CURRICULUM GUIDE
Gifted & Talented Program
K-5

“Pursuing excellence, one child at a time.”

Pemberton, New Jersey
## CURRICULUM GUIDE CONTENTS

**Educational Philosophy**  
3

**Curriculum Committee Members**  
4

### PTSD Gifted and Talented Program Overview

- **Mission**  
4
- **Purpose**  
4
- **Goals**  
5
- **Program Eligibility**  
6
- **Identification Process**  
6
- **Appeal Process**  
8
- **Implementation**  
8
- **Continuation in Program after Selection**  
9

### Curriculum Maps

- **Kindergarten**  
10
- **Grade 1**  
13
- **Grade 2**  
19
- **Grade 3**  
25
- **Grades 4 & 5**  
29
EDUCATIONAL PHILOSOPHY

The Pemberton Township Board of Education believes that education is best achieved when students become involved in experiences meaningful to their lives in today's world. We believe that the educational process should develop a feeling of self-worth and accomplishment.

We believe that equal educational opportunity is the right of all children without regard to race, creed, color, or national origin and that all laws to this end should be followed promptly and effectively.

We further believe education should develop habits, attitudes, understanding, and skills necessary for a productive, satisfying life in civilized society. Each child should be helped to understand the duties and privileges of responsible citizenship as it relates to him or her as an individual and to the world community. We recognize the vast changes brought by increasing technology, population, and urbanization. We request the advice and support of the citizens of the community and the professional staff as we endeavor to develop the attitudes and abilities demanded in this rapidly changing world.
Gifted & Talented Curriculum Committee

Jeffrey Havers
Tamra Garbutt
Wendy LaRue
Shannon Robertson

PTSD Gifted and Talented Program Overview

Mission
The mission of the Gifted and Talented Program is to provide challenging and engaging learning experiences and opportunities for growth that enable students with high potential, talent, and exceptional capacity to develop their potential.

Purpose
Pemberton Township School District encourages gifted students to excel through the Gifted and Talented Program. The purpose of the program is to make available challenging content matter, provide opportunities for the gifted learner to reach his/her potential, and to nurture self-esteem and confidence in special students. According to the US Department of Education, a student who is gifted and talented is: one who gives evidence of high performance capability in areas such as intellectual, creative, artistic or leadership capacity, or in specific academic fields, and who requires services or activities not ordinarily provided by the school in order to fully develop such capabilities.
The thrust of the Gifted and Talented Program is to develop critical thinkers. To achieve this end, we have developed a program that expands on subject areas in the regular classroom curriculum. Problem-solving and decision making skills are incorporated into a variety of curriculum experiences. Students will be required to utilize the highest level thinking skills of analysis, synthesis, evaluation and application. Research indicates that achievement rates are higher when students are more actively involved in the learning process. Gifted and Talented students will be exposed to a variety of learning modes emphasizing: reading/research, exploration, instruction/clarification and analysis of content, guided group discussions, practice by demonstration, and technology.

**Goals**

The Gifted and Talented program will:

* increase opportunity for academic growth
* provide the opportunity to pursue independent research
* develop critical thinking skills
* allow the ability and desire for the student to express self creatively
* help the student develop an understanding of his/her worth, abilities, potentials, and limitations
* provide instruction that bears meaningful relationship to the needs and interests of the pupil
* learn to enjoy the process of learning and to acquire skills necessary for a lifetime of continuous learning and adaptations to change
Program Eligibility

In the Pemberton Township Schools, efforts are made to identify gifted and talented students in Kindergarten through fifth grade, and to provide enrichment classes and acceleration in appropriate areas. Student eligibility for Pemberton Township Schools’ Gifted and Talented Program is determined through the use of multiple criteria. All students are reevaluated at the end of their second grade year. Additionally, students must demonstrate the potential for exceptional performance and advanced academic ability.

Identification Process

Kindergarten:
- NNAT 3
- Enrichment Characteristic Checklist
- Teacher Recommendation
- Writing Sample
- MAP Test Scores
- Report Card

First Grade:
- SAGES 2
- HOPE Teacher Rating Scale
- Teacher Recommendation
- Writing Sample
- MAP Test Scores
- Report Card

Second Grade:
- SAGES 2
- HOPE Teacher Rating Scale
- Teacher Recommendation
January 2017

- Writing Sample
- MAP Test Scores
- Report Card

**Third Grade:**
- SAGES 2
- HOPE Teacher Rating Scale
- Teacher Recommendation
- Writing Sample
- MAP Test Scores
- Report Card

**Fourth and Fifth Grade:**
- SAGES 2
- HOPE Teacher Rating Scale
- Teacher Recommendation
- Writing Sample
- MAP Test Scores
- Report Card
**Appeal Process**

Parents, teachers, and/or administration that challenge the identification process with warranted concerns may request that the individual child be re-tested using a Cognitive Skills Test. The re-test will be administered by the gifted and talented teacher and hand scored by a certified teacher and/or administration. Students that are ineligible due to academic grades may be re-evaluated, upon request, at the end of each marking period.

**Implementation**

**Kindergarten, First, and Second Grades**

All students in Kindergarten receive a bi-monthly whole group enrichment lesson for a 40-minute period for half of the school year. First and second graders are exposed to enrichment activities once every six day cycle through small group classes provided throughout the year. Students are identified for the program in the Spring of the previous school year.

**Third, Fourth, and Fifth Grades**

In order to qualify for the third through fifth grade program, students must have the highest number of accumulated points on the Gifted and Talented Matrix. Placement in the third through fifth grade identified group is a more permanent placement than in the kindergarten through second grade groupings. Students meet for two 40-minute periods per the six day cycle.
Program Format:

- Students will participate in Project/Problem Based Learning, contingent on student interest and giftedness with the teacher acting as the facilitator.
- All units of study will be based on a variety of Next Generation Science Standards, National Association for Gifted Children Standards and the New Jersey Student Learning Standards in various subject areas.
- Students will demonstrate their understanding of selected topics through any of the following assessments: writing reports, completed projects, portfolios, presentations, and/or teacher conferencing.

Continuation in Program after Selection

Continuation in the Gifted and Talented Program after selection is a privilege. Students must meet each challenge to the best of their ability. They must maintain their academic standing by earning A’s and B’s in all subject areas. Students receiving anything lower than a B in a subject area will be placed on probation for one marking period. Any student who fails to maintain grade averages for two consecutive marking periods will not be permitted to continue in the Gifted and Talented program. Gifted and Talented students on probation or removed from the program will be reviewed at the end of the marking period for reinstatement. Gifted and talented students must maintain good conduct according to the Student Discipline Code of Conduct in order to enter or remain in the program.
<table>
<thead>
<tr>
<th>Semester</th>
<th>Content</th>
<th>Standards</th>
<th>Assessment</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two</td>
<td>A. Weather 1. Wind Investigation</td>
<td>NGSS: K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. NJSLS: Technology 8.2.2.A.1 Define products produced as a result of technology or of nature. 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. NJSLS: 21st Century 9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.</td>
<td>A. Group discussion on different types of weather. Identify problems that wind can cause. B. Teacher observation of groups following the engineering design process. C. Final draft of groups’ tested design</td>
<td>A. “The Wind Blew” by Pat Hutchins B. Fan, Paper, Book, Straw, Penny, Pencil, Paper clip, Popsicle sticks, Tape, Pipe cleaners C. Copy of Wind Investigations</td>
</tr>
<tr>
<td></td>
<td>B. Simple Machines 1. Pushes and Pulls</td>
<td>NGSS: K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.</td>
<td>A. Group discussion on how things move B. Teacher observation of</td>
<td>A. Marble, Set of dominos, A few different matchbox cars</td>
</tr>
</tbody>
</table>
### January 2017

**K-PS2-2.** Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

**NJSLS: Technology**

**8.2.2.A.1.** Define products produced as a result of technology or of nature.

**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.

<table>
<thead>
<tr>
<th><strong>C. Bridges</strong></th>
<th><strong>NGSS:</strong></th>
<th><strong>K-2-ETS1-2.</strong> Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</th>
<th><strong>A. Group discussion on different types of bridges</strong></th>
<th><strong>B. Copy of Kindergarten Pushes and Pulls</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Building with Legos</td>
<td><strong>NJSLS: Math</strong></td>
<td><strong>K.MD.A.</strong> Describe and compare measurable attributes.</td>
<td><strong>B. Teacher observation of students working in engineering design group sand following the engineering design process.</strong></td>
<td><strong>C. Big Book “Six Simple Machines” by Zel Anman</strong></td>
</tr>
<tr>
<td></td>
<td><strong>NJSLS: Technology</strong></td>
<td><strong>8.1.2.A.4.</strong> Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums)</td>
<td><strong>C. Final Bridge design and test results</strong></td>
<td><strong>D. Nonfiction simple machine leveled readers, books and CDs</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>D. Well Rescue</strong></th>
<th><strong>NGSS:</strong></th>
<th><strong>K-2-ETS1-2.</strong> Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</th>
<th><strong>A. Group discussion on wells and there purposes as way as potential dangers</strong></th>
<th><strong>A. Lakeshore Well Rescue STEM kit</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Design a Rescue Tool</td>
<td><strong>NJSLS: Technology</strong></td>
<td><strong>8.2.2.A.1.</strong> Define products produced as a</td>
<td><strong>B. Teacher observation of</strong></td>
<td><strong>B. Copies of the Engineering Design Planning Sheet</strong></td>
</tr>
</tbody>
</table>

| | | | **A. Bridge Video** | **C. Lego Bridge Worksheet** | **D. iPad app Bridge Constructor** |
| C.Final tool design and testing results. | C. Well images | 8.2.2.C.3 Explain why we need to make new products. | students working in engineering design groups and following the engineering design process. | 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.1 Brainstorm ideas on how to solve a problem or build a product. | result of technology or of nature. |
## Grade 1 Gifted & Talented

<table>
<thead>
<tr>
<th>Semester</th>
<th>Content</th>
<th>Standards</th>
<th>Assessment</th>
<th>Resources</th>
</tr>
</thead>
</table>
| One      | A. Intro to S.T.E.M. with Fairy Tales  
1. Three Billy Goats Gruff | NGSS: K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.  
NJSLS:LA/Literacy RL.2.1. Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.  
RL.2.2. Recount stories, including fables and folktales from diverse cultures, and determine their central message/theme, lesson, or moral.  
NAGC standards: 3.4. Instructional Strategies. Students with gifts and talents become independent investigators.  
NJSLS:21 Century 9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success  
NJSLS:Technology: 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. | A. Comprehension questions about the story  
B. Teacher observation of groups following the engineering design process  
C. Final draft of groups tested design | A. “Three Billy Goats Gruff” Book  
B. Lakeshore Bridge Building Kit  
C. Copies of the Engineering Design Planning Sheet |
### A. Intro to S.T.E.M. with Fairy Tales

#### 2. Three Little Pigs

**NGSS:**
- K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

**NJSLS:**
- Language Arts Literacy
  - RL.2.1. Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.

**NAGC standards:**
- 3.4. Instructional Strategies. Students with gifts and talents become independent investigators.

**NJSLS:**
- Technology:
  - 8.2.2.B.1. Identify how technology impacts or improves life
  - 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.

**A. Comprehension questions about the story**

**B. Teacher observation of groups following the engineering design process**

**C. Final draft of groups tested design**

- A."Disney’s Three Little Pigs” Book
- B.3 House building materials: rocks, sticks, straw, cardboard, paper, glue, etc.
- C. House building planning sheets

### A. Intro to S.T.E.M. with Fairy Tales

#### 3. Rapunzel

**NGSS:**
- K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

**A. Comprehension questions about the story**

**B. Teacher observation of groups following the engineering design process**

**C. Final draft of groups tested design**

- A."Rapunzel” Book
- B. Tower building materials: cardboard, cardboard tubes, paper, glue, etc.
January 2017

<table>
<thead>
<tr>
<th>Two</th>
<th>B. Ocean Engineering 1. Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>NJSLS: Language Arts Literacy</strong></td>
</tr>
<tr>
<td></td>
<td>RL.2.1. Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.</td>
</tr>
<tr>
<td></td>
<td>RL.2.2. Recount stories, including fables and folktales from diverse cultures, and determine their central message/theme, lesson, or moral.</td>
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<td></td>
<td><strong>NAGC standards:</strong> 3.4. <strong>Instructional Strategies.</strong> Students with gifts and talents become independent investigators.</td>
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<td></td>
<td><strong>NJSLS: Technology:</strong> 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Final draft of groups tested design</th>
<th>C. Tower building planning sheets</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Two</th>
<th>B. Ocean Engineering 1. Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>NGSS:</strong> 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. 2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. NJSLS: Language Arts Literacy A.R2. Determine central ideas or arguments.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A. Student’s explanation of an object's purpose and the problem that it solves.</th>
<th>A. “Despina Makes a Splash” by EIE Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Teacher observation of group discussion on other items that are considered technology</td>
<td>B. Envelopes</td>
</tr>
<tr>
<td>C. Comprehension questions on “Despina makes a Splash”</td>
<td>C. Various objects: paper clip, stapler, other technological tools</td>
</tr>
<tr>
<td>D. Technology Around Us worksheet</td>
<td>D. Technology Around Us worksheet</td>
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<tr>
<td><strong>January 2017</strong></td>
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<tr>
<td>themes of a text and analyze their development; summarize the key supporting details and ideas. A.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text. NJSLS:21st Century 9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success. NJSLS: Math: 8.2.2.B.1 Identify how technology impacts or improves life</td>
<td></td>
</tr>
<tr>
<td><strong>B. Ocean Engineering</strong>  <strong>2. Sounding Pole Technology and Sonar</strong></td>
<td></td>
</tr>
<tr>
<td>NAGC standards: 3.4. Instructional Strategies. Students with gifts and talents become independent investigators. 3.5. Culturally Relevant Curriculum. Students with gifts and talents develop knowledge and skills for living and being productive in a multicultural, diverse, and global society. 3.6. Resources. Students with gifts and talents benefit from gifted education programming that provides a variety of high quality resources and materials. NGSS: 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. NJSLS: Math: 2.MD.D. Represent and interpret data NJSLS: Language Arts Literacy: A.R2. Determine central ideas or themes of a text and analyze their development; summarize the key</td>
<td>A. Observe student contributions to the class discussion. B. Evaluate student work using Lesson 2 Rubric {2-13} from EiE teacher guide</td>
</tr>
<tr>
<td>A. Reference Taking the Plunge Submersibles Lesson 2 for full list (Examples: Cardboard box, rocks, tennis ball, wooden dowel) B. Survey Site Image</td>
<td></td>
</tr>
</tbody>
</table>
| B. Ocean Engineering  
3. Sinking and Floating | A. Reference Taking the Plunge Submersibles Lesson 3 for full list (Examples: deli containers, vials, plastic bins) | A. Students observe the floating and sinking behavior of various vials filled with materials.  
B. Floating and Sinking Dive Log and conclusions  
C. Lesson 3 Rubric from EiE teacher guide |
|---|---|---|
| B. Ocean Engineering  
4. Designing a Submersible | A. Reference Taking the Plunge Submersibles Lesson 3 for full list (Ex: masking tape, magnets, water) | A. Observe students’ use of the Engineering Design Process and analyze students’ performances during the challenge using Lesson 4 rubric from EiE teacher guide.  
B. Design Process: Improve! |

supporting details and ideas.  
A.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.  
NJSLS:Technology:  
8.1.5.F.1. Apply digital tools to collect, organize, and analyze data that support a scientific finding.

B. Ocean Engineering  
3. Sinking and Floating

NJSLS: Math:
2.MD.D. Represent and interpret data.  
NJSLS: Language Arts Literacy:  
A.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.  
A.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.  
NGSS:  
K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.  
K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. The performance expectations above were developed using

- A. Reference Taking the Plunge Submersibles Lesson 3 for full list (Examples: deli containers, vials, plastic bins)  
- B. Floating and Sinking dive Log

B. Ocean Engineering  
4. Designing a Submersible

NJSLS: Math  
2.OA.A. Represent and solve problems involving addition and subtraction.  
NJSLS: Language Arts Literacy:  
A.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.  
A.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text

- A. Observe students’ use of the Engineering Design Process and analyze students’ performances during the challenge using Lesson 4 rubric from EiE teacher guide.  
- B. Design Process: Improve!

- A. Reference Taking the Plunge Submersibles Lesson 3 for full list (Ex: masking tape, magnets, water)  
- B. Floating and Sinking Results
of a text.

**NJSLS: 21st Century:**
- **9.1.4.B.3** Explain what a budget is and why it is important.

**NJSLS: Technology:**
- **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.

**worksheet**

- **C. Vial Similarities and Differences Chart**
- **D. Parts of a Submersible Diagram**
## Grade 2 Gifted & Talented

<table>
<thead>
<tr>
<th>Semester</th>
<th>Content</th>
<th>Standards</th>
<th>Assessment</th>
<th>Resources</th>
</tr>
</thead>
</table>
| One      | A. Software Engineering 1. Paper Prototyping | **NJSLS: Technology**  
8.1.5.A.1. Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.  
8.1.P.C.1. Collaborate with peers by participating in interactive digital games or activities.  
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.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.  
8.2.2.E.3 Create algorithms (a set of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).  
8.2.5.E.1 Identify how computer programming impacts our everyday lives.  
8.2.5.E.2 Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.  
8.2.5.E.3 Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output  
**NJSLS: 21st Century**  
9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success. | A. Teacher observation of groups following the engineering design process  
B. Final draft of groups tested working prototype | A. Paper Prototyping worksheets  
B. Quarter Sheets of paper  
C. Markers, Colored Pencils, Crayons |
<table>
<thead>
<tr>
<th>A. Final Paper Prototype</th>
<th>B. Bloxels Kit</th>
<th>C. iPad</th>
</tr>
</thead>
</table>
| **A. Software Engineering** | **2. Video Game Development** | **NJSLS: Technology:**  
**8.1.P.C.1.** Collaborate with peers by participating in interactive digital games or activities.  
**8.1.5.D.1.** Understand the need for and use of copyrights  
**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.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.  
**8.2.2.E.3.** Create algorithms (sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).  
**8.2.5.E.1.** Identify how computer programming impacts our everyday lives.  
**8.2.5.E.2.** Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.  
**8.2.5.E.3.** Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output  
**NJSLS: 21st Century**  
**9.2.4.A.4.** Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success. | **A. Teacher observation of groups following the engineering design process**  
**C. Final draft of groups tested video game design** |
|   | A. Software Engineering  
3. Video Game Testing | **NJSLS: Technology:**  
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.  
**NJSLS: 21st Century**  
9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success. | A. Peer rubric grading  
B. Teacher observation of peer discussion | A. Bloxels Kit  
B. iPad  
C. User analysis rubric |
|---|---|---|---|
|   | A. Software Engineering  
4. Video Game Production and Advertisement | **NJSLS: Technology:**  
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.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.  
8.2.2.E.3 Create algorithms (a set of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).  
8.2.5.E.1 Identify how computer programming impacts our everyday lives.  
8.2.5.E.2 Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.  
8.2.5.E.3 Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output | A. Rubric to assess final product  
B. Rubric to assess advertisement of final product | A. Bloxels  
B. iPads  
C. Poster paper |
| Two | B. Environmental Engineering  
1. Technology | NJSLS: Language Arts Literacy:  
A.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.  
NJSLS.A.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.  
NAGC standards:  
3.4. Instructional Strategies. Students with gifts and talents become independent investigators.  
3.5. Culturally Relevant Curriculum. Students with gifts and talents develop knowledge and skills for living and being productive in a multicultural, diverse, and global society.  
3.6. Resources. Students with gifts and talents benefit from gifted education programming that provides a variety of high quality resources and materials  
NJSLS: Technology:  
8.2.2.B.1. Identify how technology impacts or improves life  
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. | A. Student’s explanation of an object's purpose and the problem that it solves.  
B. Teacher observation of group discussion on other items that are considered technology  
C. Comprehension questions on “Tehya’s Pollution Solution”  
A. “Tehya’s Pollution Solution” by EIE Team  
B. Envelopes  
C. Various objects: paper clip, stapler, other technological tools  
D. Technology Around Us worksheet |
| --- | --- | --- | --- |
|  | B. Environmental Engineering  
2. PH Levels and Testing | NGSS:  
3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. | A. Observe student contributions to the class discussion.  
A. Letter from Greentown mayor  
B. Map of Greetown |
<table>
<thead>
<tr>
<th>Date: January 2017</th>
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<table>
<thead>
<tr>
<th>NJSLS: Technology:</th>
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</thead>
<tbody>
<tr>
<td>8.1.5.F.1. Apply digital tools to collect, organize, and analyze data that support a scientific finding.</td>
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<table>
<thead>
<tr>
<th>B. Evaluate student work using Lesson 2 Rubric {2-13} from EiE teacher guide.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. PH level data collection chart</td>
</tr>
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<table>
<thead>
<tr>
<th>C. PH level sample vials</th>
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</thead>
<tbody>
<tr>
<td>D. PH test data sheet</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Environmental Engineering</th>
</tr>
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<tbody>
<tr>
<td>3. Ecosystems</td>
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</table>

<table>
<thead>
<tr>
<th>NGSS:</th>
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<tbody>
<tr>
<td>3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change</td>
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<thead>
<tr>
<th>NJSLS: Technology:</th>
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<tbody>
<tr>
<td>8.2.2.B.1. Identify how technology impacts or improves life</td>
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<table>
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<tr>
<th>A. Observe student contributions to the class discussion.</th>
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<tr>
<td>B. Evaluate student work using Lesson 3 Rubric {2-13} from EiE teacher guide.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Evaluate students’ making ecosystem connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Parts of an ecosystem label cards</td>
</tr>
<tr>
<td>B. Tape, string</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Environmental Engineering</th>
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<tbody>
<tr>
<td>4. Cleaning Up and Oil Spill</td>
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</table>

<table>
<thead>
<tr>
<th>NGSS:</th>
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<tbody>
<tr>
<td>3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</td>
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<thead>
<tr>
<th>NJSLS: Technology:</th>
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<tbody>
<tr>
<td>3-5-ETS1-2. 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</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NJSLS: 21st Century:</th>
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</thead>
<tbody>
<tr>
<td>9.1.4.B.3 Explain what a budget is and why it is important.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>A. Observe students’ use of the Engineering Design Process to create an oil spill tool and analyze students’ performances during the challenge using Lesson 4 rubric from EiE teacher guide.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Design Process: Improve! worksheet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A. Material/Budget worksheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Mock River Oil Spill: foil pan, rocks, water, oil</td>
</tr>
<tr>
<td>C. Tools for clean up: cotton, rubber bands, string, felt, nylon, sponge, spoon, pipette</td>
</tr>
</tbody>
</table>

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<th>A. Material/Budget worksheet</th>
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<tr>
<td>8.2.2.B.1</td>
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<tr>
<td>8.2.2.C.1</td>
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<tr>
<td>8.2.2.C.2</td>
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<tr>
<td>8.2.2.C.3</td>
</tr>
<tr>
<td>C.Finalized Budget and Environmental Impact Score</td>
</tr>
<tr>
<td>D.Ecosystem Impact Sheet</td>
</tr>
<tr>
<td>E.Shore Score Test</td>
</tr>
<tr>
<td>Semester</td>
</tr>
<tr>
<td>----------</td>
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</tbody>
</table>
| One      | A. Electrical Engineering  
1. Technology | NAGC standards:  
3.4. Instructional Strategies. Students with gifts and talents become independent investigators.  
3.5. Culturally Relevant Curriculum. Students with gifts and talents develop knowledge and skills for living and being productive in a multicultural, diverse, and global society.  
3.6. Resources. Students with gifts and talents benefit from gifted education programming that provides a variety of high quality resources and materials.  
NJSLS: 21st Century:  
9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.  
NJSLS:Technology:  
8.2.5.C.1 Collaborate with peers to illustrate components of a designed system.  
8.2.5.C.2 Explain how specifications and limitations can be used to direct a product’s development.  
8.2.5.C.3 Research how design modifications have lead to new products.  
8.2.5.C.4 Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models. | A. Observe student contributions to class discussions  
B.Use Technology Around Us to evaluate student performances.  
C.Comprehension questions for “A Reminder for Emily” | A. “A Reminder for Emily” by EIE Team  
B.Envelopes  
C. Various objects: paper clip, stapler, other technological tools  
D. Technology Around Us worksheet |
|         | A. Electrical Engineering  
2. Forms of Energy | NGSS:  
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-PS3-3. Ask questions and predict outcomes about the changes in energy | A.Observes student contributions to class discussions.  
B.Examine students’ work. | A. Electricity Scavenger Hunt worksheet |
<table>
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<th>January 2017</th>
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<table>
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<tbody>
<tr>
<td>that occur when objects collide 5-PS1-3. Make observations and measurements to identify materials based on their properties.</td>
<td>C.Use Lesson 2 Rubric to evaluate student progress and performance.</td>
</tr>
<tr>
<td>A. Electrical Engineering 3. Representing Circuits</td>
<td></td>
</tr>
<tr>
<td>NJSLS: Technology: 8.2.5.A.2. Investigate and present factors that influence the development and function of a product and a system 8.2.5.A.3. Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints 8.1.5.F.1. Apply digital tools to collect, organize, and analyze data that support a scientific finding.</td>
<td>A. Observe student contributions to the class discussions</td>
</tr>
<tr>
<td>B. Examine students’ work</td>
<td></td>
</tr>
<tr>
<td>C. Use Lesson 3 Rubric to evaluate student progress and performance</td>
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<tr>
<td>D. Representing a circuit and Will the Bulbs Light Data Sheets</td>
<td>A. Test lead, bulb, bulb holder, buzzer, D battery, switch.</td>
</tr>
<tr>
<td>B. Schematic Design Transparency</td>
<td></td>
</tr>
<tr>
<td>C. Bulb symbol, battery symbol</td>
<td></td>
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<tr>
<td>D. Representing a Circuit sheet</td>
<td></td>
</tr>
<tr>
<td>A. Electrical Engineering 4. Designing an alarm circuit</td>
<td></td>
</tr>
<tr>
<td>NGSS: 3-5-ETS1-1. 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. 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 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. NJSLS: 21st Century: 9.1.4.B.3 Explain what a budget is and why it is important.</td>
<td>A. Observe student contributions to both class discussions and the implementation of the Engineering Design Process</td>
</tr>
<tr>
<td>B. Examine students’ alarm circuit designs.</td>
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<tr>
<td>C. Use lesson 4 rubric to evaluate student progress</td>
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<tr>
<td>D. Use the Engineering Design Process Transparency</td>
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<tr>
<td>A. Marbles, pennies, beads</td>
<td></td>
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<tr>
<td>B. Engineering Design Process Transparency</td>
<td></td>
</tr>
<tr>
<td>C. Cardboard sheet, metal brad, film canister</td>
<td></td>
</tr>
<tr>
<td>D. EiE Electricity Parts kit</td>
<td></td>
</tr>
</tbody>
</table>
| Two | B. Structural Engineering  
1. Types of Bridges | NAGC standards:  
3.4. Instructional Strategies. Students with gifts and talents become independent investigators.  
3.5. Culturally Relevant Curriculum. Students with gifts and talents develop knowledge and skills for living and being productive in a multicultural, diverse, and global society.  
3.6. Resources. Students with gifts and talents benefit from gifted education programming that provides a variety of high quality resources and materials.  
NJSLS: Technology:  
8.2.5.C.1 Collaborate with peers to illustrate components of a designed system.  
8.2.5.C.2 Explain how specifications and limitations can be used to direct a product’s development.  
8.2.5.C.3 Research how design modifications have lead to new products.  
8.2.5.C.4 Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models. | A. Observe student contributions to class discussions  
B. Use Technology Around Us to evaluate student performances.  
C. Comprehension questions for “Javier Builds a Bridge”  
D. Javier and the Engineering Design Process map | A. Book “Javier builds a Bridge”  
B. Different types of bridges image  

| B. Structural Engineering  
2. Pushes and Pulls | NGSS:  
3-5-ETS1-1. 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. 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.  
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and  
A. Observe student contributions to the discussion and examine students’ work.  
B. Use lesson 2 rubric to evaluate student performance, EiE teacher’s manual | A. Table Fan  
B. Paper clips, straws, index cards, string, tape  
C. Pushes and Pulls on Structures, The Parthenon, tent diagrams |
### B. Structural Engineering
#### 3. Model Bridges/Roller Coasters

**NGSS:**
- **3-5-ETS1-1.** 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.** 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.
- **3-5-ETS1-3.** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

**A. Observe student contributions to the discussion and examine students’ work.**
**B. Use lesson 3 rubric to evaluate student performance, EiE teacher’s manual**
**C. Testing a Beam Bridge, Testing a Deep Beam Bridge, and Testing and Arch Bridge activities.**

#### 4. Designing Bridges/Roller Coasters

**NJSLS: 21st Century:**
- **9.1.4.B.3** Explain what a budget is and why it is important.

**A. Engineering Design Process pages to analyze student work on the design challenge.**
**B. Lesson 4 rubric to evaluate individual student’s work.**

#### C. Pushes and Pulls on Structures: One Story Structure and Tower worksheet

#### D. Pushes and Pulls One Story and Tower work area papers.

**A. Index cards, blocks, cups**
**B. Images of: Testing a Beam Bridge, Deep Beam Bridge and Arch Bridge**
**C. Comparing Bridge Design Chart**
**D. Making and Testing Bridges Setup sheet**
## Grade 4 & 5 Gifted & Talented

<table>
<thead>
<tr>
<th>Semester</th>
<th>Content</th>
<th>Standards</th>
<th>Assessment</th>
<th>Resources</th>
</tr>
</thead>
</table>
| One      | A. Renewable Resources  
1. Introduction to Green Energies | NGSS:  
MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.  
3.4. Instructional Strategies. Students with gifts and talents become independent investigators.  
3.5. Culturally Relevant Curriculum. Students with gifts and talents develop knowledge and skills for living and being productive in a multicultural, diverse, and global society.  
3.6. Resources. Students with gifts and talents benefit from gifted education programming that provides a variety of high quality resources and materials.  
NJSLS: 21st Century:  
9.1.4.B.3 Explain what a budget is and why it is important.  
9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.  
NJSLS: Technology:  
8.2.8.B.4 Research examples of how humans can devise technologies to reduce the negative consequences of other technologies and present your findings  
8.2.5.C.1 Collaborate with peers to illustrate components of a designed system.  
8.2.5.C.2 Explain how specifications and limitations can be used to direct a product’s development.  
8.2.5.C.3 Research how design modifications have lead to new products.  
8.2.5.C.4 Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models. | A. Teacher observes discussion between students  
B. Student report on a renewable energy milestone in history  
C. Student recording sheet for “Wind Can Do Work” experiment | A. Wind Energies Student Workbook  
- pages 18&19  
- page 22  
B. Solar Panels  
C. Wind Turbine  
D. Other examples of Green Energies  
E. Computer |
| A. Renewable Resources | NJSLS: Technology:  
8.1.5.F.1. Apply digital tools to collect, organize, and analyze data that support a scientific finding. | A. Teacher observation of student discussions while | A. Wind Energies Student Workbook |
<table>
<thead>
<tr>
<th>2. Wind Turbine Research</th>
<th>8.2.8.B.4 Research examples of how humans can devise technologies to reduce the negative consequences of other technologies and present your findings</th>
<th>working</th>
<th><strong>Workbook</strong> - pages 26-29</th>
</tr>
</thead>
</table>
|                         | **B. Completed experiment pages**  
|                         | a. Exploring Blade Pitch  
|                         | b. Exploring Number of Blades  
|                         | c. Exploring Surface Area  
|                         | d. Exploring Mass | **B. KidWind Turbines** | |
|                         | **C. Box Fan** | **C. Box Fan** | |
|                         | **D. Premade benchmark blades** | **D. Premade benchmark blades** | |
| A. Renewable Resources | **NJSLS: Technology:**  
| 3. Designing Wind Turbines | 8.2.5.A.2. Investigate and present factors that influence the development and function of a product and a system  
| | 8.2.5.A.3. Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints  
| | 8.2.8.A.1. Research a product that was designed for a specific demand and identify how the product has changed to meet new demands  
| | 8.2.8.A.2. Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system  
| | 8.2.8.C.2. Explain the need for optimization in a design process.  
| | 8.2.8.C.4. Identify the steps in the design process that would be used to solve a designated problem.  
| | 8.2.8.D.1. Design and create a product that addresses a real world problem using a design process under specific constraints.  
| | 8.2.8.D.2. Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.  
| | 8.2.8.D.3. Build a prototype that meets a STEM-based | **A. Teacher observations of students discussions while working through the design process** | **Workbook** - page 30 |
|                         | **B. Final design of groups project** | **B. Final design of groups project** | |
|                         | **C. Groups documentation of Engineering Design Process** | **C. Groups documentation of Engineering Design Process** | |
|                         | **D. Wind Turbine Blade materials (wooden dowels, cardboard, foam, wood, glue, duct tape, etc.)** | **D. Wind Turbine Blade materials (wooden dowels, cardboard, foam, wood, glue, duct tape, etc.)** | |
| B. Survival Skills | 1. Water Filtration | NJSSL: Technology:  
8.2.5.A.2 Investigate and present factors that influence the development and function of a product and a system  
8.2.5.A.3 Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints  
8.2.8.D.1 Design and create a product that addresses a real world problem using a design process under specific constraints.  
8.2.8.D.2 Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.  
8.2.8.D.3 Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution | A. Groups documentation of Engineering Design Process  
A. Completion and functionality of water filter | A. Empty soda bottles, soil, gravel, cotton, activated carbon  
B. Zombie Apocalypse Survival STEM guide: Water Filtration |
|---|---|---|---|---|
| | 2. Mobile Greenhouse | NJSSL: Technology:  
8.2.8.D.1 Design and create a product that addresses a real world problem using a design process under specific constraints.  
8.2.8.D.2 Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.  
8.2.8.D.3 Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution | A. Groups documentation of Engineering Design Process  
B. Completion and functionality of mobile greenhouse  
C. Observe and measure results over several weeks | A. Repurposed Materials: Empty milk carton, straws, plastic bags, soil, lima beans  
B. Zombie Apocalypse Survival STEM guide: mobile greenhouse |
| | 3. Solar Oven | NJSSL: Technology:  
8.2.8.D.1 Design and create a product that addresses a real world problem using a design process under specific constraints.  
8.2.8.D.2 Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.  
8.2.8.D.3 Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution | A. Groups documentation of Engineering Design Process | A. Repurposed Materials: Pizza Box, Aluminum Foil, black paper |
| Two | A. Aerospace/ Rocket Engineering  
1. Planetary Research | Of students involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.  
8.2.8.D.3 Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution. | B. Completion and functionality of solar oven | Edible solar oven dessert items  
C. Zombie Apocalypse Survival STEM guide: mobile greenhouse |
|---|---|---|---|---|
| | NJSLS: Technology:  
8.2.5.C.1 Collaborate with peers to illustrate components of a designed system.  
8.2.5.C.2 Explain how specifications and limitations can be used to direct a product’s development.  
8.2.5.C.3 Research how design modifications have lead to new products.  
8.2.5.C.4 Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.  
NGSS:  
MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.  
MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.  
MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. | A. KWHL Chart (Know, Want to know, How to learn it, what was Learned)  
B. Completion of Task 1 worksheet  
C. Teacher observation of student discussion | A. Task 1 worksheet  
B. Computers/ iPads  
C. Poster paper  
D. Extra blank rubrics for evaluating planets  
E. Teacher website with links for researching planets |
| A. Aerospace/ Rocket Engineering  
2. Rocket Development | NJSLS: Technology:  
8.2.5.A.2. Investigate and present factors that influence the development and function of a product and a system  
8.2.5.A.3. Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints  
8.2.8.A.1. Research a product that was designed for a specific demand and identify how the product has changed to meet new demands  
8.2.8.A.2. Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system | A. Teacher observation of student discussion and progression through the Engineering Design Loop  
B. Rocket design for test launch  
C. Worksheet to show | A. Task 2 Worksheet  
B. Computers/ iPads  
C. Materials-(2- Liter Soda Bottle, Construction paper, Cardboard, Recycled Materials, Foam Board, Cardstock)  
D. 3-2-1 Blast Off Kit  
E. Soda Bottle Rocket |
| 8.2.8.D.1 | Design and create a product that addresses a real world problem using a design process under specific constraints. |
| 8.2.8.D.2 | Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook. |
| 8.2.8.D.3 | Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution. |

**NGSS:**

**MS-PS2-2.** Plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object.

**NJSLS: 21st Century:**

9.1.4.B.3 Explain what a budget is and why it is important.

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

**A. Aerospace/ Rocket Engineering**

3. **Rocket Redesign with Parachute**

**NJSLS:Technology:**

8.2.8.C.2 Explain the need for optimization in a design process.

8.2.8.C.4 Identify the steps in the design process that would be used to solve a designated problem.

**Demonstration of knowledge of the Engineering Design Loop**

**Launcher**

F. Teacher website link examples:

- [Rocket Science 101](https://www.rocketscience101.com)
- [ESA Kids Liftoff](https://www.esakidsliftoff.com)
- [Fly Rockets](https://www.flyrockets.com)

| A. Teacher observation of student discussion and progression through the Engineering Design Loop |
| B. Rocket design for final launch |
| C. Worksheet to show demonstration of knowledge of the Engineering Design Loop |

**A. Task 3 worksheet**

B. Original rocket

C. String

D. Yarn

E. Plastic shopping bag

F. Ziploc Bags

G. Paper Bags

H. Soda Bottle Rocket Launcher
<table>
<thead>
<tr>
<th>A. Aerospace/ Rocket Engineering</th>
<th><strong>4. Designing appropriate housing for space</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NJSLS:Technology:</strong></td>
<td><strong>8.2.8.D.1</strong> Design and create a product that addresses a real world problem using a design process under specific constraints. <strong>8.2.8.D.2</strong> Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook. <strong>8.2.8.D.3</strong> Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution</td>
</tr>
<tr>
<td><strong>A. Observe group discussion and research about what is needed to live in space</strong></td>
<td><strong>A. Task 4 &amp; 5 Worksheets</strong></td>
</tr>
<tr>
<td><strong>B. Completed student worksheet</strong></td>
<td>B. Recycled Materials, Foam Core, Cardboard, Plastic wrap, Toothpicks, Popsicle sticks, Tape</td>
</tr>
<tr>
<td><strong>C. Completed engineering design process for building worksheets</strong></td>
<td><strong>D. Final floor plan and/or model of “space housing”</strong></td>
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<thead>
<tr>
<th>B. Process Engineering</th>
<th><strong>1. Space Ice Cream</strong></th>
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<tbody>
<tr>
<td><strong>NJSLS:Technology:</strong></td>
<td><strong>8.2.5.C.1</strong> Collaborate with peers to illustrate components of a designed system. <strong>8.2.5.C.2</strong> Explain how specifications and limitations can be used to direct a product’s development. <strong>8.2.5.C.3</strong> Research how design modifications have lead to new products. <strong>8.2.5.C.4</strong> Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.</td>
</tr>
<tr>
<td><strong>A. Observe group discussion how astronauts eat in space.</strong></td>
<td><strong>A. Video of food engineering for space</strong></td>
</tr>
<tr>
<td><strong>B. Design for an underwater cereal tool</strong></td>
<td><strong>B. Various flavors of space ice cream</strong></td>
</tr>
<tr>
<td><strong>C. Process Engineering Packet, underwater cereal design page</strong></td>
<td><strong>C. Process Engineering Packet, puffed rice design</strong></td>
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<tr>
<th>B. Process Engineering</th>
<th><strong>2. Ordering of Processes</strong></th>
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<tbody>
<tr>
<td><strong>NJSLS:21 Century</strong></td>
<td><strong>9.2.4.A.1</strong> Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals. <strong>9.2.4.A.2</strong> Identify various life roles and civic and work-related activities in the school, home, and community. <strong>9.2.4.A.3</strong> Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes. <strong>9.2.4.A.4</strong> Explain why knowledge and skills acquired in the elementary grades lay the foundation for</td>
</tr>
<tr>
<td><strong>A. Observe and conference with groups as they design a process to make Puffed Rice Treats</strong></td>
<td><strong>A. Puffed rice, marshmallows, butter</strong></td>
</tr>
<tr>
<td><strong>B. Finished Product according to the chosen process</strong></td>
<td><strong>B. Cooking tools: measuring cups, spoons, microwave, foil pan</strong></td>
</tr>
<tr>
<td><strong>C. Reflection of changes needed</strong></td>
<td><strong>C. Process Engineering Packet, puffed rice design</strong></td>
</tr>
</tbody>
</table>
future academic and career success.  
**NGSS:**  
**3-5-ETSI-2.** 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.  
**3-5-ETSI-3.** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.  

|------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 3. Creating an Ice Cream Base and Flavor/ Color goals | B. Finished ice cream base compared to the process followed | **NJSLS: Technology:**  
**8.2.5.A.2.** Investigate and present factors that influence the development and function of a product and a system  
**8.2.5.A.3.** Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints  
**8.2.8.A.1.** Research a product that was designed for a specific demand and identify how the product has changed to meet new demands  
**8.2.8.A.2.** Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system  
**NJSLS: 21st Century:**  
**9.1.4.E.1** Determine factors that influence consumer decisions related to money.  
**9.1.4.E.2** Apply comparison shopping skills to purchasing decisions. |
| 4. Engineering Packaging for Ice Cream | C. Completed chosen goals | **A. Group Documentation of Engineering Design Process**  
**B. Finished Packaging Design**  
**C. Group Success Rubric** |
| | | **A. Various Ice Cream Material, See Teacher Guide: EiE Process Engineering**  
**B. Process Engineering Packet: Ice Cream Package** |

**NJSLS: Technology:**  
**8.2.5.A.2.** Investigate and present factors that influence the development and function of a product and a system  
**8.2.5.A.3.** Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints  
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**9.1.4.E.1** Determine factors that influence consumer decisions related to money.  
**9.1.4.E.2** Apply comparison shopping skills to purchasing decisions.
improve the system

**8.2.8.C.2** Explain the need for optimization in a design process.

**8.2.8.C.4** Identify the steps in the design process that would be used to solve a designated problem.

**8.2.8.D.1** Design and create a product that addresses a real world problem using a design process under specific constraints.

**8.2.8.D.2** Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.

**8.2.8.D.3** Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution.

**NJSLS: 21st Century:**

**9.1.4.B.3** Explain what a budget is and why it is important.

**9.1.8.E.3** Compare and contrast product facts versus advertising claims.