



# Advanced Design Applications At-A-Glance

**Intended Audience: Grades 11-12**

**Course Length: 36 weeks**

**Advanced Design Applications** focuses on the three dimensions of technological literacy "knowledge, ways of thinking and acting, and capabilities" with the goal of students developing the characteristics of technologically literate citizens. It employs teaching/learning strategies that enable students to explore and deepen their understanding of "big ideas" regarding technology and makes use of a variety of assessment instruments to reveal the extent of understanding.

## Objectives

- **Construction:** Construction technology involves the design of structures to meet various requirements.
  - The Incredible Shrinking Design: Various techniques and tools are used in technical drawing and modeling, including scales, measurement, and conversion.
  - Seeing Green: Construction technology involves the design of structures to meet various requirements and the development of plans for how those buildings can fit into the surrounding community environment.
- **Energy and Power:** The law of conservation of energy, when applied to renewable energies, involves trade-offs among competing constraints and requirements, including engineering, economic, political, social, and environmental considerations.
  - Measurement and Introduction to Energy: The law of conservation of energy, when applied to renewable energies, involves trade-offs among competing constraints and requirements, including engineering, economic, political, social, and environmental considerations.
  - Energy Transfer: Energy and Power are technologies that are necessary to use in the designed world. Reviewing simple machines and learning how they can be used to manipulate mechanical advantage will allow users to take advantage of energy and power that is generated.
- **Manufacturing:** Modern manufacturing technologies and processes can produce quality products that are essential for economic health and also enhance the quality of life for many people, while having a minimal negative impact on environment.
  - Under Pressure: The design and manufacture of products is affected by customer, societal, economic, political, and environmental concerns.
  - In Control: Computer controlled manufacturing has enabled engineers and designers to reduce costs in almost every aspect of production, from producing designs to packaging and shipping, in a safe, economical, and timely manner, as well as reduce the time and effort required by dozens of human workers.
- **Transportation:** Transportation varies culturally, but plays a vital role in each society and includes many subsystems to deliver products and services.
  - Safety First: Evaluating the benefits, limitations, and risks associated with existing and proposed technologies is essential to the engineering process and the success of the design solution.
  - Out of Control: Utilization of a variety of simple and complex technologies is essential to understanding methods of controlling new technologies.
- **SeaPerch:** Students learn about robotics, engineering, science, technology, and mathematics (STEM) while building and operating an underwater ROV as part of the *Advanced Design Applications* course.
  - From Submarines to ROVs: Conduct research on real-world uses of remotely operated vehicles.



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**For More Information**

**Contact Us At**

**[ebdbuzzsupport@iteea.org](mailto:ebdbuzzsupport@iteea.org)**