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Cambium

VOL. 4, NUMBER 3

INNOVATIVE K-8 CURRICULUM FROM THE ARBOR SCHOOL OF ARTS & SCIENCES

BIG IDEAS FOR CURIOUS MINDS

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It turns out that the most important work in developing a curriculum is deciding what NOT to teach. At Arbor School we have not been afraid to assert that some ideas are more worthy of consideration than others. When imagining what is attractive to young children by way of curricular content, it is easy to fall victim to simplistic thinking. Since the children are small and immature, the concepts and content they are thought to be able to manage can end up being narrow and unsophisticated. Subjects so local and limited as to defy a bright-eyed child's deep curiosity litter elementary curriculum binders. One of our central beliefs, however, is that students care about and therefore deserve to learn about big ideas, seminal ideas. From the start it has been our intent to devise a meaningful curricular framework that asks students to engage deeply with the concepts that form the backbone of the disciplines. These concepts, in increasingly refined and elaborated iterations, spiral up through the class levels. While review of that framework is constant, the long threads that we first identified as essential continue to form the tapestry of the children's studies. Critical ideas, concepts, and works from history, science, and literature constitute the thematic core and are played out over the nine years a student spends at Arbor.

We thought long and hard in the construction of the school's thematic

curriculum about just which conceptual threads ought to be picked up for the elementary school-age child. In devising each step of the curriculum, multiple considerations came into play. Are the ideas generative for the age child we wish to engage? Are the topics ones these students can come to care about? Are they dynamic enough to allow for in-depth study with ample room for individuals to make choices of importance to them? Are they rich and stimulating, with opportunities to create connections across domains and disciplines? What fundamental concepts are at work that can be built upon as the child matures? Are those concepts central and lasting? How can the ideas be used as vehicles for inquiry and expression, as topics for reading and writing, as sources for mathematical exploration, as material for rendering with line and color, for fabricating in three dimensions, for transformation through music?

To meet the surprisingly wide-ranging palates and marvelously global wonderments of children, we created a program that focuses on big ideas, on topics that can be linked under the umbrella of still larger central themes
continued...

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ARBOR SCHOOL
OF ARTS & SCIENCES

in human understanding — on seasons and cycles, energy and motion, communities, inventions and discoveries, pattern and diversity, cultures of the world. We ask students to think about the Sun and shadows, the reasons for the seasons, the adaptive advantages of camouflage and mimicry, the role of plants on the face of the Earth, the sea change that Galileo and company engendered in our understanding of our place in the cosmos, the phases of the Moon, the cascade of events that followed the Louisiana Purchase, the flow of energy in nature, the connections between physical geography and culture, the conditions that preceded the emergence of the notion of natural law, genetics and evolution, the forces that bind humankind into societies, Newtonian mechanics, the physics of static structures, the structures and systems of animal organisms, a selection of the defining stories — from the *Epic of Gilgamesh* to the *Mahabharata*, from the *Odyssey* to Anansi tales — of the world’s peoples, the rise of the monotheistic religions, geologic time, and what we understand of the workings of our own minds.

In this issue you will get a glimpse of how the knowledge and creativity of faculty members bring these larger themes to life. Drawing together their deep understanding of the developmental realities of each age group and a well of background knowledge that grows with each encounter with the subject matter, Arbor teachers plan irresistible experiences for their students, building strong structures of skill and knowledge and understanding.

–Kit Abel Hawkins

Some resonant resources for curricular design in light of child development:

Ames, Louise Bates and Frances Ilg. *Your Five-Year-Old: Sunny and Serene, Your Six-Year-Old: Loving and Defiant*, and subsequent volumes on older children

Elkind, David. *A Sympathetic Understanding of the Child: Birth to Sixteen*.

Wood, Chip. *Yardsticks* series

The Arbor School Theme Cycle

Primaries (K-1)

Year 1: Seasons & Cycles

Plant Cycles: Seeds, Roots, & Shoots; Flowers & Fruits; Decomposition; Seasonal Change

Critter Cycles: Animals Preparing for Winter; Frogs, Butterflies, & Chickens

Human Cycles: Houses Around the World; Human Body Systems; Winter Solstice

Year 2: Journeys

Sink & Float: Boats; Imaginary Journeys; The Mayflower

Migrating Animals: Whales

Greek Mythology: The Journey of Odysseus; The Golden Apple

History of Arbor School

Juniors (2-3)

Year 1: Change & Continuity

Geologic History, the Rock Cycle, Earth Science

Weather: Clouds, the Water Cycle, Wind, Temperature, Storms

Time: Clocks & Calendars

Year 2: Communities

North American Physical Geography & Paleontology

First Americans, First Oregonians, Human Migrations

Colonization, Lewis & Clark, the Oregon Trail

Early Settlement of Portland

Portland Bridges

Intermediates (4-5)

Year 1: Environments

Plant Experimentation, Botanical Drawing
Ecological Niche, Habitat, Adaptation
Cycles: Water, Photosynthetic, Food Chain
Measurement, Graphing, Scale
Ecosystems, Biomes, Climatic Regions
The Human Body
Scientific Classification of the Biological World
Oceanography
Observational Writing
World Folktales

Year 2: Inventions & Discoveries

The Ancient Western World (Sumer, Egypt, Greece, Rome)
Early Developments in Writing, Counting Systems, Building Principles, Astronomy
Mythology, Epic Poetry
Ancient Architecture
Density, Mass, & Volume
The Middle Ages in Europe
The Rise of Islam
The Three Estates of Medieval Society
Arthurian Legends & Historical Fiction
Tessellations & Stained Glass
Simple Machines & Fundamental Mechanical Principles
The Renaissance in Europe
Brahe, Copernicus, Galileo
The Mathematics of Science
The Printing Press
Portraiture
Optics
Mapping
Biography

Seniors (6-8)

Humanities: Peoples of the World

Year 1: South Asia, Sub-Saharan Africa, China

Year 2: The Americas

Year 3: Eurasia

Science

Year 1: Pattern & Diversity

Rock Cycle, Paleontology & the Fossil Record, Plate Tectonics, Evolution, Genetics

Year 2: Energy & Motion

Newtonian Mechanics, Electricity, Light/Sound/Water Waves, Renewable Energy

Year 3: Systems & Structures

Biology, Chemistry, Human Nervous & Endocrine Systems, Strength of Materials

DON'T THROW THUNDERBOLTS

THEMATIC PLANNING & TEACHING IN THE K-1 CLASSROOM

by Felicity Nunley, grade K-1

It's early May in the Primary Nest and the children are at work in the classroom. During this morning Choice time, some children are in the dress-up area donning togas and drinking from a golden goblet, re-enacting the story of the Golden Apple. Several children are practicing writing their own names and their parents' and their pets' names in Greek. One child is writing a book about mythological Greek creatures, carefully drawing nine heads on a hydra. At tabletops, some children are building temples, using blocks from the block area, erecting cylinders and rectangular prisms on a large sheet of graph paper, carefully balancing a triangular pediment on a row of columns.

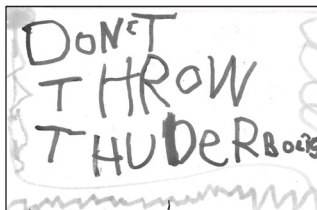
During this part of the day, the line between work and play is especially blurry. But looking at the same scene again, we see children reading, writing, researching, retelling a story, and gaining familiarity with geometric solids. And almost without exception, the children are absorbed in their work — work that is entirely elective and a productive extension of work they began during more structured class times.

Making the hard work of learning to read and write compelling, something one yearns to do during one's free time, is the magic of teaching thematically. The theme of the classroom provides a rich and compelling context in which to build the burgeoning skills of young readers and writers. Imagine the thrill of the five-year-old who, guided by the strong clue of the initial letter, recognizes the word "Zeus," or the beginning writer who finds himself able to hand-letter a sign for the dress-up area to remind the gods and goddesses, "Don't throw thunderbolts." Indeed, the theme is the soil that nourishes the habits of mind we hope our young students will develop.

Some people are surprised to learn that we study Ancient Greece in the kindergarten and first-grade classes at Arbor. In fact, our study of the Greeks is one of the richest themes we undertake. The tales of the imperfect gods and goddesses, jealous, greedy, and selfish as they often can be, are endlessly compelling to young students who are themselves learning to share and work in close concert with others. Sharing such stories is central to building our classroom community and our collective knowledge, both social and academic. As natural collectors of facts and statistics, K-1 students savor the details of each god's exploits and affiliations; they love to craft cards or booklets of the complete set of the twelve Olympian heroes. And needless to say, the material provides rich fodder for integrating reading, writing, and math.

So how to start? The yearlong themes that frame the K-8 curriculum at Arbor are broad and general, but rich with possibility and content. In one of the two rotating Primary class themes, the children study Journeys, exploring territory real and imagined, near and far. Just as the child is reaching a developmental point at which she is ready to make the stretch from home to school, it is appropriate to introduce her to the "home-adventure-home" cycle in literature, science, and history. Our year begins on the water as we consider the properties that allow a vessel to float and immerse ourselves in the story of the Mayflower, of a handful of families making a great ocean crossing to find a new home. We study the migrations of whales, the most remarkable sea-voyagers of all. Finally, we turn to the venturesome Greek heroes of old: no greater example of "home-adventure-home" exists than the *Odyssey*.

Whether we are studying the Greeks, boats, or the human body, the process of designing a thematic unit is the same. It is an exercise in editing — deciding what is essential and captivating content and what is of particular use to further our curricular aims. During the process it is important to keep asking critical questions: *Is it authentic? What is the real work that is being accomplished?*



1. Identify central curricular concepts

Remembering that the theme really serves the larger purposes of the curricular goals, my teaching partner and I broadly outline what we would like to accomplish in a year with this batch of students. In the kindergarten and first-grade classroom, our large academic purposes are that students learn that reading and writing have real purposes; that they experience that the world can be quantified and develop tools and strategies for mathematical expression; that they start to recognize and anticipate patterns, understanding that the world has order; and that they maintain and feed their sense of wonder about the world.

To study Journeys throughout the year provides opportunity to serve all these aims. Noticing and mapping landmarks on the ride from home to school encourages looking out the window of the car and getting to know one’s own particular landscape. Keeping a journal in the voice of an actual passenger on the Mayflower provides motivation to practice new writing skills. Learning about the feats of migrating animals inspires wonder in us all. Reveling in ancient tales of skullduggery and derring-do, in the bravery, wit, and persistence of characters in the oldest stories, nourishes children’s imagination and developing sense of ethics.

Traditionally, we have studied the ancient Greeks during the spring semester. At this point in the year, many of our students can practice reading with expression, summarizing stories, and articulating the main message of a story. Other readers are starting to recognize words and continue to use picture clues and context to make meaning from a text. At this point, we have practiced letter formation and are ready for longer pieces of handwriting practice, paying particular attention to end punctuation and conventions of capitalization. Mathematically, the Primaries are ready to explore and codify the properties of shapes and geometric solids. Also, we are ready for an introduction to multiplication and division, as well as continuing to write and solve our own word problems.



2. Educate myself

When turning my attention to the thematic content, I allow myself a good amount of time to stew. Our topics are genuinely rich for learners of any age, and the children can sense their teachers’ authentic interest. I read adult and children’s books about our themes and try to immerse myself in the topic. When planning the Journeys year, I am sure to take a few myself, documenting the steps of my journey to share with my students in the fall. What better excuse to spend some time messing about in boats than preparing to teach about boats? In the spring, I reread the Greek myths, eat Greek food, sift through artifacts from a long-ago trip to Greece, and look up the current temperature in Athens.

3. Draft

As I stew, I jot down notes, thinking of possibilities, but commit to nothing. Often this takes the form of a web or a hasty list. After a while, I look back at my jottings and evaluate what seems essential, what might be especially attractive to this particular group of children, and what might lend itself well to our curricular priorities. As I look over my notes, I ask myself, “Is there a balance of academic, pencil-and-paper

Kiko, Charlie, and Levi prepare to perform in “The Golden Apple,” a beloved play written by two Arbor Primaries who are now in college. See “What Could Be Wong With Such Wuv?” in Cambium Volume 2, Number 3, “Arts As Core Content.” Back issues of Cambium are available for free download on our website: www.arborcenterforteaching.org.

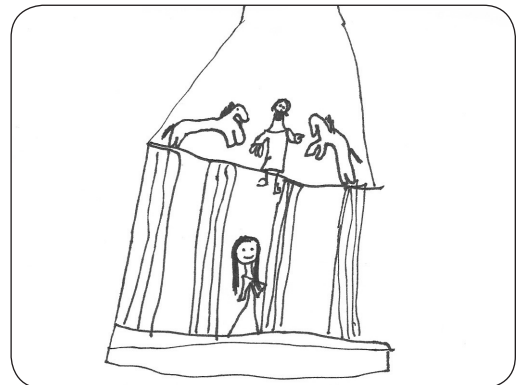
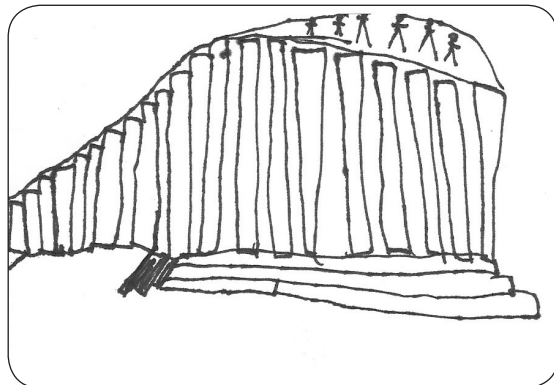
work with the make-and-do? What are the big questions the topic provokes? Are there opportunities for authentic experiences to make topics as remote and distant as Ancient Greece authentic and tangible? Is there an appropriate balance of active, physical work with quiet, reflective work?" At this point, it is appropriate to consider what is essential because it's tradition, still cherished by children who have moved on to the upper grades or beyond, and what we might jettison from previous years.



4. Start at the End

At this point, plans that seem amorphous and unwieldy must be wrestled into some sort of timeline. Typically, our units culminate in a community celebration, a fixed date on the calendar. We invite parents and the children's older buddies into the classroom to admire our hard work, to read through books we have written, and to try their hand at some of the experiences we have enjoyed. Bringing the unit to fruition on this precise date and time can feel a bit like airlifting an elephant on to an olive. So we start at the end and identify a thematic focus for each week. Under that umbrella, we identify the week's reading, writing, and math foci. A week devoted to Athena might inspire writing about her in our gods and goddesses book, trying our hands at weaving and working with clay, looking at the Parthenon, and identifying the geometry in Greek temples.

Greek temples drawn by Emil and Siddha

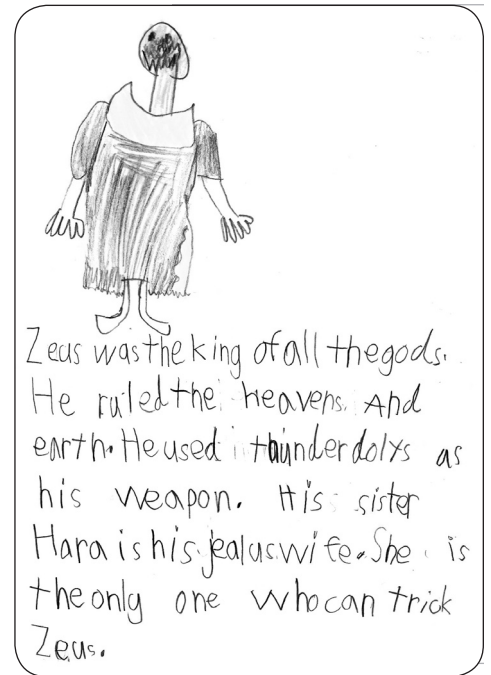


Again, we return to our curricular priorities and identify our next best move. Each year, our priorities shift in response to the make-up of the class. Is this a group that could rise to the challenge of reading chapters of the *Odyssey*? Does a young class need more time building temples?

So what might this all look like? Each year, it looks a little different, with the class developing interests of its own. Our weekly class newsletter is effective in capturing snapshots of the week's work:

"Before delving into the Greek creation myth, we asked the children to imagine what there was before there was anything. Some children imagined utter darkness, others imagined dusty plains and craters, and others imagined endless mountains. Many of us knew about the Big Bang. We read several creation myths from a variety of traditions that explained how the world came to be, including a tale from Siberia in which the world's creator sprang from a pea pod.... On Thursday, we wrote a creation myth of our own: a rollicking tale that includes a moose, a frog, and some ants. We illustrated the tale with large tempera paintings that hang on a mural in the classroom."

"We had some fun telling math stories about Zeus and Hera: 'At the banquet, there were six pomegranates. Zeus ate four. How many were left?' 'Hera's peacock had 10 feathers. Zeus plucked five for a pillow. How many were left?' We wrote our own math problems, being sure to end with the question, 'How many were left?' On Friday we solved each other's problems."



A page from Jesse's book of the gods and goddesses of Mt. Olympus



"Inspired by Apollo, we made a class set of lyres with boxes and rubber bands. We hypothesized about what makes a string make a high sound or a low sound. Is it the thickness of the rubber band? The length of the rubber band? The tightness or looseness of the rubber band? Does the shape of the box matter? Does the material the box is made from matter? With partners, the kids set about the task of making a lyre that made low tones, medium tones, and high tones. As they worked, we listened for supportive and productive communication when they encountered unanticipated design challenges and found that their initial assumptions were not always correct."

Siddha, grade 1, independently sewed her Greek robe by hand.

As I write this, our class has become captivated by the story of Theseus in King Minos's Labyrinth. Students are building mazes with geoboards and designing mazes on paper. Several children are planning "Maze Day," signing classmates up for a maze elective. We've never done it before, but such opportunities to improvise and let students take the lead are often among the richest veins in thematic teaching. Stay tuned!

FOUNDATIONAL UNDERSTANDINGS

COMMUNITY HISTORY ROOTED IN CHILD DEVELOPMENT

by Peter ffitch, grade 2-3

From their earliest days children are driven to make sense of things, to find out how things work, to explore and test, and to solve problems in service of meeting their needs and reaching their goals. In doing so, children can be remarkably persistent and self-reliant. Trial and error is the order of the day, time is a commodity which is spent freely, and motivation comes from within.

To the extent that formal schooling can tap into this nature of the child as learner, a productive and responsive curriculum will emerge. It is just such a curriculum that teachers at Arbor strive to craft: one that introduces skills and concepts within a meaningful context. For when children are off on their own pursuits, context is real. On their own exploratory journeys, children don't wonder about relevance, they don't have to ask why what they are learning is important. In the real world, children are not concerned with the traditional academic boundaries that are often drawn between subjects. Reading, writing, and arithmetic are learned — or invented — and practiced as needed. At Arbor, we have installed a small pond near our Junior (2-3) classrooms. A number of our students spend time there before, during, and after school, fascinated by the life within its waters. These students capture tadpoles, frogs, young dragonflies, and even snails, making careful observations in support of distinguishing species and individuals, and careful counts are kept of sightings from day to day. They try to create alternative habitats in order to bring the objects of their study into the classroom; they run to the Library to research nutritional needs. Later, they may write illustrated stories about the imagined lives of the creatures that they have adopted. They are building their skills as scientists, mathematicians, readers, and writers during their “free time.” At its best, thematic curriculum seeks to replicate this natural engagement, to create an educational environment in which children experience learning in that seamless way, in which students make connections, see context, and find motivation from within.

In order to meet this challenge, the creation of thematic curriculum must begin with attention to the developmental stages of the students for whom it is intended. What is irresistible to the six-year-old may not inspire quite the same passion in the nine-year-old. With this in mind, we begin by considering, “What might these children be interested in?” But, because ours is not an emergent curriculum, the road to finding an answer to this question should not lead to specific topics (these boys are crazy about baseball), but to foundational understandings (second graders are beginning to open their eyes to the structure of their own communities and to the principles of shared life that govern peaceful and fruitful human relationships). Thus, thematic units do not arise from the specific and changing interests of the children, but from an understanding of those children, and from an understanding of each thematic unit as it fits into a whole that meets students' developmental and academic needs.

In addition to planning in light of developmental stages, we take into account whether a thematic unit will provide rich opportunities for curricular integration. For example, there must be natural mathematical explorations that will arise out of a social studies unit, explorations that are not forced, but which might be proposed by the students if we did not introduce them ourselves. Juniors considering how best to load their imaginary covered wagon when risking it all on a trip to Oregon might well ask how much weight a typical wagon could carry, information which would only be useful if one also calculated the weight of the necessary food and supplies. Because integration of content areas must only be done as it makes sense within the context of the study, consideration should also be given to ways in which thematic units complement one another. In addition to providing opportunities to scaffold skills,

We capitalize on this readiness to examine community-building in our fostering of a respectful and cohesive class dynamic, too. See Cambium Volume 1, Number 4, “Community and Stewardship,” for Peter’s article on guiding his Juniors through Recess Chat, a student-led forum for resolving disputes that we adopted from The Willow School in Vermont.

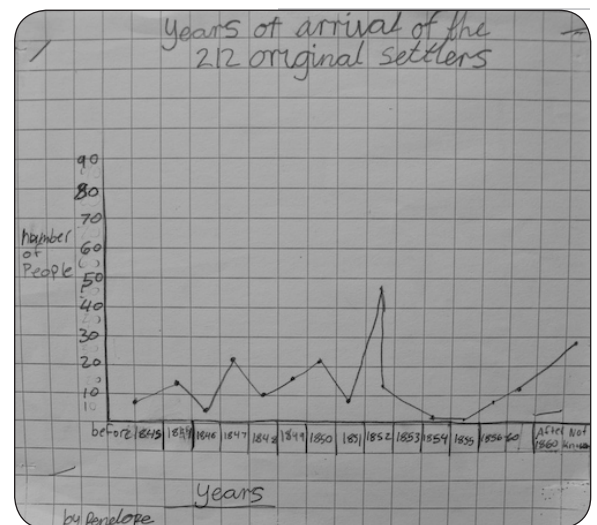
thematic units give us opportunities to vary what children are being asked to do. Our writing-heavy winter, in which Junior students journal first as members of Lewis and Clark's Corps of Discovery and then as travelers on the Oregon Trail, cries out to be followed by spring studies that allow expression of understanding by diverse means.

Finally, access to good supporting materials must be considered. If students will be expected to conduct research, we gather resources written to their level, or at least resources that we can rewrite with our young students in mind. We also investigate the possibility of field trips and the availability of guest speakers to bring our chosen subject matter to life.

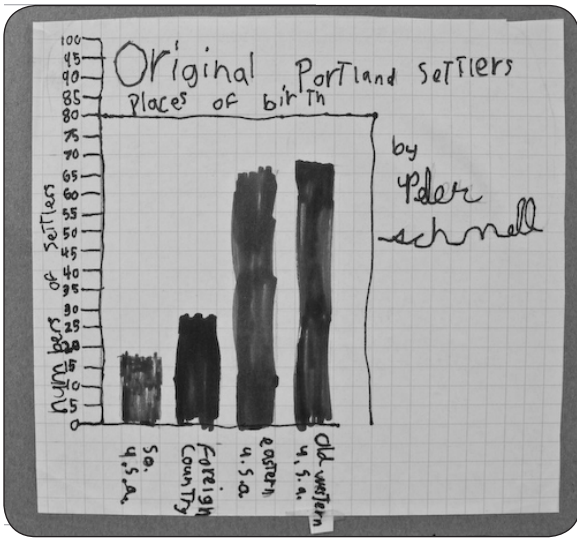
With all of these considerations in mind, when spring comes each Communities thematic year, we begin to learn about the community in which we live and go to school. Earlier in the year our students have immersed themselves in the history of the first Americans and then in the stories of the white settlers who came later to this region, culminating with an on-campus re-creation of the Oregon Trail journey. It has been a year in which we have looked at the development of the earliest communities in North America, at what binds them, and at westward migration and the population of the western states. Shifting our focus to a study of the Portland area and its growth after the era of the Oregon Trail makes sense thematically and developmentally. As in any good story, our students want to know what happened next. They have just imagined arriving in a new land after an arduous six-month journey in a covered wagon and they are curious about how they would begin their new lives. This study of our own backyard, although it begins through a historical lens, feels concrete, immediate. Arbor students make daily trips across the Willamette River that had such a significant influence on the early development of the area, they are driven to school on roads named for the ferries that once served the pioneers, and they are familiar with some of the first important buildings constructed, now surrounded by the development in our downtown core. The element of story and narrative is important also in our choice of this thematic study. Second- and third-grade students are intrigued by biographies, and most community histories have their share of colorful characters. Hearing the stories of those for whom we have named our streets, parks, and schools not only helps our students learn something of how their community came to be but also serves to strengthen their ties to the place.

As we set out to study early Portland, we are fortunate to have a concise, well-written history of the first 212 families that settled the area: *We Claimed This Land: Portland's Pioneer Settlers* by Eugene E. Snyder. This book was not written with the young researcher in mind, however, so we have to be creative about how best to share the great stories contained therein. Because our unit was not designed to help students practice independent research (other units have served this purpose during the year) but rather to help them consider the factors that are fundamental to the creation of a successful community, we read aloud from rewritten versions of these stories, edited for length and relevant detail, and have the students practice aural learning. Students at this level are not yet ready to take extensive notes while listening, so we instead ask them to make concept maps of characters that we introduce. These webs allow students to begin with just the few main facts that they remember from a reading and then to expand the web as one detail triggers the memory of another. Students learn about a number of the founders of Portland in this way and begin to get a sense of the kinds of people and personalities who had the wherewithal to found a community, as well as the various roles that would need to be filled to make that community thrive and endure.

After the class has brainstormed a list of important occupations for this new community, we share with the students a list of the roles actually played by the early



Penelope's graph of the numbers of settlers arriving in Portland by year



Each new citizen of Portland illustrated his land claim to add to our township map. Above, Peter's bar graph shows the places of origin of Portland's original families.

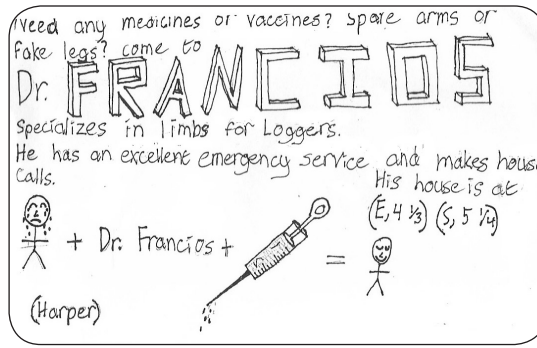
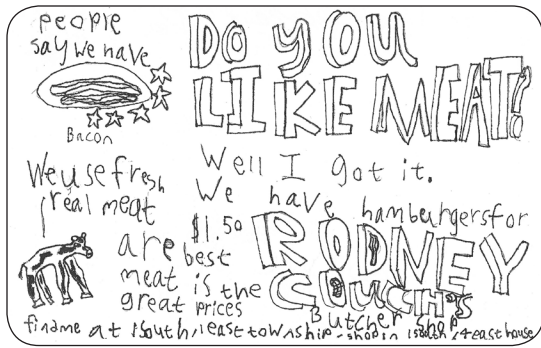
Portlanders. The demographic information available from city records provides an opportunity to practice graphing. Students make bar graphs of the places of origin of the settlers and of their occupations. Older students also make line graphs to illustrate the changing immigration patterns that occurred over the fifteen years of our study period and compare these with a similar graph they make of the number of travelers on the Oregon Trail in the same period.

Those new citizens of Portland needed land, and in many cases it was the availability of land that drew them to the future city in the first place. In Oregon, the Donation Land Claim Act offered free land in parcels of various sizes to those who could promise to improve it. After assuming the identity of one of the founding members of the community and choosing an occupation in concert with their classmates, students are given the opportunity to file land claims. But first we need to give them some sense of the size of the parcels they are considering. We begin by heading outside to find out how big an acre really is. After learning that a square acre would be approximately 208 feet on each side, students use repeated measurements of ten feet to lay out a perimeter. This physical context gives students some feel for the true challenge of developing a 660-acre parcel, the largest available. With a simple map of the area that became Portland posted on the classroom wall, we plat the students' land claims and a community begins to grow. Students fill out applications for land based on the needs of their new life: the merchant wants to be in the middle of town, the fruit grower wants access to the river in order to ship her fruit, and so on. Of course, every acre need not be a square and the boundaries of land parcels must be determined by adjoining prior claims. This process provides a wonderful opportunity to revisit the concepts of area and perimeter. Working on graph paper, students as land buyers make the calculations necessary to ensure that they are getting all of the land that was promised.

Once the land has been apportioned, students look at the map and begin to consider the practical realities of living together: "Can I cross your land to get water?" "Is there a road for me to transport my crops to the market?" Questions such as these, and the conversations that lead to their answers, help the children develop an interest in the success of their imagined undertaking. In response, we introduce the concept of boosters, the members of the community who worked hard to attract new settlers and new business. With sample pages from the real newspapers of the time

as their inspiration, students write articles for a paper that we will publish. They tell of their reasons for leaving home and the hardships of the journey, but mostly they describe the wonders of their new home in Oregon. They regale their readers with descriptions of mild weather, acres of fertile land, and wonderful neighbors ready to help at any turn. And, as is true for any newspaper, we need to sell advertising space. To fill this space, students as settlers create advertisements for the goods and services that they are offering. While this provides another opportunity for creative writing and illustration, it also introduces mathematics back into the unit. Advertised prices need to be set to the dollar values of the day, and incomes need to be calculated. If the ferryman charged \$5, would anyone be able to afford to cross the river? Would high prices inspire competition? And in a growing community with few named roads, how would buyers be directed to find sellers? Our students begin to ask these questions, and they

want to get these details right. Having created this historical fiction, they are invested in their own success as pioneers, and in the success of their community.



Shane and Harper advertise their services as early Portland businessmen

That our students feel this commitment to accuracy, that they are deeply engaged with this wide range of academic work, testifies to their readiness to play a little bit of make-believe, to play a role in making their own learning pleasurable and satisfying. And it indicates to us that we have hit the developmental mark in constructing this thematic unit. Our students see the context for the skills and content they are learning, they are making connections that matter to them, and their motivation comes from within.

CLIMATE PATTERNS & PAINTED TIGERS INTEGRATING ENVIRONMENTAL SCIENCE & FOLKTALES

by Becca Blaney & Charles Brod, grade 4-5

By the time students reach the ages of nine, ten, and eleven, they are on the cusp of thinking broadly and abstractly about the world around them. As teachers, we can move from the use of role-plays and other more literal devices for supporting student thinking to conceptual approaches. The Environments thematic studies we undertake every other year offer opportunities for children to employ the tools and examine the frameworks that enable humans to interpret the world around them with precision and subtlety: scaled representations, mapping, the taxonomic system in biology, the interplay of cause and effect relationships within an ecosystem, and the genetic adaptation encased in the DNA of a cell are among our concerns this year. Moreover, the students advance in sophistication as thinkers and learners and begin to more deeply appreciate the diversity of life on Earth and of human culture.

In the final term of the school year, when sun invites the reawakening of a dormant outdoor world, Arbor Intermediates flex both their intellectual and creative muscles by pursuing dual writing projects: one centered on grasping the nature of a world biome and the other directed at the weaving of an original folktale inspired by a resident culture of that biome.

Biome research, the final big factual writing project of the year, was originally conceived as an opportunity for students to look at the interplay of climate and geography on a global stage. Students would come to understand the formation of large climate patterns, such as the Hadley, Ferrel, and Polar cells that create zones of high and low pressure, which in turn create bands of rainforest, deserts, temperate and polar regions. They would investigate the more particular circumstances behind the formation of biomes such as the Sahara, Antarctica, savanna, and vast taiga forests of Asia. But early in the life of the school, a student with a passion for the Humanities convinced his teachers that something was missing from this science-heavy year of our curriculum:

the relationships between humans and the environment. Our Intermediates (grade 4-5) ever since have also considered the influence of the natural world on the formation of societies and on the art and stories of native peoples.

One of our overarching goals is to deepen students' thinking about how people are alike and different, and why. The biomes unit is an inviting backdrop to explorations of the unique attributes that have developed among world cultures as a result of their environments and of the common threads that, intriguingly, unite them. In our classroom, myths, folktales, and traditional stories provide a fascinating, lively, and engaging portal to other places and people of the world, and a perfect means to that end. As one of their final creative writing pieces, our Intermediates compose a myth or folktale that is set in the world biome they are studying and is reflective of the traditional culture of its first inhabitants. The project provides a delightful arena for learning and practicing essential writing skills and literary analysis while also challenging these thinkers to imagine themselves in a physical and cultural setting completely unlike their own.

Every year that we undertake the myth project we tinker with its outline, adjusting our focus based on time constraints and the particular academic needs of the student group. Likewise, the project also could be adapted to nearly any geographic scale, whether it be the study of a single state like Oregon or a global region or particular historical time period. One constant in our work, however, is that the myth project is undertaken in conjunction with plenty of factual research.

At the beginning of the biomes unit, each student chooses both a biome and a particular region on which to concentrate, be it the savanna of Africa or the tropical rain forest of the Amazon. Individually, the students gather essential information about the climate and geography of their biome, its indigenous plants and animals, and, finally, its human inhabitants. Eventually, they hone in too on a particular group of people from their biome: the Maasai, perhaps, or the Yanomami. This work usually takes the shape of a separate research paper that is completed alongside the myth.

Children have a keen ear for story and we introduce them to traditional myths and folktales in their enticing original form, through oral retelling and discussion. During class meetings and at the beginning of writing periods, we read a selection of tales throughout the week. It hardly seems like work for the students, even though they are given jobs as listeners: *What clues do you hear about the biome where this story is set? What information can you glean about the people who tell this tale? What question does the story answer, or is there a moral? Who are the characters and what is each like?* They are asked to record this information more formally as our explorations continue, and make a chart in their notebooks that they can add to in each session. The discussions that follow mix sleuthing and literary analysis. Students begin to notice recurrent themes and character types: the trickster, for instance, reappears continually, in the form of a rabbit, a raven, or a fox. They pick up details about the community of the storytellers, noting that it was the woman's job to get water each day in her calabash, or that the Inuit wasted nothing following a hunt. We talk about the stories embedded in our own culture, ranging from the biblical creation tale to the stock characters of familiar fairy tales. Noticing rich descriptions of setting and the particular plants, animals, and geographical features within a story becomes well ingrained. For homework, each student reads a myth from his particular biome and completes independently the same exercise, adding to his notes.

After this grounding in the arc and tone of myths, students are eager to finally try their hands at creative writing. In the course of the Environments year, they have written extensively across disciplines. Stepping from the classroom doorway in the fall, they have explored the immediate environs of the school, mapping some part of the campus (geocache trails were created for younger grades this year, with clues written for poetic description as well as orienteering precision); adopting a plant found in the woods as a basis of research and design work and contributing an entry to an Arbor field guide; and recording their understanding of such fundamental concepts in biology

as the tree of life and the basic conditions for life to exist. Like ripples on a pond, our studies have moved outward from the children’s immediate environs to the many habitats found in the state of Oregon. This focus gives students the opportunity to deepen research and writing skills as they investigate such ecosystems as ponds, subalpine forest, sagebrush desert, and mountain streams. The myth project allows them to bring the attention to detail they have honed in writing as naturalists into the service of adding rich descriptive texture and authenticity to an original piece of fiction.

Before we set them loose, we hold two planning sessions to help students focus their thinking and frame their story. In the first, they form groups by biome, so that people of the desert can share ideas and people of the rainforest can compare notes. Their first challenge is to boil the myth they read for homework down to its essence and describe it in terms of a one-sentence problem and a one-sentence solution. Next, we give the students a series of exercises to brainstorm together about their biome:

- Generate a list of sensory impressions in your biome. (What would you likely hear? Smell? See?)
- Make a list of potential characters from your biome, including noteworthy plants and animals, geographical features or deities.
- What questions would the people of your biome be likely to ask? What would they wonder about?

Many of the questions credited to first peoples are shared by these modern students: Why do monkeys chatter? Why do snakes have neither fur nor feathers? How did the people of the Pole become hunters of seals? Why do grasslands lack trees? The exercises are designed to jumpstart the creative process as well as to point out areas in which more background research might be helpful. In the next session, students begin to draft the ideas that are starting to percolate. They are first asked to summarize briefly both the problem and solution at the core of their tale, as well as think out the obstacles that will arise between the two. Writing a complete, coherent story presents a daunting task for any author; this in-class scaffolding makes success more likely for fledgling writers. It also improves the quality of the final product by making explicit the frame that will showcase their creativity and knowledge. Many young students have never considered how dialogue moves the plot forward, for example, or how anecdotes can illustrate a character’s personality. At this age, they tend to be plot-driven writers whose first instinct is to simply list the steps by which action proceeds. For these reasons, we require also that they identify their main character and describe his or her personality, and plan for places where dialogue or rich descriptions of setting might fit into the myth. These early planning sheets prove invaluable later as students revise their work; both the writers and their teachers can refer to those guides when they need to get a myth back on track or clarify the point of a passage. After all this planning, the students can at last begin drafting biome myths of their own.

The results of the myth project are gratifying and entertaining to read. Students skillfully integrate the knowledge they have gleaned about world biomes in creative, expressive ways. The final myths are as varied as the environments and cultures that inspired them. Some capture the magical tone of ancient stories. Eliana described a time “in the very, very beginning” when there was nothing but the Sun Snake and the Moon Snake, who were lonely and so laid an egg they called Earth. When it failed to hatch, they decided to decorate it:

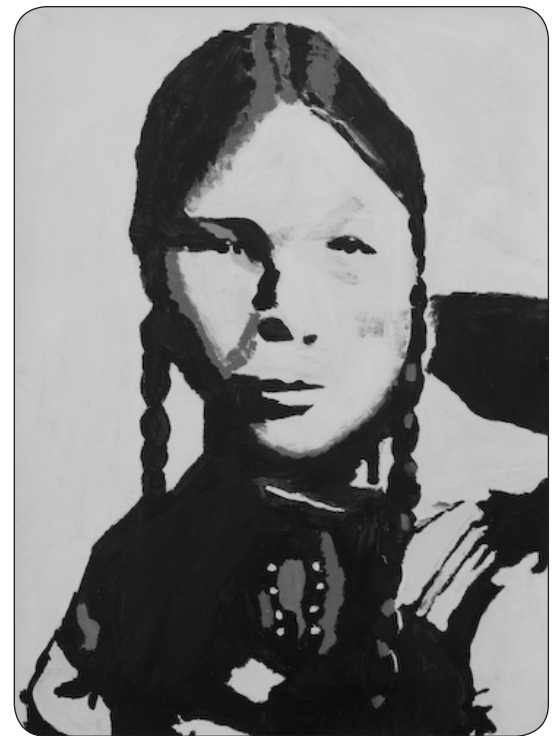
They did not have much to work with in the deep, dark nothingness but they made do. The Moon cried an ocean and wrapped it around the Earth. The Sun squeezed the darkness so it became small, hard grains of sand for the deserts. Once, he squeezed too hard and set the sand on fire. He threw [those grains] up in the air in surprise and there they stayed...

Other stories skillfully integrate fact and fiction to explain events a world away. Lehua imagined a snow-white tiger that suddenly gained his camouflage when Hindu people “threw colorful powders at him. It was Holi! How could he forget the celebration?” Amelia immersed herself in the details of her biome and created a god-like character who provided for the people of the Mongolian steppe before it was transformed into a grassland: “Long ago when people whirled hand in hand with the sun... no milk or meat could be found so everyone would have starved if it was not for the girl and her old gazelle-skin jacket, called a *deel*.” Inside there was sweet, sticky fruit and water that “tasted as sweet as *aaruul* drying on the roof of the *ger*.” Ella focused her story on Condor, a creature she researched when learning about the Kogi people and the Sierra Nevada de Santa Marta in Colombia. According to her tale, the beautiful but lazy and boastful bird was forever searching for a higher perch from which to observe “the people and fellow animals [at] work, building houses, growing crops, and collecting food.” When he decided to “fly up to sit on the sun,” he set off a chain of events that resulted in his current ugliness and his lonely circling above mountain villages.

Still other tales are noteworthy for the obvious interest and attachment the writers demonstrate for their engaging characters. Harrison described how “ducks and Arctic fox have feuded since ancient times,” then crafted a detailed dialogue of insults the two characters exchange, in large part ridiculing each other’s natural coloring and mating habits. “Go eat some lemmings!” the mallard retorts at one point. In a tale set in the tropical rain forest, Peter employed a sloth, a monkey “with a cheesy smile,” and a sneaky anaconda to explain how the food chain in that ecosystem became established.

While the biome myths are evolving, students undertake a related Design project to study and capture the intriguing faces found across our planet. Working from photographs, they use a grid system to break the picture up, scale it to a larger-than-life size, and then render it in some media such as graphite, charcoal, or acrylic paint. This work is richly satisfying to students and they approach it with considerable respect for their subjects. This year Design teacher Anne Moloney structured small teams that worked to produce collaborative portraits: in any given session, one student might blend background colors while another added the highlights or shadows of the face to the grid. The portrait in progress would look entirely different the next time each student returned to it, having been furthered by teammates in the interim; the process challenged those with tightly held artistic visions to release creative control to partners and, given the scale of the work and variety of necessary steps, encouraged meaningful contributions from those who don’t naturally view themselves as artists. The final results are stunning and the pride of every student.

The biomes theme sends its roots into the soil of mathematics, too. Students structure multistep word problems that tackle aspects of geography, populations, migration, and fascinating facts related to the people and animals of their chosen biome. This independent work is supported by direct instruction in operation short cuts for working with large numbers, like dividing by multiples of 10, thus reducing the size of the numbers to be divided. Students have also worked with time and rate



Intermediates have gained expertise in scale work throughout the year, from the translation of a botanical sketch into a large poster showing the intricate structure of a leaf to creation of a large map of the world. See our Cambium Volume 1 Preview, “Mapping,” for a complete overview of the world map project.

problems to develop the necessary confidence and strategies to create such problems themselves. While solving multistep math problems challenges a student to devise a planful approach, creating and structuring one's own problems requires a different quality of creative thinking and offers unlimited possibilities. Having gathered the relevant numeric data, transformed it into a word problem, and solved it showing each step of the work, each student neatly copies her problem onto a note card with the answer on the back so that classmates can attempt to solve it.

The Intermediate Environments curriculum takes advantage of many other avenues for integrated thematic study. Genetics, diversity, and natural selection form a coherent bridge between human body studies — another important topic in Intermediate science this year — and biomes. Our students have also spent this period of study delving into climate change, power and inequality in human societies across the globe, and the dynamics that drive human population growth.

By the conclusion of the Environments curriculum, we hope that our students' understanding of themselves and the world around them has expanded considerably. At ten and eleven years old, they are not experts in cellular biology, cartography, or cultural anthropology; many of the more complex questions of history and science remain enticingly before them. What we want for them, as they begin to open the door to the wider world, is to travel forward equipped with the powers of careful observation, logical thinking, and a sense of wonder and appreciation about all that they will encounter.



An Aboriginal girl painted by Elise, Ella, Hayden, and Sarah. On the facing page, a portrait of an Inuit woman by Gordon, Lucy, Elena, Harrison, and Adlai.



Adlai and Malcolm at work on their world maps

SCHOOL IS NOT A DINNER PARTY

EMPATHY, RESPECT, & THE STUDY OF ISLAM

by Linus Rollman, Senior Humanities Coordinator

The questions that we ask in Humanities class are essentially anthropological ones. How do societies organize themselves? How do people's beliefs inform their actions? How are their beliefs informed by their surroundings, by their history, by their interactions with others? In grades 6-8, students are living these questions, whether they realize it or not. They are organizing their own society of peers — with decreasing influence from adults. They are wrestling with their own set of emerging beliefs and deciding what actions and alliances those beliefs will require. Idealism is born; teenage humans are capable of marvelous feats of generosity and vigorous action in the service of justice and care for their fellow beings or stewardship of their surroundings. They are becoming capable of bold leadership and conviction. It is also natural, at this young age, for their conclusions about the world around them to be no less simplistic and rigid than they are passionate.

One aspect of human existence that provides an arena for all of those questions, opportunities, and pitfalls is religion. As such a critical nexus of our big ideas and lasting actions in the direction of war or peace, religion necessarily forms an important core of Arbor's three-year Senior Humanities curriculum. We spend time studying most of the world's major religions as well as a number of its minor ones. No matter what changes we have made to that curriculum over the years, we have always chosen to devote a generous portion of time to studying Islam. The reasons for that decision are several. First, of course, is the fact of Islam's enormous importance in the world. Muslims make up nearly a quarter of the world's population — around 1.6 billion people. In the roughly fourteen hundred years of Islam's existence, Muslim civilizations and Muslim thinkers have exerted influences that have spread far beyond even what would be suggested by the number of current believers. Second is the fact that, at least for many in our little corner of that world, Islam's impact is underappreciated. At our little school of about two hundred students there are currently no Muslim families enrolled. Most of our students, though they may not practice Christianity or Judaism, have had exposure to both of Islam's sister faiths but know relatively little about Islam. If one of the goals of a broad-ranging Humanities curriculum is to cultivate the ability to understand "the other," Islam is — at least for us — an "other" of great significance. And thirdly, what many of our students have heard about Islam has filtered down through layers of prejudice and misinformation. There is simply no denying the fact that, in present-day America, Islam represents for many people a particularly dangerous and foreign "other." If we are to foster understanding, sympathy, and the capacity for bridging cultural divides, there may be no more perfect subject for study.

As we embarked on the most recent iteration of our unit on Islam, we had three goals for our students' learning: that they develop an understanding of the core beliefs and practices of Islam; that they be able to compare and contrast those beliefs and practices with the beliefs and practices of Judaism and Christianity (we were fresh on the heels of units devoted to those two religions); and that they be able to recognize, examine, and understand the effects of the stereotypes and misconceptions about Islam prevalent in modern Western discourse.

The Basics

The first task was simply to acquaint our Seniors with Islam's history, geography, and tenets. We began with a simple reading about the origins of Islam. There are many strong sources of this type, but the one we chose was a chapter from Ward Fellows's *Religions East and West*, which we assigned to the students as homework. Along with

reading this selection, they wrote answers to the question, “What did I know about Islam before this reading and what have I learned?” We used these pieces of writing as a jumping-off point for a discussion in class the next day, asking students to share brief selections from their writing and inviting comments and questions. We followed this with a second reading entitled “Questions and Answers Concerning Islam and Muslims” published by the Inter-Religious Council of San Diego in 1992. This reading included answers to such questions as, “What are the major holidays of your faith tradition and what do they represent?,” “What are the rituals surrounding the rites of passage?,” and “What is your religion’s view of salvation?” It also included black-and-white diagrams of the Ka’aba, the major features of mosques, and of the route of a pilgrimage to Mecca. In class, we read aloud Demi’s picture-book *Muhammad*, which tells the story of Muhammad’s life, pausing to discuss its contents and ask questions. One night’s homework consisted of a selection of eight brief passages from a translation of the Koran. We asked the students to respond by selecting one passage and either writing about what it meant to them and how it connected to their own life or to create an illustration to accompany it. Once again, these pieces of work were used as a spur to discussion in the classroom the following day. All of these introductory activities helped not only to give students a foundational understanding of Islam but to build connections to their knowledge of Judaism and Christianity.

One of the most helpful resources that we encountered was a set of “Hands-On Culture Boxes” put together by the World Affairs Council of Oregon. These boxes, which were available for loan, contained not only a number of well-illustrated books that would otherwise have been hard for us to collect but such items as a Koran stand, a prayer rug equipped with a compass for finding the direction of Mecca, and examples of traditional Muslim attire. This allowed the students to handle and examine items that are familiar to Muslims around the world. These Culture Boxes, each devoted to a theme (Islamic Art, Ramadan, The Hajj, Mosques, Clothing, and Prayer), formed the foundation of several days’ class work. We divided the students into groups of three or four and each group was given a box to open and examine. Each group spent about an hour with the contents of their box, reading about the objects and discussing the role the objects might play in the larger context of Islam. Students then taught their peers about their group’s theme and shared key observations about the objects they had analyzed.

Don’t Fake It

Although our Humanities staff is reasonably well informed and well read, none of us is a Muslim or a real scholar of Islam, and one of our cardinal rules in all we do is not to pretend to know more than we actually know. We love to bring guests into the classroom in general, but for this unit in particular we thought it important to bring in genuine experts. Two of our guests — a former student and a current parent — were not Muslim, but speak Arabic and were able to acquaint our students with the basics of pronunciation and Arabic calligraphy. Even if you are not lucky enough to have such human resources available, it is possible to bring calligraphy into the classroom through the use of such excellent workbooks as *Learn World Calligraphy*, published by Watson-Guptill in 2011, and Mustafa Jafar’s *Arabic Calligraphy*. Both books introduce basic calligraphic strokes and provide



Lily B.'s calligraphy based on the Arabic word *kamal*, “perfection.”

We found the Muslim Youth Ambassadors through the Muslim Educational Trust: www.metpdx.org. This Portland-based organization was founded in 1993 “to enrich the public’s understanding of Islam and dispel common myths and stereotypes, while serving the Muslim community’s educational, social and spiritual needs in order to develop generations of proud and committed Muslims who will lead our community to the forefront of bridge-building dialogue, faith-based community service and stewardship of Earth and humanity.”

If you are unable to avail yourself of such outside expertise, some of the same benefits can be derived from virtual classroom visits. We showed excerpts from the video “American Muslim Teens Talk,” put out by The Islam Project. This excellent video provides students the opportunity to hear young Muslims talk frankly about their identities and experiences.

space for students to practice. After a day’s worth of study, we asked students to make their own designs using the illustrations from those and other books as inspiration.

Perhaps more important than the religious expertise that outside guests can bring is the effect that they can have of putting human faces to Islam in all its diversity. We were lucky in this regard to have a former Arbor parent — a practicing Muslim and a philanthropist — who was willing to come to class for a day. He told the students the story of his own pilgrimage to Mecca and took their questions. We also made contact with a local group, the Muslim Youth Ambassadors, who do volunteer work in

our community with a particular focus on making visits to schools. They sent us seven teenagers who gave a presentation on Islam to our students and took questions as a panel. They focused particularly on what life is like for them as young Muslims in America and did a wonderful job of connecting with our own students, talking about the things that the two groups had in common but also about the sorts of stereotyping that they, as Muslims, face in the wider community. We have found two practices to be very useful whenever we bring guests into the classroom. The first is to give our students time and coaching to prepare questions in advance, a task for which some background knowledge about the subject of the presentation is very helpful. The second practice is that of writing individualized thank-you cards to the people who have been kind enough to visit. We generally assign the composition of these cards the night after such a visit, and we always provide such prompts as “What surprised or interested you most about today’s presentation?” or “What questions do you still have for the presenter(s)?” We have found that both the preparation of questions in advance and the thoughtful thank-you cards go a long way toward ensuring that our guests are willing to make return visits.

Student Ownership

The culminating project of our Islam unit was a research paper on a topic of each student’s choice. This allowed students to pursue their own interests within the framework of the unit, gave scope for each student in our multi-grade classrooms to push him or herself to polish a piece of writing through multiple drafts, and served as excellent fodder for open-ended assessment by the teachers. We began by helping the class brainstorm a list of possible topics based on everything they had studied up to that point. Each student selected three of those topics for some further reading and used that reading to make a final selection. We brought in all of the resources that were available at our school, that we had at home, and that we had checked out from local libraries. We provided several hours of in-class research time as well as making research part of the students’ homework.

In the sixth, seventh, and eighth grades, students are still developing their capacity for original thinking as part of a research project. Even so, we ask them to go beyond the traditional “book report” in several ways. We require them to work from at least two different sources (and ideally more), so that some comparison and synthesis is necessarily involved. We coach them in taking brief notes so that they can move away from the language of the original sources and, by putting facts and ideas into their own words, begin to express original thoughts. We encourage them to take their notes on note cards so that the notes can be easily rearranged, again to steer them in the direction of building their own structures for their papers.





Once the note-taking phase was over, the Seniors wrote outlines of their final papers, which we collected and read. The first draft of each student's paper was read both by a teacher and by several of her peers. We guided the constructive feedback the students offered their classmates by asking them to address two questions: *Which part of this paper did you find the most interesting? What are some things that you know now about this topic that you did not previously know?* Using the responses, the class went on to compose final drafts, which were then exchanged during silent reading periods. Some of the topics our Seniors chose to write about

this year included the history of the Arabic language, the Hajj, Muslim women, the Five Pillars of Islam, a comparison of the lives of Jesus and Muhammad, architecture in Jerusalem, the hijab, Ramadan, and stereotypes about Islam in the wake of the 9/11 attacks. As with any such extended project, there were particularly glorious successes, progress was made by all of the students in their skills as writers and thinkers, and there was scope for continued improvement for all of them.

Religion is always a potentially sensitive topic, to be avoided, along with politics, at dinner parties. School is not, however, a dinner party, and at Arbor it is our belief that the classroom is precisely the right context for discussion and debate of important subjects — those subjects that are the most controversial, those around which public rhetoric grows the most heated. If discussion of religion in general is potentially fraught, this may be even more the case for Islam specifically. It is fair to say that many Americans are suspicious of Islam; a 2012 poll by the Public Religion Research Institute found that 47% of Americans believe that Islam is at odds with American values and ways of life. It is through rich and thorough understanding of such great matters as Islam, through sympathetic and empathetic study, through reasonable discussion and training in habits of listening and thinking carefully, that rhetoric can be cooled, that nuance can be appreciated, and that mutual respect becomes possible.

The Arbor Center for Teaching gratefully acknowledges the support of the Bloomfield Family Foundation in funding the production and distribution of Cambium for the past four years. Arbor School first approached the Bloomfield Foundation in 2003 to bring Angelica Carpenter, a children's literature specialist, to campus as a speaker and workshop leader. The foundation subsequently made possible a series of master classes, workshops, and lectures by mathematician Andy Clark; a writer-in-residence workshop for both students and faculty with poet Naomi Shihab Nye; and writing workshops for Arbor teachers and guests from the wider educational community with Melissa Madenski and Kim Stafford. In 2007, the Bloomfields responded with interest to Kit Hawkins's proposal for the creation of a publications arm of the school's teacher training program that could craft and disseminate curricular materials developed at Arbor. That year they funded the hiring of a full-time editor to begin work on Cambium, a collective memoir of Arbor School's first twenty years, and the Arbor Algebra Series. Each year since then, the foundation has generously recommitted to supporting publications born of the Arbor Center for Teaching. We are ever thankful for their vision and willingness to support a rare — perhaps unique — project to extend the creativity and experience of one small independent school's faculty to a broader audience.

We wrote more extensively about this research paper in Cambium Volume 1, Number 3, "Writing to Learn."

Islamic tile designs by Scott (left) and Aly (right)



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Cambium: (n) the cellular growth tissue of trees and other woody plants, from medieval Latin "change; exchange."

What content would you like to see offered in Cambium? Do you have ideas about how we can improve it? Send us an email: cambium@arborschool.org

Masthead by Jake Grant, after an 1890 botanical illustration.

The Arbor School of Arts & Sciences is a non-profit, independent elementary school serving grades K-8 on a 20-acre campus near Portland, OR. Low student-teacher ratios and mixed-age class groupings that keep children with the same teacher for two years support each child as an individual and foster a sense of belonging and community. An Arbor education means active engagement in learning, concrete experiences, and interdisciplinary work. For more information on the Arbor philosophy, please visit www.arborschool.org.

The Arbor Center for Teaching is a private, non-profit organization created to train teachers in the Arbor educational philosophy through a two-year apprenticeship while they earn MAT degrees and licenses, and to offer guidance to leaders of other independent schools. In 2007 its mission expanded to include the publication of material underpinning the Arbor School curriculum.



Islamic tile design by Isabella

Cambium is free! Please forward it to your friends and relations and don't hesitate to let us know if there's anyone we should add to our mailing list. For more information and to purchase publications from the Arbor Center for Teaching, please visit our website: arborcenterforteaching.org. Cambium's production is made possible by a grant from the Bloomfield Family Foundation, which has also generously underwritten the development of the Arbor Algebra series. We are ever grateful for their support of our work.