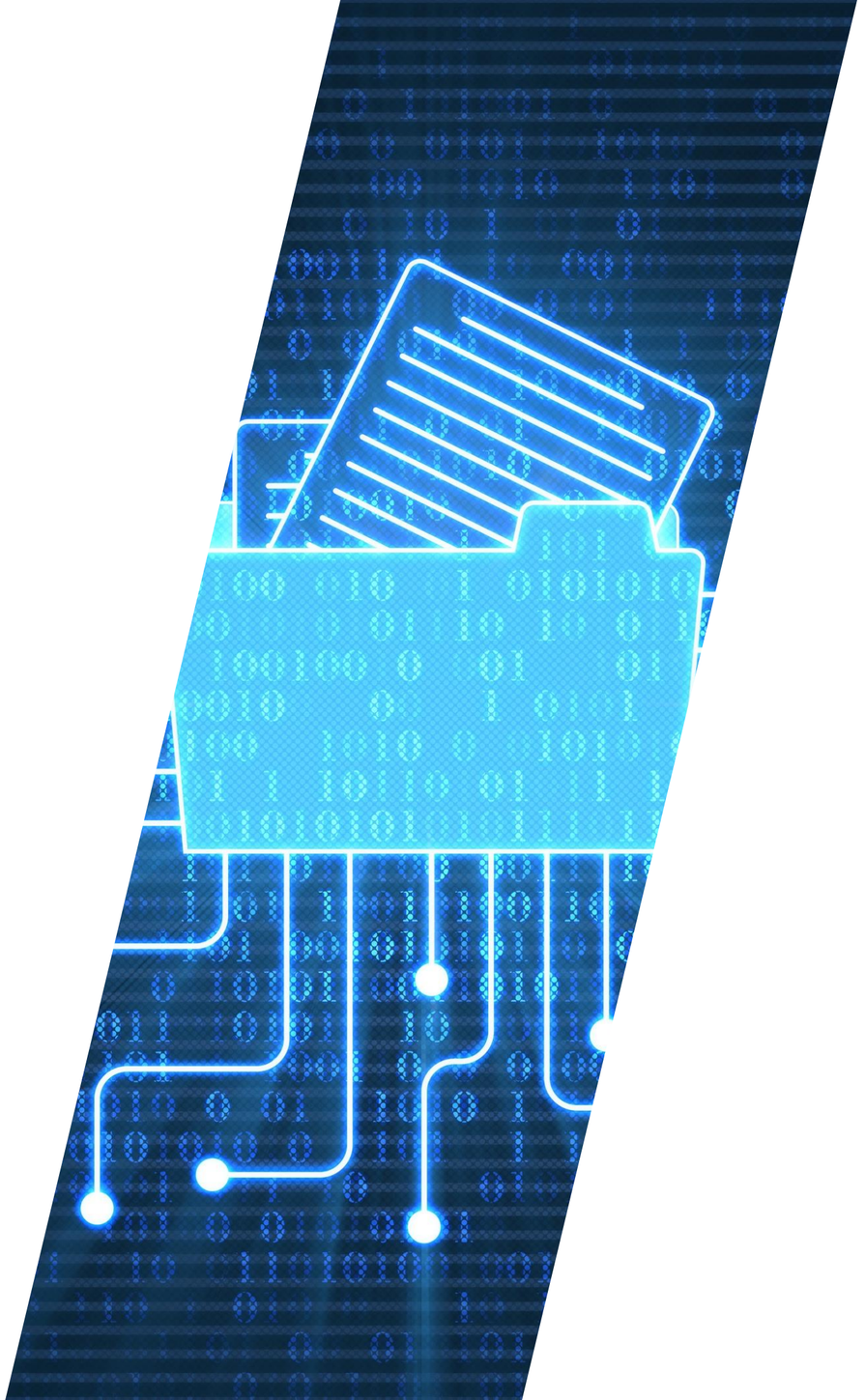
SETTING THE STAGE FOR INNOVATION

SOLVING REAL-WORLD PROBLEMS USING INNOVATION AND TECHNOLOGY

ARK-Educate



Exploring Your Tech Knowledge

Lesson 1

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Show What You Know Questionnaire

Before exploring this unit, this questionnaire assesses your knowledge of technology, innovation, and the engineering design process.

This questionnaire is not graded. However, please answer the questions to the best of your ability. Your responses will help the facilitator understand what you already know and where they can help you improve.

Choose the best answer for each multiple-choice question. For short answer questions, write your response clearly.

You will have 10 min to complete the questionnaire.

The Exciting World of Innovative Technology

How does the Merge Cube work?

“How Does the Merge Cube Work? | #mergecube.” YouTube, YouTube, 25 Aug. 2023, www.youtube.com/watch?v=aQ-yb4chHWk&t=9s.

Mastering the Engineering Design Process through Documentation

Lesson 2

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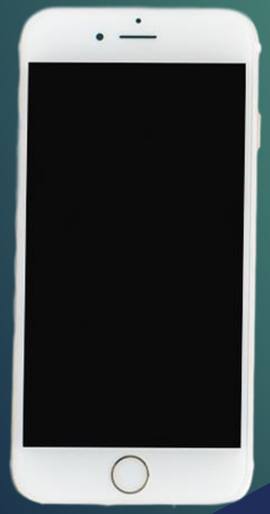
WHAT IS TECHNOLOGY?



Technology

Any tool, system, or process created by humans to solve problems or make tasks and life easier.

The Importance of the Engineering Design Process

Tacoma Narrows Bridge-Britannica

"Witness the Tacoma Narrows Bridge Collapse into Puget Sound between the Olympic Peninsula and the Washington Mainland." Encyclopedia Britannica, Encyclopedia Britannica, Inc., www.britannica.com/video/ 21895/Collapse-Tacoma-Narrows-Bridge-Puget-Sound-Washington-Nov-7-1940. Accessed 25 July 2024.

Engineering Design Process

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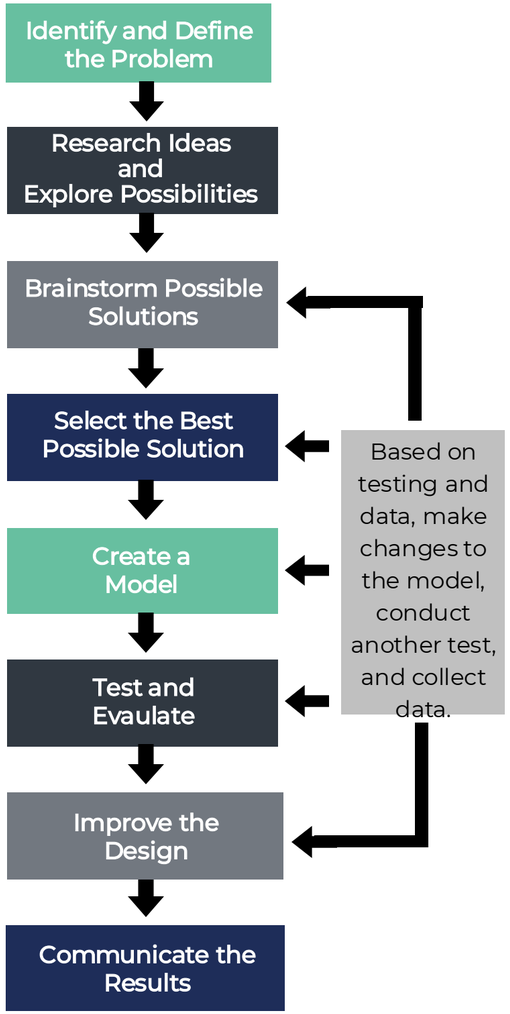

Engineering Design Process

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Identify and Define the Problem	• What is the problem that needs to be solved? • Who or what population is the design product or solution for? • Why is it important to solve this problem? • What are the design criteria and constraints?
Research Ideas and Explore Possibilities	• Conduct research to identify if existing products or solutions already exist. • Explore who the users or customers were of each product or solution and its strengths and weaknesses.
Brainstorm Solutions	• Generate a list of design solutions and technology that could be used to solve the problem. • Withhold judgment to increase the number of potential solutions.
Select the Best Possible Solution	• Examine and analyze all brainstormed solutions to identify their strengths, weaknesses, and their ability to solve the design challenge. • Select one solution, draw an annotated diagram, and create a materials list.
Create a Model	• Build the model (design product) using the diagram and materials list. • If revisions are made to the model during construction, document these changes on the existing diagram and materials list.
Test and Evaluate	• Test the design product. • Record observations, measurements, and data taken during the test. • Evaluate how well the model solves the problem and meets the design criteria. • What improvements should be made to improve the design.
Improve the Design	• Modify the model using the notes, data, and observations collected from the test phase. • If revisions are made, document the changes on the diagram and materials list.
Communicate the Results	• Collaborate with team members to determine the best way to communicate the teams' design solution, how it should be displayed during the presentation, and how the results will be shared.

EMPOWERING CHANGEMAKERS

Lesson 3

ARK-Educate

WHAT IS INNOVATION?

Innovation is the process of creating new ideas, products, processes, services, or products that solve problems in new or improved ways.

AN INNOVATIVE CHANGE-MAKING AGENCY ON A GLOBAL MISSION

Malala Introducing The World's Largest Lesson

"Malala Introducing The World's Largest Lesson", Vimeo, 16 Jan. 2024 "Malala Introducing The World's Largest Lesson", 16 Jan. 2024.

ARK-Educate

THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

United Nations. "Sustainable Development Goals." United Nations, 2024, https://www.un.org/sustainabledevelopment/sustainable-development-goals/.

WHAT IS AN INNOVATIVE CHANGEMAKER?

YOUNG INNOVATIVE CHANGEMAKERS

Greta Thurnberg

Climate Activist
Sweden

Gained international recognition for her school strike campaign, inspiring millions of young people to take action against climate change.

She has spoken at **United Nations** Climate Summit and still works hard to protect our planet.

Gitanjali Rao

Inventor and Scientist
United States

2020 TIME Kid of the Year award winner for her innovations in water quality and cyberbullying detection technology.

She is an advocate for using technology to address global challenges.

Strive Masiyiwa

Entrepreneur and Philanthropist
Zimabawe

Founded Econet Wireless, a telecommunications company.

He is also known for his charitable work through the Higherlife Foundation, focusing on education and healthcare initiatives in Africa.

YOUNG INNOVATIVE CHANGEMAKERS

Autumn Peltier

Water Activist
Canada

Advocates for clean water rights for Indigenous communities.

She has spoken at the **United Nations** and is a powerful voice for environmental conservation and Indigenous peoples rights.

Mikaila Ulmer

Social Entrepreneur
United States

Started a lemonade business as a child to support bee conservation.

Her company, *Me & the Bees Lemonade*, helps raise awareness about the importance of bees and supports environmental causes.

Jack Andraka

Scientist and Inventor
United States

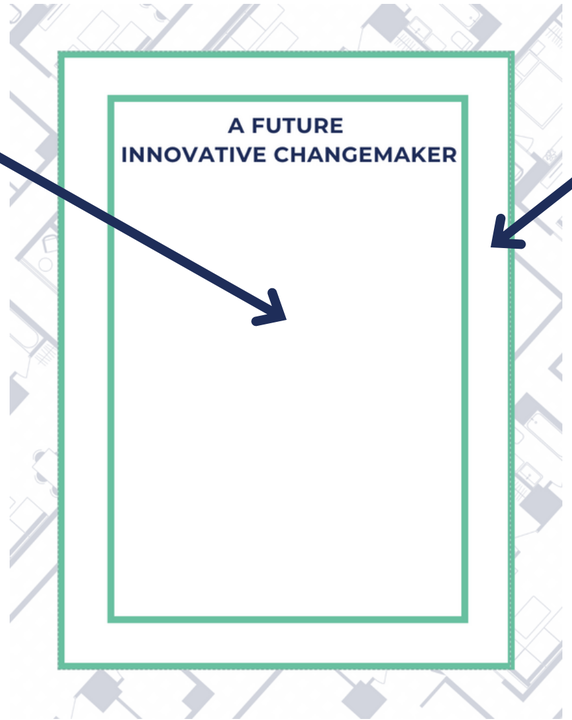
Developed a new method to detect specific types of cancer (pancreatic, ovarian, and lung) that is inexpensive and noninvasive.

He won the Intel International Science and Engineering Fair at the age of 15 for his groundbreaking research.

A FUTURE INNOVATIVE CHANGEMAKER

STEP 1

In the middle of the page, draw yourself as a future innovative changemaker.



STEP 2

Inside the frame, write a list of qualities you have or want to have as a future leader and innovative changemaker.

QUALITIES OF INNOVATIVE CHANGEMAKERS

Creative	Leader	Critical Thinker	Resourceful	Communicator
Empathetic	Collaborator	Curious	Determined	Inspiring
Bold	Motivated	Driven	Persistent	Innovative
Imaginative	Thoughtful	Confident	Problem Solver	Compassionate