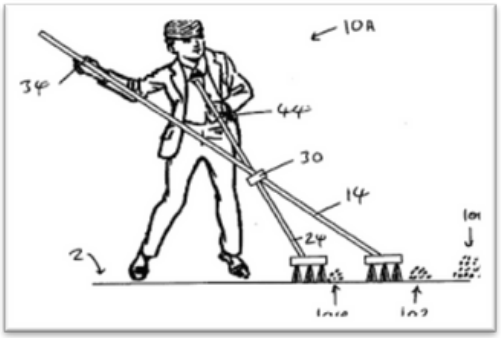
Inventing is a multi-stage process:



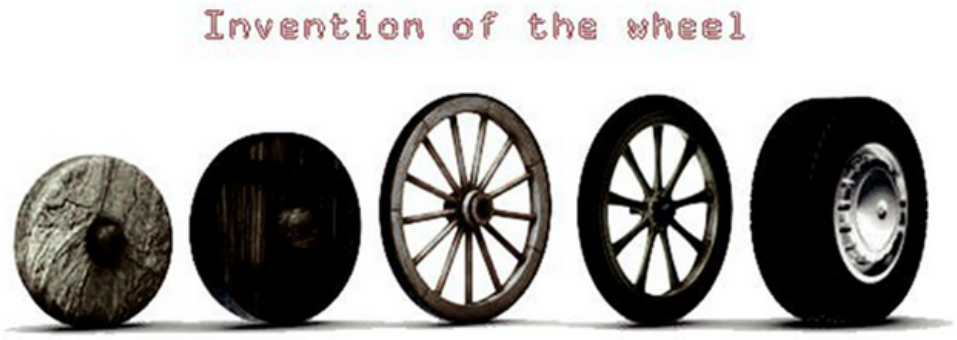
A great way to invent is to do it as a group. Do not compete, collaborate. When inventing, the initial idea often changes. Your invention may become simpler and more practical, or it may expand and become more complex. In some cases, it may even morph into something totally different! Working on one invention may lead to other inventions too.

ii. Examples of Simple Inventions

Inventions need not be sophisticated or complex. An invention titled “SWEEPING DEVICE WITH TWO HEADS” was invented by Sam Houghton, a British inventor, in 2006, and was granted a UK patent in 2008. Sam got the idea when he noticed his father sweeping their back yard using two different brooms. One broom was for clearing large leaves and another for the smaller ones. Sam realized that there was an easier way to do the job, by simply strapping two different brooms together with a large rubber band, and what resulted was a simple yet useful invention! And one more thing; Sam Houghton was only 3 years old at that time!



Another example is:



The wheel is the most important invention in human history. The oldest wheel known, for transportation use, was probably invented in Mesopotamian and probably dates back to 3,500 B.C. Though always cited as the hallmark of man’s inventiveness, the first wheels were not used for transportation! Evidence indicates they were used as potter’s wheels around 3,500 B.C. in Mesopotamia, 300 years before someone figured out to use them for chariots. The potter’s wheel becoming the wheel of the chariot is an innovation. Each stage of the innovation of the wheel has got a function. Do you know why the design of the wheels changes over time, as seen in the picture above?

iii. Concepts in Inventing

Inventing is a creative process. An open and curious mind allows an inventor to see beyond the known. Seeing a new possibility, connection or relationship can spark an invention. Many inventions are inspired by nature and its usefulness to humans. Several concepts may be considered when thinking about an invention.

A) PLAY	B) RE-ENVISION	C) EXPLORATION	D) IMPROVEMENT
Inventors feel the need to play with things that interest them. This internal drive brings about new ideas.	To invent is to see anew. Inventors often envision a new idea, seeing it in their mind's eye first.	Inventing is an exploratory process with an uncertain or unknown outcome. There are bound to be failures and successes.	Inventors may, for example, try to improve something by making it more effective, healthier, faster, more efficient, easier to use, serve more purposes, longer lasting, cheaper, more ecologically friendly, lightweight, more ergonomic, structurally different, etc.

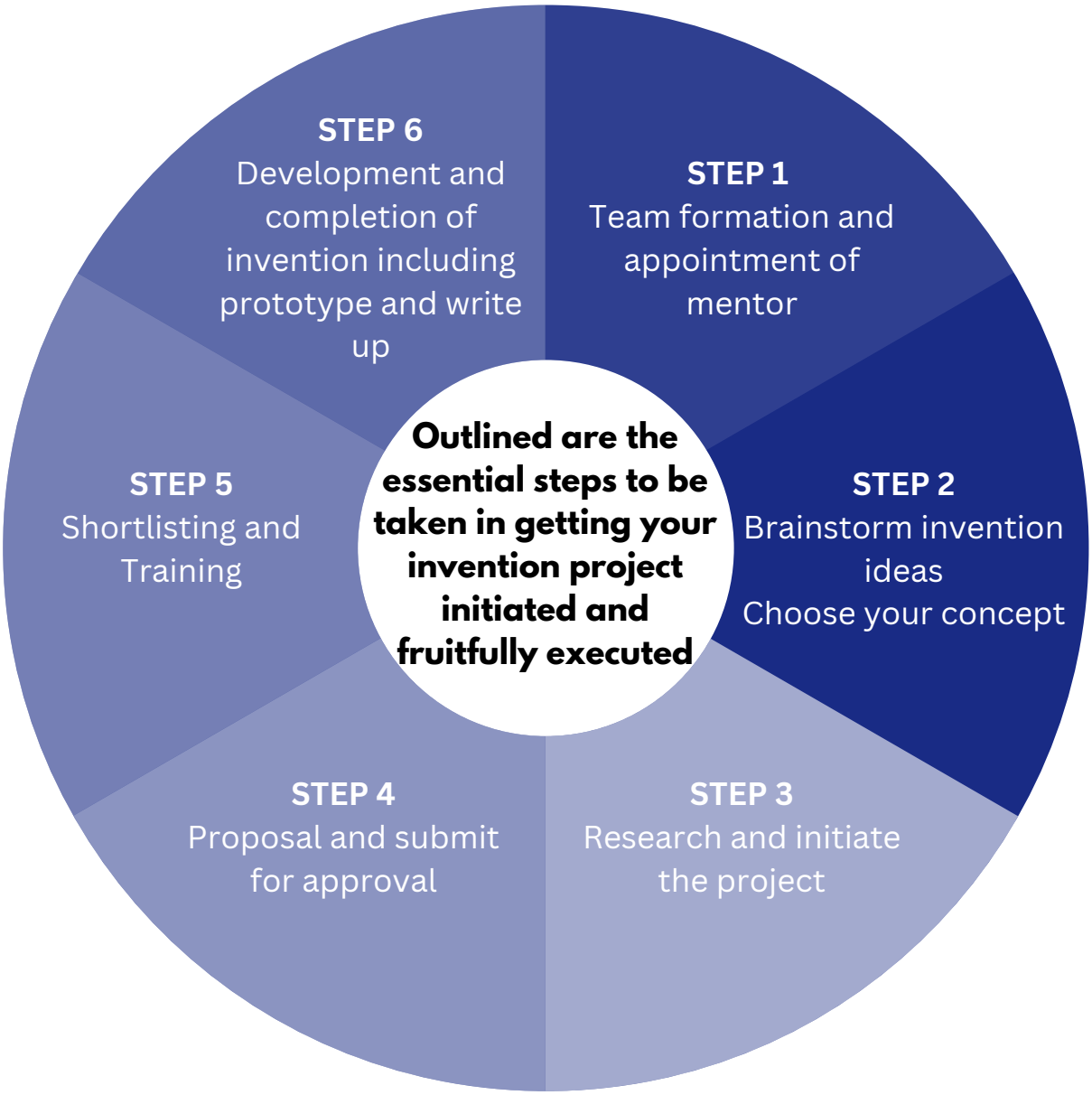
iv. Why inventions are important

Inventions change and transform our way of life, greatly impacting and improving how we do things. They basically help humans accomplish tasks in a more efficient way. For instance, the invention of the wheel had changed the way of transportation and mobility of human beings.

Additionally, if an invention is new and useful it may be protectable against unlawful copying via a patent registration. If the patented invention has commercial potential, it may even be a source of income for the patent owner. A patent for any invention is of fundamental importance as otherwise you will have no claim to ownership of the product you've worked so hard to conceptualize and invent.

PART B: HOW TO EXECUTE INVENTION PROJECT

Outlined below are the essential steps to be taken to initiate your invention project and fruitfully execute it for YIC.



STEP 1: TEAM FORMATION

1. Get your friends together and form a team! All the members of the team should be passionate, committed, willing to learn and hard working.
2. Each team should be comprised of 2 to 5 persons aged between 13 to 17 years old. ASTI encourages diversity. The team is encouraged to be multi-cultural and be able to write a proposal and presentation in English.
3. Choose a team leader. The team leader's job is to plan the activities of the team and make sure that the Invention Project is completed on time.
4. Concurrently with steps 1 and 2 above, source for a team mentor. Your team mentor may be your teachers or parents or anyone who can help. YIC permits up to 2 mentors per team.
5. Obtain a log book to record all the activities of the team. You may also use a computer for this.
6. Brainstorm an initial invention and pick an appropriate title for your Invention Project. The title should be based on the concept of **"Sustainable Development Goals (SDGs)"**.

STEP 2: CHOOSING A BEST INVENTION CONCEPT

You are now required to brainstorm and choose the best invention concept. Your invention parameters should be based, amongst others, on the points below or their combinations:

- Does your invention have a positive impact on the SDGs? If there are some negative aspects, the positive aspects have to far outweigh those. Understand on which SDGs your inventions are categorized. For example, if your invention is "Solar Lantern" for rural schools with no electricity, your SDG could be 1, 4, 7 and 13.

- Your inventions must have the potential to be built, produced and used or implemented.

STEP 3: BACKGROUND RESEARCH & STARTING THE PROJECT

Do background research on the chosen concept to come up with a winning invention. Gather all the necessary information for your invention. The library and/or internet are great tools for this (reminder: when using the internet, use reliable sources as not all the information on the internet is reliable).

You may get advice from experts in the field of your invention. Do also constantly engage with your mentor for feedback and guidance.

STEP 4: PREPARE A PROPOSAL AND SUBMIT FOR APPROVAL

Based on the gathered information, prepare a invention/innovation proposal based on format provided.

STEP 5: SHORTLISTING AND TRAINING

The best proposals submitted will be shortlisted by a team of independent judges and you will be notified via email. Online training will be conducted via Facebook Live/YouTube Live session. Then each team will be given 2 months to develop and complete the invention.

STEP 6: DEVELOP AND COMPLETE YOUR INVENTION

- Prepare a programme or work plan for completing your invention. Include the tasks and persons involved for the development of your idea/invention including a target date for completion.
- You may want to have a budget plan too.
- Keep a diary to record every activity or action taken.
- At the end of the 2 months, a prototype or small-scale model of the invention is required including a brief write up explaining the details of the invention.

PART C: UNDERSTANDING THIS YEAR'S THEME

The United Nation's Sustainable Development Goals (SDGs)* are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, peace and justice. There are 17 SDGs.

This year's YIC theme is; **Invention to address issues discussed in Sustainable Development Goals (SDGs).** You are required to invent/innovate a product that are able to provide resolution in some form and have an impact on Sustainable Development Goals (SDGs). For the explanations on the SDGs, refer to the table 1.

Participants are required to invent/innovate and produce a working prototype and/ or a working scaled model. A write-up is also required with the aim to commercialize or to put in practice the invention.

Kindly read more about United Nation's SDGs to have a better understanding at the Link Below:

- SUSTAINABLE DEVELOPMENT GOALS

For the examples of projects related to SDGs refer to the links below:

- ACCIONA - **BUSINESS AS UNUSUAL**
- INTERESTING ENGINEERING, INC.
- THE Guardian

Table 1: SDGs Reference for YIC

**For full descriptions, visit the UN website for SDGs*

Sustainable Developments Goals for YIC	Explanations
Goal 1: No poverty	End poverty in any of its forms
Goal 2: Zero hunger	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
Goal 3: Good health and well-being for people	Ensure healthy lives and promote well-being
Goal 4: Quality education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities
Goal 5: Gender equality	Achieve gender equality and empower women and girls
Goal 6: Clean water and sanitation	Ensure availability and sustainable management of water and sanitation
Goal 7: Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy
Goal 8: Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work
Goal 9: Industry, Innovation, and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation

Goal 10: Reducing inequalities	Reduce income inequality within and among countries
Goal 11: Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient, and sustainable
Goal 12: Responsible consumption and production	Ensure sustainable consumption and production patterns
Goal 13: Climate action	Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy
Goal 14: Life below water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15: Life on land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16: Peace, justice and strong institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice and build effective, accountable and inclusive institutions
Goal 17: Partnership for the goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development

PART D: TIPS FOR BETTER YIC PROPOSAL

Common mistakes to be avoided for better YIC Proposal based on Judges Comments in the past

Aspects	Common Mistake
Objectives	• Problem not identified clearly • Objectives not clearly stated
Theme	• Relevance to theme not clearly stated • Invention not relevant to the theme
Originality	• Originality of the invention was not highlighted • There is no originality in the proposal • Plagiarism and copy/presenting of other's work/invention • Exactly copy paste from the internet or already available invention
Descriptions	• No clear picture on what it is going to be done by students • Not adequate description on the equipment, method and operations • Many of the technical aspects were not elaborated • Solution is not based on scientific approach • No methodology to solve the problem in a scientific manner • No clear procedure for accomplishing the project • The technical details are not well explained • Proposal too simple without any technical information of the invention
Drawing	• No graphical or pictorial presentations • No diagram with parameters to support the idea
Others	• Proposal not very feasible/Not economically feasible • Cannot visualize the outcome of the project with the available details in the proposal • Team is not serious in participating in this competition from the way they write • Invention not clear • Not a solution to the stated problem • Not an applicable solution

THANK YOU