

MISD Energy: Feel the power!

Little Inventors – 4th Grade

Learning Opportunities and Curriculum Fit

Little Inventors provides incredible opportunities for students to develop their creative and problem solving skills as well as literacy skills. This integrated model engages students in STEM and literacy and increases exposure to NGSS Standards including science and engineering practices, disciplinary core ideas and crosscutting concepts.

Learning objectives and outcomes

Through the presentations:

- Students will begin to see that inventions are all around us, and invention is a way to create solutions to problems or challenges.
- Students will discuss topics around inventing for themselves and others that strongly link to curriculum in 4th grade.
- Students will be presented with a design challenge with specified criteria for success and investigate constraints on materials, time and cost.

Students will:

- Generate ideas for inventions.
- Learn about the importance of energy; how it is generated, how we use it on a day-to-day basis and how it affects the environment.
- Describe the steps involved in creating an invention.
- Design an invention to solve a problem related to pressing topics and predict how this will be useful in solving the identified problem.
- Articulate and communicate their ideas in drawing, writing and speech for an audience, as well as plan and evaluate their writing.
- Become aware of related careers and exposure to manufacturing.

Curriculum fit

By promoting creative thinking and problem-solving skills, Little Inventors offers many opportunities to link to several curriculum areas with an integrated approach.

Science and technology

Little Inventors is a great way to invite your students to use scientific and technological processes to begin to understand energy and its impact on the environment. Using creativity and imagination, Little Inventors allows students to design products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. Students learn how to become resourceful and innovative. The resource offers students opportunities to:

- Use creative thinking, inquiry, problem-solving, decision making, and innovation to create an invention.
- Increase knowledge of scientific concepts.
- Develop questions, identify a problem, and use innovation to suggest a solution.

3-5-ETS1-1 Engineering Design

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2 Engineering Design

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Disciplinary core idea:

ETS1.B: Developing Possible Solutions

Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.

Crosscutting Concept:

Influence of Science, Engineering, and Technology on Society and the Natural World

Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.

4-PS3.2

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

4-ESS3-1

Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

4-ESS3-2

Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

ISTE

Innovative Designer

1.4a

Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems

1.4d

Students exhibit tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

Literacy and Language

Little Inventors offers opportunities to support literacy development, and specifically for students to articulate and communicate their ideas in speech and writing for an audience as well as plan and evaluate their writing. The resource offers students opportunities to:

- Use language to represent their idea.
- Write clearly, accurately and coherently, adapting their language and style in and or a range of contexts, purposes and audiences (e.g. students could be challenged to advertise their design through media text).
- To present their designs orally to the rest of the class, or within smaller groupings in the classroom and be able to explain clearly their idea and design choice.
- Journal/reflect on why they chose the particular design and how it relates to their experiences.

CCSS.ELA-LITERACY.RI.4.3

Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

CCSS.ELA-LITERACY.RI.4.7

Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

CCSS.ELA-LITERACY.W.4.7

Conduct short research projects that build knowledge through investigation of different aspects of a topic.

CCSS.ELA-LITERACY.SL.4.4

Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

Art (Visual Arts)

Little Inventors fully support the arts curriculum by encouraging students to produce creative work and explore their ideas using drawing, design and crafts, and learn about artists, craft makers and designers. The resource offers students opportunities to:

- Use drawing to develop and share their ideas, experiences and imagination.
- Be provided a range of materials to use in the visual representation of their design – pencils, pastels, textured materials, paint, etc. to allow for creativity and self-expression, and in older students, to increase their learning around the elements of design (e.g. line, shape and form, space, texture, colour, etc.).
- Make 3-D versions of their design using various materials and processes to create a visual art piece.
- Be exposed to the work of craft makers and designers.

Standard 2 (Create) :

Apply skills and knowledge to create in the arts. (VPAA: C1, C2, C3, C4, C5, P1, P2, P4, R1, R4)