Mothers (and Fathers) of Invention
Connections to the Massachusetts Curriculum Frameworks

Science and Technology/Engineering Curriculum Framework:

Technology/Engineering

Grades 3-5

1. Materials and Tools

Broad Concept: Appropriate materials, tools, and machines extend our ability to solve problems and invent.

1.1 Identify materials used to accomplish a design task based on a specific property, i.e., weight, strength, harness, and flexibility

1.3 Identify and explain the difference between simple and complex machines, e.g., hand can opener that includes multiple gears, wheel, wedge gear, and lever.

2. Engineering Design

Broad Concept: Engineering design requires creative thinking and strategies to solve practical problems generated by needs and wants.

2.1 Identify a problem that reflects the need for shelter, storage, or convenience.

2.3 Identify relevant design features (e.g., size, shape, weight) for building a prototype of a solution to a given problem.

Grades 6-8

1. Materials, Tools, and Machines

Broad Concept: Appropriate materials, tools, and machines enable us to solve problems, invent, and construct

1.1 Given a design task, identify appropriate materials (e.g., wood, paper, plastic, aggregates, ceramics, metals, solvents, adhesives) based on specific properties and characteristics (e.g., weight, strength, hardness, and flexibility).

1.2 Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten,, and separate, and explain their safe and proper use.

2. Engineering Design

Broad Concept: Engineering design is an iterative process involving modeling and optimizing for developing technological solutions to problems within given constraints.

2.1 Identify and explain the steps of the engineering design process, i.e., identify the need or problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solutions(s) and redesign

2.2 Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings.

2.3 Describe and explain the purpose of a given prototype.

2.4 Explain how such design features as size, shape, weight, function, and cost limitations would affect the construction of a given prototype.

4. Manufacturing Technologies

Broad Concept: Manufacturing is the process of converting raw materials (primary process) into physical goods (secondary process), involving multiple industrial processes, e.g., assembly, multiple stages of production, quality control.

4.1 Describe and explain the manufacturing systems of custom and mass production.

4.2 Explain and give examples of the impacts of interchangeable parts, components of mass-produced products, and the use of automation, e.g.. robotics.
4.4 Explain basic processes in manufacturing systems, e.g., cutting, shaping, assembling, joining, finishing, quality control, and safety.

5. Construction Technologies

Broad Concept: Construction technology involves building structures in order to contain, shelter, manufacture, transport, communicate, and provide recreation.

5.1 Describe and explain parts of a structure, e.g., foundation, flooring, decking, wall, roofing systems.

6. Transportation Technologies

Broad Concept: Transportation technologies are systems and devices that move goods and people from one place to another across or through land, air, water, or space.

6.3 Identify and describe three subsystems of a transportation vehicle or device, i.e., structural, propulsion, guidance, suspension, control, and support.
6.4 Identify and explain lift, drag, friction, thrust, and gravity in a vehicle or device, e.g., cars, boats, airplanes, rockets.

History and Social Science Curriculum Framework:

Grade 5 - United State History, Geography, Economics, and Government: Early Exploration to Westward Movement

Concepts and Skills – Economics

15. Give examples of how changes in supply and demand affected prices in colonial history (e.g., fur, lumber, fish, and meat). (E,H)

Learning Standards

The Political, Intellectual, and Economic Growth of the Colonies, 1700-1775

5.11 Explain the importance of maritime commerce in the development of the economy of colonial Massachusetts. Draw on the services of historical societies and museums as needed (H,E)

a. the fishing and ship building industries
b. trans-Atlantic trade
c. the port cities of New Bedford, Newburyport, Gloucester, Salem, and Boston

Grade 6 Concepts and Skills

Economics

12. Give examples of products that are traded among nations, and examples of barriers to trade in these or other products (E)
13. Define supply and demand and describe how changes in supply and demand affect prices of specific products. (E)

Grade 7 Concepts and Skills

Economics

8. Define and apply economic concepts learned in prekindergarten through grade 6: produces, consumers, good, services,buyers, sellers, natural resources, taxes, specialization, savings, entrepreneur, prices, markets, scarcity, trade, barter, money, medium of exchange, supp, and demand. (E)

Grades 8-12 Concepts and Skills

History and Geography

7. Show connections, causal and otherwise, between particular historical events and ideas and larger social economic, and political trends and developments. (H,G,C,E)

English Language Arts:

General Standard 1: Discussion – Students will use agreed-upon rules for informal and formal discussions in small and large groups.

Grades 3-4

1.2 Follow agreed-upon rules for class discussion and carry out assigned roles in self-run small group discussions

Grades 5-6

1.3 Apply understanding of agreed-upon rules and individual roles in order to make decisions.

Grades 7-8

1.4 Know and apply rules for formal discussions (classroom, parliamentary debate, town meeting rules

General Standard 3: Oral Presentation - Students will make oral presentations that demonstrate appropriate consideration of audience, purpose, and the information to be conveyed.

Grades 3-4

3.4 Give oral presentations about experiences or interests using eye contact, proper place, adequate volume, and clear pronunciation.

3.5 Make informal presentations that have a recognizable organization (sequencing, summarizing).

Grades 5-8

3.8 Give oral presentations for various purposes, showing appropriate changes in delivery (gestures, vocabulary, pace, visuals) and using language for dramatic effect.

Grades 7-8

3.11 Use appropriate techniques for oral persuasion.

General Standard 4: Vocabulary and Concept Development - Students will understand and acquire new vocabulary and use it correctly in reading and writing.

Grades 3-4, 5-6, and 7-8

4.2 Describe common objects and events in general and specific language.