

PARSIPPANY-TROY HILLS TOWNSHIP PUBLIC SCHOOL DISTRICT

GIFTED REACH OUT PROGRAM (GRO) GRADE 3

Authored by: Stephanie Dasti and Laura Long

Reviewed by: Annamarie Altomonte
Supervisor of K-5 STEAM, BSI, GRO
Dr. Tali Axelrod
Assistant Superintendent for Curriculum and Instruction

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Members of the Board of Education:

Frank Neglia, President
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Parsippany-Troy Hills Township Public Schools
292 Parsippany Road Parsippany, NJ 07054

www.pthsd.net

I. OVERVIEW

The purpose of the Gifted Reach Out Program (GRO) is to develop the problem solving, critical and creative thinking abilities of students identified as gifted. GRO is dedicated to developing the unique talents of second through fifth grade students building on the enriched activities in the kindergarten curriculum. The GRO curriculum is designed to create a collaborative environment where students become effective questioners and producers of knowledge. Separately, we assess students to gauge progress and inform instruction. Project based learning assessments for students in grades 2 through 5 are administered for each topic of study. Students will study topics related to Architecture and Invention concepts. Each topic of study is designed to be a half year course.

II. RATIONALE

The GRO Program serves the identified population of gifted students in grades two through five. This enrichment pullout program offers students the chance to interact with peers of similar ability, while remaining a part of the regular classroom setting. The interdisciplinary, differentiated curriculum for the students in GRO is intended to be high interest, while at the same time enhancing the present core curriculum. Issues arising from the units are relevant to our times, expose students to new subjects and broaden student interests. Activities are adjusted in pace and depth to meet the needs of the children in each group. GRO encourages independent learning, research, and individual product development. Creative problem solving and critical thinking skills are stressed. Students are challenged to become consumers and producers of knowledge.

III. STUDENT OUTCOMES (Link to New Jersey Student Learning Standards)

In accordance with district policy as mandated by the New Jersey Administrative Code and the New Student Learning Standards, the following are proficiencies required for the successful completion of the above named course.

Students will:

1. 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.
2. Interpret and apply evidence of mastery of the big ideas within a subject area: what they look like, and why they matter.
3. Generate new ideas, solve problems, and make decisions.
4. Apply a variety of thinking skills including, but not limited to, associative, metacognitive, abstract, and inferential thinking and deductive reasoning.
5. Create and present information in a variety of methods (oral, visual, written and technological) in order to share thoughts and ideas with others.
6. Translate a variety of concepts learned in the classroom into innovative outcomes.

7. Engage in self-reflection/assessment with respect to their interests, strengths, identities, leadership, and academic domains.
8. Develop the ability to sense a problem exists, define and analyze the problem, then determine, assess and evaluate possible solutions.
9. Exhibit self-reliance when working independently and respond effectively to unexpected experiences and challenges.
10. Utilize digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively to create communication and knowledge.
11. Apply knowledge of disciplines to produce work that reflects individuality and creativity at a more advanced level than their grade-level peers.
12. Develop products and outcomes that communicate expertise in multiple fields and disciplines (including technology) that may be presented to a variety of authentic audiences.
13. Display competence in interpersonal and technical communication skills: promote advanced oral and written skills, and creative expression; display fluency with technologies that support effective communication.
14. Demonstrate the importance of cooperation and individual acceptance within a group setting.

Links to NEW JERSEY STUDENT LEARNING STANDARDS

- [Visual and Performing Arts](#)
- [English Language Arts](#)
- [Mathematics](#)
- [Science](#)
- [Social Studies](#)
- [Technology](#)
- [21st Century Life and Careers](#)

Modifications/Differentiation and Adaptations:

For guidelines on how to modify and adapt curricula to best meet the needs of all students, instructional staff should refer to the [Curriculum Modifications and Adaptations](#) included as an Appendix in this curriculum. Instructional staff of students with Individualized Education Plans (IEPs) must adhere to the recommended modifications outlined in each individual plan.

IV. ESSENTIAL QUESTIONS AND CONTENT

Overarching Essential Questions:

- a) Architecture
 - a. What are the components of structures in architecture?
 - b. What contributions do architects make to the field of architecture?
 - c. How do structures represent different forms of architecture? (PBL Essential Question)
- b) Inventions
 - a. Why invent?

- b. Who were important inventors and what were their inventions?
- c. What attributes are necessary for an invention to be successful?
- d. How might future inventions affect our lives? (PBL Essential Question)

Content:

A. Architecture

- What is architecture and civil engineering? Who are architects?
- What are various architectural structures?
- What are vocabulary terminology that are associated with architecture?
- How do architects contribute to architecture?
- What are the effects of tension and compression?

B. Inventions

- Why do inventions occur?
- Why are inventions important?
- How can inventions occur by mistake?
- How does an inventor create an invention using an ordered system?
- How can you analyze and discuss extremely complex inventions from multiple perspectives?
- What are some major inventions?/ Who are some famous inventors?

V. STRATEGIES

- Project Based Learning
- Direct Instruction
- Differentiation
- Student projects
- Class/Group discussion
- Individual conferencing
- Presentations
- Thinkers

VI. EVALUATION

Class Participation: 25% - Participation in group discussions, attempting thinkers (Do Now Problem Solving Challenges), cooperative groups, presentations, being prepared for class.

In Class Activities: 25% - Journal entries, projects, quizzes, experiments, activity sheets

Unit Project: 50% - Project Based Learning Assessment (See Below)

(Proposed timeline. Timeline may vary depending on school schedules.)

Architecture Project Based Learning Assessment

Essential Question: How do structures represent different forms of architecture?

Architecture PBL: [Linked Here](#)

Plan and schedule: After students spent time during the unit to learn about what architecture is, the components, the various styles, etc, students will have 2 weeks to research different styles of architecture from all over the world. Students will have 3 weeks to apply their knowledge of architecture to design and create an architectural structure specific to the area/region they have chosen. For example, if the student selected Switzerland, he/she would need to design or create a model of an architectural structure that would be appropriate for that area. Students will have 1 week to provide a write up of the structure explaining its purpose, inspiration, etc. Students will have 1 week to prepare a presentation to present their structure to the class. Finally, students will present their structure.

Monitor progress: Students need to check with the teacher no later than the end of each checkpoint to prove progress. Notes, sketches, brainstorming should be provided as necessary.

Assess: Rubric: [Linked Here](#)

Evaluate: Peer Assessment: [Linked Here](#) & Self Assessment: [Linked Here](#)

Invention Project Based Learning Assessment

Essential Question: How might future inventions affect our lives?

Invention PBL: [Linked Here](#)

Plan and schedule: After students have learned why we invent and what attributes are necessary for an invention, it's time for the students to create a unique invention/innovation by following the Steps for Inventing ([Linked Here](#)). Students will have 1-2 weeks to collect ideas of problems that need to be solved by interviewing and surveying for different ideas, as well as reading about similar things. Students will have 2-3 weeks to start a plan, log and write about the invention/innovation (Explanation page [linked here](#)). Students will have 1 week to sketch the invention. Students will have 2-3 weeks to make a model, test the invention, and name it. Students will have 1-2 weeks to prepare a write up about the invention. Students will have 1 week to prepare a presentation. Finally, students will present their inventions.

Monitor progress: Students need to check with the teacher no later than the end of each checkpoint to prove progress. Notes, sketches, brainstorming should be provided as necessary.

Assess: Rubric: [Linked Here](#)

Evaluate: Peer Assessment: [Linked Here](#) & Self Assessment: [Linked Here](#)

VII. CORE RESOURCES

<https://www.state.nj.us/education/aps/cccs/gandt/>

New Jersey Department of Education Gifted and Talented Homepage

<http://www.nagc.org/resources-publications/resources>

National Association for Gifted and Talented resources

<https://www.nsgt.org/educational-resources/>

National Society for Gifted and Talented resources

VIII. SUPPLEMENTAL RESOURCES

A. Architecture

D'Alelio, Jane. (1989). I know that building! Washington, D.C.: National Trust for Historic Preservation.

Thorne-Thomsen, Kathleen. (1994). Frank Lloyd Wright for kids. Chicago, : Chicago Review Press.

Van Der Meer, Ron and Sudjic, Deyan. (1997) The architecture pack. New York: Alfred A. Knopf.

<http://www.greatbuildings.com/types.html>

Search structures by name of building, architect, or place.

<http://www.beverlyhistory.org/houses/balchfam.html>

Changes in a structure over time.

<http://www.pbs.org/wgbh/buildingbig/bridge/index.html>

Building Big

<http://www.biography.com/people/groups/architects/all>

Famous Architects

<http://www.etc.net/njarts/details.cfm?ID=254>

Glenmont Estate

<http://www.smallblueprinter.com/floorplan/floorplan.html>

Creating online floor plan

<http://espliego.wordpress.com/2008/03/14/worlds-most-famous-buildings/>

World's Most Famous Buildings

B. Inventions

Blackburn, Ken and Lammers, Jeff. (1996). Kids' paper airplane book. New York: Workman Publishing.

Blackburn, Ken and Lammers, Jeff.(1994). The world record paper airplane book. New York: Workman Publishing.

Harper, Charise. (2001). Imaginative inventions. New York: Little, Brown and Company.

Hauser, Jill and Kline, Michael. (1999). Gizmos & Gadgets: Creating Science Contraptions that Work. Charlotte, VT: Williamson Publishing.

Jeffries, Michael and Lewis, Gary. (1992). Inventors and inventions. New York: Smithmark Publishers.

McCarthy, Meghan. (2010). Pop! The Invention of Bubble Gum. New York: Simon and Schuster Books.

<http://www.thaitechnics.com/fly/principle.html>

Forces acting on an airplane

<http://42explore.com/flight.htm> The basics of flight <http://www.rubegoldberg.com/>

Rube Goldberg Cartoons

http://science.howstuffworks.com/innovation/scientific-experiments/9-things_invented_or_discovered_byaccident.htm#page=2

IX. SCOPE AND SEQUENCE

Third Grade Unit Planner [Linked Here](#)

A. Architecture (September-January)

1. Define architecture, an architect, civil engineering, and interior designer.

Standards Covered: 5.1.4.A.1 5.1.4.A.2 5.1.4.A.3 5.1.4.B.1 5.1.4.B.2 5.1.4.B.3 5.1.4.B.4 5.1.4.C.1 5.1.4.C.2 5.1.4.C.3 5.1.4.D.1 5.1.4.D.2 L.4.2d L.4.3a L.4.4 L.4.4a L.4.4c 6.1.4.C.1 6.1.4.C.2 6.1.4.C.3 6.1.4.C.4 6.1.4.C.5 6.1.4.C.6 6.1.4.C.9 6.1.4.C.10 6.1.4.C.11 8.1.4.E2 8.1.4.F.1 8.2.4.A.1 8.1.4.D.2 8.1.4.D.3

Suggested Activities:

- a. Use prior knowledge, dictionaries, and computers to determine a group definition of architecture.
- b. Distinguish civil engineering as an important concept in architecture.
- c. Meet an architect in class who will explain his/her job.
- d. Read a variety of books explaining the field of architecture and considerations for a career.
- e. Examine, explore and discuss *The Architecture Pack* by Van Der Meer & Sudjic.
- f. Distinguish, visualize, compare and contrast concepts of interior design by exploring pictures of homes, offices, and other buildings.
- g. Create a collage of spatial designs, analyze a blueprint, construct a bird's eye view of a room, and/or experiment using three-dimensional manipulatives to create the interiors of rooms within a school, house and/or other structure.

Teacher Notes

- Interdisciplinary Connections: Science Language Arts Social Studies Technology
- Define architecture to mean: the engineering of buildings and structures; engineering is something man-made
- Define Interior Designers as being allowed to change the parts of a home that do not interfere with its actual structure.
- <http://chicagohome.donatellibuilders.com/Design-to-build/bid/374642/What-s-the-Difference-between-Architects-and-Interior-Designers>
- Architecture Symbols <http://www.smallblueprinter.com/floorplan/floorplan.html>
- Evaluation: Marzano Squares defining architecture, civil engineering and interior designer, write a thank you note to an architect that includes two facts learned, write an account of five important pieces of information learned, and present information. or Create a floor plan of a room using <http://www.smallblueprinter.com/floorplan/floorplan.html>

2. Define a plethora of vocabulary terminology associated with architecture.

Standards Covered: SL.4.1 SL.4.1a SL.4.1b SL.4.1c SL.4.1d L.4.2d L.4.3a L.4.4 L.4.4a L.4.4c

Suggested Activities:

- a. Engage in a variety of activities to understand the many components of architecture. Bingo, word and picture matching, etc.
- b. Build, paint and/or make a collage of different structures labeling all components.
- c. Using correct vocabulary, label the picture previously drawn of their shelter.
- d. Go on a walking tour to identify the various architectural terms of houses

Teacher Notes

- Interdisciplinary Connections: Language Arts Speaking and listening
- Vocabulary includes: tension and compression as well as components of structures: doors, windows, roofs, shapes, materials, decorations, barriers, and paving.
- Evaluation: Complete a crossword, fill-in-the blank, checklist, labeling or matching activity identifying architectural components

3. Discover architects' contributions to architecture.

Standards Covered: 6.1.4.C.12 6.1.4.C.13 6.1.4.C.14

Suggested Activities:

- a. Identify Frank Lloyd Wright and some of his major architectural accomplishments, i.e., Falling Waters.

Teacher Notes

- Interdisciplinary Connections: Social Studies Technology
- Frank Lloyd Wright for Kids by Kathleen Thorne-Thomsen
- http://www.biography.com/people/g_groups/architects/all
- <http://www.etc.net/njarts/details.cfm?ID=254>
- Evaluation: Present an autobiography of an architect, write up an interview for an architect that shows your knowledge of this person's contributions to architecture, or replicate an architectural piece designed by an architect.

4. Assemble a variety of structures in order to understand their function and see the effects of tension and compression.

Standards Covered: 8.2.4.A.1 8.1.4.D.2 8.1.4.D.3 5.1.4.A.1-3 5.1.4.B.1-4 5.1.4.C.1-3 5.1.4.D.1-2

Suggested Activities:

- a. Build structure(s) to discover tension and compression using index cards, Straws and Connectors Creative Building set, Knex, Legos, Lincoln logs, and/or City Blocks, etc.
- b. Role-play an architect by accessing <http://www.pbs.org/wgbh/buildingbig/bridge/index.html>

Teacher Notes

- Interdisciplinary Connections: Technology Science <http://www.pbs.org/wgbh/buildingbig/bridge/index.html>
- Evaluation: Build a structure to demonstrate tension and compression.

5. Identify a variety of architectural structures.

Standards Covered: 5.1.4.A.1 5.1.4.A.2 5.1.4.A.3 5.1.4.B.1 5.1.4.B.2 5.1.4.B.3 5.1.4.B.4 5.1.4.C.1 5.1.4.C.2 5.1.4.C.3 5.1.4.D.1

Suggested Activities:

- a. Examine pictures, videos, computer clips, and visuals to identify and realize all types of structures within the field of architecture.
- b. Examine and discuss *I Know That Building* by Jane D'Alelio.
- c. Compare and contrast a variety of shelters.
- d. Complete a city scene or mural identifying several different architectural structures
- e. Paint a city mural showing several structures.
- f. Examine pictures of styles: Victorian, Rococo, Romanesque, Art Nouveau, Art Deco, High Tech, Country, etc. and note distinct characteristics.
- g. Compare two styles of architecture.

- h. View various styles of architecture: <http://www.greatbuildings.com/type.s.html>
- i. PBL - select a geographic location and design a structure/exterior design to address specific concerns for the selected location (See Evaluation Section for links to PBL)

Teacher Notes

- Interdisciplinary Connections: Science
- <http://espliego.wordpress.com/2008/03/14/worlds-most-famousbuildings/>
<http://www.greatbuildings.com/type.s.html>
- Use Google Earth to find structures throughout the world
- Evaluation: Create a unique exterior design/structure assessed by rubric

B. Inventions (February-June)

1. Identify why inventions occur.

Standards Covered: 5.1.4.A.1 5.1.4.A.2 5.1.4.A.3 5.1.4.B.1 5.1.4.B.2 5.1.4.B.3 5.1.4.B.4 5.1.4.C.1 5.1.4.C.2 5.1.4.C.3 5.1.4.D.1 5.1.4.D.2 6.1.4.C.2 6.1.4.C.12 6.1.4.C.16 2.MD.D.10

Suggested Activities:

- a. Identify and list a variety of problems.
- b. Discuss commonalities among various inventions.
- c. Create and complete a student survey to discover what others believe was the most important invention of all time.

Teacher Notes

- Interdisciplinary Connections: Science Social Studies Mathematics
- Convenience Riddle Book and So You Want to be an Inventor (J. St. George & D. Small).
- Evaluation: Identify an invention and the need or problem it solves, analyze survey results, or create a graph to show results.

2. Justify why an invention is important.

Standards Covered: 5.1.4.A.1 5.1.4.A.2 5.1.4.A.3 5.1.4.B.1 5.1.4.B.2 5.1.4.B.3 5.1.4.B.4 5.1.4.C.1-3 5.1.4.D.1-2 6.1.4.C.2 6.1.4.C.12 6.1.4.C.16 6.1.12.C.6.b 6.1.12.D.6.a RI.3.1 RI.3.2 RI.3.1 RI.3.10

Suggested Activities:

- a. Provide clues to help peers identify invention they are describing (Guessing Game/Charades/What am I?).
- b. Identify basic machines as important inventions.
- c. Experiment with simple machines.

Teacher Notes

- Interdisciplinary Connections: Science Social Studies Language Arts
- Simple machines: Wheel/Axle Inclined plane Wedge Lever Screw Pulley
- Evaluation: Present the importance/significance of inventions shared. (Invention of the Day), participate in a Scavenger Hunt to find basic tools and simple machines, Simple Machine Lab Sheets, or “What am I?” Tent.

3. Discover that inventions sometimes occur by mistake.

Standards Covered: RI.3.1-2 RI.3.10 8.2.4.A.1 8.2.4.B.1

Suggested Activities:

- a. Read and discuss: - A Strip to Rip (Velcro invention poem). - Chocolate Chip Cookie. - Post It™ Notes and others.

Teacher Notes

- Interdisciplinary Connections Reading Technology http://science.howstuffworks.com/innovation/scientificexperiments/9-things_invented_or_discovered_by_accident.htm#page=2
- Evaluation: Journal about an invention that occurred by mistake

4. Analyze and discuss extremely complex inventions from multiple perspectives.

Standards Covered: 9.1.4.A.1 9.1.4.A.2 9.1.4.A.3 9.1.4.A.5 9.1.4.B.1 9.1.4.C.1

Suggested Activities:

- a. Play Mousetrap.
- b. Show video of Wile E. Coyote trying to catch Road Runner.
- c. Critique Rube Goldberg's cartoons and compare to Mousetrap and video.
- d. Create a collage in the style of a Rube Goldberg invention.

Teacher Notes

- Interdisciplinary Connections: 21st Century Skills
- Rube Goldberg cartoons: <http://www.rubegoldberg.com/>
- Make available A Better Mousetrap page to help with poster/comic strip.
- Evaluation: Compare Goldberg's invention to Wile E. Coyote's attempts and create a poster/comic strip in the style of Rube Goldberg, or a Rube Goldberg style chain reaction machine.

5. Explore and discover major inventors and their inventions.

Standards Covered: 6.1.8.C.4.b 1.3.2.C.1 1.2.8.C.1 RI.3.1-5, 7, 10 W.3.2a,b W.3.7-8

Suggested Activities:

- a. Create timelines of various inventions.
- b. Research and present an inventor of his/her own choosing.

Teacher Notes

- Interdisciplinary Connections: Social Studies Visual & Performing Arts Language Arts
- Possible Inventors to introduce in class: Leonardo da Vinci Ben Franklin Eli Whitney Alexander G. Bell Thomas Edison Henry Ford Charles Goodyear Louis Braille Samuel Morse
- Evaluation: Created timeline or inventor presentation

6. Conclude how an inventor may have created an invention using an ordered system

Standards Covered: W.3.1 W.3.1a W.3.1b W.3.1d W.3.2a W.3.2b W.3.2d W.3.3c W.3.5 5.1.4.A.2 5.1.4.A.3 5.1.4.B.1 5.1.4.B.2 5.1.4.B.3 5.1.4.B.4 5.1.4.C.1 5.1.4.C.2 5.1.4.C.3 5.1.4.D.1 5.1.4.D.2 9.1.4.A.1 9.1.4.A.2 9.1.4.A.3 9.1.4.A.5 9.1.4.B.1 9.1.4.C.1 6.1.4.A.1-2 6.1.4.C.8 6.1.4.C.13 8.2.4.C.3 8.2.8.C1

Suggested Activities:

- a. Work together to create a comprehensive list of "Steps to Inventing".
- b. Experiment to create inventions.
- c. Complete Why didn't I think of that?
- d. Brainstorm and list different ways to use specific inventions.
- e. Cut pictures from catalogs and combine two or more to create a new invention.
- f. Identify inventions that preceded other inventions and were similar.
- g. Complete Reinvent the Wheel.
- h. Distinguish the difference between a trademark used in everyday life, identify trademarks used in everyday life, or consult the U.S. Patent website to define patents.
- i. PBL - Follow Steps to Inventing Process for invention/innovation. (See Evaluation Section for links to PBL)

Teacher Notes

- Interdisciplinary Connections: 21st Century Skills Social Studies Technology www.uspto.gov
- Gizmos & Gadgets: Creating Science Contraptions that Work by Jill Hauser.
- Steps to Inventing: Identifying problems and needs. Collect ideas. Research – what has already been done. Sketch a solution and write ideas in a log. Make a model and test it. Name the invention. Get invention patented and name trademarked.
- Capsela Kit
- Teacher Created Materials Inventions Thematic Unit: Why didn't I think of that? Reinvent the Wheel.
- Solutions Catalog Shark Tank
- Evaluation: Complete invention/innovation assessed by rubric.