

Invention and Innovation At-A-Glance



Intended Audience: Grade 7

Course Length: 18 weeks

In this course, students learn all about invention and innovation. They have opportunities to study the history of inventions and innovations, including their impacts on society. They learn about the core concepts of technology and about the various approaches to solving problems, including engineering design and experimentation. Students apply their creativity in the invention and innovation of new products, processes, or systems. Finally, students learn about how various inventions and innovations impact their lives.

Introduction to Invention and Innovation: Create creative ways to turn ideas into real things.

- Inventing 101: How people of all times and places have increased their capability by innovating and inventing.
- Time will Tell! Inventions and innovations are the result of demands, values, and interests of individuals, industries, and societies.
- What's Your Problem? All technologies have flaws; there is no perfect design.

Engineering Design Process: A systematic problem-solving strategy, with criteria and constraints, used to develop many possible solutions to a problem, so as to satisfy human needs and wants. This process is iterative, and is informed by many factors such as human values, resources, environmental concerns and trade-offs in order to arrive at the best possible solution to the problem.

- The Process in Action: Technology involves many types of problems and different approaches to solve them, including troubleshooting, research and development, invention and innovation, and experimentation. The engineering design process must take all of these things into account.
- Working with the Design Process
- The Engineering Design Process in Action

Invention and Innovation in the Designed World: Invention and innovation are driven by human needs and wants and are influenced by the core concepts of technology: systems, resources, requirements, optimization and trade-offs, processes, and controls. These concepts are the cornerstone for creative design.

- Core Concepts of Technology: Core concepts; including systems, resources, requirements, optimization and trade-offs, processes, and controls; serve as cornerstones for the study of technology.
- Understanding the Scope of Technology Systems: In order to invent or innovate, a person must have an understanding of the technologies that exist in the modern world, and an ability to analyze and optimize technological designs.
- Real World Designing: Designers and inventors must consider the core concepts of technology and other resources such as scientific knowledge during the process of designing. They must also adhere to the criteria and constraints of a design.

Using Design and Creativity to Help Others: Improving daily life involves creatively using design concepts to solve problems.

- Technology Around You! Creativity is important to the process of invention and innovation. Innovation is the process of modifying an existing product, process, or system to improve it. Invention is a process of turning ideas and imagination into new products, processes, or systems.
- What is Design?
- Communicating Your Design? Communicating your design is important to the process of invention and innovation. As you brainstorm and collaborate, you create pictorial representations of your design. Accurate drawings and sketches can communicate your design ideas globally.
- Rube Goldberg Entertainment

Technology and Society: While technology has allowed humans to prosper, negative impacts have also resulted.

- **An iPod® Does That?** When humans develop and use technology systems and products, there is a direct influence on our economy, our culture, and our society. Additionally, the impacts of the development and use can produce positive and negative impacts.
- A Clean Solution to a Messy Problem and Getting from There to Here

Creating a Space Exploration Infrastructure: Constellation, one of NASA's latest space exploration program proposals, is a combination of large and small technology systems that will enable humans to travel to and explore the solar system.

- Establishing a Lunar Outpost
- Launch Vehicles and Earth Departure Stages
- Designing a Spacecraft Subsystem



For More Information

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