

Englewood Public School District

Technology

Grades K-2

The Nature of Technology

Overview: Over the course of the school year, students will study and implement the use of technology throughout the core subjects. Students will research technology, solve problems, and create their own technologies to address issues in science, social studies, mathematics, and English language arts.

Time Frame: One school year

Enduring Understandings:

Technology is an integral part of 21st century life and skills.
 Technology affects a lot of what we do in our daily lives.
 We can use technology to help and teach others.

Essential Questions:

How does technology affect our daily lives?
How do we use technology at home, work, and school?
How do computers work?
How do we fix broken tools and toy?

| Standards | Topics and Objectives | Activities | Resources | Assessments |
|---|---|--|--|--|
| 8.2. The Nature of Technology 8.2.2.A.1 Define products produced as a result of technology or of nature. 8.2.2.A.2 Describe how designed products and systems are useful at school, home and work. 8.2.2.A.3 Identify a system and the components that work | Topics | In a small group, students will express how technological tools and resources are practical for everyday life. | Natural vs. Man-Made – An Introduction, Better Lesson http://betterlesson.com/lesson/637596/natural-vs-man-made-an-introduction | Students will be evaluated on the quality of their participation and completion of the activities: 1. Natural vs. Man-Made – An Introduction 2. Something Old, Something Changed 3. Trains and Travel: Then and Now 4. Exploring Parts and Wholes 5. Exploring Parts and Wholes |
| | Characteristics of Technology | | | |
| | Relationship of Technology and Other Fields | Natural vs. Man-Made – An Introduction | Exploring Parts and Wholes, Project 2061 www.project2061.org/publications/rsl/online/Guide/Ch2/hlpar0.pdf | |
| | Twenty-First Century Themes and Skills include: • Informational Literacy • Media Literacy • Critical Thinking and Problem Solving • Communication and | Students learn to identify what is natural vs. man-made. Better Lesson As a class, students will list the products of today compared to those of the past. | Exploring Parts and Wholes, Science NetLinks | |

together to accomplish its purpose.

8.2.2.A.4 Choose a product to make and plan the tools and materials needed.

8.2.2.A.5 Collaborate to design a solution to a problem affecting the community.

Collaboration

Objectives

- Students will define and distinguish between a natural product and a man-made product.
- Students will explain how products are useful in different settings.
- Students will analyze a system and explain its components.
- Students will create a product.
- Students will collaborate to solve a community problem.

As a class, make a list of ways that technology affects our daily lives.

Given a set of materials, students will identify which items are man-made and which items come from nature.

Something Old, Something Changed

This lesson asks students to be detectives, to look at evidence to discover what has changed in the present and why.
Department of Education

Trains and Travel: Then and Now

Upon completion of this lesson, students will understand the changes in preferred forms of transportation over time.
Library of Congress

Exploring Parts and Wholes I

At the end of this lesson, students will be able to make some interesting and accurate statements about how parts of a product are related to the whole. Project 2061

Exploring Parts and Wholes II

Students will further explore how parts of a product are related to the whole. Project 2061

<http://sciencenetlinks.com/lessons/exploring-parts-and-wholes/>

Something Old, Something Changed, Department of Education
<https://dnet01.ode.state.oh.us/items/itemdetails/lessondetail.aspx?id=0907f84c80531d28>

Trains and Travel: Then and Now
Library of Congress
www.library.mtsu.edu/tps/lessonplans&ideas/Lesson_Plan_Pullman_Porters.pdf

Teacher Resources:

Real-World Problem Solving: Project-Based Solutions, Edutopia
<https://www.edutopia.org/practice/real-world-problem-solving-project-based-solutions>

6. Product Design
7. Safety Brochure
8. Repair a Broken Tool or Toy

Students will create a safety brochure for a toy or household product. They will explain the importance of safety in the use and selection of appropriate tools and resources for a specific purpose.

Each student will design their own product and describe how it was made and how it works.

As a class, students will brainstorm and devise a plan to repair a broken toy or tool using the design process.

Describe how the parts of a common toy or tool interact and work as part of a system.

Collect and post the results of a digital classroom survey about a problem or issue and use data to suggest solutions.

8.2.B
Technology and Society

8.2.2.B.1 Identify how technology impacts or improves life.

8.2.2.B.2 Demonstrate how reusing a product affects the local and global environment.

8.2.2.B.3 Identify products or systems that are designed to meet human needs.

| Topics | | | |
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| The Effects of Technology | Students will watch a video “Kids of Today vs. 1980’s Technology” and discuss their parent’s technology and their own. | Kids of Today vs. 1980’s Technology https://youtu.be/7v75QpvISUs | Students will be evaluated on the quality of their participation and completion of the activities: |
| Societal Use of Technology | | Save Our Earth! Alternative Uses of Common Trash, Teacher Vision https://www.teachervision.com/environmental-education/printable/63713.htm | 1. Report: How a Technology Affects My Life |
| Technology and History | Individually, students will create a Venn diagram comparing how technology has helped and improved our lives. | | 2. Save Our Earth! Alternative Uses of Common Trash |
| Twenty-First Century Themes and Skills include: | | | 3. Trash and Climate Change |
| <ul style="list-style-type: none"> • Informational Literacy • Media Literacy | | | 4. Communicating Past and Present |
| <ul style="list-style-type: none"> • Creativity and Innovation • Critical Thinking and Problem Solving | Individually, students will research how a specific technology affects their life | Trash and Climate Change, Teacher Vision https://www.teachervision.com | |

8.2.2.B.4 Identify how the ways people live and work has changed because of technology.

- Communication and Collaboration

Objectives

- Students will identify how technology affects their life at home and in school.
- Students will explain how reusing products helps the environment.
- Students will explain how different products meet their needs.
- Students will create projects that explain how technology affects human life.

and write a simple report (one to three paragraphs, with assistance).

Save Our Earth! Alternative Uses of Common Trash

With considerable instructor assistance, students participate in a lesson about alternative uses for common trash.

Trash and Climate Change

Instructors can select from a large variety of activities regarding trash and climate change. Teacher Vision

Students will select a product and identify how the technology makes life better.

In a classroom discussion, determine technology that is used to improve our lives.

Students will examine the positive and negative impact of specific technologies, including its impact on the environment.

Students will examine how technology has affected and/or changed their lives.

Communicating Past and Present

In this lesson, second-graders interview people from two or three generations to explore how technology has changed the daily life and work

m/climate-change/printable/63738.html

Communicating Past and Present – Grade Two Interdisciplinary Lesson, Ohio Department of Education
www.myips.org/cms/lib8/IN01906626/Centricity/.../lp14CommPastPresent.pdf

Teaching with Technology: Problem Solving at the Computer, Scholastic
<http://www.scholastic.com/teachers/article/teaching-technology-problem-solving-computer>

experiences of people over time. Ohio Department of Education

**8.2.C
Design**

8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product.

8.2.2.C.2 Create a drawing of a product or device that communicates its function to peers and discuss.

8.2.2.C.3 Explain why we need to make new products.

8.2.2.C.4 Identify designed products and brainstorm how to improve one used in the classroom.

8.2.2.C.5 Describe how the parts of a common toy or tool interact and work as part of a system.

8.2.2.C.6 Investigate a product that has stopped working and brainstorm ideas to correct the problem.

| Topics | <u>Technology at Work 2</u> | Technology at Work 2, Discovery Education | Students will be evaluated on the quality of their participation and completion of the activities: |
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| Attributes of Design | Students will consider the strengths and weaknesses of modern technology. | http://www.discoveryeducation.com/teachers/free-lesson-plans/technology-at-work-2.cfm | 1. Technology at Work 2 |
| Application of Engineering Design | Discovery Education | The Challenge: Green Design, PBS Kids http://pbskids.org/designsquad/parenteducators/lesson-plans/green_design.html | 2. The Challenge: Green Design |
| Inventions and Innovations | In small groups, students will investigate, brainstorm, and design a plan to solve real-world problems. | Form vs. Function, Teach Engineering.org https://www.teachengineering.org/lessons/view/cub_motion_lesson1 | 3. Form vs. Function |
| Twenty-First Century Themes and Skills include: | Students will be provided with a real-world problem, consider a technological solution, and identify the resources needed to create technological products. | An Introduction to Incline Planes, Teaching Engineering https://www.teachengineering.org/lessons/view/duk_heaveho_music_less | 4. An Introduction to Incline Planes |
| <ul style="list-style-type: none"> • Informational Literacy • Media Literacy • ICT Literacy • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration | Students will select one tool in the classroom and suggest ways to improve upon it. Next, students will draw a design of the innovation. | What Will Biodegrade? Teach Engineering https://www.teachengineering.org/lessons/view/duk_landfill_music_less | 5. What Will Biodegrade? |
| Objectives | Students will select one tool in the classroom and suggest ways to improve upon it. | | 6. Teaching with Technology: Problem Solving at the Computer |
| <ul style="list-style-type: none"> • Students will brainstorm ideas on how to solve a real-world problem. | Given a broken toy, and working in groups, students will suggest ways to fix it. | | |
| <ul style="list-style-type: none"> • Students will construct a basic drawing of a product and explain its function. | <u>The Challenge: Green Design</u> | | |
| <ul style="list-style-type: none"> • Students will explain why we need new products. | In this hands-on challenge, students consider ways to repurpose materials and invent an environmentally friendly beverage can holder. In the process, they consider what it means to “be green,” identify low-impact alternatives for common items, and use the | | |
| <ul style="list-style-type: none"> • Students will explain the parts of a product and how the product works. | | | |
| <ul style="list-style-type: none"> • Students will make conjectures as to how to fix a broken product. | | | |

design process to devise a green packaging system for beverage cans. PBS Kids

Form vs. Function

Students take a closer look at cars and learn about some characteristics that affect their energy efficiency. They come to see how vehicles are one example of a product in which engineers are making changes and improvements to gain greater efficiency and thus require less energy to operate. Teach Engineering

An Introduction to Incline Planes

Students are introduced to the concept of simple tools and how they can make difficult or impossible tasks easier. They begin by investigating the properties of inclined planes and how implementing them can reduce the force necessary to lift objects off the ground. Teach Engineering

What Will Biodegrade?

Students investigate what types of materials biodegrade in the soil, and learn what happens to their trash after they throw it away. They learn about the concepts behind landfills and compost piles. In an associated activity, students create their own miniature landfills—a hands-on way to learn the difference between

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| | <p>organic and inorganic waste. Teach Engineering</p> <p><u>Teaching with Technology: Problem Solving at the Computer</u> No-fail mazes, word puzzles, and deductive thinking activities. Teach Engineering</p> | | | |
| <p>8.2.D <u>Abilities for a Technological World</u></p> <p>8.2.2.D.1 Collaborate and apply a design process to solve a simple problem from everyday experiences.</p> <p>8.2.2.D.2 Discover how a product works by taking it apart, sketching how parts fit, and putting it back together.</p> <p>8.2.2.D.3 Identify the strengths and weaknesses in a product or system.</p> <p>8.2.2.D.4 Identify the resources needed to create technological products or systems.</p> <p>8.2.2.D.5 Identify how using a tool (such as a bucket or wagon) aids in reducing work.</p> | <p style="text-align: center;">Topics</p> <p>The Design Process</p> <p>Technological Products and Systems</p> <p>The Impact of Products and Systems</p> <p>Twenty-First Century Themes and Skills include:</p> <ul style="list-style-type: none"> • Informational Literacy • ICT Literacy • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration <p style="text-align: center;">Objectives</p> <ul style="list-style-type: none"> • Students will collaborate and apply the design process to solve an everyday problem. • Students will understand how the parts work on a simple product. • Students will identify the strengths and weaknesses | <p><u>Problem Solving</u> Students are introduced to a systematic procedure for solving problems through a demonstration and then the application of the method to an everyday activity. The unit project is introduced to provide relevance to subsequent lessons. Teach Engineering</p> <p>Provided with specific technologies (like a car), students will explain what can happen if the system malfunctions.</p> <p>Students will create a new product and create a brochure or poster to advertise it.</p> <p>Given a simple product, students will take it apart and put it back together again.</p> <p>Students select a product (such as a video game or some other product that is important to them) and will identify the strengths and the weaknesses of the product.</p> | <p>Problem Solving, Teach Engineering https://www.teachengineering.org/lessons/view/cla_lesson2_problem_solving</p> <p><u>Teacher Resources:</u></p> <p>Ready for Primary Time: Adapting Engineering Curriculum for the K-2 Classroom, Oregon State University www.asee.org/documents/conferences/k12/2011/07/17-Ready-for-</p> <p>A Collection of Elementary STEM Design Challenge Based Children’s Literature Integrated STEMEd tem.uark.edu/resources/includes/2013.student.narrative.cur</p> <p>K-3 STEM Class Lessons, Sam Houston Elementary School http://www.maryville-schools.org/site/Default.aspx?PageID=4713</p> <p>Creativity/Problem</p> | <p>Students will be evaluated on the quality of their participation and completion of the activities:</p> <ol style="list-style-type: none"> 1. Problem Solving 2. Marshmallow Challenge: A Tower Building Adventure 3. New Product Advertisement |

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| | <p>of a product.</p> <ul style="list-style-type: none"> Students will explain how a tool reduces workload. | <p>Students will be given a list of tools and will explain how each aids in reducing the workload.</p> <p><u>Marshmallow Challenge: A Tower Building Adventure</u> Students will get hands on experience building a stable structure in teams. They will learn also learn about rapid trial and error—a skill essential in early phases of engineering design. Bay Area Scientists</p> | <p>Solving/Critical Thinking Lesson Plans and Resources, Eds-resources.com http://www.eds-resources.com/edcreative.htm</p> <p><u>Marshmallow Challenge: A Tower Building Adventure, Bay Area Scientists</u> www.crscience.org/lessonplans/2_MarshmallowChallenge_Gautham_1213.pdf</p> <p>Engineering and Design, ZoomSCE http://pbskids.org/zoom/activities/sci/</p> | |
| <p>8.2.E <u>Computational Thinking: Programming</u></p> <p>8.2.2.E.1 List and demonstrate the steps to an everyday task.</p> <p>8.2.2.E.2 Demonstrate an understanding of how a computer takes input through a series of written commands and then interprets and displays information as output.</p> <p>8.2.2.E.3 Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).</p> <p>8.2.2.E.4 Debug an algorithm (i.e., correct an error).</p> | <p>Topics</p> <p>Tools Used in Design and Engineering</p> <p>Twenty-First Century Themes and Skills include:</p> <ul style="list-style-type: none"> Informational Literacy ICT Literacy Creativity and Innovation Critical Thinking and Problem Solving <p>Objectives</p> <ul style="list-style-type: none"> Students will be able to demonstrate the steps needed to complete an everyday task. Students will be able to explain in simple language how a computer works. | <p>Students will create a how-to book for a topic of choice.</p> <p>Students will watch a video regarding how a computer works.</p> <p>Students will implement a set of instructions to navigate through an age-appropriate computer maze.</p> <p>Students will identify basic computer vocabulary words.</p> <p><u>The Parts of a Computer</u> Students will identify the parts of a computer. Alabama Learning Exchange</p> <p><u>Programming Lesson Plan: Run Marco! Game</u> In this lesson plan, which is adaptable for grades 1-8,</p> | <p>How do computers work? https://youtu.be/_QEIVrqBwnk</p> <p>Programing Lesson Plan: Run Marco! Game, Brain Pop https://educators.brainpop.com/lesson-plan/programming-lesson-plan-run-marco-game/?bp-jr-topic=parts-of-a-computer</p> <p>The Parts of a Computer, Alabama Learning Exchange http://alex.state.al.us/lesson_view.php?id=6861</p> <p><u>K-2 Maze Games:</u></p> <p>A Maze Race, Knowledge Adventure http://www.knowledgeadventure.com/games/a-maze-race/</p> | <p>Students will be evaluated on the quality of their participation and completion of the activities:</p> <ol style="list-style-type: none"> How-To Book The Parts of a Computer Programming Lesson Plan: Run Marco! Game |

8.2.2.E.5 Use appropriate terms in conversation (e.g., basic vocabulary words: input, output, the operating system, debug, and algorithm).

- Students will navigate a computer game (such as a maze) using pre-defined commands.
- Students will use correct terminology when discussing computers.

students use Brain POP resources (including an online game) to explore computer coding, algorithms, and programming. Brain Pop

Primary Games, Ladybugs
<http://www.primarygames.com/science/insects/games/ladybugs/>

Modifications:

- New Jersey Department of Education – Instructional Supports and Scaffolds
- Suggested Strategies for English Language Learners
- The Nature of Technology curricula provides enrichment activities that allow for greater personalized learning to meet the needs of all learners including students with gifts and talents.

Vocabulary:

Data – Information gathered during an investigation.

Design (Noun) – A plan for a structure or process that will solve a problem.

Design (Verb) – Process of changing or inventing a structure or process.

Evidence – Information or data used to support or refute a hypothesis.

Hypothesis – A prediction that can be tested by doing an investigation.

Investigation – A process of studying a question scientifically.

Model – Object that represents a design.

Observation - Using your senses to carefully collect information.

Pattern – Reoccurring data or information.

Prediction – A Possible outcome in the future.

Procedure – A logical systematic plan for an investigation.

Question – Something that you are curious about the natural world that can be investigated.

Safety – Avoiding harm to self, others, and objects.

Solution – Structure or process that solves a problem.

Technology – Structure or process designed to solve a problem or meet a need.

Testing – Process of investigating a solution to see if it meets the criteria and constraints.

Tool – An object that helps you build something.