

8th Grade Technology Curriculum

Revised 7/2025

NJSLS Standards

8.1.8.CS.1, 8.1.8.CS.2, 8.1.8.CS.3, 8.1.8.CS.4, 8.1.8.NI.1, 8.1.8.NI.2, 8.1.8.NI.3, 8.1.8.NI.4, 8.1.8.IC.1, 8.1.8.IC.2, 8.1.8.DA.1, 8.1.8.DA.2, 8.1.8.DA.3, 8.1.8.DA.4, 8.1.8.DA.5, 8.1.8.DA.6, 8.1.8.AP.1, 8.1.8.AP.2, 8.1.8.AP.3, 8.1.8.AP.4, 8.1.8.AP.5, 8.1.8.AP.6, 8.1.8.AP.7, 8.1.8.AP.8, 8.1.8.AP.9, 8.2.8.ED.1, 8.2.8.ED.2, 8.2.8.ED.3, 8.2.8.ED.4, 8.2.8.ED.5, 8.2.8.ED.6, 8.1.8.ED.7, 8.2.8.ITH.1, 8.2.8.ITH.2, 8.2.8.ITH.3, 8.2.5.ITH.4, 8.2.8.ITH.5, 8.2.8.NT.1, 8.2.8.NT.2, 8.2.8.NT.3, 8.2.8.NT.4, 8.2.8.ETW.1, 8.2.8.ETW.2, 8.2.8.ETW.3, 8.2.8.ETW.4, 8.2.8.EC.1, 8.2.8.EC.2

8.1 Computer Science

- Recommend improvements to computing devices in order to improve the ways users interact with the devices.
- Design a system that combines hardware and software components to process data. Justify design decisions and explain potential system trade-offs.
- Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
- Model how information is broken down into smaller pieces, transmitted as addressed packets through multiple devices over networks and the Internet, and reassembled at the destination.
- Model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication.
- Explain how network security depends on a combination of hardware, software, and practices that control access to data and systems.
- Explain how new security measures have been created in response to key malware events.
- Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options.
- Describe issues of bias and accessibility in the design of existing technologies.
- Organize and transform data collected using computational tools to make it usable for a specific purpose.
- Explain the difference between how the computer stores data as bits and how the data is displayed.
- Identify the appropriate tool to access data based on its file format.
- Transform data to remove errors and improve the accuracy of the data for analysis.
- Test, analyze, and refine computational models.
- Analyze climate change computational models and propose refinements.
- Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.
- Create clearly named variables that represent different data types and perform operations on their values.
- Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.
- Decompose problems and sub-problems into parts to facilitate the design, implementation, and review of programs.
- Create procedures with parameters to organize code and make it easier to reuse.

8th Grade Technology Curriculum

Revised 7/2025

- Refine a solution that meets users' needs by incorporating feedback from team members and users.
- Design programs, incorporating existing code, media, and libraries, and give attribution.
- Systematically test and refine programs using a range of test cases and users.
- Document programs in order to make them easier to follow, test, and debug.

8.2 Design Thinking

- Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.
- Identify the steps in the design process that could be used to solve a problem.
- Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
- Investigate a malfunctioning system, identify its impact, and explain the step-by-step process used to troubleshoot, evaluate, and test options to repair the product in a collaborative team.
- Explain the need for optimization in a design process
- Analyze how trade-offs can impact the design of a product.
- Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).
- Explain how the development and use of technology influences economic, political, social, and cultural issues.
- Compare how technologies have influenced society over time.
- Evaluate the impact of sustainability on the development of a designed product or system.
- Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact.
- Compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another.
- Examine a malfunctioning tool, product, or system and propose solutions to the problem.
- Analyze an existing technological product that has been repurposed for a different function.
- Examine a system, consider how each part relates to other parts, and redesign it for another purpose.
- Explain how a product designed for a specific demand was modified to meet a new demand and led to a new product.
- Illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs.
- Analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital).
- Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact.
- Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.
- Explain ethical issues that may arise from the use of new technologies.
- Examine the effects of ethical and unethical practices in product design and development.

8th Grade Technology Curriculum

Revised 7/2025

Extended Activities

1. **Advanced Python: Text Adventure Game** - EduCode Path: *The Agency – Challenge Levels or Custom Python Editor*
Concepts: `if/elif/else`, user input, variables, multi-step logic.
Students code a branching text-based story where the user makes choices that affect the ending. Include the use of variables to store user decisions and change the storyline. For diversity, add a scoring system and multiple endings.
2. **Python Challenge: Build a Calculator** - EduCode Path: *Python Practice Mode*
Concepts: `input()`, functions, operators, error handling.
Students will create a basic four-function calculator (add, subtract, multiply, divide). They will need to wrap each operation in a function and use a `while` loop for repeat use. For a higher functioning calculator, add error-handling (e.g., division by zero) and a “clear” option.

Gifted and Talented

1. **Game Dev: Design a Level-Based Game** - EduCode Path: *Create a Game*
Concepts: Objects, variables, timers, collision detection.
Students will build a game with increasing difficulty levels, scoring, and a win condition. They will also implement a timer or live system for added challenges. To increase the game difficulty, add level progression with background music or sound effects.