Elementary GATE - Grade 1

Unit Title: First Grade Unit One (Picture Perfect STEM)

Stage 1: Desired Results

Standards & Indicators:

National Standards in Gifted and Talented Education

- **1.1** - Self-Understanding. Students with gifts and talents recognize their interests, strengths, and needs in cognitive, creative, social, emotional, and psychological areas.
- **2.1** - Identification. All students in Pre-K through grade 12 with gifts and talents have equal access to the identification process and proportionally represent each campus.
- **2.5** - Learning Progress. Students self assess their learning progress.
- **3.2** - Talent Development. Students with gifts and talents demonstrate growth in social and emotional and psychosocial skills necessary for achievement in their domain(s) of talent and/or areas of interest.
- **3.3** - Responsiveness to Diversity. Students with gifts and talents develop knowledge and skills for living in and contributing to a diverse and global society.
- **3.4** - Instructional Strategies. Students with gifts and talents demonstrate their potential or level of achievement in their domain(s) of talent and/or areas of interest.
- **3.5** - Instructional Strategies. Students with gifts and talents become independent investigators
- **4.1** - Personal Competence. Students with gifts and talents demonstrate growth in personal competence and dispositions for exceptional academic and creative productivity. These include self-awareness, self-advocacy, self-efficacy, confidence, motivation, resilience, independence, curiosity, and risk taking.
- **4.2** - Social Competence. Students with gifts and talents develop social competence manifested in positive peer relationships and social interactions.6.1. Talent Development. Students identify and fully develop their talents and gifts as a result of interacting with educators who possess content pedagogical knowledge and meet national teacher preparation standards in gifted education and the Standards for Professional Learning.

Computer Science and Design Thinking

Standard	Performance Expectations	Core Ideas
8.2.2.ED.1	Communicate the function of a product or device.	Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.
8.2.2.ED.2	Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.	
8.2.2.ED.3	Select and use appropriate tools and materials to build a product using the design process.	
8.2.2.NT.1	Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.	Innovation and the improvement of existing technology involves creative thinking.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives.	Brainstorming can create new, innovative ideas.
9.4.2.CI.2	Demonstrate originality and inventiveness in work.	
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.	Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.
9.4.5.CI.4	Research the development process of a	

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	product and identify the role of failure as a part of the creative process.	
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process.	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
9.4.5.CT.2	Identify a problem and list the types of individuals and resources	
9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.	
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.	

Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
● Engineering requires the use of the engineering design process.	● How does the engineering design process lead to better results?
Content: ● Enchanted Engineering; Building a Zipline ● Flight of the Pollinators ● A Birthday is no Ordinary Day!	**Skills (Objectives):** ● Design and create a zipline ● Design a simple model to demonstrate pollination. ● Discuss the predictable patterns of earth's motion to your birthday.

Interdisciplinary Connections:

NJSLS - Science

- 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.
- 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.

NJSLS Math

- MP.2 Reason abstractly and quantitatively.
- MP.4 Model with mathematics.
- MP5 Use appropriate tools strategically.

NJSLS Reading

- **RI.CR.1.1** - Ask and answer questions about key details in an informational text (e.g., who, what, where, when, why how)

NJSLS Writing

- **W.IW.1.2** - With prompts and support, write informative/explanatory texts to examine a topic and convey ideas and information.
- **W.IW.1.2.a** - Introduce a topic.
- **W.IW.1.2.b** - Develop the topic with facts or other information and examples related to the topic.
- **W.IW.1.2.c** - Provide a conclusion
- **W.WR.1.5** - With prompting and support, generate questions through shared research about a topic and determine possible sources to obtain information on that topic
- **W.SE.1.6** - With guidance and support from adults, gather and select information from multiple sources to answer a question or write about a topic.

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Stage 2: Assessment Evidence

Performance Task(s):

- Complete a model zipline
- Create a model of a pollinator to demonstrate pollination
- Conduct research to complete a birthday cake with motions of the sun displayed.

Other Evidence:

- Zipline completion with at least one improvement accomplished
- Students verbally demonstrate knowledge of poination using completed model.
- Students birthday cake is completed with sun patterns included.

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Lesson 1

- Engage students with the short story; *The Enchanted Forest.* Next, show students a graphic organizer displaying the steps of the engineering design process.

Lesson 2

- Students begin the zipline challenge. Students use engineering journals to plan and sketch their design and decide on materials.

Lesson 3

- Students begin to build their ziplines using materials provided. Students keep a journal of problems encountered and how problems were solved.

Lesson 4

- Testing day- students test their ziplines with as many sugar berries (mini marshmallows) as they can fit. Count and record the number of berries transported.

Lesson 5

- Students reflect and revise/modify their zipline carts to improve before retesting.

Lesson 6

- Flight of the Pollinators - Engage students with *Flowers are Calling* Read Aloud. Explore with - look at a flower, what do you see?

Lesson 7

- Explain with *What is Pollination?* Read Aloud. *Begin Pollinator Model Design Challenge.*

Lesson 8

- Complete *Pollinator Model Design Challenge.*

Resources:

Lesson 1

- Short story - *The Enchanted Forest*
- Graphic organizer

Lesson 2

- Engineering journals
- Several materials listed in the journal.

Lesson 3

- Engineering journals
- Several materials listed in the journal.

Lesson 4

- Engineering journals
- Various materials from classroom and home
- Mini Marshmallows.

Lesson 5

- Engineering journals
- Various materials from classroom and home
- Mini Marshmallows.

Lesson 6

- Book - Flowers are Calling
- Student observation page

Lesson 7

- Book -*What is Pollination?*
- Design Challenge student pages

Lesson 8

- Design Challenge student pages

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	● Building materials
Lesson 9 ● Pollinator presentations. Students present their models and describe how their models show pollination.	**Lesson 9** ● Pollinator models
Lesson 10 ● A birthday is no ordinary day! Engage with A *Birthday Cake is No Ordinary Cake.* Using a globe and flashlight, the teacher models the pattern of the sun and earth throughout the year.	**Lesson 10** ● Book - A *Birthday Cake is No Ordinary Cake* ● Globe and flashlight
Lesson 11 ● Explain with Birthday Seasons Read Aloud. Elaborate with birthday celebrations (ongoing).	**Lesson 11** ● Internet access ● Plant and animal cards
Lesson 12 ● Students design birthday cards which include sun patterns.	**Lesson 12** ● Birthday card student page ● Crayons

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to struggling and/or Special Needs Section for differentiation.

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Students will be provided with more challenging work based on their individual needs.	Students will be provided with more challenging work based on their individual needs.	Student and teacher will make plan to improve in certain areas as needed	Students will be allotted extra time as needed to finish projects. Students will have the opportunity to work solo if needed.

Unit Title: First Grade Unit Two (Picture Perfect STEM)

Stage 1: Desired Results

Standards & Indicators:

National Standards in Gifted and Talented Education

- **1.1** - Self-Understanding. Students with gifts and talents recognize their interests, strengths, and needs in cognitive, creative, social, emotional, and psychological areas.
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Computer Science and Design Thinking		
Standard	**Performance Expectations**	**Core Ideas**
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8.2.2.ED.2	Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.	
8.2.2.ED.3	Select and use appropriate tools and materials to build a product using the design process.	
8.2.2.ED.4	Identify constraints and their role in the engineering design process.	Limitations (constraints) must be considered when engineering designs.
8.2.2.NT.1	Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.	Innovation and the improvement of existing technology involves creative thinking.
8.2.2.NT.2	Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.	

Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
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Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
• Communicate solutions that will reduce the impact of humans on the land, water, air and other living things in the environment.	• How do humans use the engineering design process to improve environmental conditions?
Content: • Design a Habitat • Plant a tree • Pill bugs	**Skills (Objectives):** • Design and create a model habitat for a pet • Understand the benefits of trees • Solve a human problem through biomimicry • Design a simple model to demonstrate pollination.

Interdisciplinary Connections:

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- 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.
- 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

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Stage 2: Assessment Evidence

Performance Task(s):	**Other Evidence:**
• Complete model habitat • Plant a tree, describe the benefits • Create a solution with biomimicry	• Group discussion of needs of different animals • Students reflect in We Planted a Tree journal. • Students show understanding of nature in engineering solutions • Students evaluate the human benefits from pollination

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Stage 3: Learning Plan

Learning Opportunities/Strategies:	Resources:
Lesson 1 ● Engage students with, *I Wanna Iguana*, and explore with Observing Iguanas.	**Lesson 1** ● Book - *I Wanna Iguana* ● Observing Iguanas group discussion
Lesson 2 ● Explain with, *Where Do Animals Live?* Read-Aloud. Students pair up and complete animal habitat sort.	**Lesson 2** ● Book - *Where Do ANimals Live?* ● Animal habitat sort cards
Lesson 3 ● Elaborate with Design a Habitat Challenge. Enrichment research - choose an animal.	**Lesson 3** ● Design a Habitat student planning page ● Animal research page
Lesson 4 ● Create habitat model	**Lesson 4** ● Various materials from classroom and home.
Lesson 5 ● Evaluate with *I Wanna Iguana* re-reading. Whole group discussion on student habitat models using connections to the reading.	**Lesson 5** ● Book - *I Wanna Iguana* ● Habitat models
Lesson 6 ● Plant a Tree- Engage students with *Wangari's Tree of Peace* Read Aloud. Google Earth field trip to Kenya.	**Lesson 6** ● Book - *Wangari's Tree of Peace* ● Google Earth
Lesson 7 ● Explore with Observe a Tree activity ● Explain connections to *We Planted a Tree* Read Aloud.	**Lesson 7** ● Observe a Tree activity ● Book - *We Planted a Tree*
Lesson 8 ● Elaborate with the "Plant for the Planet" video. Whole class researches where to plant a tree and what type of tree to plant.	**Lesson 8** ● Video ● Internet access
Lesson 9 ● Plant a tree day! Whole class goes to the planned location to plant and fertilize the tree. Group discussion of what trees need. Students complete We Planted a Tree journal. Compare journals as a group.	**Lesson 9** ● Tree sapling ● Fertilizer ● Water ● We Planted a Tree Journal
Lesson 10 ● Pillbots - Engage with *Next Time You See a Pill Bug* Read Aloud. Explore with pill bug observations and discuss as a group.	**Lesson 10** ● Book - *Next Time You See a Pill Bug* ● Pill bugs in a proper container. ● Pill Bug observation student page.
Lesson 11	**Lesson 11** ● Internet access

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• Discuss biomimicry. Students research an assigned plant or animal and how humans have mimicked it through engineering. **Lesson 12** • Students create a pillbot that solves a human problem through biomimicry. DIscuss as a group. Students offer suggestions of improvement.	• Plant and animal cards **Lesson 12** • My Pillbot student page • crayons

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to the Struggling and/or Special Needs Section for differentiation.

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
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Pacing Guide

Course Name	Resource	Standards
UNIT 1 Introduction to Engineering and the Engineering Design Process 12 days 1 day per the 6 day cycle 12 weeks	A . Enchanted STEM; Building a Zipline B. Picture Perfect STEM Chapter 18 C. Picture Perfect STEM Chapter 19	**National Standards in Gifted and Talented Education** 1.1, 2.1, 2.5, 3.2, 3.3, 3.4, 3.5, 4.1, 4.2, 6.1 **NJSLS - Science** K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3, 1-ESS1
UNIT 2 Picture Perfect STEM 12 Days 1 day per the 6 day cycle 12 weeks	Picture Perfect STEM Book Chapter 6 Chapter 8 Chapter 14	**National Standards in Gifted and Talented Education** 1.1, 2.1, 2.5, 3.2, 3.3, 3.4, 3.5, 4.1, 4.2, 6.1 **NJSLS - Science** K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3, 2-PS1-1