Glen Ridge Board of Education
Science
Grade 5
Required
Full Year

New Jersey Student Learning Standards

Written by: Amanda Goodwin and Nicholas Simatos
Science Mission Statement:

The Glen Ridge Public School’s science curriculum seeks to inspire scientifically-literate citizens who will be able to participate in a dynamic global community. Our program fosters a spirit of intellectual curiosity and collaborative problem solving that is innovative, experiential, thought-provoking, and developmentally appropriate. Our students will use scientific methodology to evaluate and critique global issues relating to Life Sciences, Physical Sciences, The Sciences of Earth & Space, and Engineering Sciences. Students will be challenged and will be encouraged to take risks and develop critical scientific thinking skills.

Course Description:

Fifth grade students at Ridgewood Avenue School will learn about a multitude of different topics in science. Units will touch on topics found within the next generation science standards. Units will touch on each branch of science, earth and space, physical and life science. In life science students will learn about ecosystems and food webs as well as the water cycle and earth’s systems. In earth and space science the students will learn about the sun, moon, stars and planets. In physical science students will learn about chemical reactions and properties of matter.

<table>
<thead>
<tr>
<th>Name of Course</th>
<th>Unit 1: Spaceship Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Allotted (days of instruction):</td>
<td>33 days</td>
</tr>
<tr>
<td>New Jersey Student Learning Standards (NJSLS)</td>
<td>5-ESS1-2, 5-PS2-1, 5-ESS1-1</td>
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<td>● Why does the sun rise and set?</td>
<td>● Students will be able to determine why the sun rises in the east and sets in the west.</td>
<td>● Students will observe the pattern of the rising and setting Sun. In this Mystery, they notice the similar patterns between two different models. They recognize that the sun moving across the sky is a pattern that can be explained by either model. Students then pretend to be the Earth spinning around on its axis to model how the movement of the Earth is responsible for day and night.</td>
</tr>
<tr>
<td>● Who set the first clock?</td>
<td>● Students will be able to identify the relationship between time and Earth’s rotation.</td>
<td>● Students observe patterns in the change of shadow length and position throughout the day. They use</td>
</tr>
<tr>
<td>● How can the sun tell you the season?</td>
<td>● Students will be able to recognize that the seasons change because of the position of the sun in the sky.</td>
<td>● Students observe patterns in the change of shadow length and position throughout the day. They use</td>
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<tr>
<td>● Why do the stars change with the seasons?</td>
<td>● Students will be able to explain that</td>
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<td>● Why does the moon change shape?</td>
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<tr>
<td>● What are there wandering the stars?</td>
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<tr>
<td>● Why is gravity different on other planets?</td>
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<td></td>
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<tr>
<td>● Could there be life on other planets?</td>
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<td>constellations appear during specific seasons because of Earth’s revolution.</td>
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<td>● Students will be able to determine why the moon appears to change shape.</td>
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<td>● Students will be able to identify wandering stars and their unique characteristics.</td>
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<td>● Students will be able to determine why gravity is different on each planet.</td>
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<td>● Students will be able to identify factors that could make life possible on other planets.</td>
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shadow patterns to determine what time of day it is, without the use of a clock. In this Mystery, students will learn why our ancestors divided the day into hours and how clocks measure the Sun’s apparent movement. Students will make a shadow clock (sundial). |
| ● Students will observe photographs of different seasons. Each photograph will have obvious clues related to the season (autumn/pumpkin, winter/snow) as well as astronomical clues (length of day, time of sunrise). Students will then engage in a class discussion to see how these clues can help to determine what season each photograph was taken in. |
| ● Students observe the seasonal pattern of stars. They note the change of constellations that are visible in the night sky, based on the season. This pattern is used as evidence to argue that Earth is orbiting the Sun, and we only see a part of the night sky at a time. Students will then create a universe in a box to defend their argument. |
| ● Students will consider the phases of the Moon as a pattern. They learn that the orbit of the Moon around Earth causes each different phase. The phases repeat in the same order every 14 days, and then reverse in the same order for another 14 days. The total orbit of the Moon around the Earth takes 28 days, and then the pattern repeats. Students will then use a styrofoam ball as a model of the Moon and a flashlight as a model of the Sun to gain a better understanding of how the interactions between the Sun and Moon are responsible for the Moon’s phases. |
| ● Students use a system model of the solar system to understand the parts (the planets and sun) that make up the whole (the solar system). By creating a scaled model, they are able to observe an immensely large system of natural objects. They learn that by creating scaled models, people can interact with systems they wouldn’t otherwise be able to. Students will create a |
Students will work in pairs to learn about the gravitational pull of the Earth, the Moon, and other places within our Solar System. Students will first measure how high they can jump here on Earth. Then they'll compare this height to how high they could possibly jump on places that have more or less gravity than Earth. Each student will multiply or divide the height of their own jump to figure out the exact height that they could jump in each place. They will create a bar graph of their jump heights and look for patterns to understand that the more massive an object is, the more gravity it has.

Students will consider how the conditions of the Sun and planets in our Solar System can be extended to learn about other similar, but separate systems (other solar systems). Through this, students start to build an understanding of the scale of our Solar System and beyond. Students will work in pairs to plan a space mission to another planet outside our Solar System.

### Resources/Materials
- Chromebooks for Mystery Science Directions
- Brain Pop
- Google Classroom
- Printable Materials and mystery science kit materials from Mystery Science Website
  - [https://mysteryscience.com](https://mysteryscience.com)
  - [https://www.brainpop.com/](https://www.brainpop.com/)

### Interdisciplinary Connections
- English Language Arts (Reading Informational Text) RI.5.1-3, RI.5.7-10
- English Language Arts (Writing) W.5.2, W.5.4, W.5.6-9
- English Language Arts (Speaking and Listening) SL.5.1-6
- Mathematics: 5. OA

### 21st Century Life and Careers
- Standard 9.1 21st Century Life and Career Skills

### Technology Standards
- Standard 8.1 Computer and Information Literacy

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● Exit Slips  
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● Classroom Polls  
● Center Activities  
● Makerspace Activity  
● Worksheets  
● Thumbs Up/Thumbs Down  
● Study Island  
● Mystery Science Extras | ● End of Mystery Assessment  
● Quizzes  
● Projects | ● Study Island  
● Assessments | ● Projects  
● Presentations  
● Models  
● Experiment |

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● Giving assignments orally and visually  
● Ask students to repeat directions  
● Extend test taking time  
● School to home communication system  
● Test modifications- word bank, shortened essay, oral testing, scribe  
● Study Corral  
● Chunked assignments  
● Rest & movement breaks  
● Check-ins | ● GoogleSlide Presentations  
● Create study guides  
● Create Kahoots  
● Extension activities found within mystery science slides |

**Name of Course**

**Unit 2: Watery Planet**

**Time Allotted (days of instruction):** 23 days

**New Jersey Student Learning Standards (NJSLS)** 5-ESS2-2, 5-ESS3-1, 5-ESS2-1, 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3
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| ● How much water is in the world?  
● When you turn on the faucet, where does the water come from?  
● Can we make it rain?  
● How can you save a town from a hurricane? | ● Students will be able to distinguish between fresh, frozen and salt water and the amount of each on our planet.  
● Students will be able to categorize aquifers as a source of freshwater and analyze patterns associated with identifying the location of usable freshwater.  
● Students will be able to reason about how the hydrosphere and atmosphere systems interact to produce rain. Students model the systems to explain how rain is created.  
● Students will be able to reason how the hydrosphere and atmosphere systems interact to produce hurricanes and extreme flooding. They also consider the impact of hurricanes on the biosphere and geosphere system. | ● Students analyze and interpret data from world maps to determine the relative amounts of fresh, salt and frozen water. Students use mathematics and computational thinking to calculate areas on a map and graph values to compare and graph quantities of fresh, salt and frozen water on Earth.  
● Students are asked to determine where is the best place to settle a new town by considering the features of the landscape and what they know about where to find water. Students obtain, evaluate and communicate information from different sources about topography, plants and soil to inform their decision. Students argue using evidence to justify where their town should be built.  
● Students create a model of the ocean and sky (hydrosphere and atmosphere). Students use the model to plan and carry out an investigation to determine how temperature influences evaporation and condensation.  
● Students define the problem that a town needs protection from flooding. They obtain and communicate information about different types of engineers and work as a team to design solutions using their different types of flood protection. Students use mathematics and computational thinking design a solution under budget. |

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<td>Why would a hawk move to New York City?</td>
<td>Students will learn to identify basic relationships between predators and prey.</td>
<td>Students construct models of different food chains by linking cards representing different organisms. The chains are used to explain the relationship between predators and prey. Students argue using evidence and reasoning about which organisms can be linked together and in what order.</td>
</tr>
<tr>
<td>What do plants eat?</td>
<td>Students will determine that all animals rely on plants for survival directly and indirectly.</td>
<td>Students plan an investigation to determine whether or not air has weight. As a whole class, students conduct an investigation to compare the weights of balloons with and without air. Students analyze and interpret data from the investigation to explain what happened and how the evidence may explain how plants gain weight.</td>
</tr>
<tr>
<td>Where do fallen leaves go?</td>
<td>Students will observe patterns in the rates of change in a mold terrarium and classify decomposers role within the food chain.</td>
<td>Students ask questions about what conditions they think will induce and prevent the growth of mold. Students plan and conduct an investigation to test different conditions. Students analyze and interpret data that they record from their experiments to explain how different conditions impact mold growth.</td>
</tr>
<tr>
<td>Do worms really eat dirt?</td>
<td>Students recognize that earthworms are part of a system, a food chain, with other organisms. Earthworms help matter flow back into the food chain. Students will be able to identify earthworms as decomposers.</td>
<td>Students observe worm behavior to help them determine a worm’s role in a garden.</td>
</tr>
<tr>
<td>Why do you have to clean a fish tank but not a pond?</td>
<td>Students will be able to make connections between plants, animals and decomposers in their natural habitat.</td>
<td>Students develop a model to show the flow of energy and matter within an ecosystem. Then, students</td>
</tr>
<tr>
<td>Why did the dinosaurs go extinct?</td>
<td>Students will be able to draw conclusions as to how the dinosaurs became extinct.</td>
<td></td>
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Name of Course

Unit 3: Web of Life

Time Allotted (days of instruction): 27 Days

New Jersey Student Learning Standards (NJSLS) 5-LS2-1, 5-LS1-1, 5-PS3-1
develop a model of a pond ecosystem. They add different living things to the pond, considering what each organism needs to eat and how much carbon dioxide each organism adds or removes from the ecosystem.

- Students develop a model of a dinosaur food web to show how all animals get their energy. They use the model to help construct an explanation about how an asteroid killed all of the dinosaurs.

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| Interdisciplinary Connections | English Language Arts (Reading Informational Text) RI.5.1-3, RI.5.7-10  
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|                              | English Language Arts (Speaking and Listening) SL.5.1-6  
|                              | Mathematics: 5. OA  

| 21st Century Life and Careers | Standard 9.1 21st Century Life and Career Skills  
| Technology Standards | Standard 8.1 Computer and Information Literacy  

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| ● Presentations  
| ● Models  
<p>| ● Experiment |</p>
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<thead>
<tr>
<th>Name of Course</th>
<th>Time Allotted (days of instruction): 25 Days</th>
<th>New Jersey Student Learning Standards (NJSLS) 5-PS1-1, 5-PS1-2, 5-PS1-3, 5-PS1-4</th>
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### Modifications

**English Language Learners**
- Google translate
- Flexible grouping
- Collaborations with other students
- Simplified text
- Drawings and diagrams

**Special Education/504**
- Preferential seating
- Immediate reinforcement or consequences
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- Additional response time
- Giving assignments orally and visually
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- Test modifications - word bank, shortened essay, oral testing, scribe
- Study Corral
- Chunked assignments
- Rest & movement breaks
- Check-ins

**Gifted and Talented**
- GoogleSlide Presentations
- Create study guides
- Create Kahoots
- Extension activities found within mystery science slides

### Essential Questions
- Are magic potions real?
- Could you transform something worthless into gold?
- What would happen if you drank a glass of acid?
- What do fireworks, rubber, and silly putty have in common?

### Student Learning Objectives
- Students will be able to explore how substances undergo change and observe the effect of solutions on a dull penny.
- Students will be able to observe and investigated various materials to determine their makeup. They will

### Activities
- Students plan and carry out an investigation to see which solution will turn a dull penny into a shiny penny. Students develop a conceptual model in order to construct an explanation for their test results. They revise their conceptual model as they develop a more sophisticated understanding of particles.
- Students carry out an investigation to determine what
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<th>Observation</th>
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<tr>
<td>Why do some things explode?</td>
<td>identify that substances are able to change form when mixed with other substances.</td>
<td>happens when they place a steel object in the same solution that turned their pennies shiny in Mystery 1. Students construct an explanation by developing a conceptual model to show how the solution affects the steel nail.</td>
</tr>
<tr>
<td></td>
<td>Students will be able to interpret cause and effect relationship when combining chemicals to produce reactions. Students will be able to conclude that combining two chemicals may result in a change in the substance.</td>
<td>Students conduct an investigation to discover if a reaction occurs when mixing two substances. Analyzing the data, students determine which substances react with acid. Next, students decide how to test unknown liquids to see if they are acids.</td>
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<td></td>
<td>Students will be able to observe and experiment with substances and determine that when acids react with other substances, they form entirely new substances. They will be able to conclude that the new substance can have different properties from the original substances.</td>
<td>Students conduct an investigation to see which chemicals, when combined, result in a chemical reaction. They construct an explanation to share which chemicals reacted and formed a new substance with a goo consistency. In Part 2 of the activity, students make their own goo by mixing the two chemicals which formed a goo-like substance in Part 1.</td>
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<td>Students will be able to conclude combining two chemicals may result in a change when a substance with unique properties is created.</td>
<td>Students conduct an investigation to see what happens when baking soda and vinegar react inside a closed ziplock bag. They develop a particle model to explain their results—that gas particles are created and move outward, causing the ziplock bag to expand or even burst.</td>
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