

Fern and Mark's Group

(also known as the F-4, for
"Fern's Friendly, Fun and Fulgurant
Fourth Grade")
Curriculum Report 2008-2009

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Our classroom theme, "What Makes Us Human," provided us with a "big question," an overarching umbrella of a topic from which we derived many subtopics to explore. Together with our students and colleagues we shaped these studies through the year. As a starting point we began with the following statements:

- ❖ Humans make things.
- ❖ Humans like to live in groups.
- ❖ Humans grow and change; we learn and develop a wide variety of skills as we become older.
- ❖ Humans make observations of phenomena in their physical world.
- ❖ Humans tell stories to explain what they notice.
- ❖ Humans like to solve problems and puzzles.

Philosophers and scientists alike have pondered this topic down through the years. Questions and theories continue to be proposed today. We only scratched the surface, but it was an interesting itch!

Our group and daily life together

Our theme also provided shape to our daily life together, from the organization of the room and the schedule we followed to the jobs we did on a daily or weekly basis. We used the acronym C.A.R.E.S. to highlight our most important social values: Cooperation, Assertion, Responsibility, Empathy and Self-control. We placed a

value on minimizing our impact on the earth through reusing, recycling, and caring for our campus. We had a set of plates, a dish drainer and plasticware that we washed to reuse (but since the plasticware was made with cornstarch it eventually will decompose). We each had a personal plastic bowl and cup for snack and drinks. Dishwashing duties were shared by the students and teachers at the end of the day. We were happy to recycle paper, glass, metal, and #1 and 2 plastic bottles in the classroom with our combined stream recycling dumpster that arrived this year! We collected other plastics for occasional trips by adults to the large recycling center in Pottstown. We composted lunch food wastes whenever possible, too. In October, we began a year long project that recycled over 2600 juice drink pouches that normally would have gone into the trash stream. Instead, we collected them from the classrooms on a weekly basis. The students peeled off the cellophane bits on the exterior, removed and discarded straws, cut them open, then rinsed and dried them. We shipped them in batches of 200 to Terracycle. Terracycle is a company based in Trenton that prepares these pouches to be reused in pencil cases, backpacks and other useful objects. We were told that we were one of their most energetic recycling brigades, and a reporter called to interview us for a larger article which should appear over the summer in the Lehigh Valley area (we will be watching for the Lehigh Valley Style summer issue on line!). Finally, we

also worked on some stewardship projects for the good of the school. For example in the late spring, we had fun helping Ann with marking our young trees in Monkeyland by making stone rings around them and then later mulching other young trees to help them retain moisture in the summer.

As a small community of 12 students (7 boys and 5 girls) with a shared assistant teacher, our routines and schedule were not always the same as a traditional Miquon group. One regular component of a Miquon Middle group, Table Teams, continued to be a fun and very useful construct for our smaller group. We organized the students into three table teams. These teams changed at regular intervals so that every student was at each of the tables and with every other student at least once and in most cases more than once through the 5 rounds. We divided up the classroom maintenance jobs and the natural world observations and data collection jobs between the three tables so that everyone had turns doing each of the tasks but with enough repetitions during a table team round to feel confident about the expected work. Table teams also served as a convenient and fun way to do some of our academic work as well. We used the teams for practicing skills, reviewing concepts, and generating ideas within game-like structures that kept everyone involved and having fun. These mini-communities had very different personalities, which resulted in both fun times and sometimes conflicts.

Humans learn from each other. We made sure there was time in every day for conversation and connections with each other. We often began the day with a time called “workshop” where students completed morning obligations such as doing the attendance, and reading the morning message. There was time to choose something to do independently as well. Morning meetings were held where we enjoyed a variety of ways of greeting each

other and participated in activities to develop skills of listening and commenting in conversational ways to the stories or thoughts of others. We also enjoyed playing quick games as a whole group such as group juggle and “Detective.”

Due to the size of our group and the need to share an assistant, our daily schedule was quite varied through the course of a week. We used the half group format some of the time so that we would have 6 students in the room for a 45 minute period while the other half would be working with a specialist and then we would have a repetition with the other half of the group. We also had a number of whole group specialist times when it was reasonable or advantageous for the specialist teacher or the classroom. For example, the students had one PE class a week in the half group structure which allowed for skill lessons in a smaller group for both the PE and home classroom group. Later in the week, Bill had the whole group for PE which provided them with a better quantity of students for games while Mark and I had a needed planning session. The students worked with our specialists for a total of nine class segments each week and we had a weekly assembly and mini-courses in the tenth class segment. Mini-courses were offered in three segments over the course of the year. Each student participated in three different classes based on their interests. As an example of the variety of offerings here are the courses offered by our team: Mark worked with Karen, our music teacher, on a range of musical ensembles through the year while Fern helped Tony with a class for exploring the new programming language, Scratch, in the fall; in the winter, she had a small group designing and making “rockets” for an air-propelled launching system; and in the spring, she enjoyed tramping around for the annual Nature Rambles mini-course.

Most human groups are not organized solely by age cohorts so we valued our times with other groups in the school. Mini-courses, all school assemblies, and Reading Buddies (another weekly commitment) with Rossana and Elisa's group were important for making and supporting cross-age relationships for our students. We sat at most weekly assemblies with our reading buddies. Besides the weekly reading sessions where our students read stories and articles to their younger buddies, we also had a few social gatherings and opportunities to be an audience for the other group's presentations. In the spring we arranged several mixed seatings for lunch with the younger Miquon Middles and also with the 5th graders up on the hill. We closed out the year with an indoor set of activities and picnic with our Reading Buddies and on another drier afternoon, we had a serious of silly field day type games, using four combined teams with the younger Miquon Middles.

As teachers, our goals are always to deepen and strengthen each individual student's repertoire of academic, social, and physical skills. We hope to stimulate their interests and awaken new understandings of the world around them. One of the most important arenas for Miquon Middles is the social world. We devote time regularly to this study, to define and refine our understanding of what it is to be an active, productive member of a community. We recognize that the students care deeply about their friendships and the interactions between all the children at the school. It can be a confusing time of experimenting and finding the edges of appropriate language and behavior. We live in a complex and diverse culture, where children are exposed to many contradictory messages. Our students are avid observers of humans in the larger world, beyond home and school. Thus, sometimes they do not fully

understand the messages that they are communicating. We tried to gently help the students consider the power and messages implied in some of their choices for behavior or language that they might not have considered or intended. When a conflict or disagreement occurred, the children involved would talk it through with or without the support of an adult. Other times, it was important for the group as a whole to be able to consider a situation and have an opportunity to problem solve together. Wednesday and Friday afternoons were great times to sit down together and work to build understandings or perhaps to find alternative choices as a whole group in a class meeting.

Traditional Curriculum Overview

Our year-long theme of What Makes Us Human provided focal points for our studies in the classroom. We pursued this theme in a variety of large and small ways, such as our study of infant to toddler development with the monthly visits of a class member's baby brother and mother; our study of honey bees and our own school hive; basic astronomy and the collection of sun, moon, and weather data through the year; algebra, logic and problem solving in math, and research about our earliest ancestors and our primate cousins. These topics were used as we worked to master and strengthen the academic skills necessary for the children to become strong learners. When students reach the middle elementary years, they have already learned a lot of basic skills. We worked to fill in gaps in these basics and to provide the students with many opportunities to solidify and make the skills comfortably automatic. We also looked to extend and deepen their understandings as well.

Reading

Our primary reading goal is for our children to be strong readers. We want them to be successful readers who are passionate about the books they enjoy. These years are a good time to be developing preferences in the literature they choose to read. We also want to help them build strong comprehension skills as much of their learning in the future will involve getting information from print. IRT (Independent Reading Time) was the constant reading activity throughout the year. Students were expected to have a book available at all times, for their own reading pleasure. While teachers checked to make sure the chosen book was at an appropriate level for maximum gains in vocabulary and comprehension, the books were meant for the student to enjoy. In addition, Mark and I read aloud to the students regularly. These books tended to be high interest topics that were more complex than those we hoped the children would be reading independently. We read

The Remarkable Journey of Gustavus Bell by Gloria Skurzynski,
A Hive for the Honeybee by Soibhe Lally,
A Bone from a Dry Sea by Peter Dickinson,
The Lemonade War by Jacqueline Davies,
and short stories by Edgar Allen Poe and Sir Arthur Conan Doyle.

In the fall the teachers conducted 4 guided reading groups to get to know the students reading styles better and to model and practice good comprehension skills. We read Clementine by Sara Pennypacker, Jackson Jones and the Puddle of Thorns by Mary Quattlebaum, and The Jacket by Andrew Clements. In the early winter, the students partner-read a book called Dar and the Spear Thrower. This novel by Marjorie Cowley was written with historical accuracy and was set in the region of France where the Lascaux cave paintings were found. The people in the novel did not live in caves, but

our trip to Crystal Cave in late October was vividly remembered when Dar and his cousin had to enter the sacred cave for their initiation ceremony! For each chapter, the partners would decide on the important events, terms, or images to remember. Each student kept their own folder of notes and then periodically the children would meet in half groups to discuss the previous section that they had read with a teacher. In the last weeks of school, we had a wonderful whole group experience reading Elijah of Buxton by Christopher Paul Curtis. This is an amazing book with the very serious subjects of freedom and community. Elijah narrates his own story and has a wonderful presence and voice. We (the teachers) read it aloud to the class, sometimes in quarter groups, half groups and as a whole group. All the students read along in shared or personal copies of the book. We collected vocabulary and expressions of the times, and made character maps of Elijah. We took notes about the layout and workings of Buxton, an actual community founded in “Western” Canada for escaped slaves from the south. The children also listened to an audio book version for some of the chapters, which added to the richness of the experience for us all. Our discussions were complex and it was great to see the students pausing to jot down their notes independently as we read along.

As stated above, we want all our readers to have strong comprehension skills that they can use both to deepen their enjoyment of reading and to be able to acquire information from what they read. Throughout the year we used a variety of periodicals designed for the classroom to practice comprehension skills such as reading for the main idea, summarizing, and finding supporting details. At the end of the year, the children unanimously endorsed the National Geographic classroom magazine as their favorite for its fantastic images and

interesting articles. They all enjoyed portions of the Scholastic monthly science and language arts magazines, such as the puzzles and “quizzes” and the play scripts that were included in both. Among others, we got to try a version of Poe’s The Telltale Heart and Sir Arthur Conan Doyle’s The Red-Headed League as reader’s theater scripts. These scripts (and the later use of our Mastering Math play script) are very helpful in supporting the growth of fluent readers. Fluency is an important skill for all readers. It has been shown that fluent readers are more successful in comprehension than less fluent readers. By fluency, we mean smooth, well-paced reading out loud. Our goal here is to move the children from that careful word by word type of reading that is most common with emergent readers to the oral speed and added emotional pacing and inflections of a good story read out loud.

Diane, our librarian, began a Miquon Middle book club this year. I was pleased to see that more than two thirds of the group attended at least one meeting and a third of the group were regulars. We met monthly at lunch time in the library and shared favorite books that we had read. We ate lunch together and Diane always had some juice and seltzer for us and cookies as we left to go to afternoon choice time. I was very pleased with our class’ participation and look forward to continuing this activity next year.

Writing

In order to support our developing writers, we provided lots of opportunities for writing independently, with frequent exposure to the sounds and sights of solid, standard written language. We teachers modeled elements of crafting a written piece such as a narrative or a section of a research report. We also gave the students plenty of practice with editing, correct use of

grammar, capitalizations, and punctuation. We worked to develop our vocabularies and understanding of standard spellings (standard? how about *cough, tough, and though?*) by utilizing a variety of methods. In the classroom, we had both regular structures for skill work in these areas and then projects and lessons that were designed to work on specific aspects of writing.

We used the Handwriting without Tears program for cursive work. The children completed all the basic pages for the lower and upper case letter formations. They took their books home for the summer and can use them as they wish for additional practice. In addition, we began a touch typing program called Type to Learn, but with technical difficulties this spring, our group did not get very far. The students will resume this work next year. Keyboarding will become easier and easier as they develop proficiency with touch typing.

We highlighted the words most often written in standard English for special attention and also studied how suffixes and prefixes modify or change the meanings of base words. We worked with a set of fifty common multisyllabic words that together provide an overview of all the most common prefixes and suffixes that we use today. Developed by Patricia Cunningham, these words are called the Nifty Thrifty Fifty Words. We enjoyed exploring them and their relationships with many other words we know and use. In addition, we created a fun list of interesting words called our Oooh-La-La words. These words came from books that we were reading, research topics that we were pursuing, and also just words we found serendipitously like fractoluminescence (and triboluminescence) that we learned while we were at PEEC in February (see below). Fractoluminescence is the type of light we can see in someone’s mouth if they bite on a Wintergreen Life Saver with their mouth open, while standing

in the pitch black darkness. You could try it in a windowless bathroom but we were outside in the February dark, before the moon rose! We also used a vocabulary program called Wordly Wise 3000, to provide some organized practice with learning about words. In the lessons, the students got to think about the nuances of a word's meaning, the synonyms and antonyms for the word and used the words in both reading an article and responding to questions about what they had read. Here we practiced how to answer questions with a complete sentence.

The students created a writing sample each month of school to monitor their growth with standard spellings, and use of capital letters and punctuation. The topic was chosen for them and a graphic organizer was provided to help them collect their ideas before writing. These samples were kept in their compilation binder so they could look back on their work through the year.

The students were expected to write a few times each week in their homework journals. Here too there was no demand for editing and revisions. The stated goal was to expand their finger strength by gradually increasing the amount of time that they tried to spend in continuous writing. We began with just 2 minutes in September and ended with 8 minutes as the goal in May. By the end of the year, some students were comfortably producing more than a page of text. I enjoyed writing back to them each week. Students could write narratives, or create imaginative stories or even just write complaints! The goal was just to keep writing, but in the process, real growth occurred in expression and use of standard traditional writing conventions.

In the classroom, we kept a personal journal called the Reflection Journal. Here we might record observations or thoughts about anything and everything. At times, the teachers might specify or request that the

students write down their ideas prior to a class discussion, but it was also available for the student's use at any other time. On our trip to PEEC, we used our Reflection Journals in both ways. Some of the children enjoyed recording their impressions and used it as a diary of our days in the Poconos. It will be fun for them to pull out and read in the years to come! They also did some lovely writing as we sat around the PEEC campus on a sunny, almost balmy, February day recording sensory impressions of the world around us. These notes were used to create some cool poems too!

Some students naturally gravitate towards writing poetry, but others need to be led. Mark shared a wonderful variety of poems with us in the fall. We all enjoyed reading and listening to these poems. During the March conference week classes, Mark and Karen worked with our group to create "Dream Flag" poems as part of a larger city wide project. The students' actual dream flags were added to the wonderful collection at the Kimmel Center at a ceremony in mid-April, but nicely, we were able to make beautiful color copies of their flags before they left campus. Their poems were wonderful, and all were pleased to show me their work when school resumed after Spring Break.

Numerous times through the school year, we used writing to tell others about an experience or our opinions or what we had learned about a topic. When the work was bound for a larger audience we used an editing sequence. The students created a first draft and then worked to polish it, before putting it in its final form. We encouraged discussing our writing with a peer to see how we might make ourselves better understood. We also looked to teachers and peers for assistance with editing for standard grammar, spellings, capitalizations, and punctuation. Depending upon the purpose for the writing, we would use our dedicated

keyboards and computers to create digital files and documents of the students' work as well.

Our final writing task of the school year was to reflect on all their observations through the year of Zesru's baby brother, Nefri Re, and write a paragraph or two in summary. These writings were polished and reproduced. Each student was photographed holding Nefri Re on his final visiting day, and a print of the photo was mounted with the text that the student wrote. Zesru's mom received a copy of each page as a memento of her year of visits with us.

Math

The NCTM curriculum focal points for the middle elementary years include arithmetic operations with whole numbers, basics of algebra and problem-solving, geometry, fractions and probability. As much as possible, we try to ground our math work in the real world. We welcome opportunities to use math as we accomplish other tasks and goals. Whenever we can, we estimate, measure and calculate as part of our work. We also try to make sure that the children are developing a solid understanding of our number system and place value. Our older Miquon Middle students have already developed numerous basic skills in mathematics. Now is the time to solidify and make automatic the arithmetic skills and other concepts that they have learned. We worked with concepts of place value with large numbers and introduced the idea of decimals as specialized fractions for smaller numbers. Our bake sale and Trick or Treating for UNICEF were both opportunities which provided practice with writing and using decimals in meaningful ways. We reviewed and practiced the basic operations of regrouping for addition and subtraction with larger numbers. We concentrated on mastering the multiplication facts through

the 12's table, and presented the division facts as the reverse of the multiplication facts.

We began the year with an exploration of some basic properties of Algebra. Our activities came from a GEMS handbook developed by the Lawrence Hall of Science in Berkeley, California, entitled Algebraic Reasoning, Prof. Arbegla Introduces Variables and Functions. We had a lot of fun with Prof. Arbegla's "machines" that would take one number and produce a different number. Over time, the children became quite proficient with figuring out what was happening inside the function machines. We found a set of puzzles called Wollygoggles that similarly would name groups of numbers that had a specific relationship and by comparing the numbers that were in the group with numbers not in the group, the children would determine the "rule" or operation that was being used to create the group. At the end of these lessons, we had an introduction to the distributive and the commutative properties, as we figured out her more complex machines.

A second topic for this year was probability. We used a Marilyn Burns "Math By All Means" book which had some great games and explorations to introduce some basic ideas concerning probability. The children really enjoyed making and testing their spinners to see what was the likely outcome for a given design. We often combined our data to get a better understanding of the results.

We tackled problems of various types and looked for different ways to solve them. Our play, ostensibly about Sherlock Holmes, was actually a review of standard methods of solving math word problems. Just mentioning the words "guess and check" or "work backwards" would elicit a chorus from one of the songs in the play as we tried to figure out the word problem. (Singing is quite a powerful memorization

tool!) Along with solving word problems, we introduced deductive logic puzzles that required extracting clues from the text to figure out a series of connections, such as which child lived in which house or which person had which pet. In these problems, organizing the information into a chart was a key tool to figuring out the answers.

Our final big focus mathematically was a review of fractions, mixed numerals, improper fractions and comparisons to determine equivalence. After a bit of drawing and comparing the parts of different things we settled down with Cuisenaire rods. It was neat to see the children reacquaint themselves with these colorful old materials and over time develop a sense of the proportional relationships between the rods so that they did not have to line up the actual rods or count them out with the white rods (the smallest ones at 1 cm³) in order to solve the given puzzle or math sentence.

Research Studies

Children are born learners and researchers. They are constantly asking questions and trying to figure out how things work. In the middle elementary years we work to shape those natural inclinations into methods that allow for deeper inquiry, organization of acquired information, and ways to retell what we have learned to share it with others. Although there were many opportunities for quick research and figuring out a specific query, we had three basic stages to our research practice. In the fall, we learned about bees as a whole group and the teachers crafted text from their learnings to model the organization and drafting processes. In the winter, we worked in half groups and pairs to do some joint research about Early Modern Humans to practice these same skills. Finally in the spring, the students each did research on their own by studying a chosen primate species.

Our goals for the study of the honeybees were to collect information to teach others about our school's hive and bees, to understand the honeybees as social insects, and to appreciate the importance of honeybees to humans. We interviewed Diane and read the novel, A Hive for the Honeybee. Although the author gives the main character bees individual personalities and feelings like humans, the story does portray the life of the hive and honeybees accurately. We watched a NOVA DVD, Bees, Tales from the Hive, and took notes to collect factual information. We compared this data with information from a variety of reference books here in the classroom, and from selected internet sites. Whenever possible during web searches, we discussed how we could decide if a web site was useful or accurate. As a group we decided on the main themes we wanted to present on our information boards and pooled the information that we had gleaned. Students chose topics of personal interest and worked in a group with a teacher to finalize the texts. Mark and I wrote down their ideas and modeled how to organize and craft their ideas into sections and paragraphs. The students created images to include on the posters, as sketches and diagrams are both useful ways of conveying information.

Starting in December, we began to look at our primate ancestors, the early hominids. We then focused in on *Homo sapiens*. Here we had already been learning about the Leakey family and other anthropologists and archaeologists. We were reading Dar and the Spear Thrower, and the read aloud, A Bone From A Dry Sea which gave us fictional representations of what we were going to research. We viewed a DVD, called First Farmers, which enacted early *Homo sapiens* family groups and their life styles in the area we now call the Fertile Crescent. It also featured commentary by actual anthropologists and archaeologists

discussing the rich and early finds in caves on Mount Carmel which led to our understandings of the transition from hunter-gathers to agricultural communities. We used the phrase early modern humans to describe the subjects of our research, when humans were still wandering and living in small family based groups of hunter-gathers. Here we divided the class into two groups, our historical writers and our archaeologists. Each group had a parallel series of questions and a set of sub topics to investigate. Students worked in pairs to collect information about their particular subtopic, such as food sources for early modern humans or what can be learned from fossilized bones. Mark and I served as guides and readers when the books or web sites were complex. Each partnership drafted and edited some text with supporting images to report on their findings. These small “reports” were then assembled as two triptychs of information from the point of view of Historical fiction writers and Archaeologists. The students also divided their information to make oral presentations to our reading buddies about what we learned. We digitally recorded our presentations and later viewed the video to analyze our speaking styles.

Our final research project involved having each student choose a specific primate species to study. We began with general information gathering about primates. The students visited the Philadelphia Zoo, and viewed portions of the BBC series on Mammals to learn about primates. Conveniently, the lead article in an issue of our monthly National Geographic Explorer classroom magazine focused on the island of Madagascar which has many fascinating primates. All of these sources led us to the point of primate selection. In the end there was only one instance where more than one student wanted the same primate, and we had to use “rock, paper, scissors” to

decide. We had primates from around the world, and of every size! The students were charged with learning about four general topics in relation to their primate. They were asked to:

- ❖ Find out about the habitat requirements and location of your primate. Be sure to include the climate and geographic location along with a description of the primate’s ecological niche.
- ❖ Describe your animal fully. Be sure to include a description of its life cycle and habits.
- ❖ Describe the environmental issues it faces both now and in the past.
- ❖ Tell us how it is similar to and distinct from *Homo sapiens* (us).

Students used internet resources and many books for their information. They collected notes based on their findings on note cards or on paper in a spiral bound notebook. They drew and traced images of their primates and printed out pictures from web sources to use in their visual displays. From their data, the students organized their notes by sorting the information into the four categories of the original plan. Sometimes they learned that they had not really found very much about a specific subsection and had to do some more research to flesh out a topic. Once the notes were sorted, they then organized their information into a reasonable sequence and crafted a topic sentence for each section. We followed the pattern of drafting and revising with peer and teacher conversations, and then final editing for standard spellings and conventions of written English. Developmentally, the most difficult tasks for our students were organizing their notes and creating interesting, general topic sentences for each paragraph. They especially enjoyed the final stage of our primate work as they made their “lazy susan” three dimensional

displays to present their primates to each other.

Thematic Work

Here is a reprise of the statements we used to begin thinking about our question, What Makes Us Human:

- ❖ Humans make things.
- ❖ Humans like to live in groups.
- ❖ Humans grow and change; we learn and develop a wide variety of skills as we become older.
- ❖ Humans make observations of phenomena in their physical world.
- ❖ Humans tell stories to explain what they notice.
- ❖ Humans like to solve problems and puzzles.

We used these statements to begin our thematic work and approached them in a variety of ways through the year.

Our first writing project was to describe something that we made over the summer. The children brought in the object and wrote a clear description of the process of making the object. We made things at school too, singly and as a group. The students each worked on sewing and decorating a fabric pillow with buckwheat hulls for the filling, to use in their chairs in the classroom, or on the floor at Read-Aloud times. Together with Tony in Science, we built an outdoor sign board with spaces for four informational posters. Currently, it is positioned outside the library near our bee hive and contains our research about honeybees. We made a giant marble board as a class to bring back an old Miquon Spring Fair game. It was a very popular activity at the fair. We nailed lots and lots of nails! Everyone in the class helped, even Julia stopped in to hammer some nails for us!

Our social understandings were broadened as we lived and worked together through the year. We worked and played

with all the other children on campus. When problems in Monkeyland became distressing, we participated in a whole school process that led to a Monkeyland Summit. We involved everyone at the beginning in classroom based good of the school meetings to explore the issues. Then, each class group sent representatives to a special set of meetings to work out an agreement that we would all try to honor as we played in Monkeyland. Our delegates kept us informed as the work progressed. Just about everyone was pleased with the end result! With some of our big projects during the year, such as our musical, the children learned that they could pull together and work hard to make an event or project a success! Our read-aloud, The Lemonade War, gave us many incidents and vignettes to discuss as the brother and sister square off competing to see who can make the most money selling lemonade. It was both a funny and kid accurate depiction of modern middle elementary life!

Our monthly observations of Nefri Re were very useful in helping us realize how humans grow and develop. On his first visit in early October, he was alert, but basically lay on the floor in the center of our circle, or was held in his mother's lap. Over the course of his 8 visits, he became much more independent and able to maneuver on his own. When he joined us for a picnic at the start of June, he was walking! The students took notes, asked many questions of his mother, Baiyina Brown, and had a wonderful time with this beautiful, happy baby who we watched develop into a unique individual with preferences and abilities as a young toddler!

We made many observations of phenomena in our natural world. Each day, at approximately the same time (noon during Daylight Savings Time, and eleven AM during Standard Time) we made measurements and recorded weather, nature

and bee observations in our daily Almanac page. Every day that it was possible to do so, we made three types of measurements of the sun: the sun's angle, shadow, and reflection. Using a sextant, we measured the sun's angle above the horizon. The earliest measurements in Sept. were at about 57 degrees above the horizon. On the last day before the Winter Assembly that we got a reading, the angle was about 30 degrees. When we returned from Winter Break it was still at 30 degrees. Right before Spring Break it was at 54 degrees and the last reading we got before the end of school was 75 degrees! Using a BIC pen mounted on a wooden board as a gnomon, we recorded the length and direction of the sun's shadow. We found our gnomon was too short to see much variation over the course of the year, so we had to stop sometime in April. We would need a different procedure to get to see the changes in the sun's location and the length of the shadow. Indoors, we marked the spot on our classroom ceiling where a reflected square of sunlight was. The small mirror stayed in an outlined location on the end of the table near the window. But the spot on the ceiling traveled across the Science area and then we had to hang a posterboard off the edge of the loft as the reflection went so far into the room, we would not have been able to get up to the ceiling to mark it! The marks left an interesting loopy path! Unfortunately, by the end of the school year, the sun was too high in the sky for the light to come in to hit the mirror to make a reflection on the ceiling, so this activity ended in May. We also kept track of the sunrise and sunset actual times for our zip code in Conshohocken and on Wednesdays we colored in a line on a chart to represent the amount of daylight and darkness. This graphic display showed how the amount of daylight decreases to the Winter Solstice and then begins to increase again. It is still increasing now as I write this

and we approach the Summer Solstice. The children also charted the daily indoor and outdoor temperatures and humidity levels, the phases of the moon, and the clouds and wind levels along with any precipitation.

Along with the phases of the moon, we began to learn about the constellations and planets. Ancient peoples noticed that some stars did not stay in their patterns, these are our planets. The Greek word that became "planets" meant literally "wandering stars!" The Franklin Institute has a monthly event called Evenings in the Observatory, which we tried to make use of through the year. We invited families to come out and join me there for the planetarium show and other presentations, plus on any night when it was at all feasible, the roof top observatory was opened and the telescopes were all aimed and in use. Many of the families were able to come out for one of these evenings. We used Starry Night software in the classroom to explore the common constellations of the winter night sky in our location in preparation for our own Family Star Watch event.

Unfortunately, because of illness, we had to postpone the event until January. We had a beautiful clear sky....but yes, that meant it was also bitterly cold! Each student had some family members present to teach about the constellations. We used the hillside at the edge of the horse farm for a great open expanse of sky! The children, Mark, and I went up in the early evening before supper to practice, and then after supper we returned with their families. This allowed us to note the rotation of the earth because the constellations were not in the same location where we had spotted them earlier. That was cool! Venus was very bright and easy to find, too. In February when we were up in the Poconos, we met with an astronomer there and the children acquitted themselves very well, answering most of his questions, and asking thoughtful questions of him. We

could see more stars there as it was much darker, but then clouds moved in. So we did more viewing in his classroom sized inflated planetarium that we had to crawl into! Later, after he went home, the skies cleared again. Several of us sat out on the benches in front of our cabins to use binoculars and look at the full moon rising up before we went to bed.

In early January, we began our studies of the earliest modern humans. We approached this study experientially, through fiction, and by doing research. A new Miquon parent, Dan Stanchfield, kindly spent a January afternoon with us teaching us how to make fires with friction and tinder. He had a variety of bow drills for us to try and we made several little fires in a cleared space near the crabapple orchard. The fire's warmth was welcome on that cold, windy day! Later in March, we visited Prof. Tony Ranere's anthropology lab at Temple University for a wonderful morning. He shared actual ancient stone tools and facsimiles of some more fragile stone arrow points. He is an accomplished maker of stone tools and demonstrated his craft with both argillite (a local rock that is fairly easy to flake) and obsidian which can create edges so sharp that it is very easy to cut flesh! We loved his story of how he made surgical tools for a fellow anthropologist who wanted his own surgery to be done with a scalpel made from stone! The students each had a turn making some flakes of argillite, and all came home with their treasures! We also spent some time in their small museum area, viewing artifacts and displays from student research out in the field. In the classroom, we learned a bit about the Leakey family and their research in East Africa. We looked at timelines to appreciate the relative age of the earth, earliest signs of life on our planet and the youthfulness of Homo sapiens in comparison. We used our reading group

work with the story of Dar and the Spear Thrower and our read-aloud book, A Bone From a Dry Sea, with the twined plots of the modern child visiting her father at an anthropological dig site in Eastern Africa and the story of the ancient primate girl who begins to think and solve problems facing her kin group. The author, Peter Dickinson, weaves in an eruption of a volcano creating an ash fall that is part of the impetus for the group to move away from their home area to seek a better environment. The students were excited and immediately recognized the link to the novel when we learned of the actual discovery of ancient bipedal footprints fossilized in rock strata found by Mary Leakey and her son Philip in 1976 at Laetoli that indicated bipedalism as early as 3.5 million years ago. In PE class, Bill allowed us to experiment with dog throwing tools that somewhat mimicked the action of the spear throwers, or Atl-Atl's. We greatly enjoyed the archery portion of the PE curriculum for its connections with our studies! Diane also joined our theme, sharing a novel set in early times!

Our trip to PEEC (the Pocono Environmental Education Center) was prompted by a desire to experience the world of the early modern humans, to be in a space where we could imagine the lives of our earliest ancestors. Our own urban skies are dimmed by all the surrounding lights so we were trying to find a location within travelling distance where we could do more studying of the night sky. We also wanted to stretch ourselves, to be in a winter environment where we could look with new eyes at the world around us. We planned our trip for mid-February, right before the Doldrums long weekend. At PEEC, this was a down period in their schedule as they brought in and trained new staff. Consequently, we were the only school group there and they used our group for some of their training needs. We received

some deductions in the cost of the programs we chose and we had the luxury of lots of extra adults to hike and explore with us. Our students made a great impression with their curiosity, broad background knowledge, and good-natured high spirits. We arrived at mid-day on Tuesday and stayed through lunch on Thursday. We did a lot of hiking and examining of low plants, trees and rocks, and signs of animal activity. One highlight was the bear scratching post tree on the other side of the big pond. The scratch marks extended higher than any of us could reach! One evening we had a visit from two wildlife rehab folks who shared stories and animals that they currently have in their facility, and the second evening we visited with an astronomer from a local college. The weather cooperated for the most part, except for the rainy and cloudy evenings. Mark and I each supervised a set of connected cabins, so the boys had a two bathroom bunkhouse and the girls had the same. The children cleaned up after themselves and we passed our closing inspections with ease. It was a wonderful experience for us all.

We spent time throughout the year looking at various ways that humans make use of their thinking abilities. We learned how different animals have ways of thinking too. We focused in on our closest cousins, other primates, for more direct comparisons. The NOVA show, Ape Genius, was full of fascinating information and vignettes showing how few areas of divergence there are between us and the other great apes. The footage of the mother chimpanzee carrying her dead infant for months as it became dessicated was so sad. We marvelled at how orangutans in a rescue area enjoyed washing socks and using a saw on a wooden plank, mimicking human actions that they had observed. We visited the Philadelphia Zoo during the March Conference week period as part of our information gathering phase.

We looked at how humans solve a variety of problems with The Lemonade War and our class musical play, Mastering Math. Besides the challenges of presenting a play with 18 characters and only 12 actors, we got to solve numerous problems using various standard strategies for dealing with word problems! Both the novel and the play gave us many examples of mathematical problem solving. Because the play used the idea of a young and untrained Sherlock Holmes, we also spent some time exploring Sir Arthur Conan Doyle's creation through stories and then video examples, from both Disney and the BBC!

Conclusion

So, what makes us human? In their end of the year reviews, the students wrote down how they thought humans were different from other living things. Here is what they said:

DB: speaking and writing, poetry, singing, making and playing musical instruments

J-LR: write, read, talk, type, build buildings, drive, stand upside down, play sports, juggle, and cook

DS: schools, technology, food, and clothes

JM: harnessing electricity and our super intelligence

NG: Language, organized games, technology, school, vehicles, and so much more

SL: Personality so we can be funny and make up a lot of things

DG: Want for freedom, intelligence, humor, mourning death (remember all great apes share this.)

LCM: abilities like walking on two legs, making all sorts of foods, and we are able to live in any surroundings.

ZE: flexibility and opposable thumbs

JY: houses, schools and using words

YN-S: personalities, making things up, creating things, we can write and we have electricity

GI-H: opposable thumbs, shelters,
communities, we watch TV, we learn from
teachers, we cut down trees to make paper.

What a year! It raced by! I am very
appreciative of the things I learned from and
with our students. I am grateful for the
energy, patience, and enriching knowledge
and perspectives of my new assistant, Mark;
the extra time shared in our classroom from
Joan and Tammy; and all the collaborations
with our Miquon specialist teachers. It has
been a rich and rewarding year! Thank you
parents as well, for all your support and for
sharing your children with us.