Building Mathematics and Science Competencies through an Arts Integration Model Year Three

Project funded by United States Department of Education, Office of Innovation and Improvement, Arts in Education Model Development & Dissemination Program
Building Mathematics and Science Competencies through an Arts Integration Model Year Three

A Project funded by United States Department of Education, Office of Innovation and Improvement, Arts in Education Model Development & Dissemination Program
The Philadelphia Arts in Education Partnership (PAEP) is pleased to present this report documenting the third year of Arts Link: Building Competencies in Mathematics and Science through an Arts Integration Model, a research project funded by a four-year $1.1 million grant from the United States Department of Education, Office of Innovation and Improvement, Arts in Education Model Development and Dissemination Program (AEMDD). This support allows PAEP to expand the scope of its research on arts integration best practices and to refine its Arts Concept and Skill Alignment Model for future replication and dissemination.

Arts Link was developed in response to findings from earlier work integrating the arts with elementary grade level reading and writing curricula to promote literacy skill acquisition through an AEMDD grant made to the School District of Philadelphia in collaboration with PAEP in 2006. The most notable success of this prior project, Arts Bridges, reported a 15% increase in reading proficiency among participating students over those in the corresponding control group, a stunning achievement for an urban, inner-city school district (Table 1).

The results of Arts Bridges also indicated that to maximize the impact of an arts integration program, students must be introduced to this learning approach earlier in their educational careers. Therefore, PAEP designed the Arts Link program to reach students as early as second through fifth grade in four School District of Philadelphia schools with a corresponding complement of eight control schools. This school based program is implemented by teaching and learning teams led by the art teacher and comprised of two participating classroom teachers per grade level with a master teaching artist in residence for 8 months during the school year. Each cohort teaching team receives ongoing extensive professional development that explores ways in which to effectively integrate critical grade-level mathematics and science skills with arts curricula, as defined by the District’s content area goals. An arts integrated program infrastructure has been established upon which to develop scope and sequence curricula for classroom implementation utilizing PAEP’s concept and skill alignment and co-teaching models. Continual assessment of instruments developed to facilitate planning and execution of these models has led to their refinement, which improves the ease and effectiveness of their use as collaborative tools by participants in this study.

This arts integration concept and skill alignment model does not supply lesson plans or curriculum. It does provide a structure to organize and deliver required core academic and art content, determine student learning goals and activities, and implement a guide for co-teaching that includes assessment of student learning and strategies to meet Pennsylvania Common Core State Standards. Project content is anchored in PA/CCSS and School District of Philadelphia grade level curriculum. By using “Big Ideas” and “Essential Questions” to guide arts integrated curricular development, the model taps into higher order thinking skills as defined by Webb (1997) in “Depth of Knowledge”. Teachers plan together with the teaching artist and art teacher to reinforce concepts through multiple perspectives and experiences, and artists facilitate art making projects tied to curricula required to be learned during each marking period. The use of our researched and tested unit and lesson plan templates enable teachers, art teachers, and teaching artists to co-plan, selecting student learning objectives from the quarterly curriculum on which to focus learning. Using these templates as an organizational structure allows teachers and artists to create and individualize learning plans tailored to the needs of their students who are always at the center of learning.

A scientifically-based research methodology examined the impact of this teaching and learning model on: strengthening students’ arts, mathematics, and science competencies, improving students’ standardized test scores, pro-social behaviors, and attitudes toward school; and enhancing teacher pedagogy. Evaluation was conducted by an independent evaluation team who analyzed both quantitative and qualitative data including but not limited to student scores on standardized tests, unexcused absences, and suspension rates. Additionally, the team evaluated measures to improve teacher pedagogy. (See Chart 1 on page 4.) The 2013 Pennsylvania standardized mathematics test showed a statistically significant (p<.01) difference in scores between the treatment and control schools, with the treatment school students scoring 58 points higher on the standardized proficiency exam (Table 2). The treatment school students scored a greater percentage at the proficient/advanced level than students in the control schools. Additionally, the control group scores declined with more students in the control schools failing to meet proficient and advance classifications. For treatment schools, the percentage of students in the “below” standards grew marginally, the percentage in the “basic” category decreased substantially, the percentage in the “proficient” category decreased marginally, and the percentage for the “advanced” category increased substantially. The mean scores on the Science PSSA tests were substantially higher for the treatment schools as compared to the control schools and showed a strong (p<.12) difference in scores between the treatment and control schools, with the treatment school students scoring 28 points higher on the standardized proficiency exam (Table 3).
In Year Three of Arts Link, the four teaching artists worked with the same two grade levels at two schools providing each grade level classroom with 30 sessions over an 8-month period during the school year. PAEP believed that this approach would insure a greater depth of art integrated projects since each teaching artist would have the time to become more knowledgeable about required grade level curriculum in mathematics and science. Classroom teachers also embraced the idea of sharing curriculum and strategies for implementation across schools. Teaching artists, classroom teachers, and art teachers from each of the four schools designed student learning objectives that reflected required curriculum per marking period. At least four unit plans were developed for each grade level. One unit plan per grade level is highlighted in the text. Other selected grade level unit plans can be found in the resource section at the end of this catalog.

This program documents for dissemination a model for arts-based teaching and learning collaborations integrating the arts into the core mathematics and science curricula and provides teachers, working under the guidance of the school art teacher and a master teaching artist, with a greater variety of teaching and learning strategies specifically focused on differentiated instruction to enhance learning for all students.

© Philadelphia Arts in Education Partnership 2014
Prior to the start of Year Three, four days of professional development activities for the Arts Link program ran from the July 30 - August 2, 2012. In the first session teaching artists new to the program received training on how current brain-based research has informed the way we teach and how to integrate the arts with mathematics and science curricula using PAEP’s concept and skill alignment model. The second session began with a report on the previous year’s experiences. In the afternoon classroom teachers grouped by grade level across all four schools, selected student learning objectives and brainstormed ideas with both art teachers and teaching artists for arts integrated projects. In day three, professional development covered Common Core State Standards newly adopted by the Commonwealth of Pennsylvania with a review of the Pennsylvania Department of Education Website, Standards Aligned System (SAS), a tool created to help educators plan and implement common core as well as assessment strategies for arts integrated projects. Four breakout sessions completed the third session where classrooms teachers were provided an opportunity to experience hands-on 2-dimensional and 3-dimensional art making taught by their school’s art teachers. Planning together occupied the morning of the final day. Groups were divided by grade level at the request of classroom teachers, who found that planning with fellow grade level teachers across schools was very beneficial. The four days of professional development concluded with a visit to the Philadelphia Museum of Art where museum staff provided guided tours with interactive presentations designed to help classroom teachers make the connections to the art lessons they experienced earlier in the week and how they could make connections to their mathematics and science curricula.

Further professional development sessions were held in January and February, 2013. These included training for teaching artists and more instruction in Common Core and application of Webb’s Depth of Knowledge. Altogether, classroom teachers and art teachers received 24 hours of professional development, and teaching artist received 34.5 hours. These hours did not include monthly planning sessions. Teachers and artists strongly indicated the value of these sessions to improve their pedagogy.
Arts Link Evaluation Results for Professional Development 2012-2013 School Year

The Arts Link evaluation plan included means of measuring improvement in student learning and behavior goals and also improvement in teacher pedagogy. Chart 1 presents a comparison of Arts Link school and control school teachers’ perceptions of current levels of arts integration in their classes. The scores reflect the average response for each of the two groups on a 5 point Likert scale ranging from 1 (Low) to 5 (High). In all of the measures, the Arts Link teachers reported substantially higher levels of arts integration than those in the control schools. These differences were most extreme in the items relating to partnering and collaboration between classroom teachers and art teachers. There was an increase of at least 10% in all but one of the Teacher Skill Inventory items. The mean scores for each of the teacher skill criteria were significantly higher for the Arts Link group as compared to the control group. Chart 2 represents the results of two surveys administered after summer and the winter professional development sessions completed by classroom and art teachers and teaching artists. The results overwhelmingly demonstrate the importance of providing consistent, relevant professional development to enhance teacher effectiveness and student learning outcomes.

Chart 1
Arts Link Teacher Skills Inventory Evaluation 2012-2013

<table>
<thead>
<tr>
<th>Skill and Description</th>
<th>Treatment Mean 2013</th>
<th>Control Mean 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner with art teacher to plan curriculum</td>
<td>1.64</td>
<td>3.78</td>
</tr>
<tr>
<td>Include art teacher in grade level meetings</td>
<td>1.47</td>
<td>3.13</td>
</tr>
<tr>
<td>Effective assessment of arts integrated units</td>
<td>2.47</td>
<td>3.56</td>
</tr>
<tr>
<td>Art component is fully integrated</td>
<td>2.66</td>
<td>3.95</td>
</tr>
<tr>
<td>Art imbedded in unit of study</td>
<td>2.64</td>
<td>3.56</td>
</tr>
<tr>
<td>Incorporate the arts in curricular planning</td>
<td>3.04</td>
<td>3.82</td>
</tr>
</tbody>
</table>

Chart 2
Arts Link Professional Development Survey Results 2012-2013

<table>
<thead>
<tr>
<th>Item and Description</th>
<th>Summer PD</th>
<th>Winter PD</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD information communicated effectively</td>
<td>97%</td>
<td>100%</td>
</tr>
<tr>
<td>Transferability of information to classroom</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Enhanced confidence in using arts integration strategies</td>
<td>97%</td>
<td>100%</td>
</tr>
<tr>
<td>Enhanced perceived value in collaboration</td>
<td>94%</td>
<td>100%</td>
</tr>
<tr>
<td>Perceived value in using Planning Template</td>
<td>87%</td>
<td>97%</td>
</tr>
<tr>
<td>Perceived value in using Co-Teaching Lesson Plan Template</td>
<td>94%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Watson Comly Elementary School

Art Teacher - Cohort Leader
Ann Akif

Teaching Artist
Alexandra Kopanaiko, 2nd & 3rd Grades
Deborah Williams, 4th & 5th Grades

Classroom Teachers
Barbara Drossner, 2nd Grade
Kenneth Pitt, 2nd Grade
Sara DiDonato, 3rd Grade
Cynthia O’Donnell, 3rd Grade
Nikeeta Yancey, 4th Grade
Marina Feldman, 4th Grade
Erin McGinley, 5th Grade
Linda Gelfand, 5th Grade

Principal
Michelle Byruch

The Comly team was comprised of two teachers per grade in second, third, fourth, and fifth grades, led by Art Teacher Ann Akif and Teaching Artists Alexandra Kopanaiko and Deborah Williams. For the second year in a row, Comly’s principal decided to provide Arts Link program content to those classrooms not assigned to the Arts Link program by providing a subsidy for the teaching artists to collaborate with those classrooms. These teachers also volunteered to attend professional development sessions and after school meetings so that they would be as informed as the participating Arts Link teachers.

Second Grade

Second grade students taught by Classroom Teachers Barbara Drossner and Kenneth Pitt began the school year by reviewing the numbers 0-9 and identifying the different place values of large numbers up to 1000. An art making project in which students created two series of textured numbers reinforced this. The first series produced a large collage. The second, which the students did backwards, created printed numbers. Each place value was represented by a different color. Students printed multiple copies and when the teacher called out a number such as 532, the students would hold up the colored numbers in their correct place value.

One of the more difficult concepts for students to understand is elapsed time. Teaching Artist Alexandra Kopanaiko created a “stained glass” project in which students detailed activities from their daily lives. This project reinforced lessons on reading analog clocks, interpreting time over
elapsed periods, and calculating how long it takes to complete an activity. Teachers asked students to make observations of their daily lives and to record them in a time journal; they were to note how long it took them to do errands and activities in their everyday lives. They used this information for the content of their “stained glass” windows.

Students continued with their observations. They kept a weather diary and learned all about the different clouds and the weather patterns that created them. This multi-faceted project involved a variety of smaller works of art that included each student designing a weather balloon to take him/her up into the sky.

Second grade students also worked on a math unit exploring squares and cubes. They created characters that expressed a variety of emotions and placed them on the different facets of their cubes. Finally, another math and arts integration project looked at fractions. Working in teams with the teaching artist, students divided up a circle into equal parts. Each student was charged with creating a part of the whole by making a wedge of birthday cake out of clay, corresponding to the equal parts of the circle. They decorated and glazed the cake; some students even added the candle to it. When they finished, they put it back together to form a whole.
Third Grade

Third grade students began Arts Link projects under the direction of Classroom Teachers Sarah DiDonato and Cindy O’Donnell by exploring linear measurements that represented hours and minutes over a 12 hour period. Students calculated the amount of time spent on a task by noting the beginning and end times counting in increments of 5 minutes. Students constructed a daily log using class activity schedules and recording how long each activity lasted. They calculated elapsed time on paper noting the start time and end time and the minutes in between. Under the guidance of Teaching Artist Alexandra Kopaniako, students used simple geometric shapes to construct a 3-dimensional board game that demonstrated the representation of time. Students used the finished project as a tool to tell time over an extended period or to visualize how long it takes to perform an activity.

For both science and mathematics, students studied the inner layers of the earth identifying the four layers: inner core, outer core, mantle, and crust. They were required to explain the position of each layer on the earth and to discuss the substances that make up each part as well as to identify the three types of matter. Additionally, students studied symmetry and concentric circles as part of their mathematics unit of study. The art-integrated project helped students to develop a better understanding of concentric circles through application and construction of a large mural depicting a variety of concentric circles representing the four layers that make up the earth.

In mathematics students developed an understanding of multiplication strategies of whole numbers within 100. They described and analyzed 2-dimensional shapes. They used this knowledge to create an original pattern based on a multiplication table that served as the motif for making 2-dimensional, Native American pots. Students created their pot using applied cut paper techniques. The pots’ motifs were based on a specific multiplication table and any 2 dimensional shape. Students finished the activity by painting a traditional flower, one that is native to the North American region, on their pots.
Continuing with their study on symmetry, students incorporated portraits, both realistic and abstract into a larger quilt project that also emphasized how to break down a whole unit into its parts - quarters, thirds, and halves.

In the third marking period, students learned to represent and interpret data and used their understanding of place value and properties of operations to perform multi-digit arithmetic. Students learned about money and how to count coins, make change, determine equivalency, and establish value. For an art integrated project to further this learning, students created a rural landscape that focused on depth and texture; they learned about the horizon line and how to use it to create a landscape; and they created textures that included using four different types of found objects - in this case the texture consisted of pinto beans, coffee beans, corn kernels, and rice, that representing four different crops on their farm. Each texture was given a specific monetary value. After the texture was applied to the landscape, emphasizing structure and organization, a quality that farmers must have in order to be successful, the students determined the total value of their farm landscapes. Students counted and tallied a receipt for the total value of their crops.
Fourth Grade

Fourth grade teachers, Nikeeta Yancy and Marina Feldman, began the school year by reviewing mathematics concepts involving geometric shapes with an emphasis on how to draw various size circles using a compass and how to calculate degrees of a circle. Additionally, students learned how to weigh, measure, record, and calculate changes to materials as they go through different phases. Students applied this new found knowledge to a study of the water cycle examining the processes of erosion and deposition. Students worked with Teaching Artist Deborah Williams to create mixed media landscapes as well as clay work that demonstrated the principles of erosion.

In the second marking period students compared fractions by first writing them as fractions with a common numerator or a common denominator and then moved on to solving problems using equivalent fractions. Students applied this to an arts-integrated project that introduced them to Native American bead designs. They created their own design patterns on graph paper using fractions of 10, and sewed these bead designs on fabric.

Another unit of study focused on 2-dimensional and 3-dimensional geometric shapes. Students compared and contrasted figures according to attributes describing similarities and differences using formal geometric vocabulary such as describing the difference between a rectangle and a rectangular prism or the difference between a prism and a pyramid. Students used terra cotta clay and modeled geometric solids: sphere, hemisphere, prisms, pyramids, cones, cubes, cylinders, etc. These shapes were pierced with holes to allow for mounting on wire that was supported by a ceramic base to create an interactive sculpture. Students changed the sculpture by changing the position of the small geometric shapes and by bending the wire.
## Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Comly</th>
<th>Teaching Artist: Williams</th>
<th>Unit Title/Big Idea: Fractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers: Yancy/Feldman</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Grade: 4  Marking Period: 2

<table>
<thead>
<tr>
<th>Essential Question: How can you use models to show equivalent fractions? How do you write and compare fractions?</th>
</tr>
</thead>
</table>

### Math Standards and Descriptor

<table>
<thead>
<tr>
<th>CC.4.NF.1. 2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering; CC.4.NF.3a. M04.A-F.2.1.1 Add and subtract fractions with a common denominator</th>
</tr>
</thead>
</table>

### Teaching Objective: (What I will teach) (Classroom teachers complete)

- Use models/multiplication to show equivalent fractions
- Write and identify equivalent fractions
- Solve problems using equivalent fractions; compare fractions

### Math Learning Activities: (What students will do) (Classroom teachers complete)

- Compare fractions by first writing them as fractions with a common numerator or a common denominator
- Compare and order fractions

### Art Standards and Descriptor

| 9.1.5. A. Know and use the elements and principles of each art form to create works in the arts and humanities; 9.2.5.A. Explain the historical, cultural and social context of an individual work in the arts |

### Teaching Objective: (What I will teach) (Classroom teachers complete)

- Familiarize students with Native American bead designs
- Looking for geometric patterns representing fractions
- Creating design patterns on graph paper using fractions of 10
- Threading and sewing bead designs on fabric

### Art Skills & integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)

- Create symmetrical design patterns using fractions of 10 on graph paper with colored marker
- Translate designs into beadwork sewn onto felt with plastic beads, needle, and thread

### Vocabulary: Denominator, numerator, equivalent fractions, mixed number, unit fraction

### Vocabulary: Pattern, wampum belt, beadwork, symmetry

### Assessment strategies: Assessment of student art work will indicate level of understanding of fractions of 10, geometric patterns, symmetry, and mastery of the materials; discussion and questions using new vocabulary for both math and artwork

### Describe strategies that will be used to meet Common Core Standards: Students will use MathBoard and Counting Tape to write and compare fractions; they will use technical vocabulary appropriately; students will research informational texts and write an essay about Native American bead work.
For fifth grade students, Classroom Teachers Linda Gelfand and Erin McGinley integrated projects that reflected their studies on probability, elapsed time, and the physics of motion and force on objects, as well as units covering geometric shapes and fractions. To reinforce the concept of elapsed time, students explored the essential question: How does the rotation of the earth cause the sun to cast shadows in different ways throughout the day? Students responded by constructing and using a shadow tracker to tell time using artificial light. They also differentiated the rate of heat fluctuation using color and materials. Using jars of dyed liquid, students were able to evaluate a color’s influence on the absorption of solar energy by measuring the heat absorbed. Additionally, this unit’s learning was reflected through other art making projects that included still life drawings with varying light sources as well as creating functional, fired clay sundials.

In marking period two, students observed and compared the behaviors of pendulums and gained experience with the concept of variables. Students conducted controlled experiments to find out what variables affect the number of cycles a pendulum will complete in a unit of time. They also studied about ecosystems. Teaching Artist Deborah Williams reviewed examples of mobiles made by artists such as Alexander Calder and demonstrated how to combine mixed media into sculptural constructions using collage techniques allowing for variables in weight distribution to demonstrate how balance is achieved as weight changes. Working in groups of five and six, students constructed large scale mobiles using found objects, mixed media, and decoupage techniques that described the variables within ecosystems.
## Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Comly</th>
<th>Artist: Williams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers: Gelfand/McGinley</td>
<td></td>
</tr>
</tbody>
</table>

**Big Idea:** Energy transformation by convection, conduction, or radiation; the relationship between the sun, an object, and its shadow as the earth rotates over a 24 hours period.

**Grade:** 5  **Marking Period:** 1 and 2

**Essential Question:** How do energy transformations explain that energy is neither created nor destroyed? How does the position of the sun in the sky relate to the size and orientation of the shadow cast?

<table>
<thead>
<tr>
<th>Math Content/Performance Descriptor</th>
<th>Science Content/Performance Descriptor</th>
<th>Art Content/Performance Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCRS.4.G.1.2.3. Draw lines and angles and identify these in two-dimensional figures</td>
<td>S8.A.2.2.2.Use a thermometer as a tool to measure temperature in degrees Celsius</td>
<td>9.1.S.A. Know and use the elements and principles of each art form to create works in the arts and humanities</td>
</tr>
</tbody>
</table>

**Teaching Objective:** *(What I will teach) (Classroom teachers complete)*
- How to measure an angle to the nearest degree using a protractor
- How to use a compass to create the circular part of the sundial

**Math Learning Activities:** *(What students will do) (Classroom teachers complete)*
- Review Lesson on measuring angles (based on 4th grade learning)
- Review using a compass to draw a circle (based on 4th grade)

**Science Learning Activities:** *(What students will do) (Classroom teachers complete)*
- Use a thermometer to observe and compare the temperature change of black and white solar heaters
- Create shadow trackers using an artificial light source
- Compare the temperature change in covered and uncovered solar water heaters

**Art Skills & integrated Learning Activities:** *(What students will do) (Art teacher/Teaching artist complete)*
- Students will identify primary colors and dye water in jars for our experiment
- Draw a still life with charcoal pencil on drawing paper representing light on an object and shadows created
- Calculate and measure angle, then make a sundial out of slabs of clay

**Vocabulary:** Right, acute, obtuse angles, circle, radius, compass

**Vocabulary:** Solar energy, sun, direction, orientation, shadow, thermometer, heat transfer, umbra, penumbra

**Vocabulary:** Primary color, tint, light, shadow, highlights, ellipse, gradation, shades, shading, gnomon, radius, clay, underglaze, glaze, slab, slip, score, relief, model, sgraffito

**Assessment strategies:** Journal entries, visual critique, teacher made assessments based on independent reading of related science stories, student artwork demonstrates an understanding of the math, science and art objectives; students can articulate understanding using new vocabulary

**Describe strategies that will be used to meet Common Core Standards:** Vocabulary acquisition through reading in context; create 4-square vocabulary cards; hands-on investigations in small groups as well as small group and partner discussion; small groups will write up investigations using scientific methods.
In the third year of Arts Link at Decatur Elementary School, Art Teacher Marisa Grasso, Teaching Artist Alexandra Kopanaiko, and classroom teachers from 2nd through 5th grade selected art integrated projects that demonstrated critical curricular content in mathematics and science.

**Second Grade**

Second grade teachers, Jennifer Meisel-Jarema and Phylis Anderson, and Teaching Artist Alexandra Kopanaiko worked with students to explore the concept of elapsed time by documenting the time it takes to accomplish a specific activity. Students practiced telling time using both analog and digital clocks. They made calculations to determine the length of time it took to perform a common task. Then they told their stories by creating a "stained glass window" with tissue paper collage.

Mathematics was integrated into art projects to build an understanding of geometric shapes. In science, students studied cloud formations and made scientific observations about them. They illustrated the shapes and characteristics of four different types of clouds and depicted a variety of landscapes and environments in which a specific cloud type would exist.
In a math unit of study, second grade students learned about geometric shapes and in particular, they learned about the differences between a square and a cube. To reinforce the idea that a cube has six sides called faces, students created cartoon characters expressing a variety of emotions. They added these expressions to the faces of their cubes.

Combining time and geometric shapes, students created a textural painting divided into day and night, which served as a backdrop for a geometrical detailed skyline. Students visualized how buildings were built by breaking them down into simple geometric shapes. They sponge-painted a textural sky using only the colors that were identified as daytime colors or nighttime colors. Then they developed the skyline using different geometric construction paper cutouts. Students created a full city skyline by building (stacking, placing, layering) as well as adding drawn-on detail.

<table>
<thead>
<tr>
<th>Classroom Teachers: Meisel-Jarema/Anderson</th>
<th>Teaching Objective: How to calculate the length of time to perform a common task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Content/Performance Descriptor</td>
<td>CCRS.2.MD.7.B.4 Tell and write time to the nearest 5 minutes</td>
</tr>
<tr>
<td>Essential Question: How can we accurately describe how long it takes to accomplish a specific activity?</td>
<td></td>
</tr>
<tr>
<td>Teaching Objective: (What I will teach) Classroom teachers complete</td>
<td>How to tell time to the hour and half hour using both analog and digital clocks</td>
</tr>
<tr>
<td>Math Learning Activities: (What students will do) Classroom teachers complete</td>
<td>Match clock face cards to analog clock cards to show given time; put clocks in order</td>
</tr>
<tr>
<td>Vocabulary: Digital Clock, analog clock, hour hand, minute hand</td>
<td>Be introduced to the art of collage and simple contour line illustration</td>
</tr>
<tr>
<td>Assessment strategies: Teacher observation and assessment of time activities, rubric for art project, gallery talk</td>
<td></td>
</tr>
<tr>
<td>Describe strategies that will be used to meet Common Core Standards: Practice telling time; essay about a personal elapsed time event; use of technical vocabulary</td>
<td></td>
</tr>
</tbody>
</table>

**Big Idea:** The comprehension and understanding of time

**Essential Question:** How can we accurately describe how long it takes to accomplish a specific activity?
Third Grade

Third grade teachers, Gayle Torjman and Adrienne Wasielewski, began the school year by reviewing the concepts of telling and writing time to the nearest minute and solving problems by calculating time intervals. Like the third grade students at Comly School, they learned how to make exact linear measurements that represented hours and minutes over a 12 hour period. They constructed a daily log using their class activity schedule, recording how long each activity lasted by calculating elapsed time noting the start and end time and figuring out the minutes in between. Additionally, they used simple geometric shapes to construct a board game. The finished project became a tool to tell time over an extended period and to visualize how long it takes to perform a particular activity.

In science students explored the earth’s layers and learned about concentric circles and symmetry. Teaching Artist Alexandra Kopanaiko created art-integrated projects that provided students with multiple ways of understanding and experiencing these concepts. In one of these projects, students created a mosaic model of the earth’s layers. Using Plaster of Paris as an example of how a liquid turns into a solid, students measured specific amounts of the plaster and water to observe how these materials (a powder and a liquid) combine to form a solid, which they then painted to represent the concentric layers of the earth.

In a unit of study that combined science and mathematics, students described, analyzed, and compared properties of 2-dimensional and 3-dimensional shapes. Additionally, they studied about the products that are derived from natural resources as well as learned about how Native Americans used natural products to create objects for everyday use. Students first created Native American design vases with construction paper and then they turned their designs into papier maché pots.

Another science unit focused on sound and vibration. Students learned how to identify the difference between high pitch and low pitch, determined how the tension and vibration of a stringed instrument affects the pitch of a sound, and experimented in creating different sounds and pitches using multiple resources such as glasses, water, spoons, string, and straws.
Students explored line and how it can convey different moods and feelings. Students listened to four different types of music and created line drawings to represent what they heard. Students were also asked to write down any color that they might associate with each song. Once the music finished, students filled in the white space on their paper with the colors and lines that they had associated with each piece of music.

Included in this lesson was the study of a number of abstract artists from Kandinsky to Duchamp to Rauschenberg. Students explored what abstract art is and how they could use it in the creation of their own artwork. Teaching Artist Alexandra Kopanaiko developed a step-by-step process whereby students created abstract representations of the four pieces of music as a backdrop to the creation of a symmetrical, realistic representation of a guitar fashioned with pegs and strings. The final piece included a musical collaboration of multiple aspects of science and art.
Fourth Grade

Classroom Teachers Shelley Gable and Megan Kauffman Dager began Arts Link Year Three projects by combining a science unit on land and water with a mathematics unit that discussed measurement and scale. Students worked with Teaching Artist Deborah Williams to create landscape collages depicting land masses and water visually. They extended this project by creating a Mandala of the water cycle applied to a slab cylinder of clay, which when dry yielded a bas relief representing the erosion of the soil.

Units of math and science were combined in a project that included the study of the relationship between magnets and electricity to build an understanding of positive and negative numbers. Students demonstrated their understanding of the science unit through a project based on the theory of tessellation and notan designs. Referencing traditional Japanese notan designs, students cut and pasted positive and negative designs with black and white construction paper. Continuing with this theme, students explored positive and negative space through patterns creating large M. C. Escher-type artworks.

Fourth grade Decatur students also worked on fractions of 10 creating Wampum beaded patterns. They created plant life cycle Mandalas and created clay insects. Finally, students designed their own Family Feud game using geometric shapes and constructing their own game prizes.
### Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Decatur   Teaching Artist: Williams   Teachers: Gable/Kaufman</th>
<th>Big Idea: The earth system changes constantly as air, water, and soil interact.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade: 4 Marking Period: 1 and 2</td>
<td>Essential Question: What predictable patterns of change can be observed on and from earth?</td>
</tr>
<tr>
<td><strong>Math Content/Performance Descriptor</strong></td>
<td><strong>Science Content/Performance Descriptor</strong></td>
</tr>
<tr>
<td>CCRS.4.G.1. Classify two-dimensional figures by the properties of their lines and angles; CCRS.4.MD.2. Solve problems involving measurement and conversions</td>
<td>S4.A.3.2.2. Observe through the use of models; S4.A.2.1.3. Predict ways a river can alter land; S4.A.3.2.2. Use models to investigate the water cycle</td>
</tr>
</tbody>
</table>

#### Teaching Objective: (What I will teach) (Classroom teachers complete)
- How to use a compass to draw circles and calculate degrees in a circle
- How to weigh, measure, record, and calculate changes

#### Teaching Objective: (What I will teach) (Classroom teachers complete)
- Summarize what happens when water flows over and through land.
- Compare and analyze parts of a river.
- Water Cycle process

#### Teaching Objective: (What I will teach) (Art teacher/Teaching artist complete)
- Landscape collage of mixed media
- Radial design with colored markers
- Clay slab cylinder with eroded surface design

#### Math Learning Activities: (What students will do) (Classroom teachers complete)
- Use a compass to draw circles (different sizes and shapes)
- Measure degrees in a circle
- Measure and estimate weight, length, width, height, calculating difference through phase changes

#### Science Learning Activities: (What students will do) (Classroom teachers complete)
- Summarize what happens when water from a single source flows over and through land
- Discuss similarities and differences among streams
- Examine processes of erosion and deposition
- Identify components of a river
- Record data from weight and measurement of clay projects and analyze data.

#### Art Skills & Integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)
- Create mixed media landscape collages
- Describe land masses and water using color to show depth
- Using a compass, create a mandala of the water cycle in a radial design
- Make a slab cylinder of clay with a wax design eroding dry clay to yield a bas relief design
- Weigh and measure their clay project to observe changes with wet, dry and fired clay

#### Vocabulary: Compass, degrees, circle, radius
- Vocabulary: Natural phenomenon, erosion, deposition
- Vocabulary: Foreground, middle ground, background, mandala, radial design, slab, slip, score, bas relief, resist, bisque, glaze

#### Assessment strategies: Student use of appropriate vocabulary to discuss their artwork; finished projects assessed to determine student's understanding of math, science, and art concepts; group reflection and sharing to show use of new vocabulary and demonstrate mastery of new concepts and processes

Describe strategies that will be used to meet Common Core Standards: Students use reasoning, problem solving, and decision making while applying skills in numbers operations and measurement; reading of science texts; researching and writing about how the interaction of air, water, and soil changes the earth.
Fifth Grade

Fifth grade students working with Classroom Teachers Janet Jordan and Lucia Crosley Marks began their science studies exploring the relationship between the sun, an object, and the shadow cast. By asking the essential question of how does the position of the sun in the sky relate to the size and orientation of the shadow cast, students explored still life drawing using a variety of light sources to depict cast shadows. Using the ambient latitude, students built sundials by creating an angled shape of clay that cast a shadow to tell time relative to the position of the sun.

Students then worked on a scientific and mathematics investigation to gain experience with the concept of variables. They observed and compared the behaviors of pendulums. They conducted controlled experiments to find out what variables affected the number of cycles a pendulum completed in a unit of time. Students also identified the variables that related the capacity of a boat to the amount of weight it held. Students built their own boats for the experiment determining the amount of weight their boat could hold.

Working with relative sizes of measurement units within one system of units in mathematics, students practiced using a pan balance. Allowing for variables in weight distribution, they demonstrated how balance is achieved as weight changes. After studying the mobiles of Alexander Calder, they created their own mobiles choosing as subject matter ecosystems in nature.

Finally, students combined a unit on probability and a unit on volume. They converted geometric shapes into 3-dimensional geometric forms incorporating them as playing pieces to be used in developing their own Family Feud vocabulary game.
### Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Decatur</th>
<th>Teaching Artist: Williams</th>
<th>Unit Title/Big Idea: Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade: 5</td>
<td>Marking Period: 2</td>
<td>Essential Question: What variables can you change in a system that might affect a system?</td>
</tr>
</tbody>
</table>

#### Math Standards and Descriptor:
- CCRS.4.MD.1. Know relative sizes of measurement units within one system of units
- (Classroom teachers complete)

#### Science Standards and Descriptor:
- S8.A.2.1.3 Design and construct controlled experiments to find out what variables affect the number of cycles a pendulum will complete in a unit of time; S8.A.1.1.3 Use evidence from experiments to support conclusions and answer questions

#### Art Standards and Descriptor:
- 9.1.5 A. Know and use the elements and principles of each art form to create works in the arts and humanities

#### Teaching Objective: (What I will teach) (Classroom teachers complete)
- **Balance objects using a pan balance**

#### Teaching Objective: (What I will teach) (Classroom teachers complete)
- **Observe and compare behaviors of pendulums**
- **Gain experience with the concept of variable**
- **Conduct controlled experiments to find out what variables affect the number of cycles in a pendulum will complete in a unit of time**
- **Identify what variables that might affect the number of passengers a paper cup boat can hold without sinking**

#### Math Learning Activities: (What students will do) (Classroom teachers complete)
- **Pan balance activity**

#### Science Learning Activities: (What students will do) (Classroom teachers complete)
- **Investigation #1 Pendulums/swingers**
- **Investigation #2 Lifeboats**

#### Art Skills & integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)
- In groups of 5-6 students, construct large scale mobiles using found objects, mixed media and decoupage techniques.
- Demonstrate the ability to observe and predict how balance is achieved when weight distribution changes.

#### Vocabulary: Balanced weight

#### Vocabulary: Variables, systems, motion

#### Vocabulary: Mobile, balance, collage, found object sculpture, decoupage

**Assessment strategies:** Students use appropriate vocabulary to question and discuss their artwork; learning objectives assessed by evaluating the student’s finished artwork to ascertain understanding of the art, science, and math concepts; observation journals; results of investigation #1 and #2; written reports

**Describe strategies that will be used to meet Common Core Standards:** Science experiments; use of a journal for data entry; reading non-fiction texts about the nature of balance; reading non-fiction text about Calder and the history of mobiles.
Art Teacher - Cohort Leader
Diane Craven

Teaching Artist
Rosi Dispensa, 2nd & 3rd Grades
Benjamin DeMeo, 4th & 5th Grades

Classroom Teacher
Kueiping Su, 2nd Grade
Elaine Welles, 2nd Grade
Paul Manchin, 3rd Grade
Marc Falco, 3rd Grade
Andrew Oliver, 4th Grade
Meg Merlini, 4th Grade
Alison Stuart, 5th Grade
Joanna Bottaro, 5th Grade

Principal
Carol Domb

Second Grade

Collaborating with second grade classroom teachers, Kueiping Su and Elaine Welles, Teaching Artist Rosi Dispensa reinforced the mathematics concepts that had recently been presented to students: comparison number stories, rectangular arrays, multiples of a number, and the concept of remainder. Art projects were grouped according to each math concept and then were scaffolded in a way that each previous project was used to construct appropriate knowledge for the current week’s project.

Students began a unit on coin identification, coin value, counting, addition, observing and identifying properties of coins. For the art integrated project, students identified the shape, color, and texture of five fruits and vegetables and demonstrated these characteristics by creating 3-dimensional sculpted produce. Students discussed the value of these fruits and vegetables and created signage to market their sale. Additionally, they created their own currency to purchase these items. This unit was followed by a unit on telling time. Students created clocks, the face of which was made of glue that acted as a resist to the oil pastels. Students combined primary colors and secondary colors to create secondary and tertiary colors.
Students continued their mathematics studies to include counting by units of ten and simple fractions: halves, quarters, and thirds of squares and rectangles. Additionally, they learned how to graph collected data as bar and picture graphs.

Finally, students studied weather and clouds. They learned how to identify cloud formations and kept a journal to describe their observations of the weather and the types of clouds they saw each day. With Teaching Artist Rosi Dispensa, they learned how to apply and blend oil pastels to show a variety of textures and lines seen in cloud structures, they sculpted and decorated a bird made of wire, and created a weather and cloud collage environment in which to house their birds.
Third Grade Teachers Paul Manchin and Marc Falco concentrated their Arts Link project on a unit of science with a study of the life cycle of plants. Students took a walk to nearby Washington Square to gather a variety of plant specimens creating informational posters and writing about the plants they discovered. They moved on to observing and describing the properties of rocks by first identifying the three types: igneous, metamorphic, and sedimentary, and then used their properties to create an art integrated project in which students made their own non-cooked dough to create each type of rock. Additionally, in their mathematics classes, students reviewed U.S. customary and metric units of length and estimated and measured lengths to the nearest inch, ½, and ¼ inch and nearest centimeter. They polished their skills as well as measured their stones and used volume measurements to mix the ingredients for their dough. Students worked in groups to create the tallest structure out of their batch of dough; they were responsible for identifying the tools needed to measure the structure and collect the measurements. Finally, they used their measurement skills to create robots and incorporated their rocks into the robots as eyes, noses, and mouths.

Continuing with measurements in math, students tackled a unit on sound and vibration. Students learned that sounds are produced by vibrations; they identified that sound waves move in different directions; and they discovered several ways to effect the transmission of sound vibrations; they compared high-low-medium pitched sounds and investigated how tension affects the pitch of a sound. Students then created gourd drums that were incised with designs and used the sounds and vibrations their drums created to inform their timbre paintings.
Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: McCall</th>
<th>Teaching Artist: Dispensa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers: Manchin/Falco</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade: 3</th>
<th>Marking Period: 3</th>
</tr>
</thead>
</table>

Unit Title/Big Idea: Properties of sound

Essential Question: How is sound made? How can sound waves be controlled and manipulated?

Math Standards and Descriptor: CCRS.3.MD. 6.2.4.3.A.6. Solve problems involving perimeters of polygons and distinguish between linear and area measures

Science Standards and Descriptor:
- S4.C.2.1.2. Identify that sounds are produced by vibrations; S4.C.2.1.4. Identify that sound moves in different directions; S4.A.2.1.1. Discover several ways to affect the transmission of sound vibrations; compare high-low-medium pitched sounds; investigate how tension affects the pitch of a sound

Art Standards and Descriptor:
- 9.1.3.A. Know and use the elements and principles of each art form to create works in the arts and humanities; 9.1.3.J. Know and use traditional and contemporary technologies; 9.3.3.A. Compare and contrast, analyze, interpret, form and test hypotheses, evaluate/judge; 9.3.3.F. Recognize and compare similar and different characteristics

Teaching Objective: (What I will teach) (Classroom teachers complete)
- How to use width, height, and radius to determine circumference and surface area of their gourds

Teaching Objective: (What I will teach) (Classroom teachers complete)
- Teach students to identify how sound moves, different types of sound waves, and how tension affects the pitch of a sound.

Teaching Objective: (What I will teach) (Art teacher/Teaching artist complete)
- Teach students to design, paint, and construct a gourd drum

Math Learning Activities: (What students will do) (Classroom teachers complete)
- Worksheets in math journal
- Math message and challenges

Science Learning Activities: (What students will do) (Classroom teachers complete)
- Information videos
- Use of manipulative (pitchforks, etc)
- Sound experiments

Art Skills & Integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)
- Students will design and paint the exterior of a drum; they will use design theory to create an arrangement that is made up of lines that produce a pattern
- Students will construct a drum by sanding a gourd, cutting out hide, and attaching the hide.
- Students will use the vibrations and sounds produced by the pitch of their drum instruct timbre paintings

Vocabulary: Area, perimeter, surface area, circumference

Vocabulary: Pitch, frequency, sound, timbre, vibration

Vocabulary: Balance, contrast, movement, rhythm, stroke

Assessment strategies: Quiz on sound and vibration unit; quiz on math unit; teacher evaluation and observation; rubric for drum project

Describe strategies that will be used to meet Common Core Standards: Sound experiments; short essay on content from informational videos; presentation of drum and explanation of how it works.
Fourth Grade

Teaching Artist Ben DeMeo joined the Arts Link team in January 2013. His ideas about how to integrate the arts into science and mathematics, in particular, excited fourth and fifth grade teachers at both McCall and Morton Elementary Schools. Consequently, most of the projects created were undertaken by all fourth and fifth grade participating students at both schools.

Most of the projects focused learning on fractions. The first project utilized the fraction stick to help students visualize and understand fractions as parts of a whole. Teaching Artist Ben DeMeo worked with Fourth Grade Teachers Andrew Oliver and Meg Merlini at McCall School to create a project in which the teachers made correlations between fractions and the physical world by dissecting wholes into parts. Presenting the rich history of quilt making, he demonstrated how each student’s individual fraction stick could be assembled like a quilt creating a new whole. He helped students to understand fractions from a variety of perspectives.

Students then worked with Teaching Artist Ben DeMeo to create fractal sculptures relying on the pyramid as the basic geometric structure from which a variety of sculptures were created.
## Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: McCall</th>
<th>Teaching Artist: DeMeo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers: Oliver/Merlini</td>
<td></td>
</tr>
</tbody>
</table>

### Unit Title/Big Idea: Mandala/Parts of a circle

**Grade: 4   Marking Period: 3**

**Essential Question: What are the parts of a circle and how are they related?**

### Math Standards and Descriptor:
- CCRS.3.MD.1: Solve problems involving measurement and estimation of temperature, liquid volume, mass or length
- CCRS.3.MD.2: Solve problems involving measurement and estimation of weight and time
- CCRS.3.MD.3: Apply properties of shapes to classify them
- CCRS.3.MD.4: Understand concepts of measurement and measurement systems
- CCRS.3.MD.5: Relate area to the operations of multiplication and addition
- CCRS.3.MD.6: Measure areas of plane figures by using unit squares (cm², in², ft², in.², yd²)
- CCRS.3.MD.7: Use square units to find the area of rectangles
- CCRS.3.MD.8: Understand concepts of measurement and measurement systems

### Art Standards and Descriptor:
- 9.1.5.A: Know and use the elements and principles of each art form to create works in the arts and humanities
- 9.1.5.B: Use simple materials to create works of art
- 9.1.5.C: Recognize and use fundamental vocabulary within each of the arts forms
- 9.1.5.D: Compare similar and contrasting important aspects of works in the arts and humanities based on a set of guidelines using a comprehensive vocabulary of critical response

### Teaching Objective: (What I will teach) (Classroom teachers complete)
- Explore perimeter and area of geometric shapes (triangle, rectangles, etc.) using formulas
- Identify parts of a circle and common angles of sectors
- Explore the history and significance of Mandalas
- Demonstrate how to make a compass using simple materials
- Use and maintain materials, equipment and tools safely at work and performance spaces
- Compare similar and contrasting important aspects of works in the arts and humanities

### Math Learning Activities: (What students will do) (Classroom teachers complete)
- Identify shapes
- Apply formulas
- Find properties of geometric solids
- Investigate relationships of volume between geometric shapes
- Convert measurements

### Art Learning Activities: (Art teacher/Teaching artist complete)
- Identify parts of a circle and common angles of sectors
- Measure and layout equal sectors within a circle
- Experiment with radial pattern and radial symmetry
- Use and maintain materials, equipment and tools safely at work and performance spaces

### Assessment strategies: Math quizzes, rubric for art making project, class critiques, class presentations

### Vocabulary: Prisms, pyramid, triangle, parallelogram, quadrangle, perimeter, circumference, diameter, radius

### Vocabulary: Radial pattern, symmetry, asymmetry, organic, geometric, protractor, compass

Describe strategies that will be used to meet Common Core Standards: Student research and written essay on the history of Mandalas; the use of tools such as compasses to draw circles and protractors to measure 8 equal parts; persistency for accuracy of measurements to ensure the design in each part is the same; oral presentation of each Mandala to explain how it was done and why elements were chosen for the design.

Finally, the students explored perimeter and area of geometric shapes using formulas. Their art making project was to create a mandala with a radial design. They identified parts of a circle and angles of sectors. They made a compass using simple materials and explored the history and significance of mandalas. They measured and laid out equal sectors within a circle and created a radial pattern using radial symmetry.
Fifth Grade

Classroom Teachers Alison Stuart and Joanna Bottaro worked with students to understand how fractals are related to fractions while Teaching Artist Ben DeMeo taught students how they are used to assemble three dimensional shapes. DeMeo introduced students to paper engineering and fractals; he demonstrated how paper can be folded to create a 3-dimensional shape. Additionally, he worked with Teachers Alison Stuart and Joanna Bottaro to review volume and fractions, and how they relate to different size pyramids. He reviewed proper measurement and cutting techniques. Students were assigned to groups and each group had specific rules for assembling their pyramids.

Students also created fraction quilts in response to their study of how fractions represent parts of a whole. They manipulated sticks to create an array of fractions and then painted them on squares using primary and secondary colors. Learning about the history of quilts helped them to create a large fraction quilt representing parts and wholes in a unique way.

Working with Teaching Artist Ben DeMeo, students also studied the history and significance of mandalas. Relating their geometric designs to their study of radial designs, students created their own mandalas by carefully using tools to accurately measure and divide a circle into equal parts. Then they created a design using geometric shapes and primary and secondary colors within one section of the circle. Students recreated that design in the remaining sections of their mandala.
# Arts Link Grade Level Unit Planning Template

**School:** McCall  
**Teaching Artist:** DeMeo  
**Teachers:** Stuart/Bottaro

<table>
<thead>
<tr>
<th>Grade: 5</th>
<th>Marking Period: 3</th>
<th>Essential Question: How are fractals related to fractions and how are they used to assemble three dimensional, voluminous shapes?</th>
</tr>
</thead>
</table>

| Math Standards and Descriptor:  
CCRS.4.M04.A-F.2.1 Find equivalencies and compare fractions; M04-D-M.1.1 Solve problems involving length, weight (mass), liquid volume, time, area, and Perimeter; CCRS.4.G.1 2.3.3.A.1 Draw lines and angles and identify these in two-dimensional figures | Art Standards and Descriptor:  
9.1.5.A. Know and use the elements and principles of each art form to create works in the arts and humanities; 9.1.5.C. Recognize and use fundamental vocabulary within each of the arts forms; Use and maintain materials, equipment and tools safely at work and performance spaces; 9.3.5.D. Compare similar and contrasting important aspects of works in the arts and humanities based on a set of guidelines using a comprehensive vocabulary of critical response |

| Teaching Objective: *(What I will teach) (Classroom teachers complete)*  
• Review equivalent numbers, converting fractions, and addition of fractions  
• Introduce mass and volume, and types of triangles | Teaching Objective: *(What I will teach) (Art teacher/Teaching artist complete)*  
• Present paper engineering and fractals  
• Demonstrate how paper can be folded to create a 3d shape  
• Review volume and fractions, and how they relate to the different size pyramids  
• Review proper measurement and cutting techniques  
• Demonstrate how each groups pyramid will be assembled according to specific rules |

| Math Learning Activities: *(What students will do) (Classroom teachers complete)*  
• Recognize equivalent numbers and how they translate to shapes  
• Identify types of triangles  
• Measure and define geometric shapes  
• Experiment with volume of 3-dimensional shapes | Art Skills & Integrated Learning Activities: *(What students will do) (Art teacher/Teaching artist complete)*  
• Recognize correlation between fractions and how fractals are assembled to create a 3d object  
• Color code, and assemble several different sizes of pyramid  
• Assemble individual pyramids together according to a set of rules to create a balanced sculpture |

| Vocabulary: Geometry, volume, mass, equilateral triangle, variable | Vocabulary: Fractal, geometry, volume, engineering |

**Assessment strategies:** Math quizzes, rubric for art project, critique

Describe strategies that will be used to meet Common Core Standards: This project presents many opportunities for integrated learning. Geometry and visual art have many things in common as a prominent element of art is shape. Also, students’ motor skills will be exercised as they review measurement and use rulers to make precise marks. The final sculpture incorporates many elements and principles of visual art while addressing equivalent numbers, fractions, measuring, and geometry.
Art Teacher - Cohort Leader
Brad Vena

Teaching Artist
Rosi Dispensa, 2nd & 3rd Grades
Benjamin DeMeo, 4th & 5th Grades

Classroom Teachers
Robert Liptock, 2nd Grade
Sheila Johnson, 2nd Grade
Rose Truscia, 3rd Grade
Tia Elliott, 3rd Grade
James Childs, 4th Grade
Dawn Merritt, 4th Grade
Catherine Nelson, 5th Grade
Nicole Buonocore, 5th Grade

Principal
Zena Sacks

Second Grade

Second Grade Teachers Robert Liptock and Sheila Johnson and Teaching Artist Rosi Dispensa began the school year reviewing types and uses of numbers. Students studied the value of money, numerical counting of currency, coin identification, coin value, and addition of coins. They worked with place value of ones, tens, hundreds and base ten numerals. They represented, described, and applied place value concepts to make and compare numbers and money amounts. This was reinforced by their art integrated project in which students applied their understanding of the value of things to an activity that required them to create five fruit and vegetables through contour drawing adding texture and color and then shading them. Students discussed their value in the market place and created coins of different values using their own images and designs. They then set up a little market to sell and buy the fruits and vegetables they had made.

Students followed up this activity by working on the concept of balance by creating mobiles out of wire and sculpted clay. In their unit of study about weather and clouds, students used oil pastels to create each of the three cloud types. Students then sculpted wire birds and collaged them into a cloud environment that showed different weather conditions and the clouds that were appropriate to those conditions.
## Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Morton</th>
<th>Teaching Artist: Dispensa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers: Liptock/Johnson</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade: 2</th>
<th>Marking Period: 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Question How can students understand that the digits in a number represent amounts of hundreds, tens, ones</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Math Content/Performance Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCRS.2.OA.2.2.2.A.1 Represent and solve problems involving addition and subtraction within 100; CCRS.2.MD.8.2.4.2.A.3 Solve problems using coins and paper currency; CCRS.2.NBT.1.2.1.2.B.1 Use place value concepts to represent amounts of tens and ones and to compare three digit numbers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Art Content/Performance Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1.3.A. Know and use the elements and principles of each art form to create works in the arts and humanities; 9.1.3.C. Recognize and use fundamental vocabulary within each of the arts forms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching Objective: (What I will teach) (Classroom teachers complete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place value, ones, tens, hundreds</td>
</tr>
<tr>
<td>• Base ten</td>
</tr>
<tr>
<td>• Understand concept of value and money</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching Objective: (What I will teach) (Art teacher/Teaching artist complete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Observation and identification of properties</td>
</tr>
<tr>
<td>• Contour drawing</td>
</tr>
<tr>
<td>• Shading and creating texture with crayon</td>
</tr>
<tr>
<td>• Creating currency using their own portraits and designs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Math Learning Activities: (What students will do) (Classroom teachers complete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Worksheets practicing teaching objectives</td>
</tr>
<tr>
<td>• Journal book to record outside experiences with value and money</td>
</tr>
<tr>
<td>• Use of paper money to practice concepts of value and money</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Art Skills &amp; integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Students will identify the shape, color and texture of five fruits and vegetables and demonstrate these characteristics in observational contour drawings.</td>
</tr>
<tr>
<td>• Students will then find the value of these fruits and vegetables and use coin stamps to create the currency necessary to purchase these items.</td>
</tr>
<tr>
<td>• Students will cut out their produce drawings and Velcro them into a communal fruit bowl and also cut out the equivalent monetary value in coins that will be added to a communal coin jar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary: Dollars, coins, cents, hundreds, tens, ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary: Texture, color, shape, round, oval, square, triangle, bumpy, smooth, rough, sharp, soft, hard</td>
</tr>
</tbody>
</table>

| Assessment strategies: Observation and teacher based tests; rubric to assess art project |

Describe strategies that will be used to meet Common Core Standards: Appropriate use of technical vocabulary; mathematical practice in addition and subtraction of money and building understanding of the value of products; reinforcement of base ten principles
Third Grade

The third grade students of Classroom Teachers Rose Truscia and Tia Elliott began the year with a unit of science and mathematics. Students learned to compare and contrast types of rocks and they distinguished between the different types using observation of color, texture, and pattern. This provided the background knowledge needed for the art integrated project undertaken with the help of Teaching Artist Rosi Dispensa. Students replicated rock formations with colored clay. They also manipulated the clay to create maximum units of measurement: longest, widest, tallest, roundest, and recorded all measurements within fractions of inches. All data collected was graphed; once graphed, students add embellishments with drawn lines and patterns. Each bar became a tall building in a class-created cityscape.

A unit in math required students to review the basics of calculating time using number models and measuring to the ¼ hour using a clock. They also reviewed elapsed time and how to find and use the perimeters of plane figures. Working with Teaching Artist Rosi Dispensa, students also learned how to create resist painting. They created clocks by measuring and crafting geometric shapes to create clock parts. Students painted with glue to create a resist to oil pastels and blended primary colors to create secondary colors. Then, they assembled the clock parts and used the clocks to practice telling time to the quarter hour.

Additionally, students worked on a unit in science where they studied the life cycle of flowers and plants. They kept a journal in which they wrote about their observations of the natural world. Students diagrammed parts of a flower and they created bouquets of flowers with all their parts in honor of Mother’s Day.
# Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Morton</th>
<th>Teaching Artist: Dispensa</th>
<th>Unit Title/Big Idea: Measuring time to the quarter hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers: Truscia/Elliott</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Grade: 3   Marking Period: 2nd

### Essential Question:
Can making a clock help students recognize and understand ¼ hour increments?

### Math Standards and Descriptor:
- CCRS.3.NBT. 2.1.3.B.1 Use place value understanding and properties of operations to perform multi-digit arithmetic; M03.A-T.1.1 Apply place value strategies to solve problems; CCRS.3.MD. 2.4.3.A.2 Tell and write time to the nearest minute and solve problems by calculating time intervals; M03.D-M.1.1 Determine or calculate time and elapsed time CCRS.3.MD. M03.D-M.3.1 Find the areas of plane figures

### Teaching Objective: (What I will teach) (Classroom teachers complete)
- How to make rectangles with given perimeters, relate tiling to area and construct triangles using given lengths, then finding their perimeters
- How to calculate time using number models
- How to measure to the ¼ hour using a clock
- How to understand elapsed time

### Art Standards and Descriptor:
- 3.1.3 A. Know and use the elements and principles of each art form to create works in the arts and humanities; 9.3.3.F. Compare and Contrast similar and different characteristics

### Teaching Objective: (What I will teach) (Art teacher/Teaching artist complete)
- How to construction and design of a clock using geometric shapes
- How to use drawings as a design tool
- How to mix primary colors to create secondary colors
- How to use glue as paint to create a resist for oil pastels

### Math Learning Activities: (What students will do) (Classroom teachers complete)
- Practice making rectangles and finding their perimeters
- Complete exercises to calculate time to the nearest ¼ hour
- Complete exercises to understand elapsed time

### Art Skills & Integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)
- Paint with glue to create a resist to oil pastels and blend primary colors to create secondary colors
- Assemble the clock parts
- Use the clock to practice telling time to the quarter hour

### Vocabulary: Quarter hour, perimeter, rounding, geometric shapes, tiling, area, elapsed time

### Vocabulary: Resist, primary colors, secondary colors, blending

### Assessment strategies:
Teacher observed exercises telling time; quizzes on finding perimeters; rubric to assess art project, critique using vocabulary

Describe strategies that will be used to meet Common Core Standards: Use of appropriate vocabulary in both mathematics and art; calculating time to ¼ hour; use of place value strategies to solve problems.
Fourth Grade

Teaching Artist Ben DeMeo and Classroom Teachers James Childs and Dawn Merritt began their Arts Link Year Three project working with an essential question asking, “How do visual representations of fractions (i.e., pie charts) relate to their numerical forms of measurement, grids, and polygon shapes?” Teachers had students use fraction sticks to show a visual representation of fractions. This demonstrated that a whole can be made up of a variety of parts, which students then used as they practiced the mathematical functions of addition and subtraction of fractions.

Students worked with the teaching artist to present their results in an art making project. Students created visuals that corresponded to their fraction sticks. Teaching Artist Ben DeMeo made correlations between fractions and the physical world by dissecting a whole into parts; he presented and demonstrated how to color code a fraction table. Additionally, he showed how parts of the fraction stick can be reassembled in any number of ways to create an interesting composition. He presented the rich history of quilt making, which uses parts to make wholes. Finally, he demonstrated how each student’s individual fraction stick could be assembled like a quilt to create a new whole.
### Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Morton  Teaching Artist: DeMeo  Teachers: Childs/Merritt</th>
<th>Unit Title/Big Idea: Fraction Quilt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade: 4  Marking Period: 2</td>
<td>Essential Question: How do visual representations of fractions relate to the numerical form?</td>
</tr>
</tbody>
</table>
| **Math Standards and Descriptor:**  
CCRS.NF.1 M05.A-F.1.1 Solve addition and subtraction problems involving fractions; M05.A-F.2.1.1 Solve word problems involving division of whole numbers leading to answers in the form of fractions (including mixed numbers) | **Art Standards and Descriptor:**  
9.1.5.A. Know and use the elements and principles of each art form to create works in the arts and humanities; 9.1.5.C. Recognize and use fundamental vocabulary within each of the arts forms; Use and maintain materials, equipment and tools safely at work and performance spaces; 9.3.5.D. Compare similar and contrasting important aspects of works in the arts and humanities based on a set of guidelines using a comprehensive vocabulary of critical response |
| **Teaching Objective: (What I will teach) (Classroom teachers complete)**  
• Use a fraction stick to show a visual representation of fractions  
• Show that a whole can be made up of a variety of fractions,  
• Demonstrate the addition and subtraction of fractions. | **Teaching Objective: (What I will teach) (Art teacher/Teaching artist complete)**  
• Make correlation between fractions and the physical world by dissecting a whole into parts  
• Present and demonstrate how to color code fraction table  
• Show how parts of the fraction stick can be reassembled in any number of ways to create an interesting composition  
• Present the rich history of quilt making  
• Demonstrate how each student’s individual fraction stick can be assembled like a quilt to create a new whole |
| **Math Learning Activities: (What students will do) (Classroom teachers complete)**  
• Recognize correlation between fractions and visual aid (fraction stick)  
• Demonstrate ability to add and subtract various fractions | **Art Skills & integrated Learning Activities: (What I will teach) (Art teacher/Teaching artist complete)**  
• Recognize correlation between fractions and visual aid (fraction stick)  
• Color code, dissect, reorder, and reassemble, fraction stick  
• Assemble individual fraction sticks to create a quilt |
| **Vocabulary:** Fraction, whole number, numerator, denominator | **Vocabulary:** Collage, quilt, primary colors, secondary colors, scale |

**Assessment strategies:** Math quizzes, teacher observation, rubric for art project

Describe strategies that will be used to meet Common Core Standards: By using a color coded fraction stick as a visual aid, students will be able to recognize that a whole can be made up of parts. Many combinations can be used to create interesting compositions. This draws on both the elements and principles of design and fractions that make up a whole.
Fifth Grade

Fifth grade students under the auspices of Classroom teachers Catherine Nelson and Nicole Buonocore began working with Teaching Artist Ben DeMeo to create art integrated lessons that would build math skills from multiple perspectives. Like the students in fourth and fifth grades at McCall and fourth grade students at Morton, fifth grade students would also undertake the same projects. What Teachers Nelson and Buonocore did was to deepen the understanding of these math and art integrated projects by making more appropriate connections to fifth grade mathematics.

Whereas, in the fraction quilt project fourth grade students added and subtracted fractions, fifth graders also added and subtracted including mixed numbers with unlike denominators. They also solved multiplication and division problems involving fractions and whole numbers in straight computation and solved word problems involving division of whole numbers leading to answers in the form of fractions including mixed numbers.

For the mandala project, fifth grade students were required to delve deeper into design theory as they created their radial designs. They became familiar with a variety of tools to aid them in completing their tasks. They researched and wrote about the history and significance of mandalas.

In creating their fractal sculptures, students were expected to demonstrate more complex understanding of how to apply concepts of volume to solve problems and relate volume to multiplication and to addition as they created a variety of pyramid forms to build their fractal sculptures. They were also expected to demonstrate greater competency in using the tools required to measure and cut the shapes for their sculptures.
# Arts Link Teaching Artist Lesson Plan Template

**School:** Morton  
**Classroom Teacher:** Nelson/Buonocore  
**Teaching Artist:** De Meo  
**Grade Level:** 5  
**Marking Period:** 3rd  
**Project:** Mandalas

<table>
<thead>
<tr>
<th>Date: 4-1-13</th>
<th>Core content: Math</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of classroom sessions for this project: 4</td>
</tr>
</tbody>
</table>

### Core Content Learning Objective:
- Identify shapes
- Apply formulas
- Find properties of geometric solids
- Investigate relationships of volume between geometric shapes
- Convert measurements

### Art Skill Learning Objective:
- Create symmetry
- Implement multiple tools of measurement
- Understand the difference between organic and geometric shapes
- Incorporate each in a design

### Art Skill & Integrated Subjects Short Description of Activity:
Mandalas perfectly blend art and math skills. Radial symmetry is achieved by creating 8 equal slices within an 8" circle. A design is created in one slice first using a combination of geometric and organic shapes. The design is then repeated in each of the other slices and colored.

### Priming for learning (pre-lesson):
Visual presentation about the history and significance of Mandalas

### Classroom Teacher: The content connections I can make to the Core Content Learning Objectives are:
- Identify shapes
- Apply formulas
- Find properties of geometric solids
- Investigate relationships of volume between geometric shapes
- Convert measurements

### Teaching Artist: The components of the project I will teach are:
- Identify parts and common angles of a circle
- Measure and layout equal slices within a circle
- Experiment with radial pattern and radial symmetry

### Vocabulary:
Radial pattern, symmetry, asymmetry, organic, geometric, protractor, compass

### Student Assessment:
Students will be assessed on their ability to use the provided tools and materials (compass, ruler, protractor), identify parts of a circle, follow directions, and create a repeating pattern.

### Closure:
All students will participate in filling out a self-reflection and a group discussion about the project using vocabulary appropriately.
## Second Grade

### Arts Link Grade Level Unit Planning Template

**School:** Morton  
**Teaching Artist:** Dispensa  
**Teachers:** Lipstick/Johnson  

**Grade:** 2  
**Marking Period:** 1  

**Big Idea:** Students will employ measurement skills to achieve the balance of small objects.

**Essential Question:** How can students learn about measurement, measurement tools, and balancing objects through experiences with art materials and objects?

**Math Content/Performance Descriptor:**  
- CCSS.MD.2.4.2.A.1 Measure and estimate lengths in standard units using appropriate tools

**Science Content/Performance Descriptor:**  
- S4.A.2.1.1 Learn how to look at the world in a scientific way; S4.A.2.2.1 Gather information about observations and measurements in a systematic way; S4.A.3.3.2 Make predictions (hypotheses) about what might happen next in an experiment

**Art Content/Performance Descriptor:**  
- 9.1.3.B. Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts

**Science Learning Activities:**  
- Construct models of the 3 basic cloud types; S4.D.2.1.1 Identify Several types of clouds; S4.D.2.1.1. Observe and compare various types of clouds; S.4.A.3.2.1 Learn how to look at the world in a scientific way; S.4.A.3.3.2 Make predictions (hypotheses) about what might happen next in an experiment

**Math Learning Activities:**  
- Learn to measure the length of small objects; S4.A.2.1.1 Learn how to look at the world in a scientific way; S4.A.2.2.1 Gather information about observations and measurements in a systematic way; S4.A.3.3.2 Make predictions (hypotheses) about what might happen next in an experiment

**Vocabulary:** Length, centimeter, longer than, shorter than

**Assessment strategies:** Teacher observation in mathematics activities, science journal, rubric to evaluate mobiles, oral presentation on individual mobiles to explain processes involved in both making the work and creating the balance

**Describe strategies that will be used to meet Common Core Standards:** Students used rulers (tools) to accurately measure lines or objects using centimeters; students used gram weights in making their clay objects and a balance scale to demonstrate making adjustments to the clay in order to achieve balance; students did scientific experiments and recorded their observations in their science journals; they used technical vocabulary correctly.

---

### Arts Link Grade Level Unit Planning Template

**School:** McCall  
**Teaching Artist:** Dispensa  
**Teachers:** Su/Welles

**Grade:** 2  
**Marking Period:** 4  

**Unit Title/Big Idea:** Clouds

**Essential Question:** How can we create cloud environments for birds?

**Science Standards and Descriptor:**  
- S4.D.2.1.1. Observe and compare various types of clouds; S4.A.3.2.1 Construct models of the 3 basic cloud types; S4.D.2.1.1 Identify Several types of clouds

**Art Standards and Descriptor:**  
- 9.1.3.B. Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts

**Teaching Objective:**  
- (What I will teach) (Classroom teachers complete)  
- Teach students what clouds are made of and how and why each type of cloud is formed  
- Identify various weather conditions that produce clouds

**Science Learning Activities:**  
- Keep a cloud journal and observe the sky for clouds  
- Record which types they have seen  
- Record the weather for each day and look for connections to the type of clouds

**Art Skills & Integrated Learning Activities:**  
- Sculpt and decorate a bird out of wire  
- Create a weather and cloud environment for their birds

**Vocabulary:** Cumulus, cirrus, stratus, evaporation, condensation

**Assessment strategies:** Teacher review of journal; vocabulary quiz; rubric for art project

**Describe strategies that will be used to meet Common Core Standards:** Students read informational texts about their chosen birds and will write an essay about the environment needed to support their bird. The cloud environment that the students create will be directly connected to the type of weather and cloud forming process that they draw. Students will demonstrate their knowledge by successfully using appropriate technical vocabulary when they discuss what they have done.
### ARTS LINK TEACHING ARTIST LESSON PLAN TEMPLATE

**Third Grade**

**School:** Decatur

<table>
<thead>
<tr>
<th>Classroom Teacher: Jarema/Anderson</th>
<th>Number of sessions: 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Content Learning Objective:</strong> CCRS.2.G.1</td>
<td></td>
</tr>
<tr>
<td>Students will:</td>
<td></td>
</tr>
<tr>
<td>- Recognize and draw shapes having specific attributes</td>
<td></td>
</tr>
<tr>
<td>- Visually compare different shapes (triangles, squares, quadrilaterals, etc.)</td>
<td></td>
</tr>
<tr>
<td>- Build geometric shapes using concrete objects</td>
<td></td>
</tr>
<tr>
<td>- Fold paper to demonstrate the reflections about a line</td>
<td></td>
</tr>
<tr>
<td><strong>Art Skill Learning Objective:</strong> 9.1.3.E</td>
<td></td>
</tr>
<tr>
<td>Students will:</td>
<td></td>
</tr>
<tr>
<td>- Practice constructing a cube from a cut and fold template</td>
<td></td>
</tr>
<tr>
<td>- Draw cartoon illustrations based on different facial emotions and expressions</td>
<td></td>
</tr>
<tr>
<td>- Demonstrate the ability to define objects, express emotions, illustrate an action, or relate and experience through the creation of the arts</td>
<td></td>
</tr>
</tbody>
</table>

**Core Skill & Integrated Subjects Short Description of Activity:**

Students will be introduced to the characteristics of both a square and a cube. Geometrical vocabulary will also be reviewed, specifically the "Face". Students will be given a template consisting of six squares, solid lines and dashed lines. Students will brainstorm two separate lists: different emotions or expressions (happy, sad, angry) and facial features (nose, eyes, mouth). After a brief demonstration of how to create a cartoon face that expresses a certain emotion, students will draw six different expressions on each of the six squares, utilizing all or most of the components of the aforementioned lists. The template will then be cut out and folded into a cube, creating the faces of a cube.

**Classroom Teacher:** The content connections I can make to the Core Content Learning Objectives are: |

- Review of geometric shapes and their attributes

**Teaching Artist:** The components of the project I will teach are: |

- How to build a cube by folding and cutting one piece of paper |
- How to create a cartoon illustration that expresses an emotion

**Vocabulary:** Square, cube, face, emotion, expression

**Student Assessment:** How will we know that students understand and make the correct connection? What do learning objectives do we need for a rubric that covers academic content, art skills, and affective skills? Understanding for the art education aspect can be determined through observation of the artwork: Were six different emotions described? Were all the facial features drawn? Understanding of the geometric principles can be determined through question and answer reviews, as well as through the construction of the actual cube. Does the student understand how six flat squares can be manipulated to create a cube?

**Closure:** What will we do to reinforce learning and close the lesson for today? Review of vocabulary; group display and discussion of constructed cubes

### ARTS LINK TEACHING ARTIST LESSON PLAN TEMPLATE

**School:** Comly

<table>
<thead>
<tr>
<th>Classroom Teacher: ODonoll/DiDonato/Sorichello</th>
<th>Number of sessions: 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Content Learning Objective:</strong> S3.A.3.2 Use models to illustrate simple concepts</td>
<td></td>
</tr>
<tr>
<td>- Represent and interpret data</td>
<td></td>
</tr>
<tr>
<td>- Use place value understanding and properties of operations to perform multi digit arithmetic</td>
<td></td>
</tr>
<tr>
<td>- Model with mathematics</td>
<td></td>
</tr>
<tr>
<td><strong>Art Skill Learning Objective:</strong> Students Will:</td>
<td></td>
</tr>
<tr>
<td>- Create a rural landscape that focuses on depth, texture, and (money) value</td>
<td></td>
</tr>
<tr>
<td>- Identify a horizon line and illustrate how it is used to create a landscape</td>
<td></td>
</tr>
<tr>
<td>- Collect and display different elements of texture (through the use of found materials)</td>
<td></td>
</tr>
</tbody>
</table>

**Core Skill & Integrated Subjects Short Description of Activity:**

A step-by-step procedure will be conducted on the smart board about how to create a rural landscape (how to create multiple hills, where to put the crops of the farm, how to draw specific details). Once the landscape has been set up, the texture can be applied. Students will be given 4 different types of texture that will represent 4 different crops on their farm. For this particular project the texture will consist of pinto beans, coffee beans, corn kernels, and rice. Each texture will be given a specific value (in this case each texture was given a monetary value that reflects U.S currency, i.e.: 1 pinto bean = 25 cents, 1 coffee bean = 10 cents, 1 corn kernel = 5 cents, and 1 piece of rice = 1 cent. After the texture is applied to the landscape, emphasizing structure and organization, a quality that farmers must have in order to be successful, the students will be asked to determine the total value of their farm landscapes. Students will count and tally up a receipt for the total value of their crops.

**Priming for learning (pre-lesson):** What activity will we do to prepare the students to learn?

This lesson has been designed to work hand and hand with the lessons that the students are working on in mathematics. Students who are learning about money during their daily curriculum will be working on: how to count coins, give change, determine equivalency, and establish value. Before this lesson begins, 5-10 minutes will be dedicated to identifying and exemplifying what a landscape painting is.

**Classroom Teacher:** The content connections I can make to the Core Content Learning Objectives are: |

- Addition and subtraction of money |
- Understanding value of goods in monetary terms

**Teaching Artist:** The components of the project I will teach are: |

- How to create a landscape |
- What a horizon line is and why it is important |
- What is texture, and where it is seen in art

**Vocabulary:** Landscape, horizon line, texture, value, currency

**Student Assessment:** How will we know that students understand and make the correct connection? What do learning objectives do we need for a rubric that covers academic content, art skills, and affective skills? The receipt requirement for this project will serve as a comprehension test. The receipt will need to be accurate to the specific artwork. A rubric will be created for the art making part of the project.

**Closure:** What will we do to reinforce learning and close the lesson for today?

A gallery talk for this project will include the student verbally reviewing all of the characteristics of their project. This will act as a closure that will also let students see the differences between the landscapes and make connections with why certain farms were more valuable than others.
### Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Morton</th>
<th>Teaching Artist: Dispensa</th>
<th>Unit Title/Big Idea: The earth is constantly changing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade: 3</td>
<td>Marking Period: 1</td>
<td>Essential Question: How are rocks formed?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Math Content/Performance Descriptor</th>
<th>Science Content/Performance Descriptor</th>
<th>Art Content/Performance Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCRS.3.MD.2.M3.B.2.1.1. Measure line segments to the nearest inch, ½ and ¼ inch, and measure to the nearest centimeter</td>
<td>S.A.1.3.2. Observe and describe the properties of rocks; explore similarities and differences of rocks; identify three kinds of rocks: igneous, metamorphic, and sedimentary</td>
<td>9.1.3.A. Know and use the elements and principles of each art form to create works in the arts and humanities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching Objective: (What I will teach) (Classroom teachers complete)</th>
<th>Teaching Objective: (What students will do) (Classroom teachers complete)</th>
<th>Teaching Objective: (What I will teach) (Art teacher/Teaching artist complete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review U.S. customary and metric units of length; estimate and measure lengths to the nearest inch, ½ and ¼ inch and nearest centimeter</td>
<td>Students will measure objects to the nearest inch, ½ and ¼ inch and nearest centimeter</td>
<td>Students will simulate three types of rock formations in colored clay</td>
</tr>
<tr>
<td></td>
<td>Students will learn how igneous, sedimentary and metamorphic rocks are formed</td>
<td>Clay will also be used to create measurement competitions and comparisons. (Ie. Who can make the longest snake out of clay, can we make a structure out of clay that is as tall as the tallest student in class)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Math Learning Activities: (What students will do) (Classroom teachers complete)</th>
<th>Science Learning Activities: (What students will do) (Classroom teachers complete)</th>
<th>Art Skills &amp; Integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will measure objects to the nearest inch, ½ and ¼ inch and nearest centimeter</td>
<td>Students will learn how igneous, sedimentary and metamorphic rocks are formed</td>
<td>Students will simulate three types of rock formations in colored clay</td>
</tr>
<tr>
<td>Moodle: Standard unit, length, inch (in), line segment, centimeter (cm), millimeter (mm), foot, yard, U.S. customary system, metric system</td>
<td>Vocabulary: Igneous rock, metamorphic rock, and sedimentary rock</td>
<td>Clay will also be used to create measurement competitions and comparisons. (Ie. Who can make the longest snake out of clay, can we make a structure out of clay that is as tall as the tallest student in class)</td>
</tr>
<tr>
<td>Vocabulary: Measurement, pattern, texture, manipulation</td>
<td>Vocabulary: Igneous rock, metamorphic rock, and sedimentary rock</td>
<td>Data will be collected for each measurement taken and later drawn into a graphed data cityscape</td>
</tr>
</tbody>
</table>

**Assessment strategies:** Teacher based test and observations of basic skills and understanding

- Describe strategies that will be used to meet Common Core Standards: Use a ruler to measure objects to nearest quarter inch or centimeter; draw lines to specific measures; use technical vocabulary

---

### ARTS LINK TEACHING ARTIST LESSON PLAN TEMPLATE

<table>
<thead>
<tr>
<th>School: McCall</th>
<th>Classroom Teacher: Manchin/Falco</th>
<th>Teaching Artist: Dispensa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Level: 3</td>
<td>Marking Period: 1</td>
<td>Project: Rock and data collection</td>
</tr>
<tr>
<td>Number of sessions: 4 weeks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Date:** 11/4/12

**Core content:** Math / Science / Both (Underline one)

**Core Content Learning Objective:**
- Identify patterns in rock formations and measurement

**Art Skill Learning Objective:**
- Sculpt and manipulate clay
- Draw representational graphs

**Art Skill & Integrated Subjects Short Description of Activity:**
- Students will replicate rock formation with colored clay. They will also manipulate clay to create maximum units of measurement: longest, widest, tallest, roundest, etc. and record all measurements within fractions of inches. All data collected will be graphed and used to create drawn cityscapes.

**Priming for learning (pre-lesson):** What activity will we do to prepare the students to learn?
- Each class will begin with a review of what was done in the previous class, and a thought question relating to measurement, color, or rock identification will be asked to access prior knowledge and learning.

**Classroom Teacher: The content connections I can make to the Core Content Learning Objectives are:**
- Compare and contrast types of rocks
- Distinguish between the different types of rocks using observation of color, texture, and pattern

**Teaching Artist: The components of the project I will teach are:**
- Week One: Making Rock Formations: 6 colors of clay will be given to each table. Students will be responsible for dividing clay equally amongst each student at the table. The process of how each type of rock (3) is formed will be discussed. Students will then start manipulating clay to replicate the rock formations.
- Week Two: Tallest Structure: Students will work in groups using equal amounts of clay to create the tallest structure out of their dough. They will be responsible for identifying the tools needed to measure the structure and then collecting and recording measurements in their data journals.
- Week Three: Equal Measurements: We will take measurements of the students' desks, rooms, hands, feet, etc. and see if we can make snakes of clay equal to the length of these things. We will measure and record all data in journals.
- Week Four: Using the data: We will chart all of the data we collected into bar graphs. Once data is graphed we will start to add embellishment with drawn lines and patterns. Each bar will eventually become a tall building in a class created cityscape.

**Vocabulary:** Standard unit, length, inch (in), line segment, centimeter (cm), millimeter (mm), foot, yard, U.S. customary system, metric system, igneous rock, metamorphic rock, sedimentary rock, measurement, pattern, texture, manipulation

**Student Assessment:** How will we know that students understand and make the correct connection? What do learning objectives do we need for a rubric that covers academic content, art skills, and affective skills? Students will be able to demonstrate the following skills: Using a ruler to measure objects to nearest quarter inch or centimeter; ability to recognize the characteristics of igneous, sedimentary and metamorphic rock formations; and meet the requirements of the art making project.

**Closure:** What will we do to reinforce learning and close the lesson for today? Classes will end by regrouping and recapitulating how we created our project for the day. I will then give a brief intro to what will happen in the next class, including its relationship to previous lessons.
# Fourth Grade

## Arts Link Grade Level Unit Planning Template

<table>
<thead>
<tr>
<th>School: Comly</th>
<th>Classroom Teacher: Feldman/ Yancey</th>
<th>Teaching Artist: Williams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade: 4</td>
<td>Marking Period: 3</td>
<td></td>
</tr>
<tr>
<td>Grade Level: 4</td>
<td>Students complete)</td>
<td></td>
</tr>
<tr>
<td>Math Standards and Descriptor:</td>
<td>Art Standards and Descriptor:</td>
<td>Art Learning Objectives:</td>
</tr>
<tr>
<td>CCRS.4.G.1 M04.C.G.11 List properties, classify, and identify geometric figures in two dimensions</td>
<td>9.1.4. B. Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts</td>
<td>(What I will teach) (Art teacher/Teaching artist complete)</td>
</tr>
</tbody>
</table>

### Teaching Objective: (What I will teach) (Classroom teachers complete)

- Compare and contrast figures according to attributes describing similarities and differences using formal geometric vocabulary (ex: the difference between a rectangle and a rectangular prism or the difference between a prism and a pyramid)
- Art Skills & Integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)
  - Power point presentation on cubist sculpture and sculpture based on geometric shapes
  - Using terra cotta clay, students will model geometric solids: sphere, hemisphere, prisms, pyramids, cones, cubes, and cylinders; shapes are pierced with holes to allow for mounting on wire; hands, knives, paddles, and skewsers will be our tools
  - Students make a pinch-pot base to house the pieces for firing and for supporting the wire
  - The fired pieces are mounted on a wire support fixed in a ceramic base and compose a sculpture on the wire with the clay pieces
  - The interchangeable interactive sculpture will allow students to rearrange the components for new expression by changing the bead positions and bending the wire

### Vocabulary:
- Cubes, prism, cylinder, sphere, cone, rectangular prism, edges, corners, faces
- Three dimensional geometric shapes, geometric solids, faces/planes, edges, vertices, modeling, cubist sculpture, armature, mixed media, terra cotta, fire, kiln

### Assessment strategies: Math quizzes; use technical vocabulary appropriately

### Describe strategies that will be used to meet Common Core Standards: Students will compare and contrast figures according to attributes describing similarities and differences using formal geometric vocabulary; written essay explaining art making process

---

## ARTS LINK TEACHING ARTIST LESSON PLAN TEMPLATE

<table>
<thead>
<tr>
<th>School: Comly</th>
<th>Classroom Teacher: Feldman/ Yancey</th>
<th>Teaching Artist: Williams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Level: 4</td>
<td>Marking Period: 2</td>
<td>Project: Water erosion</td>
</tr>
<tr>
<td>Number of sessions: 6-8</td>
<td>Date: 11/6/12</td>
<td></td>
</tr>
<tr>
<td>Core Content Learning Objective:</td>
<td>Art Skill Learning Objective:</td>
<td>Art Skill &amp; Integrated Subjects Short Description of Activity:</td>
</tr>
<tr>
<td>Impact of water erosion on land</td>
<td>Landscape, collage, two dimensional representation of depth</td>
<td>Students create a landscape out of paper collage and water color wash, showing an understanding of how water changes land mass</td>
</tr>
<tr>
<td>How water changes land mass</td>
<td>Creating a radial design mandala using colored markers</td>
<td>Using a compass and calculating the degrees of the circle, students design a mandala depicting the phases of the water cycle</td>
</tr>
<tr>
<td>The water cycle</td>
<td>Clay slab construction, using surface erosion to create relief design</td>
<td>Measuring and drawing a template for a rectangular piece of clay, students then create a clay slab cylinder container, decorate the surface with a resist of Modpodge, then when the surfaces is dry, erode the surface of the clay with water and friction where the clay is unprotected by the resist to create a bas relief design</td>
</tr>
</tbody>
</table>

### Priming for learning (pre-lesson): What activity will we do to prepare the students to learn?

- Look at images of landscape paintings, traditional mandala designs, and clay relief

### Classroom Teacher: The content connection suggestions for classroom teacher:

- Study how moving water changes the land through erosion, creating mountains, valleys and rivers
- Use a compass, learn about the radius of a circle and calculate angles within 360 degrees

### Teaching Artist: The components of the project I will teach are:

- Water color wash to create sky, paper collage to create middle ground and marker drawings for foreground of landscape
- Use of color to create atmospheric depth; perspective created by diminishing size and detail
- Use of symbolism to represent the water cycle; contrast of dark/light, cool/warm, pattern/solids to create a visually organized mandala with colored markers
- Create a cylindrical container from a rectangular slab of clay; use of resist to mask out design elements for later erosion of the surface with a sponge and water to create a bas relief design

### Vocabulary:
- Landscape, mixed media, collage, water color wash, foreground, middle ground, background, perspective, detail, atmosphere, decoupage, mandala, radial design, cool/warm colors, contrast, pattern, clay, slab, slip, score, bas relief, resist, mask, erosion, greenware, fire, bisque, glaze

### Student Assessment: Each week, students will be evaluated by their use of proper vocabulary to ask questions and discuss their projects. Learning objectives will be assessed by evaluating the student's finished artwork to ascertain understanding of the art, science and math concepts.

### Closure: What will we do to reinforce learning and close the lesson for today? Review and the sharing of student's experience, encouraging understanding of daily objectives and building new vocabulary

---

39
### ARTS LINK GRADE LEVEL UNIT PLANNING TEMPLATE

**Fifth Grade**

<table>
<thead>
<tr>
<th>School: Comly</th>
<th>Teaching Artist: Williams Teachers: McGinley/Gelfand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade: 5</td>
<td>Marking Period: 2</td>
</tr>
<tr>
<td>Unit Title/Big Idea: Variables</td>
<td>Essential Question: What causes an object to move?</td>
</tr>
</tbody>
</table>

**Science Standards and Descriptor:**
- 5.A.2.1.3 Conduct controlled experiments to find out what variables affect the number of cycles a pendulum will complete in a unit of time; 5.A.2.2.2 Measure the capacity of paper-cup boats in metric units; 5.A.3.2.3 Identify variables

**Science Learning Activities: (What students will do) (classroom teachers complete)**
- Conduct controlled experiments to find out what variables affect the number of cycles a pendulum will complete in a unit of time
- Conduct experiments to find out what variables affect the number of passengers a paper cup boat can hold without sinking

**Art Standards and Descriptor:**
- 9.1.5.B. Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts

**Art Skills & Integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)**
- Students will create cut patterns of negative and positive shapes to create a traditional Japanese Notan
- Students will create cut patterns of negative and positive shapes to create a traditional Japanese Notan
- Using a premeasured square, students will design their own tessellation pattern
- Using patterned wall paper, scissors and glue sticks, students will design their own tessellated patterns and cut them out to create repeat patterns in a 10 square repeat pattern

**Vocabulary: Variable, motion, pendulum**
- Vocabulary: Mobile, balance, collage, found object sculpture, decoupage, "Mod Podge".

**Assessment strategies:**
- Teacher observation on controlled experiments, rubric for art project
- Teacher observation on controlled experiments, rubric for art project

Describe strategies that will be used to meet Common Core Standards: Students use relevant vocabulary substantiated by observed data and learned facts to write an essay describing one of their experiments; students will read informational texts on variables and controlled experiments.
Lesson 11.8 Investigation: Estimate Volume
Lesson 11.7 Investigation: Volume
Lesson 11.6 Investigation: Unit Cubes and Solid Figures
Lesson 11.5 3-Dimensional Figures

GO MATH! Unit 11: Geometry and Volume
Mathematical problems

Face, edge, vertex

Prism, cone, cylinder, base, height, volume, area, face, edge, vertex

3-Dimensional form, geometric solids, hollow construction, rigid materials, craft foam, piping, adhesives

Math Learning Activities: (What students will do) (Classroom teachers complete)
- Calculate volume of various size rectangular prisms using the appropriate formula
- Apply the formula for volume in real world scenarios

Math Standards and Descriptor:
CCRS.5.MD.5. 2.4.5.A.6-Apply concepts of volume to solve problems involving volume; 9.1.S. J. Incorporate specific uses of traditional and contemporary technologies within the design for producing, performing and exhibiting works in the arts or the works of others

Teaching Objectives: (What I will teach) (Classroom teachers complete)
- Demonstrate the construction of a hollow 3-D geometric form
- Show resurfacing the hollow form with mixed media to represent planes, edges, and vertices
- Guide students in a brain storming session to design a board game of “probability” for use with their geometric shapes as pieces in the game
- Show how to enlarge a smaller image on a grid
- Create a large paper game board with markers and sharpies

Teaching Objectives: (What I will teach) (Art teacher/Teaching artist complete)
- Demonstrate the construction of a hollow 3-D geometric form
- Show resurfacing the hollow form with mixed media to represent planes, edges, and vertices
- Guide students in a brain storming session to design a board game of “probability” for use with their geometric shapes as pieces in the game
- Show how to enlarge a smaller image on a grid
- Create a large paper game board with markers and sharpies

Assessment strategies: Math quizzes, production of the game, critique

Describe strategies that will be used to meet Common Core Standards: Students will work collaboratively to produce their game; students will cite evidence for how and why they constructed the game as they did; students will practice mathematics by solving real world-problems; and they will master technical vocabulary for both math and art.

Arts Link Grade Level Unit Planning Template

School: Decatur  Teaching Artist: Williams
Teachers: Jordan/Marks

Grade: 5  Marking Period: 4

Unit Title/Big Idea: Geometric solids, probability

Essential Question: How are geometric solids alike/ different? How do we use fractions to predict probability?

Art Standards and Descriptor:
9.1.S.B. Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts; 9.1.S.C. Recognize and use fundamental vocabulary within each of the arts forms; 9.1.S. J. Incorporate specific uses of traditional and contemporary technologies within the design for producing, performing, and exhibiting works in the arts or the works of others

Teaching Objective: (What I will teach) (Classroom teachers complete)
- Demonstrate the construction of a hollow 3-D geometric form
- Show resurfacing the hollow form with mixed media to represent planes, edges, and vertices
- Guide students in a brain storming session to design a board game of “probability” for use with their geometric shapes as pieces in the game
- Show how to enlarge a smaller image on a grid
- Create a large paper game board with markers and sharpies

Art Skills & Integrated Learning Activities: (What students will do) (Art teacher/Teaching artist complete)
- Construct a specific geometric shape using craft foam for the planes, chord for the edges and beaded pins for the vertices
- Demonstrate the ability to represent faces or planes, the base, edges, and vertices in an organized visual format with mixed media
- As part of a group, conceptualize, design, and execute a game board for a tossing game of chance

Vocabulary: Prism, cone, cylinder, base, height, volume, area, face, edge, vertex

Vocabulary: 3-Dimensional form, geometric solids, hollow construction, rigid materials, craft foam, piping, adhesives

Assessment strategies: Math quizzes, production of the game, critique

Describe strategies that will be used to meet Common Core Standards: Students will work collaboratively to produce their game; students will cite evidence for how and why they constructed the game as they did; students will practice mathematics by solving real world-problems; and they will master technical vocabulary for both math and art.

Arts Link Teaching Artist Lesson Plan Template

School: Decatur  Classroom Teacher: Jordan/Marks  Teaching Artist: Williams
Grade Level: 5  Marking Period: 2

Number of sessions: 6-7  Project: Mixed media mobile

Date: January 2013
Core content: Math / Science / Both (Underline one)

Core Content Learning Objective:
- Balance, weight, and variables

Art Skill Learning Objective:
- Create mixed media sculpture in mobile format

Art Skill & Integrated Subjects Short Description of Activity:
Large scale mobiles for permanent school installation made from metal, paper, and other mixed media encased in decoupage. Starting with consistent materials, each group of students will add to this “system” a variety of weighed mixed media materials to create thematic mobiles. After the weighed materials (variables) are added to the “system”, students measure the adjustments needed to the support rods to maintain balance.

Priming for learning (pre-lesson): What activity will we do to prepare the students to learn?
Look at a power point presentation of Calder and contemporary mobiles. Observe on a small mobile model how balance is achieved as the variable of weight is added to the system.

Classroom Teacher: The content connections I can make to the Core Content Learning Objectives are:
- Explain the parts of a system and their relationship to each other
- Identify and use the elements of scientific inquiry to solve problems
- Use appropriate instruments and apparatus to study materials

Teaching Artist: The components of the project I will teach are:
- Students groups select a theme for their mobiles and create drawn images based on their thematic content
- Student groups get standardized materials for their mobile system and begin construction
- Groups select their design elements to add to their mobiles from a selection of mixed media: papers, foil, plastic shapes, and begin the decoupage process
- Finish decoupage process
- Weigh mobile components on a gram scale and record data
- Assemble mobile on support rods, measure distance from support center to achieve balance, and record observations

Vocabulary: Mobile, balance, collage, found object sculpture, decoupage, “Mod Podge”

Student Assessment: How will we know that students understand and make the correct connection?
Finished mobiles will reflect student’s knowledge of art principles, mastery of various materials and construction techniques while the balance achieved in the finished mobiles indicates the understanding of how the variables influence the system. Analyze data and observations collected by the group.

Closure: What will we do to reinforce learning and close the lesson for today?
Allow students to use new vocabulary to review each day’s activity while connecting the art processes to their knowledge of variables. Classroom discussion of data at the end of the project.
Arts Link Leadership Team

Pearl B. Schaeffer, Project Director
CEO, Philadelphia Arts in Education Partnership

Raye M. Cohen, Director of Education
Philadelphia Arts in Education Partnership

Megan Lafferty, Director of Administration
Philadelphia Arts in Education Partnership

Mary T. Dupre, Project Manager
Philadelphia Arts in Education Partnership

Evan Leach, Ph.D., TAP Consulting
Independent Program Evaluator

Dennis W. Creedon, Ed.D.
Assistant Superintendent, School District of Philadelphia

Valerie Evans, Ph.D., Senior Research Associate

Board of Directors

Jeffrey Blumenfeld
PAEP President

Dr. Donald Gephardt
PAEP Vice President / Treasurer

Dr. Barbara Suplee
PAEP Secretary

Flora Becker
Dr. Dennis W. Creedon
Dr. Suzanne Reese Horvitz
Sister Lauretta Linsalata
Linda Richardson
Marla K. Shoemaker
The Honorable Carolyn Engel Temin

Arts Link: Building Mathematics and Science Competencies through an Arts Integration Model is made possible by a grant of federal funds to the Philadelphia Arts in Education Partnership by the United States Department of Education, Office of Innovation and Improvement, under the Arts in Education Model Development & Dissemination Grant Program. The contents of this catalog were developed under a grant from the U.S. Department of Education. However, these contents do not necessarily represent the policy of the U.S. Department of Education, and one should not assume endorsement by the Federal Government.