Rhode Island **Engineering and Technology**

Grades 9, 10, 11, 12

Adopted 2011

Engineering and technology impacts the world and humankind. ET1

1 (9-12). **Identify the factors affecting technological advances (e.g. social, economic, political, cultural, and environmental) throughout history.** ET1.1 (9-12)

1 (9-12). Students demonstrate an understanding of the influences of technology by: ET1.1 (9-12)

1a. analyzing factors related to the development of technology and its effects on the rate of change on the designed world.

1b. assessing the relationship between available resources and the development of technology.

1c. analyzing the evolution of factors affecting technological advances in a global environment (e.g. satellites, transportation, media).

1aa. forecasting technological advancements based on potential needs and wants. (e.g. eBooks, Kindle)

1bb. developing technology to meet a need and identify potential tradeoffs.

2 (9-12). **Analyze and explain advancements in technological systems and their impact on the world.** ET1.2 (9-12)

2 (9-12). Students demonstrate an understanding of the impacts of technology by: ET1.2 (9-12)

2a. revising a current technological system and analyzing the global effects of the innovation (e.g. transition from fossil fuels to use of renewable resources).

2b. modeling the design of a technological system and evaluating its impact on humankind

2aa. designing a technological system to meet a specified need and analyzing its potential impact on the world

Effective design through engineering and technology is the outcome of a problem solving process involving the application of content knowledge, acquired skills, and creativity. ET2

1 (9-12). Evaluate and refine the design used to solve a real world problem. ET2.1 (9-12)

1 (9-12). Students demonstrate an understanding of the attributes of a design process by: ET2.1 (9-12)

1a. identifying in-depth criteria and constraints by developing a concise problem statement.

1b. evaluating and finalizing the most appropriate design solution for a given scenario or task

1c. creating a team and assigning roles to team members for the purpose of achieving an overall desired result.

1aa. reevaluating the process utilized in the development of the design solution with the goal of enhanced efficiency.

1bb. identifying the personnel positions required to complete a task and the essential qualities required of each position

---

2 (9-12). Incorporate technological products, systems and their tools to achieve design solutions. ET2.2 (9-12)

2 (9-12). Students demonstrate an understanding of technological products and systems by: ET2.2 (9-12)

2a. selecting independently the proper tools or information resources used in completing a task.

2b. incorporating proper information, material selection and appropriate tools throughout the design process. (e.g. digital micrometers, digital oscilloscopes)

2c. documenting, communicating, and evaluating processes and procedures used to build, operate, and maintain systems.

2d. integrating information to develop possible solutions and evaluate designs.

2aa. designing specific tools (e.g. jigs and fixtures) to expedite the task.

2bb. creating technically written documentation to support a designed product.

3 (9-12). **Refine the processes of research and development, invention and innovation, experimentation, and troubleshooting for the purpose of achieving an optimal design solution.** ET2.3 (9-12)

3 (9-12). Students demonstrate an understanding of what is an optimal design solution by: ET2.3 (9-12)

3a. independently develop and utilize a process to solve a real world problem and justifying the selection.

3b. selecting appropriate materials to construct a working prototype and/or simulation.

3c. evaluating and refining a complex design solution for a working prototype

3d. presenting comparative simulations/ prototypes and defending the selected solution.

3aa. revising a process to solve a real world problem given unexpected constraints. (e.g. time, funding, personnel)

3bb. developing an alternative solution to a design problem.

3cc. researching the patent application process.

3dd. presenting solutions to a community problem in a public forum (e.g. senior exhibitions).

The designed world community selects and uses appropriate technologies. ET3

1 (9-12). **Experience and implement the various areas in engineering and technology.** ET3.1 (9-12)

1 (9-12). Students demonstrate an understanding of the areas of engineering and technology by ET3.1 (9-12)

1a. preparing a career portfolio of a particular area of engineering or technology.

1b. evaluating the connections within the areas of engineering and technology as they apply to a student designed product.

1aa. participating in an internship or job shadowing opportunity in a particular engineering / technological discipline.

2 (9-12). **Evaluate the effectiveness of tools to measure, design, and implement specific technologies.** ET3.2 (9-12)

2 (9-12). Students demonstrate an understanding of selecting appropriate tools by: ET3.2 (9-12)

2a. evaluating the effectiveness of various tool(s) used in specific technologies.

2b. developing or improving a tool for a specific technology (e.g. software, jig, fixture).

2aa. Design, manufacture and test a prototype.