# **Glen Ridge Public Schools – Science Curriculum**



**Course Title: General Science** 

**Subject: Science** 

Grade Level: 5

**Duration: Full Year** 

Prerequisite: N/A

Elective or Required: N/A

#### **DEPARTMENT MISSION STATEMENT**

The Glen Ridge Public School's science curriculum seeks to inspire scientific literate citizens who will be able to complete in the technologically driven global community. Our program fosters a spirit of intellectual curiosity and collaborative problem solving that is innovative, hands-on, inquiry based and developmentally appropriate. This is done through the study of Life, Physical, Earth & Space, and Engineering Sciences.

Our students will use scientific methodology to evaluate and critique global issues. Students will be challenged and 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 every branch of science including physical, life, and earth. Physical science will focus on light and sound. In Earth science, students will learn about the compositions of the three types of rocks, how those rocks are formed, and changes in Earth's surface. In Life science, students will discuss cells, photosynthesis, and ecosystems and their components. Students will also be able to use science material appropriately and safely while doing scientific investigations.

Author: Stacy Amanna & Nicole King Date Submitted: Summer 2014

# **TOPIC/UNIT I: SCIENCE PRACTICES**

Approximate # of Weeks: 6 weeks

# **ESSENTIAL QUESTIONS:**

- What makes a question scientific?
- How do scientists investigate a question?
- How is science inquiry organized?
- What does a safe science laboratory look like?
- What does Safety First demand of us?

# **OBJECTIVES:**

Upon completion of this unit, students will be able to:

- 1. Identify questions and make predictions that can be addressed by conducting investigations. (NJCCC: 5.1.8.A.3, 5.1.8.B.1)
- 2. Collect, organize, and interpret the data that results from experiments. (NJCCC: 5.1.8.A.1-3, 5.1.8.B.1-2, 5.1.8.C1-3,)
- 3. Communicate experimental findings to others. (NJCCC: 5.1.8.D.1)
- 4. Recognize that curiosity, skepticism, open-mindedness, and honesty are attributes of scientists. (NJCCC: 5.1.8.C.1-3)
- 5. Demonstrate understanding and use interrelationships among central scientific concepts to revise explanations and to consider alternative explanations. (NJCCC: 5.1.8.A.1, 5.1.8.C.2)
- 6. Design investigations and use scientific instrumentation to collect, analyze, and evaluate evidence as part of building and revising models and explanations. (NJCCC: 5.1.8.B.1)
- 7. Gather, evaluate, and represent evidence using scientific tools, technologies, and computational strategies. (NJCCC: 5.1.8.B.2)
- 8. Use qualitative and quantitative evidence to develop evidence-based arguments. (NJCCC: 5.1.8.B.3)
- 9. Engage in multiple forms of discussion in order to process, make sense of, and learn from others' ideas, observations, and experiences. (NJCCC: 5.1.8.D.1)
- 10. Demonstrate how to safely use tools, instruments, and supplies. (NJCCC: 5.1.8.D.3)

# COMMON CORE STANDARDS:

- 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.MB.A.1, 5.MD.B.2

### **INTERDISCIPLINARY STANDARDS:**

- Standard 9.1: 21<sup>st</sup> Century Life and Career Skills
- Standard 8.1: Computer and Information Literacy

# **ACTIVITIES:**

- Design an experiment using scientific processes to complete. Represent these findings using an online poster program (example: postermywall.com)
- Analyze experiments according to the scientific method.

- Follow scientific process from student made questions to outcome.
- Write lab reports based on experiment outcomes.
- Design safety rule posters.
- Make observations of mystery materials, using appropriate senses and descriptions.
- Utilize Chromebooks in daily lessons and activities.

#### **ENRICHMENT ACTIVITIES:**

- Have students outline how they would research the following question using the scientific method: *How does the flu spread in school?* When students have completed the assignment, have volunteers present their outlines to the rest of the class.

- Have students identify a new question that might result from their research. Have them list two variables they would need to consider in order to formulate a hypothesis for the question they identified.

#### **METHODS OF ASSESSMENTS/EVALUATION:**

- Tests
- Discussion
- Posters
- Lab reports
- Experiment outcome

#### **RESOURCES/ INCLUDING ONLINE RESOURCES:**

- -Online Textbook Information: www.macmillanmh.com Online student edition eJournal Vocabulary Games eGlossary eCareer eReview -Teacher Webpage -Activity Lab Book -Reading & Writing Workbook -Science, Engineering, and Technology Workbook -Leveled Readers
- -Brain Pop/Brain Pop Jr.
- -Discovery Education
- -Smart Exchange
- -Websites

Science: A Closer Look, MacMillan/McGraw-Hill

http://www.biology4kids.com/files/studies\_scimethod.html http://www2.scholastic.com/browse/article.jsp?id=639 http://www.unitedstreaming.com/

# **TOPIC/UNIT II: EARTH SCIENCE** (CHAPTER 5 LESSONS 1-5, CHAPTER 6 LESSONS 1-4)

Approximate # of Weeks: <u>12 weeks</u>

# **ESSENTIAL QUESTIONS:**

- How can we describe Earth's features?
- What happens when Earth's plates move?
- How do volcanoes shape the land?
- What are earthquakes and how do they occur?
- How do weathering and erosion shape the land?
- What are the properties of minerals and rocks?
- What makes up soil and how is it conserved?
- What energy sources are available to people?
- How are clean air and water important to living things?

### **OBJECTIVES:**

Upon completion of this unit, students will be able to:

- 1. Summarize the process involved in the rock cycle and describe the characteristics of the rocks involved. (NGSS: ESS1.C, ESS2.A, NJCCC: 5.4.6.B.1, 5.4.6.C.2)
- 2. Utilize various tools such as map projections and topographical maps to interpret features of Earth's surface. (NGSS: ESS2.B, NJCCC: 5.4.6.B.3)
- 3. Interpret a representation of a rock layer sequence to establish oldest and youngest layers, geologic events, and changing life forms. (NGSS: ESS1.C NJCCC: 5.4.6.B.1)
- 4. Examine Earth's surface features and identify those created on a scale of human life or on a geologic time scale. (NGSS: ESS1.C NJCCC: 5.4.6.B.2)
- Determine if landforms were created by processes of erosion (e.g., wind, water, and/or ice) based on evidence in pictures, video, and/or maps. (NGSS: ESS2.A NJCCC: 5.4.6.B.3-4)
- Describe methods people use to reduce soil erosion. (NGSS: ESS2.A NJCCC: 5.4.6.B.3-4)
- 7. Distinguish physical properties of sedimentary, igneous, or metamorphic rocks and explain how one kind of rock could eventually become a different kind of rock. (NGSS: ESS1.C, ESS2.A NJCCC: 5.4.6.C.2)
- 8. Apply understanding of the motion of lithospheric plates to explain why the Pacific Rim is referred to as the Ring of Fire. (NGSS: ESS2.B NJCCC: 5.4.6.C.3)
- 9. Deduce the story of the tectonic conditions and erosion forces that created sample rocks or rock formation. (NGSS: ESS2.B NJCCC: 5.4.6.C.3, 5.4.6.D.1-2)

### **CORE CURRICULUM STANDARDS:**

- 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.MB.A.1, 5.MD.B.2

### **INTERDISCIPLINARY STANDARDS:**

- Standard 9.1: 21<sup>st</sup> Century Life and Career Skills

- Standard 8.1: Computer and Information Literacy

#### **ACTIVITIES:**

- Recognize various types of rocks and minerals through mystery mineral/rock lab.
- Use mineral identification tests (streak, hardness, cleavage, and color) to identify materials.
- Model rock cycle using real material such as sand, soil, gravel, pebbles, and rock.
- Make a rock model based on real characteristics such as color, grains size, and layering.
- Make a model of the ocean floor out of clay in order to recreate ocean floor features.
- Observe and classify landforms and earth features.
- Make a topographical map of a natural landform.
- Create a mountain range out of sand by pushing it together between pieces of paper.
- Make models of different volcano types (shield, cinder cone, and composite).
- Use Discovery Education or BrainPop to watch video clips about earth's geological makeup.
- Make P and S waves using a Slinky.
- Write children's story about a rock that cycles through the rock cycle.
- Create a timeline of a specific rock or mineral's usage through the years.
- Observe crystal growth by keeping a log of daily drawings and measurements.
- Use an apple to demonstrate the layers of the earth.
- Utilize Chromebooks in daily lessons and activities.

# **ENRICHMENT ACTIVITIES:**

- Have students draw a step by step poster of physical and chemical weathering.
- Have students make a visual aid that shows how much of North America was covered by glaciers at the height of the last ice age. Have students also show the current geographic features that were formed by the glacier.
- Have students write a brief report about how triangulation works. Have students explain how it is used.
- Have students draw a diagram showing how one tectonic plate slips under another forming the reservoir that may fuel a volcano.

### METHODS OF ASSESSMENT/EVALUATION:

- Smartboard Lessons (clickers)
- KWL charts
- Thumbs Up/Thumbs Down
- Think/Pair/Share
- 3\*2\*1
- Exit Slip
- Labs
- Class work/Independent work
- PowerPoint Presentations
- Oral Presentations
- Poster/Display
- Tests/Quizzes
- Rubrics for models and posters

### **RESOURCES/INCLUDING ONLINE RESOURCES:**

-Online Textbook Information: www.macmillanmh.com

Online student edition eJournal Vocabulary Games eGlossary eCareer eReview -Teacher Webpage -Activity Lab Book -Reading & Writing Workbook -Science, Engineering, and Technology Workbook -Leveled Readers -Brain Pop/Brain Pop Jr. -Discovery Education -Smart Exchange -Websites http://www.minsocam.org/MSA/K12/K\_12.html http://www.rocksforkids.com/RFK/identification.html http://www.classzone.com/books/earth\_science/terc/content/investigations/es0602/es0602pag e02.cfm http://www.learner.org/interactives/rockcycle/

# **TOPIC/UNIT III: LIFE SCIENCE** (CHAPTER 1 LESSON 3, CHAPTER 2 LESSON 4, CHAPTER 3 LESSONS 1-3, CHAPTER 4 LESSON 2)

Approximate # of Weeks: <u>10 weeks</u>

### **ESSENTIAL QUESTIONS:**

- How do organisms acquire their traits?
- How does energy flow between organisms in an ecosystem?
- How do living and nonliving things interact in an ecosystem?
- How do adaptations help living things survive in their environments?
- How do humans and natural events change ecosystems?
- What are the structure of plants and their function?
- How do humans and natural events change ecosystems?

### **OBJECTIVES:**

Upon completion of this unit, students will be able to:

- 1. Describe how traits are passed from one generation to the next. (NGSS: LS3.B, NJCCC: 5.3.6.D.2-3)
- 2. Explain dominant and recessive traits. (NGSS: LS3.B, LS4.B NJCCC: 5.3.6.D)
- 3. Explain ecosystems, communities, and populations. (NGSS: LS2.B, NJCCC: 5.3.6.B.2)
- 4. Describe how food chains, food webs, and energy pyramid work. (NGSS: LS2.B, NJCCC: 5.3.6.B.2)
- 5. Explain how populations compete and are limited by the resources they need. (NGSS: LS4.B, LS4.D NJCCC: 5.3.6.C.2-3)

- 6. Define habitat, niche, symbiosis, and commensalism, mutualism, and parasitism. (NGSS: LS4.D NJCCC: 5.3.6.C.2)
- 7. Explain structural and behavioral adaptations. (NGSS: LS4.C)
- 8. Describe plant and animal adaptations including camouflage and mimicry. (NGSS: LS4.C, LS4.D, LS1.D NJCCC: 5.3.6.C.3)
- 9. Analyze how changes in ecosystems can cause extinction. (NGSS: LS4.D NJCCC: 5.3.6.C.1)
- 10. Describe the natural and human caused changes in ecosystems. (NGSS: LS4.D NJCCC: 5.3.6.C.1)
- 11. Describe the process by which leaves carry out photosynthesis. (NJCCC: 5.3.6.B.1)
- 12. Describe the structure and function of root, stems, and leaves. (NJCCC: 5.3.6.B.1)
- 13. Analyze how changes in ecosystems can cause extinction. (NGSS: LS2.C, LS4.D)
- 14. Describe the natural human cause changes in ecosystems. (NGSS: LS2.C, LS4.D)

### CORE CURRICULUM STANDARDS:

- 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.MB.A.1, 5.MD.B.2

### **INTERDISCIPLINARY STANDARDS:**

- Standard 9.1: 21<sup>st</sup> Century Life and Career Skills
- Standard 8.1: Computer and Information Literacy

### **ACTIVITIES:**

- Determine success of plants based on knowledge of needs (light, water, air).
- Design a poster illustrating the process of photosynthesis.
- Design an ecosystem using relationships between animals, niches, and other ecosystem characteristics.
- Use paper strips to demonstrate energy flow through a food chain.
- Chart the relationships between organisms in a food chain/web by showing the chain in terms of first, second and third order consumers.
- Observe the adaptations of different types of leaves.
- Observe tree rings and hypothesize what changes in the environment affected the tree.
- -Use chemicals to understand the differences between soil types.
- Determine carbon footprint using online calculators.
- Construct a pond food chain using students to represent each organism.
- Construct a food web poster using animals from the prairie and string to connect each animal relationship.
- Create a stem, leaves, & roots foldable.
- Extinction game
- Utilize Chromebooks in daily lessons and activities.

### **ENRICHMENT ACTIVITIES:**

- Make a diorama of an ecosystem. Include abiotic and biotic factors and several populations of organisms.

- Research examples of mutualism and commensalism among organisms. Write and illustrate a report that includes and describes at least 3 examples of each.

- Research and write a report about plant adaptations from a specific environment.

- Write a story about an animal that mimics an unpleasant or dangerous animal. Describe a day in the life of that animal.

#### **METHODS OF ASSESSMENT/EVALUATION:**

- Smartboard Lessons (clickers)
- KWL charts
- Thumbs Up/Thumbs Down
- Think/Pair/Share
- 3\*2\*1
- Exit Slip
- Labs
- Class work/Independent work
- PowerPoint Presentations
- Oral Presentations
- Poster/Display
- Tests/Quizzes
- Rubrics for models and posters

#### **RESOURCES/INCLUDING ONLINE RESOURCES:**

-Online Textbook Information: www.macmillanmh.com

- Online student edition
- eJournal
- Vocabulary Games
- eGlossary
- eCareer
- eReview
- -Teacher Webpage
- -Activity Lab Book
- -Reading & Writing Workbook
- -Science, Engineering, and Technology Workbook
- -Leveled Readers
- -Brain Pop/Brain Pop Jr.
- -Discovery Education
- -Smart Exchange
- -Websites

http://www.biology4kids.com/files/plants\_photosynthesis.html http://www.realtrees4kids.org/sixeight/letseat.htm http://plants.pppst.com/photosynthesis.html

http://www.nationalgeographic.com/xpeditions/lessons/08/g35/

# TOPIC/UNIT IV: PHYSICAL SCIENCE- LIGHT & SOUND (CHAPTER 12 LESSONS 2 AND 3)

Approximate # of Weeks: <u>6 weeks</u>

#### **ESSENTIAL QUESTIONS:**

- What are the properties of sound?
- What makes sound?
- How does sound travel?
- What is echolocation?
- How does light travel and interact with matter?

#### **OBJECTIVES:**

Upon completion of this unit, students will be able to:

- 1. Find out how a sound wave travels and how echolocation works? (NGSS: PS4.A)
- 2. Learn the parts of a wave: frequency, pitch, and volume. (NGSS: PS3.B, PS4.A)
- 3. Learn that light is a wave and particle. (NGSS: PS3.B, PS4.A, NJCCC: 5.2.6.C.1-3)
- 4. Recognize that light can be reflected and bent and that it has wavelengths and color. (NGSS: PS3.B, PS4.A, NJCCC: 5.2.6.C.1-3)

#### **CORE CURRICULUM STANDARDS:**

- 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.MB.A.1, 5.MD.B.2

### **INTERDISCIPLINARY STANDARDS:**

- Standard 9.1: 21st Century Life and Career Skills
- Standard 8.1: Computer and Information Literacy

### **ACTIVITIES:**

- View YouTube videos to visualize and label parts of a wave.
- Use materials to demonstrate that vibrations produce sounds.
- Use materials such as a radio, wooden table, and plastic bag to show that different mediums can transmit sound.
- Make instruments out of found items in order to create different sounds.
- Determine which carrier (air, water, or wood) would carry sound the best.
- Follow the path of light using mirrors and lenses.
- Create refraction in different materials (water and oil).
- Utilize Chromebooks in daily lessons and activities.

#### **ENRICHMENT ACTIVITIES:**

- Research the effect of temperature on the speed at which sound travels through air. Devise a method to compute the speed of sound at different temperatures. Share results.

- Research photons.

- Calculate the distance of the sun to earth when it takes 8 minutes for light from the sun to reach us.

#### **METHODS OF ASSESSMENT/EVALUATION:**

- Smartboard Lessons (clickers)
- KWL charts
- Thumbs Up/Thumbs Down
- Think/Pair/Share
- 3\*2\*1
- Exit Slip
- Labs
- Class work/Independent work
- PowerPoint Presentations
- Oral Presentations
- Poster/Display
- Tests/Quizzes
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#### **RESOURCES/INCLUDING ONLINE RESOURCES:**

- -Online Textbook Information: www.macmillanmh.com Online student edition eJournal Vocabulary Games eGlossary
  - eCareer
  - eReview
- -Teacher Webpage
- -Activity Lab Book
- -Reading & Writing Workbook
- -Science, Engineering, and Technology Workbook
- -Leveled Readers
- -Brain Pop/Brain Pop Jr.
- -Discovery Education
- -Smart Exchange
- -Websites

http://www.spartechsoftware.com/reeko/moreexperimentssortcategory.htm#Light http://www.fizzicseducation.com.au/experiments/Light%20and%20Sound/Light%20and%20 Sound.html