

2013-2014 Science Curriculum Report Specialist: Sue Cooper

"Science is a way of thinking, much more than it is a body of knowledge" Carl Sagan

Science at Miquon is taught through inquiry based hands on instruction. Students learn best when they are able to discover information about a topic independently and then make connections to prior knowledge. At Miquon one of our goals is to have fun while doing science. If kids are having fun while learning Science, it will uncover a pathway to lifelong curiosity, scientific thinking, observation and discovery.

Starting in the early years and building on these skills throughout their time at Miquon, students begin to ask questions, make predictions and perform experiments to answer questions. In the later years, students further refine their ability to record data and analyze experimental results in more meaningful ways. Emphasis is made on exploring current events in each of the topics covered and also to explore Scientists who have made significant contributions throughout history in these areas of study.

Students in Grades 3-6 come to Science twice a week in half groups for 45 minutes each. At the beginning of the year, Grade 3-6 engaged in a picture reflection exercise to assess student interest on a wide range of scientific topics. This information was used to build a dynamic curriculum that is also aligned with state and national standards. This curriculum was balanced along with ecology, environmental stewardship, the use of the Miquon campus and garden, along with other topics strongly aligned with Miquon's core values.

Curriculum for 5th and 6th Grades:

The 5th and 6th graders began the year in Science exploring Tree Identification and making leaf rubbings. We then explored how rockets work and made model rockets using film cannisters, water and alka seltzer. We moved on to begin a unit on Spy Science. During this unit we studied and learned how to lift fingerprints and even how ear prints left behind at the scene of crime can be used to solve a crime. We then spent some time learning about decomposers and other components of the food chain. Students performed some composting experiments and discovered which variables are important in decomposition. In the late fall we explored a unit on Animal Adaptations. Students worked in pairs to research, make a poster and present orally a specific Animal Adaptation that was of interest to them. Before the first frost of the year, students learned about and then assembled a winter garden structure. Garlic and potatoes were planted in our winter garden. We ended the first half of the year making models of tornados and delving into physical science as we learned about momentum using slinkys on inclined planes. We also learned to read an orienteering map. Students then worked in small groups to make an orienteering course and map on the Miquon campus. The holiday season would not be complete with some consumer science treats. The kids really enjoyed cooking and baking several times during the school year.

Students began the second half of the year exploring Chemistry by studying polymers (green slime and artificial snow). We then performed a series of experiments that reflected the properties of acids and bases. We moved on from Chemistry to study and define the major Biomes on Earth and what types of flora and fauna could be found in each. Exploring our own habitat at Miquon, we learned to identify birds and participated in a campus bird count where we counted and graphed the local bird population.. Students learned about the major Systems of the Human Body, including the Brain and Central Nervous System, The Digestive and Excretory Systems and the Circulatory and Respiratory Systems. In anticipation of the Art and Science Expo, students selected an independent research project and presented their data and results in a poster during evenings festivities. We also spent some time on both student directed and teacher directed current events in science, a community clean up hike and a nature scavenger hunt. We ended the year delving into the study of inheritance as we explored the

intricacies of Genetics. Students really enjoyed learning how to use variable volume pipettes and other instruments that are used in a Molecular Biology lab.

Curriculum for 3rd and 4th Grades:

The 3rd and 4th Grades began the year learning about the Plant lifecycle. Students grew lima bean plants in a clear plastic bag and watched how the seeds sprouted and matured into plants. We also studied the different parts of a plant and learned about all of the parts of the plant that we eat. Students assembled plant art using all edible parts of a plant and were able to sample their creations. We then began a unit on Habitats. We learned about the parts of a habitat and also discovered things that can harm habitats. We played a game called "Habitat Tag" where students formed small habitats of 4-5 people by joining hands and a habitat harmer would have to tag an individual component of the habitat that it affected. This was a favorite game and was requested to be replayed numerous times throughout the year. We moved on to study Earth Science where we learned about extreme weather. Students built models of tornadoes, volcanoes and geysers. Using dry ice, we moved on to study the states of matter. The late fall brought about the study of Spy Science. We studied how to lift and use fingerprints and ear prints to solve crimes. We also played around with secret messages using invisible ink, ciphers and mirror messages. In the late fall we began to study the components of an ecosystem and we learned about the 5 major land biomes on earth. Students worked in pairs to research and create a "biome box" which was a diorama that gave a visual representation of flora and fauna in a particular biome. We ended the first half of the year celebrating world soil day where we collected and observed soil samples on the Miquon campus. Holiday time would not be complete without dabbling in consumer science as we made some tasty holiday treats.

We began the second half of the year exploring Chemistry by studying polymers. We then moved to learn about John James Audubon as a scientist who made great contributions to the study of bird illustration, anatomy and migration. This unit culminated with the students completing a bird field guide. Students also focused their attention to the bird community at Miquon by providing feeders and counting and graphing bird populations. We further expanded our life science inquiry by studying the declining bee population at Miquon and how this is happening on a larger scale all over the world in a process known as colony collapse disorder. Physical Science was also touched on specifically as we studied about Sound and worked to understand Newton's laws of Motion. In the Spring, we moved on to explore our Solar System which culminated with the completion of a written and orally presented planet report. We ended the year studying the human body systems and more specifically delving into the study of inheritance as we explored the intricacies of Genetics.

Curriculum for 1st and 2nd Grades:

Students in 1st and 2nd Grades attend Science once a week for 45 minutes.

The 1st and 2nd Graders began the year exploring the five senses as we mapped our taste buds by sampling foods that were sweet, sour, salty and bitter. Students then began a unit on animal classification where we studied the characteristics and then compared and contrasted reptiles and fish. In the late fall we explored the Miquon campus where we discovered signs that animals leave behind. During this unit students made rubbings of animal tracks. We spent some time in the late fall studying Physical Science where we learned about what makes something sink or float. We made predictions and performed experiments to test our results. While on the topic of Physical Science, we also learned all about magnets. We moved through stations to discover what types of things stick to magnets and if magnets can move through water and clothing. After our unit on Physical Sciences, we explored animal lifecycles. We read the book Bird, Butterfly and Eel by James Prosek and drew our own animal lifecycles. In honor of World Soil Week we collected and separated soil samples on the Miquon campus and identified the different layers. We also talked about what in soil helps us compost. Students observed decomposition over time by performing composting experiments using carrots and paper. The winter would not be complete without a consumer science unit on making holiday treats!

We began the second half of the year exploring Chemistry by studying polymers (green slime and artificial snow). We then moved on to study Physical Science as we explored the properties of Motion

and Light. Life Sciences then became our focus as we began learning about nocturnal animals. This unit culminated with the students selecting a nocturnal animal to study in more detail. Students also focused their attention to the bird community at Miquon by providing feeders, counting and graphing bird populations, and looking closer at migration patterns of local birds. Students leveraged the five senses as we explored the Miquon campus on a listening walk. We also looked for the first signs of Spring! Later in the Spring we moved on to explore our Solar System as we worked together to build of a large solar system, complete with orbiting planets, asteroids, comets and more! We ended the year planting a garden to be harvested by the summer camp. Specifically we weeded, tilled soil and planted peppers, peas, tomatoes, squash and cucumbers.

Curriculum for Nursery/Kindergarten:

Students in Nursery attend Science once a week for 30 minutes. Students in Kindergarten attend Science once a week for 40 minutes. Students were exposed to scientific topics through literature connections and through both teacher and instructor led hands on activities.

Students in Nursery and Kindergarten began the year exploring their five senses as we used scent jars to guess different scents from nature. We also used a "feely box" to feel different items from Nature and to see if we could identify them by just feeling them with our hands. Don't worry we did not use anything gross or scary! We hiked through campus on a listening walk to hear sounds of fall and tried to match shapes and colors on paint chip cards and shape cards. In the late fall we explored the Miquon campus where we discovered signs that animals leave behind. During this unit students made rubbings of animal tracks. We also spent some time in the late fall studying Physical Science where we learned about what makes something sink or float. We made predictions and performed experiments to test our results. While on the topic of Physical Science, we also learned all about magnets. We moved through stations to discover what types of things stick to magnets and if magnets can move through water and clothing. After our unit on Physical Sciences, we compared and contrasted animal lifecycles. We ended the first half of the year using real life models of tornados and the children were enchanted to explore how tornadoes spin and form a vortex.

Students began the second half of the year with a tactile activity of discovering the properties of polymers as we made artificial snow and green slime. We examined chemistry by mixing different substances together to watch how they mix. We made lava lamps with oil, water, food coloring and alka seltzer. Students also made rainbows using milk and food coloring and demonstrated how colors can mix together to make new colors. Building upon concepts from the fall we continued to study animal classification and habitats. Students also learned to identify birds at Miquon and how we can help birds by providing feeders and nesting bags with materials to allow birds to make nests in the Spring. Later in the spring we thought about objects in the sky and made our very own solar system. We ended the year in our garden learning about the plant cycle and what plants need to grow. Students also enjoyed hikes on campus to discover what may be the same and what may be different in winter versus spring. We even helped to clean up some of the trash on our campus that we found after the snow melted.

Lunch Choice and Mini Courses:

During lunch time students frequented the science room to revisit experiments introduced in class, interact with classroom animals or explore the computer lab. I enjoyed this additional time to get to know each of the students. In the fall I co-taught a cooking mini course with Amy which emphasized healthy eating with treats in moderation. In the winter Connie and I ran a sewing mini course where students could engage in independent sewing projects of interest while learning how to use a sewing machine. Hilary and I taught a tap dance mini course that culminated in a student performance at an end of year assembly.

I want to thank the Miquon students, their families and of course the Miquon staff for welcoming me into their community this year as I filled in for Kate Shapero while she was out on maternity leave. I am so grateful for this experience and for all of your friendship and support. I learned so much from each and every one of you. It was a truly amazing year!