

6th Grade – Exploring Technology

Lesson 1 – What is Technology?

Duration – Three hours

Big Idea – New products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.

Learning Objectives Students will learn to:

1. Explain that the use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology’s development and use.
2. Explain why technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences.
3. Cite instances where technology has strongly influenced the course of history.
4. Define and provide examples of technology.
5. Differentiate between desirable and undesirable outcomes of technology.
6. Recognize that all technology has the potential to have positive and/or negative effects.

Lesson 2 Push Pull Manufacturing

Duration – Three hours

Big Idea – Manufacturing is the production of physical goods using a variety of mechanical processes.

Learning Objectives: Students will learn to:

1. Identify examples of mechanical processes that change the form of materials through the processes of separating, forming, combining, and conditioning them.
2. Classify durable and non-durable manufactured goods.
3. Solve simple problems involving rates and derived measurements for such attributes as velocity and density.
4. Use graphs to show a variety of possible relationships between two variables.
5. Describe the role of manufacturing in the United States and the world.
6. Explain how manufacturing impacts their lives.
7. Compare and contrast push and pull manufacturing processes.

Lesson 3 The Core Technologies

Duration – Three hours

Big Idea – The nine Core Technologies are the “building blocks” of technological systems.

Learning Objectives: Students will learn to:

1. Identify the nine Core Technologies and provide examples of technological systems they use them.
2. Explain how the Core Technologies are the “building blocks” of technological systems.

DRAFT DOCUMENT:
Technology Education – Essential Curriculum 6th Grade

3. Identify the people who use the Core Technologies in the development and maintenance of systems
4. Describe the derivation and application of technology systems. (poster series 7)
5. Identify the application of the Core Technologies in the agricultural and medical fields.
6. Explain how new systems in the medical and agricultural fields solve problems or help do things that could not be done without the help of technology.

Lesson 4 Documenting Our Ideas

Duration – Four hours

Big Idea – An engineering design journal is a tool used to record and communicate information about new solutions to technological problems.

Learning Objectives Students will learn to:

1. Explain that design involves a set of steps, which can be performed in different sequences and repeated as needed.
2. Apply a design process to solve problems in and beyond the laboratory-classroom.
3. Specify criteria and constraints for the design.
4. Make two-dimensional and three-dimensional representations of the designed solution.
5. Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed.
6. Incorporate characteristics of communication systems in the design of a new product.
7. Create sketches that technically represent an object or idea.
8. Draw geometric objects with specified properties, such as side lengths or angle measures.
9. Recognize and apply geometric ideas and relationships in areas outside the mathematics classroom, such as art, science and everyday life.
10. Understand relationships among units and convert from one unit to another within the same system.
11. Explain the purpose of accurately and systematically developing an Engineering Design Journal.

Lesson 5 Using Computer Aided Design

Duration –5 hours

Big Idea – CAD systems provide designers with many advantages over traditional drafting techniques.

Learning Objectives Students will learn to:

Lesson 6 The Engineering Design Process

Duration – Five hours

Big Idea – The Engineering Design Process is a method that is used to solve technological challenges to change and improve products for the way we live.

Learning Objectives Students will learn to:

1. Explain that design involves a set of steps, which can be performed in different sequences and repeated as needed.
2. Explain that although there is no fixed set of steps that all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.
3. Monitor and reflect on the process of mathematical problem-solving.
4. Explain the Engineering Design Process (EDP) as it relates to solving technological challenges.
5. Identify the factors that affect the design of a structural system.
6. Compare and contrast the EDP with problem solving processes in science and mathematics.
7. Apply a design process to solve problems in and beyond the laboratory-classroom.

Lesson 7 Transportation System Design

Duration – 6 hours

Big Idea – Transportation vehicles are made up of subsystems, such as structural, propulsion, suspension, guidance, control, and support, that must function together for a system to work effectively.

Learning Objectives Students will learn to:

1. Explain that transporting people and goods involves a combination of individuals and vehicles.
2. Identify and distinguish between the subsystems of transportation vehicles in various environments.
3. Define the terms “power” and “energy” as they relate to transportation systems.
4. Apply the Engineering Design Process to solve a transportation technology design challenge.
5. Specify criteria and constraints for a design problem.
6. Make two-dimensional and three-dimensional representations of the designed solution.
7. Make a product or system and document the solution.
8. Describe how engineers, architects, and others who engage in design and technology use scientific knowledge to solve practical problems.
9. Convert units of measurement.
10. Solve simple problems involving rates.
11. Describe and calculate velocity as it relates to the speed of the transportation vehicle that was constructed.

Lesson 8 Impacts of Technology

Duration – Three hours

Big Idea – The use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology’s development and use.

Learning Objectives Students will learn to:

1. Explain that the use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology’s development and use.
2. Explain why technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences.
3. Cite instances where technology has strongly influenced the course of history.
4. Define and provide examples of technology.
5. Differentiate between desirable and undesirable outcomes of technology.
6. Recognize that all technology has the potential to have positive and/or negative effects.

Course Timeline

Lesson	Title	Hours
1	What is Technology?	3
2	Push Pull Manufacturing	3
3	The Core Technologies	3
4	Documenting Our Ideas	4
5	Using Computer Aided Design	5
6	The Engineering Design Process	5
7	Transportation System Design	6
8	Impacts of Technology	3
	Total hours	33