Elementary GATE - Grade 2

Unit Title: Second Grade Unit One (Cultural Connections in Engineering)

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, confi - dence, 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.
- **9.4.2:** Articulate the role of culture in everyday life by describing one's own culture and comparing it to the cultures of other individuals.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community. **9.2.2.CAP.3:** Define entrepreneurship and social entrepreneurship. **9.4.2.CI.1:** Demonstrate openness to new ideas and perspectives. **9.4.2.CI.2:** Demonstrate originality and inventiveness in work.	Students will verbally communicate project designs using reasoning and prior knowledge. Students will complete assigned tasks using original ideas and designs. Students will offer and accept constructive criticism. Students will respectfully compare different cultures to their own.	Design communication Implementing original ideas into design plans Accept others ideas and suggestions

Central Idea/Enduring Understanding:	Essential/Guiding Question:
• Engineering design requires creativity and imagination.	• How have different countries/communities used engineering to enrich their culture?

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Content:	**Skills (Objectives):**
• Architecture around the world • Design a drum • Communication innovations	• Design and build a famous structure • Create a drum out of materials given to learn different rhythms • Research and discuss early forms of communication

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.

NJSLS - Math

- MP.2 Reason abstractly and quantitatively.
- MP.4 Model with mathematics.
- MP.5 Use appropriate tools strategically.

NJSLS - Language Arts

- L.KL.2.1. Use knowledge of language and its conventions when writing, speaking, reading, or listening.W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-ESS1-1), (1-ESS1-2)
- L.VL.2.2. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 2 reading and content, choosing flexibly from an array of strategies.
- L.VI.2.3. Demonstrate understanding of figurative language, word relationships and nuances in word meanings.
- RL.CR.2.1. Ask and answer questions to demonstrate understanding of key details in a literary text, referring explicitly to the text as the basis for the answers.
- RI.CR.2.1. Ask and answer questions to demonstrate understanding of key details in an informational text, referring explicitly to the text as the basis for the answers.
- RI.CI.2.2. Recount a text in oral and written form and determine the main topic (in multi-paragraph informational text, focusing on specific paragraphs).
- RI.IT.2.3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in a sequence within a text.
- RI.TS.2.4. Describe the overall structure of a text and effectively use various text features (e.g., graphs, charts, images, captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information.
- RI.MF.2.6. Explain how specific illustrations and images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
- RI.AA.2.7. Describe and identify the logical connections of how reasons support specific points the author makes in a text.
- RI.CT.2.8. Compare and contrast two informational versions of the same idea or topic by different authors or authors from different cultures.
- W.AW.2.1. With prompts and support, write opinion pieces to present an idea with reasons or information.
- W.IW.2.2. Write informative/explanatory texts to examine a topic and convey ideas and information.
- W.WP.2.4. With guidance and support from adults and peers, develop and strengthen writing as needed by planning, revising and editing.
- W.WR.2.5. Generate questions about a topic and locate related information from a reference source to obtain information on that topic through shared and independent research.

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- W.SE.2.6. Prioritize information provided by different sources on the same topic while gathering ideas and planning to write about a topic.
- W.RW.2.7. Engage in both collaborative and independent writing tasks regularly, including extended and shorter time frames.
- SL.PE.2.1. Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
- SL.II.2.2. Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
- SL.UM.2.5. Use multimedia; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.

Stage 2: Assessment Evidence

Performance Task(s):

- Complete a model of a famous structure.
- Students research different types of drums to design and create their favorite type.
- Students design and build devices to communicate over a distance to compare the strengths and weaknesses.

Other Evidence:

- Completed architectural journal and famous structure.
- Students verbally demonstrate knowledge of drum components and types as well as complete a drum.
- Students evaluate different methods of communication using t-chart.

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Lesson 1

- Engage students with the story; *Iggy Peck, Arcitec* Read Aloud. Allow time for free build.

Lesson 2

- Explain with *Dreaming Up* Read Aloud. Show famous structure and Building video. WHole group discussion on buildings around the world.

Lesson 3

- Review Iggy's models and how he used creativity in his designs. Students begin their architectural journals.

Lesson 4

- Students build a model of a famous building of their choice using materials provided.

Lesson 5

- Let's Drum! Engage students with *Drum Dream Girl* Read Aloud. Explore with different drums and the different sounds they make.

Lesson 6

- Comparing sounds auditory scavenger hunt. Explain different sounds with a whole group discussion of Drum Sounds article.

Resources:

Lesson 1

- Book - *Iggy Peck, Architect.*
- Building materials such as blocks, Leogs, etc.

Lesson 2

- Book, *Dreaming Up*
- Internet access

Lesson 3

- Book - *Iggy Peck, Architect.*
- Architectural journals
- Several pictures of famous buildings

Lesson 4

- Architectural journals
- Building materials

Lesson 5

- Book, *Drum Dream Girl*
- Drums of different shapes and sizes

Lesson 6

- Scavenger hunt student page
- Drum sounds article

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Lesson 7 ● Elaborate with *Drum City* Read-Aloud and Design A Drum. Students begin to build a drum, if time. **Lesson 8** ● Complete building drums. Students then evaluate the sounds of the different drums and record observations. Whole group discussion to follow. **Lesson 9** ● Communication Innovations - Engage with *Jackrabbit McCabe and the Electric Telegraph*. Explore with Crack the Code. **Lesson 10** ● Student activity - Card Sequencing then and now. After a whole group discussion, read the book, *Long Ago and Today*. DIscuss the book. **Lesson 11** ● Get the Message design challenge Steps #1-5. Students will build a prototype of a messaging device. **Lesson 12** ● Get the Message design challenge steps #6-8. Students complete evaluating your design student page. Discuss results as a whole class.	**Lesson 7** ● Book -*Drum City* ● Design Challenge student page - Drum Design ● Various building materials **Lesson 8** ● Various building materials ● Observation student page. **Lesson 9** ● Book - *Jackrabbit McCabe and the Electric Telegraph*. ● Crack the Code and Morse Code key **Lesson 10** ● Communication innovation cards for sequencing ● Book - *Long Ago and Today* **Lesson 11** ● Get the message student journal ● Various materials and mediums to create codes **Lesson 12** ● Get the message student journal ● Completed message device

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: Second Grade Unit Two (Force, Motion, and Energy)

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.

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- **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.
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Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.2.CI.1 - Demonstrate openness to new ideas and perspectives. **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. **9.4.5.CI.4**: Research the development process of a 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. **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.	Students will explore a variety of technologies that solve problems in our everyday lives. Students will brainstorm ways to improve an invention that they use everyday. Students will offer and accept constructive criticism.	Defining and delimiting engineering practices Developing possible solutions Influence of engineering, technology, and science on society and the natural world.

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Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
• Recognize cause and effect relationships between force, motion and energy.	• How do pushes and pulls change the motion and direction of an object? • Why do some mixtures cause a reaction? • What types of materials protect against heat transfer?
Content:	**Skills (Objectives):**
• Move it; pushes and pulls • Mystery Mixtures • Feel the heat	• Design a ramp that changes the motion of a toy car. • Perform an experiment to gain an understanding of different mixtures. • Design and build a structure to keep an ice cube from melting.

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.
- 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

NJSLS Math

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

NJSLS ELA

- L.KL.2.1. Use knowledge of language and its conventions when writing, speaking, reading, or listening.W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-ESS1-1), (1-ESS1-2)
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Stage 2: Assessment Evidence

Performance Task(s):

- Create a ramp to explore the differences in speed and motion.
- Conduct an experiment to qualitatively measure the effect of different mixtures.
- Design and build a structure that will keep an ice cube frozen in a heated environment.

Other Evidence:

- Students draw and label their best ramp design.
- Students communicate empirical evidence of mixtures in their lab journal. Students also take a quiz on the properties of matter.
- Students communicate their results of the ice cube design challenge.

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Lesson 1

- Engage students with a picture walk through *Newton and Me* before Read Aloud. Explore with Ride Newton, Ride.

Lesson 2

- Begin Newton's Doghouse Challenge.

Lesson 3

- Reflect on the results of the challenge. Whole group discussion of best design for each group.

Lesson 4

- Science Mysteries - Engage with *Ada Twist, Scientist* Read Aloud, and Great Scientists Chart.

Resources:

Lesson 1

- Book - *Newton and Me*
- Toy cars, plastic dogs, wooden ramps.

Lesson 2

- Various materials for challenge
- Ride Newton, Ride student journal.

Lesson 3

- Ride Newton, Ride student journal

Lesson 4

- Book - *Ada Twist, Scientist*
- Great Scientists Chart

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Lesson 5 ● Explore with Properties of Matter and explain with our results. **Lesson 6** ● Explain with Properties of Matter Vocabulary and *Matter* Read Aloud. **Lesson 7** ● Elaborate with the Mystery Mixtures lab. **Lesson 8** ● Evaluate with Matter Quiz and Matter Mystery student challenge. **Lesson 9** ● Engage with *Summer Sun Risin'* Read Aloud and explore with Compares Temperatures activity. **Lesson 10** ● Explain with Comparing Temperatures Graph and *The Sun: Our Nearest Star* Anticipation Guide and Read-Aloud. **Lesson 11** ● Elaborate with Keep it Cool Design Challenge: Building our Models. **Lesson 12** ● Elaborate with Keep it Cool Design Challenge: testing our Models. Whole group discussion of results.	**Lesson 5** ● Properties of Matter student journal ● Various substances for lab **Lesson 6** ● Book - *Matter* ● Properties of Matter Vocabulary student page **Lesson 7** ● Various substances ● Mystery Mixtures student pages **Lesson 8** ● Matter Quiz ● Matter Mystery challenge page **Lesson 9** ● Book - *Summer Sun Risin'* ● Comparing Temperatures Student page ● Thermometers **Lesson 10** ● Comparing Temperatures Graph ● Book - *The Sun: Our Nearest Star* ● Anticipation Guide **Lesson 11** ● Various building materials including ice cubes ● Keep it Cool Challenge student journal **Lesson 12** ● Keep it cool challenge structures ● Keep it Cool Challenge student journal

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.

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Pacing Guide

Course Name	Resource	Standards
UNIT 1 Cultural Connections in Engineering 12 days 1 day per the 6 day cycle 12 weeks	Picture Perfect STEM Book A. Architecture around the world - chapter 7 B. Design a drum Chapter 11 C. Communication innovations Chapter 12	**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 Force, Motion, and Energy 12 Days 1 day per the 6 day cycle 12 weeks	Picture Perfect STEM Book D. Move it: Pushes and Pulls chapter 10 E. Mystery Mixtures Chapter 13 F. Feel the Heat Chapter 9	**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