Gifted and Talented Curriculum
for Cherry Hill and Roosevelt
Elementary Schools
in River Edge, New Jersey
# C.R.E.A.T.E.

Children of River Edge in Academically Talented Education

## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy</td>
<td>p. 3</td>
</tr>
<tr>
<td>New Jersey State Definition of Gifted and Talented</td>
<td>p. 4</td>
</tr>
<tr>
<td>Identification Criteria</td>
<td>p. 5</td>
</tr>
<tr>
<td>C.R.E.A.T.E. Staff</td>
<td>p. 6</td>
</tr>
<tr>
<td>Grade 3 Webquest</td>
<td>p. 7 - 9</td>
</tr>
<tr>
<td>Interdisciplinary Services, Grades 4 – 6</td>
<td>p. 10 - 12</td>
</tr>
<tr>
<td>Literacy, Grades 4 – 6</td>
<td>p. 13 - 15</td>
</tr>
<tr>
<td>Cherry Hill Science, Grades 4 - 6</td>
<td>p. 16 – 24</td>
</tr>
<tr>
<td>Roosevelt Science, Grades 4 – 6</td>
<td>p. 25 - 37</td>
</tr>
</tbody>
</table>
Philosophy

C.R.E.A.T.E, or Children of River Edge in Academically Talented Education, serves students in Cherry Hill and Roosevelt Elementary Schools in River Edge, New Jersey. This is a student driven program designed to combine individual strengths, passions, talents and critical thinking skills in order for them to build the tool kits necessary to become active 21st century citizens.

The River Edge School District is committed to providing differentiation of instruction that is based on each and every student’s needs in all areas of the curriculum. While our classroom teachers will differentiate within the classrooms, educators will also meet with identified students outside of their classrooms. As classroom teachers deliver differentiation during general classroom instruction they will often receive support and resources from the C.R.E.A.T.E professionals. C.R.E.A.T.E. is committed to providing the best and most challenging opportunities and experiences to all students. Pull out services will focus on assisting identified students with the successful completion of self-driven proposals.
New Jersey Definition of Gifted and Talented

The New Jersey Administrative Code (N.J.A.C. 6A: 8-3.1) defines gifted and talented students as: Those students who possess or demonstrate high levels of ability, in one or more content areas, when compared to their chronological peers in the local district and who require modification of their educational program if they are to achieve in accordance with their capabilities.

Regulations require that students be compared to their chronological peers in the local school district. New Jersey does not have state-level criteria such as mandated tests or assessments, grade point averages, or IQ scores. Local school districts must use multiple measures to identify students.

Further resources provided by the state of New Jersey can be found on the State of New Jersey Department of Education website at http://www.state.nj.us/education/aps/cccs/g_and_t_req.htm.
Identification Criteria

Criteria for Entrance

Identification for pull out services is based upon information gathered from multiple criteria. These include district approved testing, standardized tests, teacher recommendations, report cards and the sustained maintenance of academic performance and behavior.

Entrance for students new to the district will be based on scores & grades reported from his/her previous school.

Continued Eligibility

Students will continue to receive these supplementary services provided the following are maintained:

1. Classroom Grades
   Students must be able to maintain at least an A- average throughout the year.

2. Classroom Performance
   Students must be able to keep up with their class work and homework assignments while engaging in this program.

3. Support
   Parents / Guardians / Teachers agree that child participation in this program should continue.

4. Program Participation
   Students must demonstrate active and consistent participation in the program.
C.R.E.A.T.E. Staff

Coordinator & Interdisciplinary Services, Grades 4 - 6: Katie O’Brien

Literacy, Grades 4 - 6: Julia Diminich

Science, Grades 4 – 6: Kristen Crawford & John Corcoran

Methods of Research, Grade 3: Laura Fleming & Wendy Rosenzweig
BY THE END OF GRADE 3
ACADEMICALLY TALENTED METHODS OF RESEARCH
WEBQUEST

STATE STANDARDS
A.A.S.L.1.1 Learners use skills, resources, and tools to inquire, think critically, and gain knowledge

1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects and make the real world connection for using this process in own life

1.1.2 Use prior and background knowledge as context for new learning

1.1.3 Develop and refine a range of questions to frame search for new understanding

1.1.4 Find, evaluate, and select appropriate sources to answer questions

1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness to needs, importance, and social and cultural context

1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning

1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias

1.1.8 Demonstrate mastery of technology tools to access information and pursue inquiry

1.1.9 Collaborate with others to broaden and deepen understanding

BIG IDEA / COMMON THREAD
Students will become experts on a topic they choose by utilizing the research process through a Webquest.
ENDURING UNDERSTANDING
Research provides us with the skills, resources and tools necessary to inquire, think critically and gain knowledge.

ESSENTIAL QUESTIONS
- How can different processes and resources be used to gain information?
- How can we use what we know to learn new things?
- How can questions influence a search for understanding?
- How does the process of searching for a reliable source impact research driven questions?
- Explain the different components of identifying reliable information.
- Why is media literacy important when researching a topic?
- What strategies can be used to determine the validity of information?
- What role does technology play in the pursuit of inquiry?
- How does communication with others strengthen and broaden understanding?

MODULE ASSESSMENTS
- Teacher observation / conferences
- Successful completion of finalized project

LESSON OBJECTIVES
Students will be able to…
- Identify a self-chosen research topic
- Develop a research question
- Utilize key strategies in researching a topic
- Locate the most reliable sources of information
- Identify and choose facts relevant to a topic
- Write out relevant facts in complete sentences

MODULE SKILLS
Students will be able to…
• Research a topic
• Choose learning materials
• Design and execute a project
• Present conclusions in a comprehensive fashion

RESOURCES

• Computers / Laptops
• Printer
• Webquest (www.cherryhilllibrary.weebly.com)
• Top 10 List Sheet
• Searching for Resources on the Web video
• Sweet Search Engine
• Note taking Organizer
• Citation Organizer
• Self - Evaluation Sheet
BY THE END OF GRADE SIX

ACADEMICALLY TALENTED INTERDISCIPLINARY SERVICES

STATE STANDARDS

Math.Practice.MP3: Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments.

Math.Practice.MP4: Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.

Math.Practice.MP5: Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem.

Math.Practice.MP6: Attend to precision. Mathematically proficient students try to communicate precisely to others.

Literacy.RST.6-8.7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

Literacy.W.6.3: Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

Literacy.W.6.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

Literacy.W.6.6: Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.

Literacy.W.6.7: Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
**Literacy.RL.6.3** Describe how a particular story or drama’s plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution

**Literacy.RL.6.5** Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot

**Literacy.SL.6.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others’ ideas and expressing their own clearly

**Literacy.SL.6.4** Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation

**Literacy.SL.6.5** Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information

**Literacy.L.6.3** Use knowledge of language and its conventions when writing, speaking, reading, or listening

**BIG IDEA / COMMON THREAD**

All students will participate in learning opportunities that peak their curiosities and broaden their perspectives; exercise their creativity, critical thinking, logic and problem solving skills; actively demonstrate their abilities to plan, self-monitor, evaluate and publish learning experiences and conclusions.

**ENDURING UNDERSTANDING**

Students will learn to work in cooperative teams that utilize individual strengths and enhance critical thinking in order for them to become creative problem solvers and active 21st century citizens.

**ESSENTIAL QUESTIONS**

- What challenges does America face in the 21st century?
- How are teamwork and cooperation 21st century life skills?
- How can technology play a role in the engagement of 21st century problems?
- What are the essential components of a written or performed narrative?
• What strategies best enable a group to brainstorm and creatively solve problems?
• How can research lead to decision making?
• How can interdisciplinary approaches to problem solving lead to strong outcomes?

MODULE ASSESSMENTS

• Teacher observation and monitoring of project process
• Performance-based summative assessment
• Online self-reflective survey
• Blog communication

LESSON OBJECTIVES

Students will be able to…

• Democratically develop a themed project to collectively pursue throughout the year
• Reflect upon their personal strengths to select individual and cooperative roles
• Apply research-based learning to differentiated topics within the thematic unit
• Communicate and evaluate research findings and ideas through the use of a blog
• Create electronic or physical project culmination to be published online
• Work in cooperative teams to evaluate each other’s work and compose narrative’s around the thematic unit
• Work in cooperative teams to produce digital media reflection of the narrative

MODULE SKILLS

Students will be able to…

• Identify personal strengths
• Evaluate research materials
• Apply critical thinking to problem solve
• Manipulate technology
• Learn cooperatively

RESOURCES

• Laptops
• iPad
- Websites: [www.riveredgecreates.webly.com](http://www.riveredgecreates.webly.com) / [www.thelemmatricksystem.weebly.com](http://www.thelemmatricksystem.weebly.com)
- ELMO Document Camera
- iMovie
- Garage Band
- Headphones
- Weebly website creator: [www.weebly.com](http://www.weebly.com)
- Video Cameras
- Tripod
- Green Screen Technology
- Color Scanner
- Presentation Boards
BY THE END OF GRADE 6
ACADEMICALLY TALENTED LITERACY
SCHOOL NEWSLETTERS

STATE STANDARDS

Literacy.W.6.1 Write arguments to support claims with clear reasons and relevant evidence

Literacy.W.6.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content

Literacy.W.6.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

Literacy.W.6.5 With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach

Literacy.W.6.6 Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting

Literacy.W.6.7 Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate

Literacy.W.6.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources

Literacy.W.6.9 Draw evidence from literary or informational texts to support analysis, reflection, and research

Literacy.W.6.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences
BIG IDEA / COMMON THREAD

All students will engage in differentiated writing processes based upon personal interest and will compile writing pieces into a journal that is published in both printed and online three times a year.

ENDURING UNDERSTANDING

Writing is a form of communication that has a specific audience, task and purpose.

ESSENTIAL QUESTIONS

- How can an argument best support a claim?
- How can you use informative/explanatory writing to convey ideas and concepts?
- What elements of narrative writing can be used to best communicate a story?
- How can a newsletter be best formatted to impact an audience?
- How does the writing process strengthen one’s writing?
- How does technology assist the collaboration and publication of writing?
- How does research support the writing process?
- How do you assess the credibility of information?
- What strategies are best for comprehending and writing nonfiction text?

MODULE ASSESSMENTS

- Teacher observation and monitoring of project process
- Performance based summative assessment
- Online self-reflective survey

LESSON OBJECTIVES

Students will be able to…

- Engage in the writing process
- Create differentiated writing products
- Work cooperatively to produce a newsletter to be published three times per academic year. These writing products will include, but are not limited to:
  - Showcasing Student Work
  - Student Birthday ‘Shout-Outs’
  - Informational Writing
  - Book & Movie Reviews & Recommendations
• Coverage of School Functions
• Guess the Teacher
• Word Searches, Crossword Puzzles & Jumbles
• School Polls/Surveys
• Pop Culture: Featured Musical Artist
• Interviews
• Seasonal Short Stories/Poems
• School Mystery Stories
• Sports Review- River Dell & Rec Sports coverage

MODULE SKILLS

Students will be able to…

• Utilize effective writing practices for the purpose of communication
• Write to a specific audience
• Apply methods of research to compose credible pieces

RESOURCES

• Laptops
• Word Perfect
• Excel
• Books individual students are independently reading
• Pop-Culture, media & cinema related websites
STATE STANDARDS

5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.

B. Matter and Energy Transformations: Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms.

C. Interdependence: All animals and most plants depend on both organisms and their environment to meet their basic needs.

E. Evolution and Diversity: Sometimes, differences between organisms of the same kind provide advantages for surviving and reproducing in different environments. These selective differences may lead to dramatic changes in characteristics of organisms in a population over extremely long periods of time.

5.4 Earth Systems Science: All students will understand that earth operates as a set of complex, dynamic, and interconnected systems, and is part of the all-encompassing system of the universe.

E. Energy in Earth Systems: Internal and external sources of energy drive Earth systems.

F. Climate and Weather: Earth’s weather and climate systems are the result of complex interactions between land, ocean, ice and atmosphere.

BIG IDEA / COMMON THREAD

By studying sea turtles and tracking their behavior, all students will understand the intricacies of earth systems and life sciences.
ENDURING UNDERSTANDING

Students will understand that sea turtles represent the interdependence of matter & energy, evolution & diversity, energy in earth systems and climate & weather.

ESSENTIAL QUESTIONS

- How do sea turtles acquire food and what role does it play in energy and cell growth?
- How does the life cycle of a sea turtle reflect the complexity, diversity and interconnectedness of life on earth?
- How do sea turtles depend on both other organisms and their environment to meet their basic needs?
- How have sea turtles evolved to survive and reproduce in their environment?
- What internal and external sources of energy drive the life cycle of sea turtles?
- How do sea turtles adapt to and interact with Earth’s weather and climate systems?

MODULE ASSESSMENT

- Teacher Observation / Conferences
- Successful completion of final project

LESSON OBJECTIVES

Students will be able to…

- Discuss the role that food plays in the life cycle of a sea turtle.
- Compare and contrast the life cycle of a sea turtle with other life cycles on earth.
- Describe the dependency of the basic needs of sea turtles on other organism and their environment.
- Analyze and investigate the evolution and diversity among sea turtles.
- Outline how matter and energy transformations drive the life cycle of sea turtles.
- Discuss the interdependence of sea turtles and other marine animals and compare it to other life systems.

MODULE SKILLS

Students will be able to:
• Evaluate research and data collection
• Apply critical thinking to problem solve
• Apply the scientific method
• Manipulate technology
• Learn cooperatively

RESOURCES

• Laptops
• Poster Paper
• Markers
• Crayons
• Printer
STATE STANDARDS

5.1 Science Practices: All students will understand that science is a body of knowledge and an evidence based, model building enterprise that continually extends, refines, and revises knowledge

A. Understand Scientific Explanations: Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world

B. Generate Scientific Evidence Through Active Investigations: Students master the conceptual, mathematical, physical and computational tools that need to be applied when constructing and evaluating claims

C. Reflect on Scientific Knowledge: Scientific knowledge builds on itself over time

D. Participate Productively in Science: The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms

5.2 Physical Science: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space and matter has inertia

C. Forms of Energy: Knowing the characteristics of familiar forms of energy, including potential and kinetic energy is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable

D. Energy Transfer and Conservation: The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another

E. Forces and Motion: It takes energy to change the motion of objects. The energy change is understood in terms of force
BIG IDEAS/COMMON THREADS

All students will engage in scientific procedures and participate in social practices to build and program LEGO robotic models.

ENDURING UNDERSTANDINGS:

Scientific inquiry is accomplished as a process with set procedures.

ESSENTIAL QUESTIONS

How does the collection and analysis of research extend, refine and revise knowledge?

• What role do scientific tools play in categorizing, representing and interpreting our world?
• What tools and procedures are necessary to conduct a scientific inquiry?
• What is the process of scientific inquiry?
• What roles do critique and communication play in the growth of scientific knowledge?
• How do the two fundamental properties of matter impact the natural world?
• How can potential and kinetic energy be used to explain and predict the natural world?

MODULE ASSESSMENT

• Teacher Observation / Conferences
• Successful completion of final project

LESSON OBJECTIVES

Students will be able to…

• Identify the transmission of motion and transfer of energy through the creation of a LEGO machine
• Identify the basic elements of a simple or complex machine
• Create a programmable model that demonstrates knowledge and operation of technology
• Build and test mechanical movement
• Utilize mechanical tools in order to manipulate movement
• Understand how gears affect angles of movement
• Use numbers to initialize audio and timing of sounds and motion
• Organize and deliver a presentation of LEGO robotic
• Utilize technology to communicate with a machine
• Apply appropriate command vocabulary to communicate with the LEGO software and robot

MODULE SKILLS

Students will be able to:

• Connect animation to movement in our world
• Construct a model following step-by-step instructions
• Contemplate how a programmed robot demonstrates movement
• Extend model behavior to other students and groups to collectively program machines together

RESOURCES

• LEGO Education WeDo Activity Pack
• LEGO Education WeDo Construction Set
• LEGO Education WeDo Software
• LEGO’S
• Laptops
STATE STANDARDS

5.1 Science Practices: All students will understand that science is a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge

   A. Understand Scientific Explanations: Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world

   B. Generate Scientific Evidence through Active Investigations: Students master the conceptual, mathematical, physical and computational tools that need to be applied when constructing and evaluating claims

   C. Reflect on Scientific Knowledge: Scientific knowledge builds on itself over time

   D. Participate Productively in Science: The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms

5.4 Earth Systems Science: All students will understand that earth operates as a set of complex, dynamic, and interconnected systems, and is part of the all-encompassing system of the universe

   G. Biochemical Cycles: The biochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geosphere, atmosphere, or biosphere to another, and are driven by Earth’s internal and external sources of energy, and are impacted by human activity

BIG IDEA / COMMON THREADS

All students will combine technology, team building and problem solving with the outdoors to experience how human activity is interconnected with the universe.
ENDURING UNDERSTANDING

Science practices reveal that humans, cycles and systems are interrelated.

ESSENTIAL QUESTIONS

- How does the collection and analysis of research extend, refine and revise knowledge?
- What roles do scientific tools play in categorizing, representing and interpreting the geocaching process?
- What tools and procedures are necessary to conduct a scientific inquiry?
- What is the process of scientific inquiry?
- What roles do critique and communication play in the growth of scientific knowledge?
- How can a GPS device bring interconnected systems together?
- Explain the role human activity play in the flow of resources with geocaching as compared to the interconnectedness of systems throughout the universe.

MODULE ASSESSMENTS

- Teacher Observation / Conferences
- Successful completion of finalized project

LESSON OBJECTIVES

Students will be able to…

- Work in groups and use GPS receivers to locate various locations on school grounds
- Use GPS receivers to mark an observation spot and record data and observations
- Identify and interpret online longitude and latitude coordinates
- Gather clues within the geocaches that will help them solve logic problems

MODULE SKILLS

Students will be able to:

- Communicate with others to identify geographic locations
- Use a Global Positioning System to hide and seek geocaches
- Interpret lines of longitude and latitude
• Work collaboratively to interpret data and solve problems

RESOURCES

• Global Positioning System
• Leaf Snap application
• Tree Identification Books
• Laptops
• Poster Paper
• Glue
• Leaves
• Map of School Grounds
STATE STANDARDS

5.1 Science Practices: All students will understand that science is a body of knowledge and an evidence based, model building enterprise that continually extends, refines, and revises knowledge

   B. Generate Scientific Evidence through Active Investigations: Students master the conceptual, mathematical, physical and computational tools that need to be applied when constructing and evaluating claims

   C. Reflect on Scientific Knowledge: Scientific knowledge builds on itself over time

   D. Participate Productively in Science: The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms

5.2 Physical Science: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space and matter has inertia

   A Properties of Matter: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space and matter has inertia

   B. Changes in Matter: Substances can undergo physical or chemical changes to form new substances. Each change involves energy

   C. Forms of Energy: Knowing the characteristics of familiar forms of energy, including potential and kinetic energy is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable

   D. Energy Transfer and Conservation: The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another

   E. Forces and Motion: It takes energy to change the motion of objects. The energy change is understood in terms of forces
5.4 Earth Systems Science: All students will understand that earth operates as a set of complex, dynamic, and interconnected systems, and is part of the all-encompassing system of the universe

C. Properties of Earth Materials: Earth’s composition is unique, is related to the origin of our solar system, and provides us with the raw resources needed to sustain life

D. Tectonics: The theory of plate tectonics provides a framework for understanding the dynamic process within and on Earth

E. Energy in Earth Systems: Internal and external sources of energy drive Earth systems

F. Climate and Weather: Earth’s weather and climate systems are the result of complex interactions between land, ocean, ice and atmosphere

G. Biochemical Cycles: The biochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geosphere, atmosphere, or biosphere to another, and are driven by Earth’s internal and external sources of energy, and are impacted by human activity

BIG IDEA / COMMON THREAD

Students will use real time data to track ships at sea and predict when and where they will dock according to the impact caused by current weather patterns.

ENDURING UNDERSTANDING

Accessing and interpreting real time marine data reveals that interconnected systems and principles affect one another.

ESSENTIAL QUESTIONS

- How do conceptual, mathematical, physical and computational tools provide reliable data used in maritime tracking?
- How can tracking data overtime contribute to sea travel predictability?
- How can the collective analyzation of data contribute to changes in social practices of sea travel?
- How does the matter of a ship effect the outcome of its travel time?
• How can changes in atmospheric energy impact data reliability?
• What role does energy play in the predictable movement of a ship from one place to another?
• In what ways does energy impact the forces and motion of a ship traveling at sea?
• How are weather and seas interconnected?
• What effect would plate tectonics have on determining the destination of a ship?
• Explain the interconnectedness between biochemical cycles, Earth’s internal and external sources of energy, and human activity and how these factors impact maritime travel.

MODULE ASSESSMENTS
• Successful completion of the project
• Teacher observation / conferencing

LESSON OBJECTIVES
Students will be able to…
• Identify an active ocean liner
• Track the ocean liner according to degrees of latitude and longitude
• Record coordinates
• Research ports of call
• Form a hypothesis as to where it will dock
• Identify weather patterns and determine how they will impact travel

MODULE SKILLS
Students will be able to…
• Observe the activity of an ocean liner
• Locate the ocean liner according to lines of latitude and longitude
• Categorize and graph data
• Predict an ocean liner’s destination
• Evaluate the impact of weather on sea travel

RESOURCES

• Laptops
• Access to the Center for Innovation in Engineering and Science Education website at www.ciese.org
• Data tracking sheets
• Maps
STATE STANDARDS

5.1 Science Practices: All students will understand that science is a body of knowledge and an evidence based, model building enterprise that continually extends, refines, and revises knowledge

A. Understand Scientific Explanations: Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world

B. Generate Scientific Evidence through Active Investigations: Students master the conceptual, mathematical, physical and computational tools that need to be applied when constructing and evaluating claims

C. Reflect on Scientific Knowledge: Scientific knowledge builds on itself over time

D. Participate Productively in Science: The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms

5.2 Physical Science: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space and matter has inertia

D. Energy Transfer and Conservation: The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another

5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics

C. Interdependence: All animals and most plants depend on both organisms and their environment to meet their basic needs
**D. Heredity and Reproduction:** Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass it on to their offspring during reproduction.

**E. Evolution and Diversity:** Sometimes, differences between organisms that are the same kind provide advantages for surviving and reproducing in different environments. These selective differences may lead to dramatic changes in characteristics of organisms in a population over extremely long periods of time.

**BIG IDEA / COMMON THREAD**

Students will raise, nurture and release brook trout into the wild in a hands-on process that reveals the importance of balance in the natural world.

**ENDURING UNDERSTANDING**

Students will generate scientific knowledge through active investigations.

**ESSENTIAL QUESTIONS**

- How does active an investigation impact scientific understanding?
- Explain the role of matter in a tank with several fingerlings.
- How do brook trout depend on each other and their surroundings, both in captivity and in their natural environment?
- How do brook trout transfer energy to each other?
- How does the environment effect the life cycles of brook trout?
- How has the environment impacted the evolution of brook trout?

**MODULE ASSESSMENTS**

- Successful project completion
- Project posters
• Successful completion of data tracking sheets
• Teacher observation / Conferencing

LESSON OBJECTIVES
Students will be able to…

• Raise brook trout from eggs to fingerlings
• Monitor water chemistry (ph., ammonia & nitrate levels) to ensure the well being of trout eggs
• Research brook trout and stream habitats
• Provide nourishment for trout
• Follow a formula to predict the date of fertilization
• Hatch and raise trout
• Release trout to stream approved by the New Jersey Division of Fish & Wildlife
• Reflect upon the process through collected data

MODULE SKILLS
Students will be able to…

• Produce a healthy environment for raising trout eggs
• Interpret research
• Apply healthy environment data collection to monitor conditions
• Solve equations to make predictions
• Introduce brook trout to a new environment
• Evaluate the process of raising and releasing Brook Trout
RESOURCES

- 55 gallon fish tank
- Fish tank chiller
- Chemistry kit
- Permit from the State of New Jersey Division of Fish and Wildlife to release trout eggs
- Brook Trout eggs
- Laptops
- Filter
- Fish food
BY THE END OF GRADE 6
ACADEMICALLY TALENTED SCIENCE
DOWN THE DRAIN

STATE STANDARDS

5.1 Science Practices: All students will understand that science is a body of knowledge and an evidence based, model building enterprise that continually extends, refines, and revises knowledge

B. Generate Scientific Evidence through Active Investigations: Students master the conceptual, mathematical, physical and computational tools that need to be applied when constructing and evaluating claims

C. Reflect on Scientific Knowledge: Scientific knowledge builds on itself over time

D. Participate Productively in Science: The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms

5.2 Physical Science: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space and matter has inertia

A. Properties of Matter: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space and matter has inertia

B. Substances can undergo physical or chemical changes to form new substances. Each change involves energy

C. Forms of Energy: Knowing the characteristics of familiar forms of energy, including potential and kinetic energy is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable

D. Energy Transfer and Conservation: The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another

5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on
Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics

B. **Matter and Energy Transformations**: Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms

C. **Interdependence**: All animals and most plants depend on both organisms and their environment to meet their basic needs

D. **Heredity and Reproduction**: Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass it on to their offspring during reproduction

5.4 **Earth Systems Science**: All students will understand that earth operates as a set of complex, dynamic, and interconnected systems, and is part of the all-encompassing system of the universe

E. **Energy in Earth Systems**: Internal and external sources of energy drive Earth systems

F. **Climate and Weather**: Earth’s weather and climate systems are the result of complex interactions between land, ocean, ice and atmosphere

**BIG IDEA / COMMON THREAD**

Students will share information about the amount of water they use at home in a one-week time period and compare this information with others around the world through an internet-based collaborative project.

**ENDURING UNDERSTANDING**

Data can be collected, compared and analyzed to identify and track information in a worldwide database.

**ESSENTIAL QUESTIONS**

- How can current water usage trends in different areas be used to influence human water practices?
• How does the water usage of one person over time impact someone else on the other side of the globe?
• How does matter in water impact the environment?
• How does weather affect water availability in different climates?
• What makes water predictable?
• In what ways do animals and plants depend on water?
• How can water be used to create energy?

MODULE ASSESSMENTS
• Successful completion of data collection worksheets
• Teacher observation / Conferencing
• Successful completion of the project

LESSON OBJECTIVES
Students will be able to…

• Monitor home water usage for seven days
• Compute data on a spreadsheet
• Find the class average of water used in seven days
• Hypothesize what their water usage is in comparison to the United States and the World
• Submit data to the Center for Innovation in Engineering and Science
• View submissions on a worldwide database
• Collaborate with other schools around the world to compare data
• Analyze cultural water usage differences through the World
MODULE SKILLS

Students will be able to…

- Self-evaluate home water usage
- Categorize data
- Summarize collected data
- Predict results and outcomes
- Report on and analyze outcomes
- Compare the results of different cultures

RESOURCES

- Center for Innovation in Science and Engineering website
- Laptops
- Water use conversion sheet