Glen Ridge Public Schools – Gifted and Talented Curriculum

Course Title: GT

Subject: Literature, Humanities, Science and Engineering

Grade Level: 3rd, 4th, 5th, 6th

Duration: One class period every six day cycle

Prerequisite: N/A

Elective or Required: elective

Gifted and Talented Mission Statement:

The Glen Ridge Public School District recognizes the unique needs, abilities, talents and potential of the individual student. The purpose of the Gifted and Talented program is to provide students with opportunities, resources, and encouragement to aspire to a higher level of academic development. By utilizing a broad range of learning experiences, higher order thinking skills, and opportunities for creativity, the potential of gifted students will be further enriched and developed.

Course Description:

Via the Gifted and Talented program, students will be exposed to accelerated content that will develop creativity and research skills. The diverse enrichment provided will strive to broaden learning, stimulate intellectual curiosity, emphasize the process of learning, and encourage critical and divergent thinking through problem solving. Students will also experience collaborative learning through teamwork and group projects.
Author: Ms. L. Ellersick
Date Submitted: Summer 2016
Topic/Unit: GT Grade 3 Unit A
Engineering by Design “Every Drop Matters”

Approximate # Of Lessons: 10

Essential Questions:
Which part of the water on earth is fresh and available for consumption?
What is the importance of an aquifer?
What are the differences between the roles of scientists and engineers?
How does the phrase, “We all live downstream,” relate to us?

Upon completion of this unit students will be able to:
- Understand the amount of fresh water available for human consumption. (Science 5.4.4.G.3) (Mathematics 4.NF)
- Identify earth resources and materials that come from the environment to meet the needs and want of humans. (Science 5.4.12.C.1)
- Identify technology as a way of inventing tools and techniques to solve human problems. (Technology 8.2.2.A.3)

Interdisciplinary Standards
- Standard 8.1 C-Computer and Information Literacy
- Standard 8.2 B-Technology Education

Activities, including 21st Century Technologies:
- Identify the percentages of water on earth, fresh vs. frozen water, fresh vs. salt water, ground vs. surface water.
- Identify various countries where water resources are lacking.
- Investigate and reflect on the functionality of one of the world’s major bodies of water.
- Create a model of an aquifer. Identify the location and the current strain placed on the Ogallala Aquifer in the mid plains region of the US.
- Explore the five steps of a water treatment system via hands-on activity.

STEAM Activities (Visual Arts)
The Pet Wash Design Challenge
- Students follow the steps of the Design Process to improve a method or a device that will reuse, recycle or conserve water when washing an animal.
**Enrichment Activities:**
- Create a filtering system to clean a cup of dirty, simulated polluted water.
- Research photographer and cinematographer Peter McBride’s explorations and experiences on the Colorado and Ganges Rivers.
- Explore the nearby Passaic River. Compare and contrast its past and recent history with that of the Hudson River.

**Methods of Assessments/Evaluation:**
- Student responses in notebooks
- Performance rubrics
- Self-review/evaluations

**Resources**
- TEEMS Integrative Curriculum for Elementary STEM program for grade 3
- *A River Ran Wild* by Lynne Cherry

**Online Resources:**
- Renewal-A Reborn Colorado River Once Again Finds Her Path to the Sea- [https://www.youtube.com/watch?v=TODV7FW746s](https://www.youtube.com/watch?v=TODV7FW746s)
- The Ogallala Aquifer-[https://www.youtube.com/watch?v=XXFsS94HF08](https://www.youtube.com/watch?v=XXFsS94HF08)
- National Geographic Live! Chasing Rivers-part 1 The Colorado-[https://www.youtube.com/watch?v=xt5uJrWW1g](https://www.youtube.com/watch?v=xt5uJrWW1g)
- National Geographic Live! Chasing Rivers-part 1 The Ganges-[https://www.youtube.com/watch?v=mkPwEuflhKo](https://www.youtube.com/watch?v=mkPwEuflhKo)
Topic/Unit: GT Grade 3 Unit B
The American Dust Bowl

Approximate # Of Lessons: 10

Essential Questions:
What were the major contributing factors to the Dust Bowl Era?
What are the major sections of a newspaper?

Upon completion of this unit students will be able to:
● Identify historical facts and happenings of the Dust Bowl in America (CCSS.ELA-Literacy.RL.3.1) (CCSS.ELA-Literacy.W.3.7)
● Create a newspaper that reflects the Dust Bowl Era (CCSS.ELA-Literacy.W.3.8)

Interdisciplinary Standards
● Standard 8.1 C-Computer and Information Literacy

Activities, including 21st Century Technologies:
● Students read three or more books dealing with the Dust Bowl.
● Students collect information gained from books and online sources about facts, people and happenings pertaining to the Dust Bowl.
● Students complete a scavenger hunt to find and learn the major parts of a newspaper: banner, ears, headline, byline, index, obituary, classified sections, want ads, entertainment, wire services, etc.

STEAM Activities
The Dust Bowl Newspaper
● Students utilize fictional and nonfictional novels along with primary and secondary sources to recreate the front page of a newspaper that depicts the era of the American Dust Bowl via stories and photos.
● Students test the difference between native grasses with long roots (pipe cleaners inserted 2 inches down randomly in sand to represent native grasses) and non-native grasses with short roots planted in rows (1 inch pipe cleaners planted in sand in rows with 1 inch spaces) while the winds of west blow (using a blow dryer).

https://www.pinterest.com/pin/413627546996976902/
Enrichment Activities:
● Listen to and reflect on the lyrics of Woody Guthrie’s “Dust Bowl Blues” and other songs- https://www.youtube.com/watch?v=iQYKJaWuj0Y
  Research the comparison of the burning of rainforests in South America and Africa today for farmland with the Black Blizzard of the 30s. 
  Is global warming a trend that will produce dust storms in the future? 
  Compare the formation of these with the dust storms on Mars. 
● Learn more about the photographers that captured the pictures of the era- http://www.pbs.org/kenburns/dustbowl/legacy/
  Take black and white photos of your town. Compare with color images.

Methods of Assessments/Evaluation:
● Student responses in notebooks 
● Performance rubrics 
● Self-review/evaluations

Resources
● The Great American Dust Bowl by Don Brown 
● Children of the Dust Bowl: The True Story of the School at Weedpatch Camp by Jerry Stanley 
● The Dust Bowl by David Booth 
● Blue Willow by Doris Gates 
● Out of the Dust by Karen Hesse 
● The Dust Bowl: An Interactive History Adventure by Allison Lassieur

Online Resources:
● Dust Bowl Interactive- http://www.pbs.org/kenburns/dustbowl/interactive/
Topic/Unit: GT Grade 4 Unit A
Engineering by Design “Solar Energy”

Approximate # Of Lessons: 10

Essential Questions:
What is reverse engineering?
What are the advantages and disadvantages of utilizing solar energy?

Upon completion of this unit students will be able to:
● Investigate how photovoltaic cells work by reverse engineering a simple solar calculator. (Science 5.2.4.D.1 and 5.2.8.C.2) (Technology 8.2.2.A.3)
● Create a timeline reflecting the history of solar energy. (CCSSELA-Literacy.W.4.2) (Technology 8.2.5.B.3)
● Identify technology as a way of inventing tools and techniques to solve human problems. (Technology 8.2.2.A.3)

Interdisciplinary Standards
● Standard 8.1 C-Computer and Information Literacy
● Standard 8.2 B-Technology Education

Activities – including 21st Century Technologies:
● Reverse engineering a solar calculator.
● Take notes while reading “Earth’s Long Distance Power Source” in order to create a Solar Energy Timeline.
● Create closed circuitry utilizing solar cells and solar motors.
● Brainstorm and collaborate on a solar tree house design with colleagues.

STEAM Activities
The Solar Tree house Design Challenge
● Students follow the steps of the Design Process to create a model of a tree house that is warmed and lighted using only solar energy.
Enrichment Activities:
- Explore the solar thermal properties of various materials and their colors to heat similar containers of water.
- Watch the function of solar thermal by setting up a solar balloon in the courtyard.
- Utilize a solar cooker to warm Smores or other edible treats.
- Find a local home or business that utilizes solar energy and ask for a tour to see first-hand how the system operates.

Methods of Assessments/Evaluation:
- Student responses in notebook
- Performance Rubrics
- Self-review/evaluation

Resources
- TEEMS Integrative Curriculum for Elementary STEM program for grade 4
- Earth’s Long Distance Power Source, Unit 1 pamphlet, Houghton Mifflin

Online Resources:
- https://wonderville.org/app/asset/solarenergydefenders
Essential Questions:
During the Revolutionary War, what were the various roles individuals played in the fight for America’s freedom?

Upon completion of this unit students will be able to:
- Identify the components of historical fiction in a novel by sorting the historical facts from the historical fiction. (ELA-Literacy.WHST.6-8.2)
- Explore various techniques utilized by the Culper Spy Ring. (Science 5.1.4.C.3)

Interdisciplinary Standards
- Standard 8.1 C-Computer and Information Literacy

Activities – including 21st Century Technologies:
- Read the novel, Sophia’s War, by Avi.
- Identify prominent historical figures and places of the Revolutionary War.
- Research a Revolutionary spy and comment on his/her contribution to the war effort.

STEAM Activities
Students try their hands at a few tricks of the spy trade-
- Crafting a secret message using lemon juice and revealing it by applying heat from a candle or an iron.
- Decoding a message using a cipher code or utilizing a mask to reveal a hidden code in text.
Enrichment Activities:

- Experiment with alum and vinegar to see if secret messages can pass through the shell of an egg.
- Research the various places in New Jersey that were home to battles and confrontations of the Revolutionary War.

Methods of Assessments/Evaluation:

- Student responses in notebook
- Performance Rubrics
- Self-review/evaluation

Resources

- Sophia’s War by Avi

Online Resources:

- Watch "How to write a secret message using lemon"
  [https://youtu.be/x_cKUqH10N](https://youtu.be/x_cKUqH10N)
- Learn various ways members of the Culper Spy Ring shared their secrets
  [https://www.youtube.com/watch?v=x_cKUqH10Nc](https://www.youtube.com/watch?v=x_cKUqH10Nc)
Topic/Unit: GT Grade 5 Unit A
Engineering by Design “Infrastructure and Nanotechnology”

Approximate # Of Lessons: 10

Essential Questions:
- What is infrastructure?
- What are sustainable practices?
- What is nanotechnology?
- How can nanotechnology aid in the sustainability of current infrastructure?

Upon completion of this unit students will be able to:
- Identify key principles of nanotechnology: how size can affect physical and chemical properties of matter, etc. (Science 5.2.6.A.3)

Interdisciplinary Standards
- Standard 8.1 C-Computer and Information Literacy
- Standard 8.2 B-Technology Education

Activities – including 21st Century Technologies:
- Complete a quick draw that illustrates the infrastructure that can be found in the community.
- View “Smart Building: Pioneering Sustainable Design and Construction” to illicit what sustainable practices were incorporated into San Francisco’s Public Utilities Commission Headquarters building that warranted a Platinum LEED rating.
- Investigate what Nanotechnology is by viewing videos and experimenting with nitinol wire, scratch and sniff stickers, color changing UV beads, etc.
- Discover how tiny nanosized particles are by testing 2 different brands of sun tan lotion on black construction paper.
- Test the reaction time differences when materials become smaller by comparing the reaction time of full vs. tiny pieces of denture tablets or Alka Seltzer tablets when placed in water.
- Research how nanotechnology is aiding in the sustainable practices with regard to various infrastructures.
STEAM Activities

- To mimic the repetitive structure of carbon nanotubes, students create Lumifold Lamps from folded paper.
- Create iridescent bookmarks with black construction paper and drops of clear nail polish floating in containers of water.

Enrichment Activities:

- Research how nitinol wire is used in the field of orthodontics
- Read A City Through Time by Philip Steele and compare and contrast it with A Street Through Time by Dr. Anne Millard.

Methods of Assessments/Evaluation:

- Student responses in notebook
- Performance Rubrics
- Self-review/evaluation

Resources

- TEEMS Integrative Curriculum for Elementary STEM program for grade 5
- A Street Through Time, A 12,000 Year Walk Through History by Dr. Anne Millard

Online Resources:

- Infrastructure and Nanotechnology article http://www.fullertreacymoney.com/system/data/images/archive/2012-12-28/nano.pdf
- What is Nano? http://www.whatisnano.org Search Resources/ Games on this site for the Presidential Decisions Game
- Lumifold folding directions http://steampop.zone/lumifolding-instructions/
Topic/Unit: GT Grade 5  
Nothing But the Truth

Approximate # Of Lessons: 10

Essential Questions:
What is a documentary novel?  
What does the phrase, "There are two sides to every story." mean?

Upon completion of this unit students will be able to:
● Give supporting details for the so-called “mistruths” revealed in the story.  
  (CCSS.ELS-Literacy.RL5.5 and 5.6)
● Create a rough draft of a story’s major components: character development, setting, plot, etc.  
  (CCSS.ELA-Literacy.W5.3A and D)

Interdisciplinary Standards
● Standard 6.3 Active Citizenship in the 21st Century

Activities – including 21st Century Technologies:  
● Read novel, Nothing But the Truth, by Avi

STEAM Activities
● Google images of American flag art. Brainstorm five different objects you could use to recreate the American flag. Design it on the computer or in an original medium.

Enrichment Activities
● Watch a woman's impromptu singing of the Star Spangled Banner at the Lincoln Memorial:  
  https://www.youtube.com/watch?v=KUvVhWqXiWo  
● Research the actual words to the Star Spangled Banner. Be inspired by this video:  
  https://www.youtube.com/watch?v=l0fQd858cRc

Methods of Assessments/Evaluation:
● Student responses in notebook  
● Performance Rubrics  
● Self-review/evaluations

Resources
● Nothing But the Truth by Avi

Online Resources:
● Review the story of the National Anthem:  
  https://youtu.be/6hZe8CPGA1E
**Topic/Unit:** GT Grade 6 Unit A  
**Engineering by Design “Biomimicry”**

**Approximate # Of Lessons: 10**

**Essential Questions:**
What is biomimicry?  
How can biomimetic design be incorporated into our world?

**Upon completion of this unit students will be able to:**
- Cite examples of biomimicry in the world today. (Technology 8.2.12.B.1)

**Interdisciplinary Standards**
- Standard 8.1 C-Computer and Information Literacy  
- Standard 8.2 B-Technology Education

**Activities – including 21st Century Technologies:**
- Review information on Janine Benyus and Biomimicry.  
- Keep an inventor's log noting plants or animals, their characteristics that could be copied for new products.  
- Complete a challenge of photos that show living things and their inspirational products.  
- Design a Super Hero, composed of the traits of three living organisms (animals or plants) that will protect the world and create a poster or powerpoint that presents pertinent nanotechnology information.

**STEAM Activities**
- To mimic the shape changing ability of deployable structures in nature, (blowfish and hornbeam leaves), students create Lumifold lamps from folded paper.  
  http://steampop.zone/lumifolding-instructions/

**Enrichment Activities:**
- Origami magic ball directions: https://youtu.be/DLk6ZsSLc8E
Methods of Assessments/Evaluation:
- Student responses in notebook
- Performance Rubrics
- Self-review/evaluation

Resources

Online Resources:
- Janine Benyus TED Talk
  https://www.ted.com/talks/janine_benyus_biomimicry_in_action?language=en
**Topic/Unit:** GT Grade 6 Unit B

**Refugees**

**Approximate # Of Lessons:** 10

**Essential Questions:**
- What is a refugee?
- What is being done about the refugee crisis?

**Upon completion of this unit students will be able to:**
- Understand the conditions under which refugees leave native countries and investigate the situations surrounding resettlement in the United States (Social Studies 6.2.12.A.6.b)

**Interdisciplinary Standards**
- Standard 8.1 C-Computer and Information Literacy
- Standard 8.2 B-Technology Education

**Activities – including 21st Century Technologies:**
- Reflect on the plight of refugees after viewing the UNHCR video “To Be a Refugee.” [https://youtu.be/LpwqK3B2ac8](https://youtu.be/LpwqK3B2ac8)
- Write about what you would bring with you if you only had 2 minutes to flee your home.
- Read the novel, Outcasts United: The Story of a Refugee Soccer Team That Changed a Town adapted for young people by Warren St. John.
- Research the country of origin of one of the refugees and the political conflict that was happening at the time of his departure.
- Utilize the data.worldbank.org website. Click on *data, indicators,* and then *GNI per capita* to get an alphabetical table of countries and their Gross National Income per capita. Search for the refugee's country of origin and compare it with that of the United States and one other country. Research a little about the temperature, climate and landform actions of the country of origin. Compare that with the state of Georgia.

**STEAM Activities**
● Brainstorm design ideas that could help with the refugee crisis whether a unique ideas for housing. Check out the IKEA Challenge-

Enrichment Activities:
● Read “UNHCR Refugee Youth Poetry,” a collection of poetry written by refugee students, and choose a poem or group of poems to read. What is each poem about? Who wrote the poem? What connections are seen between the poem that is read and what is learned about the refugee crisis?
● Read the article "Obama Increases Number of Syrian Refugees for U.S. Resettlement." Based on what they have read, what role should the United States play? Write letters to elected officials detailing these opinions. Find contact information for the White House at whitehouse.gov/contact and find U.S. senators and representatives at congress.gov.
● PBS article citing design ideas for the Refugee Challenge-

Methods of Assessments/Evaluation:
● Student Responses
● Performance Rubrics
● Self-review/evaluation

Resources
● Outcasts United: The Story of a Refugee Soccer Team That Changed a Town adapted for young people by Warren St. John.

Online Resources:
● A Book of Poems: Expressions from our Youth-
● What our state is doing about refugee resettlement-
http://www.acf.hhs.gov/programs/orr/state-programs-annual-overview
Depending on time, interest, and/or need, an additional unit may be explored. In the past, units have gone “Beyond the Rubik’s Cube,” travelled aboard the “Clearwater Sailing Ship” on the Hudson River, and have examined “Bits and Bytes” of information. In the future, perhaps students will travel “To the Moon and Mars.”