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## **THE WILLOW SCHOOL CURRICULUM SUMMARY**

### **INTRODUCTION**

The Willow School curriculum is guided by the Mission Statement:

The Willow School, a small, independent coeducational day school for students in kindergarten through eighth grade, is committed to combining academic excellence and the joy of learning and to experiencing the wonder of the natural world. Mastery of the English language is an essential element in an integrated curriculum that helps students comprehend the patterns of how things are connected and prepares them for all areas of their secondary education. The school is dedicated to maintaining an environment where respect for the individual, an outstanding faculty, and an understanding of place foster independent thinking, creativity, responsibility, and integrity. The Willow School education enables children to develop an ethical approach to all relationships, to realize their full potential, and to believe in their power to effect positive change.

At The Willow School, we appreciate the complexity and seriousness of educating children. We seek to develop each child's intellectual, artistic, and personal potential through a comprehensive, inter-disciplinary curriculum. Children become motivated lifelong learners by experiencing the joy of discovery and the ownership of results through learning that is organic, wondrous, and creative.

Framed around key themes and essential questions, our integrated curriculum allows students to learn material in great depth as well as to see the connections that naturally exist among subject areas, making learning more meaningful and lasting. Lessons include multi-sensory activities, because children learn by doing. Individual learning styles are supported as each child is appropriately challenged. The visual and performing arts are woven into the curriculum and daily life of the school, creating opportunities for different modes of self-expression and interpretation.

Character development is essential to each child's overall growth and citizenship. The Willow School helps children understand and internalize virtues such as integrity, respect, responsibility, compassion, and courage. Children also learn to appreciate the beauty of nature, along with the complex relationships that exist between humans and the natural world. The school's facilities serve as a paradigm of how humans and nature can co-exist harmoniously, and the grounds provide a rich laboratory for observation.

Throughout the curriculum, special attention is given to the written and spoken word, for strong communication skills form the foundation of both academic and personal success. As they acquire proficiency in reading, writing, listening, and speaking, Willow School students gain mastery of the English language.

**THE WILLOW SCHOOL:  
THE SCHOOL-WIDE VIRTUES PROGRAM**

At The Willow School, we seek to cultivate in ourselves and in our students a rich garden of virtues. By choosing to lead a consciously ethical life, each individual comes to understand his or her own significance as a valuable and contributing member of the community.

Using Mary Beth Klee’s *Core Virtues* curriculum as a basic model, the school focuses on a different virtue each month. This curriculum outlines a three-year rotation of virtues, which we have modified to suit our needs. We use Morning Gathering to introduce our monthly virtue and discuss its importance to our community. At Morning Gathering, the community comes together for stories, songs, presentations, and discussion. The discussion of virtues is carried into the classroom for reinforcement through curriculum integration, class meetings, advisories, and other classroom interactions. Language arts provides a key vehicle for exploring character and ethics. As Klee writes, “It is not so much about teaching children what the virtues *mean*, as it is about reading stories that make the virtues *mean something* to the children.”

The three-year rotational calendar is as follows:

<u>Month</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
September	Responsibility and Respect	Responsibility and Respect	Responsibility and Respect
October	Diligence	Temperance	Perseverance
November	Gratitude	Gratitude	Gratitude
December	Generosity	Charity	Service
January	Courage	Courage	Courage
February	Loyalty	Honesty	Justice
March	Compassion	Compassion	Compassion
April	Forgiveness	Faithfulness	Gentleness and Humility
May	Prudence	Prudence	Wisdom
June	Hope	Joy and Wonder	Joy and Wonder

## **THE WILLOW SCHOOL: LANGUAGE ARTS**

The language arts program at The Willow School forms the heart of the school's academic program. At The Willow School, students are taught to listen thoughtfully, to speak eloquently, to read fluently, and to write clearly and compellingly. Within a balanced literacy program, strong foundations of phonemic principles are established in conjunction with rich literature.

The process of learning to read begins when children discover that print carries meaning and continues as children develop into fluent readers who comprehend and analyze the material they read. As part of a sequential, multi-sensory approach to language learning, the well-structured phonics program provides a solid foundation for young readers. Students learn to use this knowledge along with other reading strategies -- such as making inferences, forming predictions, and detecting patterns -- as they encounter books that challenge and delight them.

Stories are also read to students, both in the classroom and as part of the Morning Gathering. Hearing stories read aloud improves listening and comprehension skills, builds vocabulary, and in the early grades exposes children to literature beyond their reading ability. This is an opportunity for teachers to help students develop strong comprehension and analytic skills as well as an understanding of the story elements.

Writing is an integral part of the school day, as children record their thoughts, predictions, descriptions, and observations in all of the subject areas. Through our writers' workshop program, students write creatively and have opportunities to choose their own topics so that they have a vested interest in their writing. They focus on the substance of their story, poem, or play, as well as the style. Teachers encourage students to work with increasing independence as they are challenged and their abilities are stretched.

Grammar is of critical importance in the language arts program. Children need to be taught the structure of language, as this forms the foundation upon which all subsequent learning is built. The study of Latin helps students understand the English language, and it helps them become more precise in their use of language. Studying Latin also develops an attention to detail and logical thinking.

At the Willow School each child has the opportunity to find his or her voice through music, drama, debate, and classroom discussion. Young children imitate all that they see around them. As they grow older, they attempt to emulate the adults in their world whom they admire. The teachers and administrators at The Willow School model eloquent language and provide examples of worthy imitation for their students.

## **Kindergarten**

In kindergarten children discover that the world of print is not the exclusive domain of adults. By being surrounded with print and good literature, by playing with words, enjoying rhymes and poetry, acting out stories, and playing phonemic awareness games, children learn that the world of language and print belongs to them. In kindergarten children become familiar with the alphabet and the sounds that each letter represents; they learn to segment words into syllables and phonemes, blend sounds into words, recognize common words by sight, and decode words because they are motivated to become independent readers. However, children learn from the beginning that the purpose of reading is not to decode words but to understand meaning. They discuss books and how they connect with personal experiences, how a story is developed, and how the author goes about communicating feelings and ideas. Through author studies, children become attuned to the style of different authors: they compare the illustrations an author frequently uses with those used in other books, the themes the author explores, the characters he or she creates.

In writing, students learn the formation of letters, common spelling patterns and grammatical conventions such as capitalization, punctuation, and the structure of sentences because writing is perceived as a fun and rewarding activity. Already in kindergarten, children learn to see themselves as authors. At first they dictate stories based on the pictures they draw. They keep a journal in which they draw and write daily, and they “publish” books, which become part of the classroom library, or are shared with parents and friends. They take turns at the “author’s chair” to read what they write and receive feedback from their classmates who learn to offer constructive suggestions and encouragement by praising some aspect of their peers’ work. In kindergarten children read and write books, poems and journal entries relating to the self, family and immediate community of which they are a part.

## **First Grade**

For our first grade students, the focus in Language Arts is on developing their appreciation for language as a means for expressing and communicating a person’s unique way of relating, sharing, and connecting with others. The children are encouraged to develop skill and fluency in listening, speaking, writing and reading—the basics of language arts. In order to keep the Language Arts curriculum alive and responsive to children, the school utilizes methods that accommodate various learning styles (visual, auditory, kinesthetic and tactile) and teachers are encouraged to create and utilize new presentations that introduce and clarify abstract concepts using practical and concrete experiences and materials.

To develop their reading skills, the children participate in both guided and independent reading. As part of guided reading, the teacher leads the class in interpretive discussions to help students learn to read for meaning and think critically. Children are encouraged to read both fiction and non-fiction, and to read with the purpose of answering questions of how, why, and what-if. At The Willow School, we strive to help the children appreciate that reading can be a means for pleasure, as well as a tool for finding information about

topics being studied. Consequently, our reading programs spans a variety of different genres, including poetry, fiction, fables, myths, legends, and folktales. As the children improve their comprehension, we focus on the components of literature, such as plot, setting, and character development, as well as the skills of predicting and drawing inferences. To make the tools of reading readily accessible, a library is maintained at the school, and students are taught how to access the library facilities.

To develop their writing skills, the children are taught the rules of sentence structure, punctuation, spelling and grammar; and they are taught how to use a dictionary and conduct online research. The Lucy Calkin's writing workshop model is utilized as a guide to provide structure to the development of the first graders. However, it is through activities such as invigorating woodland walks, interviews, exciting field trips and interesting school events that the children are provided with a common basis for stimulating discussions and creative writing exercises. Through discussions and brainstorming sessions, the children also learn how to prepare interview questions, which they are given the opportunity to ask during interviews with Willow School employees and while attending the town community field trips. During the school year, each child is required to produce a variety of writing including Word of the Week entries, journal entries, short stories, research projects, poetry, plays, and descriptions. As children mature in their writing skills, they are taught to edit their own compositions.

## **Second Grade**

The second grade Language Arts program is organized around the themes Family History, Teddy Bears, First Nations Legends, Fractured Fairy Tales, Mysteries, Dragons and Dinosaurs and Jazz. Students learn to decode multi-syllable words by using knowledge of letter sound patterns, comparing the sounds that make up words, and segmenting and blending a variety of sounds and compounds in words.

Grade two students are encouraged to move from phonetic to conventional spelling, and this is reinforced in spelling homework assignments, spelling dictionaries and word wall lists.

The class reads grade-level-appropriate materials that reflect a variety of genres within each theme. Reading comprehension is emphasized as students recall details, make predictions, make personal connections, compare stories, recognize cause and effect, compose questions and analyze characters. Conventional structures of writing are taught as students write the four sentence types (statement, question, exclamation and command), paragraphs, and stories with beginnings, middles and ends.

Children analyze sentences for the common parts of speech including articles, common and proper nouns, verbs (including linking and helping verbs), adjectives, adverbs and contractions. Capitalization rules are applied to sentences, proper nouns, days of the week and months. Grade two students also study comparatives, similes and alliteration.

Students write, illustrate and publish legends, mysteries, fractured tales, poetry, scientific reports, interviews and journal entries. Stories are often modeled on stories used for

comprehension activities such as the Frank Asch Bear Stories. Rough drafts, editing, revision and clarification are all stressed throughout the writing process in addition to spelling and sentence structure.

Throughout the year children make oral presentations during morning gathering and in classroom show and tell sessions. Printing is practiced during learning center times, and handwriting is introduced towards the end of the school year. The integrated nature of the themes permits Language Arts skills to be practiced in Mathematics, Social Studies and Science classes.

### **Third Grade**

In third grade, students read a wide variety of books chosen to meet individual reading needs and interests. They examine books through a variety of lenses. They engage in author studies, explore commonalities among Caldecott medal winners, analyze historical fiction and non-fiction, and compare their own lives to the lives of literary characters. They use active reading skills including connecting, questioning, inferring, synthesizing, visualizing and determining importance.

The focus of creative writing in third grade is on the personal narrative. Students develop the understanding that the stories from their own lives hold great significance, and they learn how to use details and language to retell their stories in meaningful ways. They follow the writing process of rehearsing, drafting, editing, and publishing. Students also write fictional stories, journal entries, and poems. In third grade, students begin to learn how to do research in books and on the computer; how to organize information and write short reports and summaries; and how to take notes. They deliver a variety of short oral presentations and build skills of memorization and public speaking.

### **Fourth Grade**

In fourth grade, students practice comprehension strategies in the reading of a selection of literature that includes fiction, short stories, mythology, folk tales, historical fiction and poetry. Students participate in Literature Circles in which they share passages of objective and subjective significance, offer interpretations, discuss or analyze information, ask questions and comment on the author's craft.

Fourth graders complete the study of parts of speech. Their focus is then directed toward sentence analysis; parts of the sentence and the relationships among them are studied. Students' vocabulary is developed through word study involving synonyms, antonyms, homophones, homonyms, homographs, prefixes and suffixes. They study classical roots are studied and research derivative words. Vocabulary includes words from literature as well as nomenclature from other subject areas. Students practice the identification and completion of different types of analogies. Spelling is directed toward high frequency words and those derived from classical roots.

Students participate in writers' workshops devoted to the essentials of writing: collecting ideas, drafting, revising, editing and publishing. The "small moment" story is further developed. Students practice aligning story elements into a cohesive whole using flow maps. They use story arcs to create rising action, a conflict and a resolution. Literary essays include writing into the story, character analysis and writing from a character's point of view. Different forms of poetry are explored, including the haiku, tanka and xanadu. Proper mechanics and writing conventions are practiced in the development of the author's craft.

### **Fifth Grade**

In fifth grade, students refine comprehension strategies in the reading of a selection of literature that includes fiction, short stories, mythology, folk tales, historical fiction, poetry and nonfiction. Students form Literature Circles in which they initiate discussions based on passages of objective and subjective significance, interpretations, analysis of information, questions and comments on the author's craft.

Fifth graders review the parts of speech, but focus on sentence analysis. Parts of the sentence and the relationships among them are studied. Introductory and subordinate clauses, prepositional phrases, and adverbial modifiers are some of the structures discussed. Students' vocabulary is developed through word research involving synonyms, antonyms, homophones, homonyms, homographs, prefixes and suffixes. They study classical roots and research derivative words. Additionally, vocabulary includes words from literature and nomenclature from other subject areas. Students practice the identification and completion of different types of analogies. Spelling is directed toward high frequency words and those derived from classical roots.

Students participate in writers' workshops devoted to the essentials of writing: collecting ideas, drafting, revising, editing and publishing. The "small moment" story is further developed. Students practice aligning story elements into a cohesive whole using flow maps. They use story arcs to create rising action, a conflict and a resolution. Literary essays include writing into the story, character analysis and writing from a character's point of view. Students learn to craft a five-paragraph essay; this form is used for both literary analysis and other expository writing. Different forms of poetry are explored, including the ballad, cinquain, free verse, ghazal and ubi sunt. Proper mechanics and writing conventions are practiced in the development of the author's craft.

### **Sixth Grade**

The sixth grade curriculum focuses on active engagement with the text. Students are required to analyze, predict, critique, and explain rather than simply understand what they read. Students become involved in literary criticism. They learn, for instance, how to isolate the key passages within a novel that contribute to the understanding of character development. They discover how a third- person narration affects the reader's understanding of the protagonist, and how narrative structure affects the reader's interpretation of plot, character and theme.

Students in sixth grade are exposed to a variety of literary genres. They read novels, short stories and poetry. They learn to explain the effects of literary devices such as symbolism, imagery, and metaphor in the texts they read. In sixth grade students are also required to analyze persuasive texts and expository writing. They use these texts both as models for their own writing and to determine the appropriateness of evidence for an author's conclusions, note instances of unsupported inferences, fallacious reasoning, unreasonable persuasion, or propaganda.

In the sixth grade, students continue to use the Writers' Workshop approach developed by Lucy Calkins. In this approach, students analyze different devices authors use in their writing, develop their understanding of the elements of good writing and, from this understanding, create a list of strategies that they can use in their own writing. Students also keep journals for their writing entries, and learn to select and develop some of these entries into a finished piece.

In addition to creative writing, sixth graders create multiple-paragraph expository compositions using a variety of effective and coherent organizational patterns. Some examples of the expository writing they produce are persuasive, expository, and descriptive pieces, responses to literature, and research reports about important ideas and issues.

To develop their speaking skills, students are required to deliver narrative presentations in which they include sensory detail, concrete language, dialogue, tension, suspense to establish context, and develop plot and point of view. They also deliver informative presentations from multiple authoritative sources of information. To give students the opportunity to justify a personal interpretation of a literary piece, some responses to literature are also delivered orally. This helps students practice interacting with an audience as well as using examples and textual evidence for the interpretation they wish to defend. Persuasive speeches further allow students to develop a clear statement of a position, select relevant evidence, and deliver it in a clear way.

### **Seventh Grade**

Seventh graders are ready to create well-argued persuasive reports clearly supported by evidence. Students' vocabulary increases dramatically at this time because students are required to read extensively. They read a variety of genres of literature. In addition, students increase their vocabulary by working with word derivations from Greek, Latin, and Anglo-Saxon roots.

Writing in the seventh grade focuses less on narrative and more on expository, multi-paragraph compositions in the following categories: interpretations of literature, research, persuasive compositions, and summaries. The writing students produce reflects correct sentence structure (placement of modifiers, use of active voice), correct grammar (proper use of infinitives and participles, clear pronouns and antecedents), correct use of punctuation (including dashes, hyphens, and semi-colons), and spelling. Although

expository writing is emphasized, the curriculum includes creative writing experiences in poetry and short stories. The Writers' Workshop format, as described in sixth grade, continues.

At this grade level, students continue to work on developing research skills, from using databases and electronic sources to organizing information and preparing a bibliography.

Seventh-grade students continue to develop listening skills such as asking appropriate questions to elicit information and discerning the speaker's point of view. In terms of public speaking, students are instructed in rhetorical strategies to develop their ability to deliver a well-organized, formal narrative, research, or persuasive presentation, as well as summaries of articles and books.

### **Eighth Grade**

In eighth grade, students understand and analyze different kinds of prose. They are required to evaluate structure elements of plot; compare and contrast motivations of different characters; analyze relevance of setting; identify and analyze recurring themes; and identify elements of an author's style. They are expected to compare expository texts and evaluate their scope and the organization of ideas. They also compare an original text to a summary to determine if it captures the main ideas, critical details, and underlying meaning.

Eighth-graders continue to develop their writing through the Writers Workshop format. At the eighth-grade level, students write more sophisticated and polished essays with more attention to transitions, parallelism, and consistent point of view. Research skills focus on evaluating evidence, paraphrasing sources accurately and concisely, and producing a focused and coherent piece.

Students learn to write applications and personal essays. They pay particular attention to the purpose and the audience for which these documents are intended, and focus on how to create pieces that are clear and succinct, have a logical sequence and coherence and at the same time capture the unique voice of the author.

Students' rhetorical skills now focus on matching voice modulation, pacing, and tone to the purpose of the presentation. They also learn to listen to and observe verbal and non-verbal cues from an audience and to make adjustments to their presentation in order to clarify a point or forestall opposition. They continue to practice asking relevant questions to evaluate a presenter's credibility and purpose.

## **THE WILLOW SCHOOL: MATHEMATICS**

The mathematics curriculum integrates the child's natural sense of order, pattern, and number with the manifestation of these concepts in the physical world. Research shows that children are naturally drawn to mathematical explorations, and they are born with a natural aptitude and interest in exploring spatial relationships, balance, volume, counting, and creating patterns through playing with blocks, filling containers with water and sand, working with puzzles, etc. At The Willow School we observe the child's natural process of exploration and let it guide us in scaffolding the next learning step. Children learn through concrete manipulation of materials designed to develop certain concepts. They are challenged to use what they know to come up with solutions to new problems that are meaningful to them. They are taught to explain their thinking with words and pictures and to arrive on their own to increasingly more symbolic representations. They are encouraged to discuss different ways to solve problems and to see errors as great opportunities to clarify thinking and deepen understanding. Their experiences in geometry are used to develop number operation concepts; their work with patterns lays the foundation for later algebraic understanding. Every topic is connected to the other, supporting the structure of mathematical thought that enables the child to invent an algorithm rather than to memorize one-- to do the work of a mathematician.

In grades K-5, teachers use Terc but supplement this program with a variety of other approaches and resources including Everyday Math, Marilyn Burns, and Montessori. In grades 6-8, The Willow School has adopted Connected Mathematics Project (CMP2) for its mathematics curriculum. This program was developed by Michigan State University and is designed to support student inquiry into important mathematical ideas and how these ideas connect to each other. This instructional model is based on current cognitive research, which indicates that mathematical understanding consists of a web of connections between ideas and that conceptual understanding is the foundation for procedural skill rather than a consequence of it. Rather than teaching students through memorization of discrete formulas and procedures, or from observing a teacher demonstrate how a problem is solved, CMP2 teaches students to develop understanding of concepts and procedures by presenting them with engaging problems to solve and asking them to use what they know to arrive at what they do not know, to explore, compare, and reflect on various solution methods—in short, to do what mathematicians in the real world do.

Deep understanding of concepts prevents students from viewing mathematics as a collection of different algorithms to be memorized and problem solving as a desperate search for the correct algorithm to use. Building understanding takes time, but it provides students with a solid foundation on which to build new mathematical ideas, and it avoids the waste of time involved in re-teaching superficially learned ideas and procedures that are quickly forgotten.

## **Kindergarten**

Kindergarten units of study:

### Classroom Routines and Materials

This unit introduces the processes, structures, and materials that are important features of the kindergarten math curriculum. It also introduces routines, common to many kindergarten classrooms that students will encounter regularly throughout the year. These routines include taking attendance, using the calendar to count and to keep track of time and events, counting sets of objects, and collecting and discussing data about the class. They offer reinforcement of number concepts that are central to the kindergarten curriculum.

### Counting and Comparing: The Number System

Students explore numbers through a variety of counting activities. They build knowledge of the counting sequence, use numerals to represent quantities, represent equivalent amounts, and develop skills for accurate counting. They also begin to compare quantities. As an introduction to linear measurement, students measure and compare the lengths of objects using direct comparison.

### What Comes Next?: Patterns and Functions

In this unit, students investigate what makes a repeating pattern. They focus on attributes of objects and think about which attributes (i.e., size, color, shape, orientation) are important in the patterns they are making. Students work with simple and complex repeating patterns. They have many opportunities to copy, create, and extend repeating patterns using a variety of materials and common objects. They use patterns to determine what comes next and focus on the part, or unit, of a pattern that repeats.

### Measuring and Counting: Measurement and the Number System

Students gain a deeper understanding of numbers and number relationships as they engage in activities in which they count, combine, and compare amounts. They develop visual images of numbers and solve problems in which they find different combinations of the same number. Students are introduced to addition and subtraction situations through story problem contexts. Work with linear measurement continues as students use nonstandard units to measure the length of objects and paths.

### Make a Shape, Build a Block: 2D and 3D Geometry

Students explore geometry using a variety of materials, including Geoblocks, pattern blocks, interlocking cubes and geoboards. They describe, sort, and compose and decompose two- and three-dimensional shapes. They think about shapes in their environment and match two-dimensional shapes to three-dimensional objects. The *Shapes* software is introduced as a tool for extending and deepening this work. This tool is designed for K–2 students to explore how different shapes go together, experiment with different sorts of geometric transformations (rotations, translation, reflection), explore patterning, and investigate symmetry.

### How Many Do You Have?: Addition and the Number System

Students continue to work with counting and number composition as they count sets of

objects and find multiple combinations of the same number as they decompose numbers to 10. They use numbers and notation to describe arrangements of tiles and number combinations. Students continue to develop an understanding of the operations of addition and subtraction as they act out, model, solve story problems, and play games that involve combining or separating small amounts.

#### Sorting and Surveys: Data Analysis

This unit develops ideas about sorting and classifying, counting, representing, conducting a data investigation, and using data to solve a problem. In this unit, students sort objects according to common attributes, as well as sort data about their class. They collect, record, and represent categorical and numerical data about their class, and they carry out their own data investigation by collecting responses to their own survey questions.

### **First Grade**

In first grade, students are introduced to the TERC and EVERYDAY MATHEMATICS programs with the Montessori approach. Children learn the basic concepts of mathematics and geometry using hands-on learning materials, which were designed to help students learn abstract concepts in a clear and concrete manner. In this way, learning comes earlier and more easily to students and develops a deep understanding that serves as the foundation for future learning in these subjects. Units include:

- Mathematical Thinking at Grade 1 (Introduction)
- Building Number Sense (The Number System)
- Survey Questions and Secret Rules (Collecting and Sorting Data)
- Quilt Squares and Block Towns (2-D and 3-D Geometry)
- Number Games and Story Problems (Addition and Subtraction)
- Bigger, Taller, Heavier, Smaller (Measuring)
- Introduction to numbers
- Introduction to the decimal system
- Introduction to linear counting
- Understanding of mathematical operations
- Memorization of math facts
- Developing an abstract understanding of mathematical operations
- Geometry
- The study of fractions
- The study of money
- The study of measurement
- The study of time

### **Second Grade**

Second grade begins with the sorting and classification sets of related objects. Numbers to 200 are represented on number grids. As the year proceeds the grids are extended to

one thousand and significant “years ago” from the Social Studies program are recorded on their grids. Students identify patterns on number grids and number lines including skip counting by twos, fives and tens. Students also compose and decompose numbers from their grids into ones, tens and hundreds.

Children learn to tell time by hour, half hour and quarter hour intervals. The grade two class creates a variety of time lines including one which represents the early life of Theodore Roosevelt up to his presidency.

Regular addition and subtraction fact dictation to twenty continues throughout the school year. Double-digit addition and subtraction is explored first in the context of expanded notation and later using the common algorithms.

Students collect, tally, bar graph and analyze data. Two data projects of importance are the school wide lost tooth survey and the Willow Pond population study.

The class investigates the local occurrence and characteristics of two and three-dimensional shapes. Fractions ( $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{10}$ ) and the many ways that they can be represented are studied and applied especially to two dimensional objects.

Problem solving strategies encompassing single and multi-step solutions are practiced throughout the year and students are required to offer solutions that have numbers, words and pictures. Children practice money skills by making different combinations of twenty-five cent, fifty cent and one dollar. Real world activities that involve making change up to one dollar are also undertaken.

Linear measurement activities use both standard and metric units and are integrated with the student’s science program. Dinosaur lengths for example, are measured and marked on the schoolyard and are integrated with the fossil study in the grade two science program. The children also graph a two-week period at school in both Fahrenheit and Celsius scales.

The final unit of the year introduces the students to the concepts of multiplication and division.

In virtually all of their experiences children learn apply what they have learned to the concrete including real life situations in their classroom and in the natural world outside.

### **Third Grade**

Third grade mathematics begins with a review of multi-digit addition and subtraction, and other concepts covered in previous years. Addition and subtraction are then used as the foundation for the study of multiplication and division. Real world examples are used to help the students understand and apply their knowledge to a wide variety of situations, including single and multi-digit multiplication and single-digit division problems. Students learn two different algorithms each for solving addition, subtraction and multiplication problems.

In third grade, the study of measurement includes both the metric and U.S. Customary systems. Students refine and expand their knowledge of linear, as well as spatial measurement. By the end of third grade, students can identify and measure to the nearest  $\frac{1}{8}$  in or  $\frac{1}{2}$  cm the area and perimeter of a regular polygon. They can find the volume of a regular or irregular container. In geometry, students learn to identify and construct simple polygons, polyhedrons, line segments and angles.

Students in grade three learn to read, write and manipulate numbers as high as 100,000,000 and as low as .001. They develop an understanding of place value and practice applying that understanding in a wide variety of real-world situations (e.g. calculating the distance of a planet to the sun, adding and subtracting monetary values). Students learn to compare and record numbers greater and less than 0 in a number of ways including as fractions, as decimals, or as mixed numbers.

Algebraic problem solving is taught throughout the year, within the context of each unit of study. Students learn about growth patterns and coordinate graphing during their studies of multiplication. They explore the uses of variables and look for patterns that allow them to apply their understanding of one type of problem to another.

### **Fourth Grade**

Fourth grade begins with the class reading and writing whole numbers and decimals and identify places in such numbers and the values of the digits in those places. They will also explore number theory by identifying prime and composite numbers, finding factors of numbers. They will use arrays to see the relationship between multiplication and factors of numbers. At this time, students are encouraged to practice and memorize their basic multiplication facts.

Following that, they will be studying the geometry of 2-dimensional shapes. Students examine definitions and properties of various shapes and the relationships between and among these shapes. Students will use compasses to construct shapes and to create their own geometric designs. In the process, they will develop an appreciation for geometric patterns and their many uses.

The class will then learn to organize collections of numbers in tables and graphs and draw conclusions about them. They can go into the Willow property and find something natural to graph. They will use landmarks such as minimum, maximum, mode, median, and range to interpret the data.

Using money as the standard, the class will learn about other uses of decimals. Students will see why decimals are needed because numerical information often cannot be expressed by a whole number. The class will focus on a number of examples of uses of decimals in everyday life. Students will explore how decimals are used in measuring distances, times, and gasoline mileage. Students will find “personal references,” which they will use to estimate lengths, heights, and distances in metric units.

The class will begin to multiply 1- and 2-digit numbers using a variety of methods. Students are encouraged to explore their own method. Students will use big numbers to solve problems and make reasonable estimates. Students will also be introduced to exponents.

Students will begin to explore division and look for the relationship between this and multiplication. They will also look at numbers in map coordinate grids and the system of latitude and longitude. Since this global system is based on angle measures, the class will practice measuring and drawing angles with circular ( $360^\circ$ ) and half-circle ( $180^\circ$ ) protractors.

After reviewing the meaning and uses of fractions, students will explore common fractions and equivalent fractions. Students will handle concrete objects and look at pictures, to understand what fractions mean. This will also lead to some exploration with chance events or probability.

Students will learn how to make scale drawings and apply their knowledge of perimeter, area, and scale drawing by analyzing the school garden. Using fence posts as points and line segments, students will map the garden. They will also focus on reflectional symmetry and the transformations of figures.

Next we will be studying percents and their uses in everyday situations. Students' collections will be used to illustrate a variety of percent applications. As we study percents, children will learn equivalent values for percents, fractions, and decimals.

Finally, students begin focusing on grams and ounces. Students handle and weigh a variety of objects, trying to develop "weight sense" so that they can estimate weights effectively. As part of a review of the properties of 3-dimensional shapes they will construct models of geometric solids. By experimenting with cubes, the class will develop and apply a formula for finding the volumes of rectangular prisms.

### **Fifth Grade**

Fifth grade begins with students investigating the properties of whole numbers. Students read and write whole numbers and decimals and identify places in such numbers and the values of the digits in those places. They will also explore number theory by identifying prime and composite numbers, finding factors of numbers and writing prime factorizations. Students also continue the process of memorizing the basic multiplication facts.

Students will examine several methods for adding, subtracting, and multiplying whole numbers and decimals. From these exposures to a variety of methods, they will see that there are often several ways to accomplish the same task and achieve the same result. Students are encouraged to solve problems by whatever method they find most comfortable, even if it's one that they themselves may have invented. Students also use landmarks (minimum, maximum, mode, median, and range) to arrange data.

In exploring geometry, a compass is used to construct basic shapes and create geometric designs. In this unit, children will be introduced to the concept of congruent figures by using a compass and a straightedge to copy triangles. Another tool that will be introduced is the Geometry Template, which contains protractors and rulers for measuring, and cutouts for drawing a variety of geometric figures. These will be used to explore angles, regular and non-regular polygons, and tessellations.

After a review of division facts and the relation between division and multiplication, students will start naming numbers as fractions, decimals, and percents. They will use pattern blocks to review basic fraction and mixed-number concepts and notations, and will formulate rules for finding equivalent fractions. Having reviewed basic fractions in 4<sup>th</sup> grade, students will now learn how to rename any fraction as a decimal and as a percent. They will explore addition and subtraction of fractions by finding common denominators and applying this skill in adding and subtracting fractions with unlike denominators. Later in the year they will multiply fractions.

Next, students are introduced to exponential and scientific notation as a way of naming very large and very small numbers. They will also review how parentheses are used to make expressions unambiguous and will be introduced to rules that determine in what order the operations in a mathematical expression must be performed. Finally, they investigate why negative numbers were invented and learn to work with positive and negative numbers, using a variety of strategies.

Students will develop and apply formulas for the areas of rectangles, parallelograms, and triangles and use the rectangle method for finding areas of regular and irregular shapes. Students will also examine how area, perimeter, and angle measurements are affected when a figure is changed by mathematical transformations such as through translation or reflection. The unit concludes with a look at volume and capacity

As the year concludes, the child will use their own manipulatives as they are introduced to solving simple equations with a pan balance, thus developing basic skills of algebra. They take these demonstrations and apply them to writing and solving algebraic expressions and equations.

## **Sixth Grade**

### **Prime Time: Factors and Multiples**

The first unit deals with multiplication and division of whole numbers. By constructing **Factor Strings**, students come to recognize and use the fact that every whole number can be written in only one way as a product of prime numbers (prime factorization). They develop strategies for finding greatest common factors and least common multiples and use them to solve problems dealing with everyday life through building models, making lists and tables, drawing diagrams, and solving simpler problems. Students are engaged in

activities such as playing the **Factor game** or the **Product Game** as they apply their understanding of the properties of whole numbers to solve problems.

### **Bits and Pieces I: Understanding Fractions, Decimals, and Percents**

In the next unit, the students become more comfortable moving among these three representations of numbers less than 1. They use models such as fraction strips, number lines, and grids as they work on problems that reflect different contexts and involve writing, comparing, and ordering fractions and decimals. Skill with estimating and comparing is further developed through a set of benchmark fractions, including  $\frac{1}{4}$ ,  $\frac{1}{3}$ ,  $\frac{1}{2}$ ,  $\frac{2}{3}$ , or  $\frac{3}{4}$  that often occur in real world situations, and their decimal equivalents.

### **Shapes and Designs: Two-Dimensional Geometry**

In this unit, students recognize, analyze, measure, and reason about the shapes and visual patterns that are important features of our world. It focuses on some key properties of polygonal figures and the importance of those properties in applications. The students ponder questions such as, “How do the measures of angles in a polygon determine its shape and uses?” or “What kinds of polygons will cover a flat surface?” In the process, they learn such things as how to accurately measure angles using a **goniometer** or **angle ruler**, and how to determine if a polygon has **rotational symmetry**.

### **Bits and Pieces II: Understanding Fraction Operations**

The next unit’s focus is on understanding and developing systematic ways to add subtract, multiply, and divide fractions. While working on this unit, students investigate interesting problem situations to help them develop algorithms for fraction computation using their knowledge of fractions and equivalence of fractions. The students develop ways to model sums, differences, products, and quotients with areas, strips, and number lines. They also use benchmarks and number and operation sense to estimate solutions for computations to help them decide if their answers are reasonable.

### **Covering and Surrounding: Two-Dimensional Measurement**

The following unit deals with area and perimeter. The students develop an understanding of and strategies for measuring perimeters and areas of rectangles, triangles, parallelograms, and circles. For example, by surrounding a triangle with a rectangle and dividing it into pairs of congruent triangles, they see that the area of the triangle is half that of the rectangle. This allows them to understand why  $\frac{1}{2}bh$  works for finding the area of a triangle rather than just memorizing it. They discover relationships between area and perimeter such as each measurement can vary while the other remains fixed. They also use estimating and counting to find areas of irregular figures.

### **Bits and Pieces III: Computing With Decimals and Percents**

The final unit is designed to provide experiences in building algorithms for the four basic operations with decimals, as well as opportunities for students to consider when such operations are useful in solving problems. It uses both a fraction interpretation and a place value interpretation of decimals to support the development of these algorithms. It also uses the students’ knowledge of operations with decimals to further develop their understanding and skill in solving percent problems.

## **Seventh Grade**

### **Variables and Patterns: Introducing Algebra**

This is the first unit in the Connected Mathematics algebra strand and it develops students' ability to explore a variety of situations in which changes occur. Students examine three ways of representing a changing situation: in the narrative, with a data table, and with a graph. They revisit these three ways throughout the unit and compare one to another to identify the strengths of each. Later in the unit, students begin to write symbolic equations as a shorter, quicker way to give a summary of the relationship between two variables. They also learn to use graphing calculators to make tables and graphs for any given equation.

### **Stretching and Shrinking: Similarity**

The next unit deals with proportional reasoning. In the beginning, students make drawings of similar figures using a pair of rubber bands and compare side lengths, angle measures, perimeters, and areas of the original and enlarged figures. They then use the coordinate system to draw geometric figures, some of which are similar and others are not. They explore algebraic rules that cause images to change size and move about the coordinate plane and begin to see connections between geometry and algebra. Through experiments with rep-tiles (shapes where copies are put together to make larger, similar figures), students explore the relationship between area and side length of similar figures. They learn how to find missing side lengths of similar figures using ratios and scale factors. For non-rectangular shapes, they need to compare angle measures as well. Finally, they apply their knowledge to real world problems like finding the height of a tall object or the distance across a river.

### **Comparing and Scaling: Ratio, Proportion, and Percent**

The following unit develops students' ability to make intelligent comparisons of quantitative information using ratios, fractions, decimals, rates, and percents. Students build on their concrete experiences with geometric representation of ratio comparisons developed in the previous unit and concentrate on more numerical situations. They then use quantitative comparison information to make larger or smaller scale models. They learn not only different ways to reason in proportional situations, but to recognize when such reasoning is appropriate.

### **Accentuate the Negative: Positive and Negative Numbers**

In this unit, students explore situations that require representation with positive and negative numbers including fractions and decimals. They formalize algorithms for adding, subtracting, multiplying, and dividing with positive and negative numbers and consider the order of operations as well as the Commutative and Distributive properties. They also use positive and negative numbers to graph in four quadrants and to model and answer questions about applied settings.

### **Moving Straight Ahead: Linear Relationships**

Students recognize linear functions by the constant rate of change between two variables in a verbal context, a table, a graph, or an equation. It begins with an experiment in

which students determine their walking rates. This is expanded upon in the context of a walkathon in which students look at the rates at which students walk and the donation per kilometer that sponsors pay. They explore situations such as this by constructing tables, graphs, and symbolic equations to express linear relationships and interpreting and translating information given in one form into the others.

### **Filling and Wrapping: Three-Dimensional Measurement**

In this final unit, students' understanding of similarity and scale factor is extended to three-dimensional figures. They explore the surface areas and volumes of rectangular prisms and cylinders in depth. They look at how changing the scale of a box affects its surface area and volume. They also investigate cones, spheres and square pyramids to develop volume relationships.

## **Eighth Grade**

### **Thinking With Mathematical Models: Linear and Inverse Variation**

The first unit reviews linear functions and equations which were developed in grade 7 and introduces concepts associated with nonlinear functions such as approximating nearly linear relationships with mathematical models and, in particular, inverse variation. Students begin to develop facility in working with inverse variation in several common contexts.

### **Looking for Pythagoras: The Pythagorean Theorem**

In the next unit, students explore two important ideas: the Pythagorean Theorem and square roots. By finding distances between points on a coordinate grid, they learn that the positive square root of a number is the side length of a square whose area is that number. Then students discover the Pythagorean relationship through an exploration of squares drawn on the sides of a right triangle and go on to apply the Pythagorean Theorem to a variety of problems.

### **Growing, Growing, Growing: Exponential Relationships**

In the following unit, students continue working toward one of the central goals of algebra; describing and reasoning about relationships among quantitative variables. Students focus on a family of nonlinear relationships: those that model exponential growth and exponential decay. For example, by examining studies of biological populations from bacteria to humans, students see populations increasing over time at an increasing rate which is an exponential pattern of growth. Likewise, exponential decay can be seen with radioactive substances in which the radioactivity declines as time passes, but the actual amount of decline diminishes over time.

### **Frogs, Fleas and Painted Cubes: Quadratic Relationships**

In this unit, the focus switches to a nonlinear polynomial relationship; the second-degree polynomial, or quadratic function. By investigating a variety of problem situations, students learn about the characteristics of quadratic relationships, as represented in tables, graphs, and equations. They discover that each of these three types of representations of quadratic functions gives important information about the situation being modeled as

they look for commonalities and differences among them and use them to answer questions.

**Say It With Symbols: Making Sense of Symbols**

The following unit emphasizes using the properties of numbers to look at equivalent algebraic expressions and the information each expression represents in a given context and interpreting underlying patterns that a symbolic equation or statement represents. Students look critically at each part of an expression and how each part relates to the original expression. They examine the graph and table of an expression as well as the context the expression models. The properties of equality and numbers are used extensively as students write and interpret equivalent expressions, combine expressions to form new expressions, predict patterns of change represented by an equation or expression, and solve equations all of which helps them develop symbol sense.

**Shapes of Algebra: Linear Systems and Inequalities**

The final unit capitalizes on the strong connections between algebra and geometry in order to extend students' understanding and skill in several significant aspects of those two key strands. Circles, triangles, rectangles, and general parallelograms are visually familiar shapes. When those shapes are drawn on a coordinate grid, the coordinates of points comprising the figures can be described and analyzed by studying properties of the corresponding equations. Students extend earlier work with the Pythagorean Theorem by connecting it to the standard equation for circles; with properties of polygons by connecting parallel and perpendicular lines to slopes of lines and linear functions; and with solutions of linear equations by considering solutions of linear systems and equations in standard  $ax + by = c$  form, and solutions of linear inequalities.

## **THE WILLOW SCHOOL: SOCIAL STUDIES**

Stories are at the heart of the Willow School's social studies curriculum. It is through the study of stories that children grow to understand themselves, their communities, their country and the world. This understanding helps them to grasp and analyze current events and become enlightened world citizens. By becoming familiar with other cultures, students are able to appreciate the diverse peoples and places around the globe. The study of history also supplies children with a context within which they can better comprehend the developments that have occurred in the sciences and the arts. Geography is an important component of the social studies curriculum as well, so that children may gain a solid understanding of the world's physical, governmental, and cultural divisions, and learn how location and natural resources have affected history. Through the social studies curriculum, children are also exposed to aspects of economics, archaeology, anthropology, and the role of religion in historical and cultural events.

Children love stories. They are intrigued by the unknown. Willow School students learn to see history as an adventure, as they learn about far away peoples and places through literature, art, music and dance. Mathematics and science are also incorporated into individual units. A comprehensive thematic approach makes history come alive.

History is meant to help us think of who we are and to envision possible futures; therefore it is not limited to the traditional chronological memorizing and recounting of events. Instead its study focuses on investigations of important questions about human interactions, values, and choices. In order for these investigations to be meaningful to young children, they begin with the children's personal experience. Children can best understand how history affects human destiny, for instance, by thinking about events in their own lives and how they affected who they are. They can best understand social and material changes over time by interviewing grandparents, examining old family photographs and artifacts and building on this experience to learn about similar changes elsewhere. Personal histories engage and motivate students and allow them to understand the human dimension of past events. By using personal histories as a departure point, and focusing on the similarities between one's experiences and the experiences of other groups in society and how these groups shaped the present and will continue to shape the future, students are able to see themselves as agents in a pluralistic society. The study of history then emphasizes the interactions of different peoples, different values, and different perspectives. It also highlights the interpretation of the past as largely dependent on our present way of thinking.

The social studies curriculum promotes critical thinking. For this to happen, its focus is not just on hearing accounts of the past, but on asking questions worth pursuing, questions about human dilemmas we still confront, about patterns we follow, about how past events relate to each other and to current issues, and about how the local relates to the global. Ultimately the curriculum promotes thinking that takes into account not just the actions of isolated individuals, but how individuals act within a system of interconnected forces, and how this system in its turn relates to larger systems and to the

life support systems of nature. Our social studies curriculum gives children the tools to understand the interdependence of all life on this planet and the model for investigating alternative ways to ensure its preservation.

Because critical thinking is our primary goal, we steer away from a program that focuses only on quantity of information and coverage of facts, though we know that information and facts are important. Critical thinking depends on in-depth understanding. The understanding of complex concepts such as culture, environment, and society requires time for sustained attention and for reflecting on meaningful connections. Thus, in teaching geography, for example the focus is on human interactions with the environment and the movement of people, goods and ideas through space. In-depth understanding comes from focusing on themes and comparing different responses to the same issue in different contexts.

Finally, the tasks we ask students to perform in the classroom in the process of investigating a theme are similar to the tasks historians and social scientists perform to conduct authentic investigations. By allowing our students to face the same challenges professional social scientists face, we teach them the tools and skills that create understanding, and we help them retain the information they discover and apply what they learn. Part of learning history is learning how to formulate broad historical questions, how to find information, how to evaluate sources, how to reconcile conflicting accounts, and how to create an interpretive narrative. In addition students learn how to analyze and draw information from a variety of sources including photographs, primary and secondary written sources, videos, cartoons, songs, and interviews. In short, our goal is to teach children how to plan and how to control and monitor their own learning so that they become increasingly more independent.

### **Kindergarten**

The focus of the kindergarten social studies curriculum is the self. Through examination of the self and answering the essential question, “who am I?” the children become aware of who they are in relation to others around them. The children start the year exploring the question “who am I?” by looking at the attributes that make them an individual such as what they look like, how they feel and things they do, how they change and grow. They demonstrate their understanding of what makes them unique and valued, what their needs and wants are, what their abilities and talents are. They explore how they are the same and how they are different from each other. Through these explorations, the children come to understand that their differences can be assets that add richness to the social environment.

As the children become aware of themselves as individuals, they further explore the self in the context of the classroom. They explore questions such as: What is a kindergartener? What is a classroom? What talents do I bring to the classroom? What kind of a classroom do I want to belong to? What makes a successful classroom? What are my responsibilities to others and to myself? As the children generate goals for the classroom and formulate their own hopes for the year, they come to realize that their individual actions impact what the group and they can achieve. As they answer the

guiding questions, they come to see themselves as virtuous members of a community where they need to exhibit virtues such as respect and responsibility. They come to see themselves as problem solvers as they cooperate with and support each other as they work out their differences in work and play.

The kindergarteners continue to explore the concepts of the self in the context of the family. They explore questions such as: Why do humans organize themselves into families? How does family organization relate to human needs? What is my role within my family? What roles does each family member play? How do families change? How are families alike and different? The children start the unit by examining the guiding questions in the context of their own immediate families. They learn to identify human needs and they investigate how families are organized to meet them. They begin to see the self within the context of a family system in which the roles and responsibilities of each family member allows individuals to thrive. They come to understand that mutual cooperation and mutual support is necessary to ensure the well being of all its members.

As the children establish an understanding of the structure of their own families and their role in their families, they branch out to examine individuals and the diverse family structures around the world. Children learn to identify the continents on a globe. Continents are explored in the context of the family. As they compare and contrast diverse family structures, the children come to understand that families worldwide may have the same basic needs, yet they may meet their needs in different ways.

The curriculum focuses on children developing positive attitudes about themselves, their families and families of diverse cultures. At the end of the year, the children perform the play, *The Rainbow People*, which emphasizes the common bonds between all people regardless of their differences. The play illustrates humans' basic needs and their need for acceptance and friendship.

### **First Grade**

In first grade, students explore essential question, What is a community? First, they examine *the Classroom Community*. Guiding questions in this investigation include:

- What is a community?
- Who are the people in the community?
- What makes a successful community?

To answer these questions, the children generate, sort and categorize rules and guidelines for the classroom community. They also explore the logical consequences of being a part of a community, for example, the sacrifice of personal liberty for the common good. Through this examination, the students begin to recognize various virtues as essential to a communal way of life, such as the blending of self-reliance with personal responsibility for others and the environment. They participate in activities that promote a sense of community and class identity, by conducting partner projects and surveys that enhance their appreciation of teamwork, responsibility and interdependence. The children

participate in various brainstorming and problem solving activities as a means for learning to think of themselves as problem solvers.

From the Classroom Community, the children progress to the more complex *School Community*. They undertake extensive research of the Willow School community members, the procedures in place at the school and the school's physical environment. The children learned to conduct surveys and interviews to obtain answers to the questions:

- Who are the members of the school community?
- What roles do members play?
- How are members interdependent?

By structuring the questions and reviewing the answers, they learned to compile, organize and evaluate data. To better understand school procedures, the children role-play, such as pretending to be parents going through the Willow School admission process. They also examine the school's facilities, focusing on the question of how the facilities reflect the values of the school, which for the Willow School, includes preserving our natural resources by using recycled materials. Within the context of examining the school community, it is hoped that the children will gain a greater appreciation for the concept of "giving back" to the communities in which we live. Towards that end, some of the projects the children undertake include: cleaning up the schoolyard, and planting bulbs to enhance its beauty. One special project involved the creation of a scarecrow to watch over and protect the vegetables in the Willow School garden. Many of the children observe that a sense of pride and joy developed within them as they participate in these projects.

For *the Town Community* unit, the children seek answers to the following questions:

- What is a Town Community?
- How does a Town Community meet the needs of the people?
- Why do people come together in a Town Community?
- What makes a Town Community work well for everyone in it?

The children come to recognize that all people have similar, basic needs and wants, such as:

- food, shelter and clothes;
- the need for attachment – emotional support/beauty/ virtues;
- the need for empowerment and to be challenged to develop;
- the need for freedom and safety, fun and entertainment.

The children learn that these needs and wants are met and fulfilled by different industries and institutions within a community, and that many of the institutions are interdependent in some ways. They also learn how the will of the people who participate within the community points the way to the type of community that results.

The children initially start this unit by examining their daily needs and activities to gather data. They look at buildings, advertisements and brochures of town businesses. They form a working definition of a Town Community. Children work extensively with maps and mapping, and plan and build a 3-D geo-block town. They research institutions by going on field trips to the local Bank, the Redwoods Restaurant, the Mayor's Office, Public Library, Public Works Dept., Post Office, Fire Dept. and Police Dept. They then participate in various collaborative projects to deepen their understanding of the importance to a Town Community of money and banking, foods, businesses for goods and services, law and citizenship, and government planning. As a final project to this unit, the children assume roles of various members of the community and construct a town in the school's woods.

### **Second Grade**

The grade two year begins with the essential questions "What is the past?" and "How can we find out about the past?"

Second grade students continue to explore differences in communities by investigating how communities change over time. Students also learn to extract information from photographs, paintings, artifacts, interviews, fictional and non-fictional texts and museums to reconstruct past community life.

Students begin with their own family history. Family photograph displays, family trees, a family artifact museum, grandparent stories and interviews at a local retirement home are used to deepen student understanding of what life was like a generation ago.

A collection of Willow artifacts that have been collected at the school site provide an opportunity for students to move farther back in time while developing a sense of place. A field trip to a local functioning historic farm also connects students to the Willow School site history.

In the second semester students go even further back in time to investigate the first inhabitants of this area – the Lenape. Artifact collections from a local museum allow students to practice anthropology. Students imagine Lenape life through the artifacts before researching the culture and its' relationship to its environment using written accounts, texts and an animal skin preparation and fire making demonstration. Students are now ready to compare our present relationship to the environment with a first nation relationship. A slide presentation also permits students to compare Lenape culture with a modern first nation group, the Cree of Northern Quebec.

Ground view and bird's eye view are studied and practiced in a map making unit. Students create maps of their rooms, school garden and classroom. Map title, key, scale, compass rose and symbols are all introduced through student made maps. Students use their maps to navigate and locate hidden, "mystery" objects.

Continents and oceans are studied in the context of the Discovery of America. Explorations of First Nations, Vikings, Columbus and Hudson are examined and mapped. An important question to this unit is “Why humans explore?”

An on-site archaeological dig is the final second grade activity. Children learn to “dig,” catalogue, map and interpret. Children also learn by doing how history is reconstructed through archaeology.

### **Third Grade**

Social studies in third grade is focused on the essential question, “What compels a community to seek change?” It is this question that guides the students’ studies of the growth of our nation from Jamestown through and beyond the American Revolution. Students are challenged to consider, “What are the push and pull factors drawing the European settlers to America?” Students learn about life during the colonial period by visiting historical landmarks of New Jersey, and examining both primary and secondary source material. They immerse themselves in the time period by reading historical novels, performing in role-plays, researching and reporting information, and engaging in hands-on activities designed to simulate life in the 1600 and 1700s. Throughout these studies, students are guided to consider the answers to a variety of questions including: “Why did the original colonists move to the new world?” “How did the colonists’ behavior in their new land mirror and/or oppose the behavior that drove them out of England in the first place?”

During their studies of the American Revolution, the students are challenged to consider, “What options are available to a people who feel oppressed?” They seek answers to the question, “What events catalyzed the American Revolution?” and they investigate the conflicts that existed both among and within groups of people living in the Colonies. They examine closely the language of the Declaration of Independence and the Constitution and the lives of the men that crafted and signed each document.

Throughout their social studies explorations, students engage in research and report writing, critical source analysis and comparison, and creative thinking and collaboration. They use maps, timelines, and other materials to help them recreate the past and gain understanding of how the colonial American culture has influenced our lives in America today.

### **Fourth Grade**

In beginning of the fourth grade, students investigate the essential question "What defines our humanness?" The year begins with a study of the geologic history of the Earth for the purpose of placing human history in perspective. A 98.5 foot ribbon, the beginning of which represents the moment of Earth's formation, is unrolled. The last quarter inch represents the length of time humans have inhabited this planet. An overview of the evolutionary timeline ensues, with students researching examples of the five kingdoms of life. Focus turns to the Neozoic Era and the order of primates; students learn of the place

of hominids in the system of classification. After comparing the physical, social and genetic characteristics of apes and hominids, the students are ready to embark on a study of the evolutionary development of our species. Research of topics, such as physical development and appearance, cognitive development and skills, tools, range, habitat and climate, reveals the relationship between environment and the evolutionary process. As early social groups, such as those at Terra Amata, Dolni Vestonice and Lascaux are examined, students are exposed to the needs, habits, and organization of hunter-gatherer communities.

Fourth grade students then investigate the essential questions, "What influences a world view? How do different groups of people see the world? How does world view influence actions?" In-depth studies of indigenous cultures of Australia, Africa, the Arctic, Asia, and South and Central America occupy the students' attention for the balance of the year. As students examine the ways in which each culture meets its fundamental needs, the impact of specific location (longitude and latitude) on human social, economic and cultural development becomes understood. The geography of each area is studied in-depth. The study of any culture requires consideration of the following questions: Immersion in aspects of indigenous cultures exposes the students to their mythologies, art, architecture, spiritual beliefs, morals, and social organization. This in-depth study invites students to consider the definition of "civilized."

Throughout the year, relevant literature is read, including historical fiction, myths and folktales, and poetry.

### **Fifth Grade**

In the fifth grade, students investigate the essential question, "What is gained and lost when a people develop a way of life that is 'civilized'?" The year begins with an analysis of the transition from hunter-gatherer communities to agrarian societies. Students explore the causes leading to food production as well as its role in the development of complex human settlements such as Catal Huyuk, Abu Hureyra, Skara Brae, and Jericho. They study human migration from southwestern Eurasia to the river valleys of the Nile, Tigris, Euphrates, Indus and Yellow River where early civilizations developed. Coordinates of longitude and latitude are examined for their significance in the development of civilization. Students examine the transformation of tribal associations to more complex forms of social and political organization. A study of the ancient cultures of Mesopotamia, Egypt, Nubia, India and China encourages students to examine the question of what influences a worldview. A comparison of the worldviews held by the peoples of the ancient civilizations is followed by an analysis of how these worldviews affected their actions. Immersion in aspects of these ancient civilizations exposes the students to their mythologies, art, architecture, systems of writing, spiritual beliefs, morals, and social and political structures. Relevant literature, such as *The Epic of Gilgamesh*, is read.

In tandem with their study of the ancient civilizations, the students are involved in the "Island Project." The Island Project addresses the notions of the importance of the imagination, of history as vision, and of putting together patterns and meanings in many

ways. First, the project requires that students imagine something that does not exist: a place. They must then imagine everything about it - size and proportion, land and water forms, non-human life, and humans' arrival, progress and culture. All of the Island Project must be based in or compatible with reality. The Island Project encourages students to address the nature of knowledge, competing values, complexity and interdependency, humans' relationships with their environments, co-habiting non-human life forms and one another.

## **Middle School Social Studies**

The middle school Social Studies program transports students through time and space and challenges them to make connections that lead to a deeper understanding of the present. The primary purpose of Social Studies is to prepare students for effective citizenship in the global community. In our view, effective citizenship in the 21<sup>st</sup> century requires the ability to think in terms of systems and understand the forces that hold society together or pull it apart. While building students' knowledge of the history and cultures of our nation and the world, investigations in Social Studies develop appreciation for diversity and a capacity for perspective and empathy. They also develop the skills necessary for students to understand the complex connections between individuals and society, between individual freedom and the common good.

Rather than aiming for superficial coverage of a great many topics, our Social Studies program aims to provide depth by selecting precedent-setting events, representative case studies, and concepts that students can apply to their lives outside of school. The program provides an inquiry-based approach to learning and ample opportunities to examine written primary sources and artifacts. Through visual, auditory, and kinesthetic activities, students are able to extract meaning from the content presented and process it at several levels. This allows students to focus on important ideas and their potential implications and to connect what they are studying with their own interests, and with local and current events.

Throughout their Social Studies education, students are given opportunities to reflect on the ethical dimensions of the topics they are studying and to debate controversial issues through multiple perspectives. This encourages students to think critically and to develop empathy and the capacity get beyond cultural differences to work with others cooperatively, habits of mind of vital importance for problem solvers in our diverse world. We want our students to value partnerships, diversity, and active participation in creating a better world. The training they get in middle school culminates with a course in participatory democracy in which they pick a community problem and propose a public policy and action plan for creating positive change.

## **Sixth Grade**

In sixth grade students investigate the essential question "Is domination a good strategy for achieving success?" Students start the year with the study of ancient Greece. They investigate the positive and negative effects of competition and the attitudes that lead

people to want to dominate others. In the second trimester, students study ancient Rome's expansionist policy and how it led to its hegemony and many cultural achievements as well as to its undoing. By taking the role of a Roman citizen, students delve into the everyday life of ancient Rome to answer the question: "Does domination benefit the whole society?" Diary entries written from the point of view of a Roman patrician, plebeian, or slave highlight the inequalities in Roman society and help students understand in a concrete way the advantages and disadvantages of domination. The year ends with a study of medieval European society and how its structure based on relationships of domination and submission limit human achievement. In addition to analyzing the constraints social hierarchy imposes, students examine how religion serves both as a unifying element that glues medieval society together and as a source of division and conflict with non-Christians. A study of the crusades and Islamic civilization leads students to think critically about modern approaches to inter-cultural contacts and highlights the importance of cultural knowledge, empathy, and flexibility for creating global partnerships.

### **Seventh Grade**

The essential question for the seventh grade is: "What does it take to create positive change?" Students investigate cultural exchanges along the Silk Road in the first trimester and evaluate the importance of creating multicultural partnerships. They also reflect on what virtues can help make such partnerships possible.

In the second trimester, students study the Renaissance to examine the ideas and attitudes that promoted innovation and confidence in the human potential for solving problems and creating positive change. Taking the role of a Renaissance apprentice, students learn about the guild system, and enroll in an apprenticeship with a master in science, art, music, architecture, writing, etc. This project allows them to study in more depth one area of cultural achievement of the Renaissance. They produce a "masterpiece" in their field and present what they learned in their research in a "Guild Hall."

In the third trimester, students investigate the voyages of exploration and the impact Europeans had on the native peoples of the Americas. They study the conquest of the Aztec and Inca empires from both the European and the Native American perspectives. From this study, students discern the importance of considering all parts of a system and both short and long term consequences of human action.

Throughout the year, students in the seventh grade reflect on the transformations that ushered the modern world, and observe continuity and change from purely religious thinking to empirical scientific thinking, from community-centered life to individualism, from mercantilism to capitalism, from religious political power to secular political power, and from the known world to the New World. These transformations become a vehicle for thinking more deeply about some of the same questions investigated in sixth grade: How do people negotiate their differences? What kind of thinking produces conflict? What virtues can help us create partnerships?

## **Eighth Grade**

The essential question for eighth grade is “what future will we invent?” Students study how the American government works, how a bill becomes a law, and what it means to be a citizen of their country and the world. They re-examine the question they started with in Kindergarten-- “Who am I?” but this time to discover in what ways they are agents in their world. This is a course on civics, citizenship and government, which prepares students to make a difference in their communities. As a culminating project, students survey assets and liabilities in their community and design an action plan to work with local government and community members to create positive change in an area of community life that they identify. In the process, they develop a better sense of their own goals and power for influencing the future.

This year, the project in participatory democracy links the eighth graders' science work in developing a land ethic with citizenship action. Throughout their years at the Willow School, students develop a sense of place. Early in the year, they take a field trip to the Pine Lands to understand better how humans affect their natural environment and why they must take on the responsibility for protecting it. To reinforce land ethic concepts, in English class students also read the Sand County Almanac by the naturalist Aldo Leopold, analyze the tree rings in a tree stump, develop a timeline of local and world events in a local tree's life, and create an autobiography from the point of view of the tree. The project also leads to the students' creation of their own land ethic. In Social Studies, students then pick a problem that affects the local community and through a partnership with community members and local government, they develop or modify a public policy. Because policies related to environmental issues are a high priority for students, this year, their work centers on a state mandate for a local ordinance regulating fertilizer use and its impact on our watershed through storm water runoff. Working with community members and governmental officials, students propose a modification to the ordinance to enhance the municipality's ability to enforce this law, and implement positive incentives to promote citizens' voluntary compliance with it.

## **THE WILLOW SCHOOL: SCIENCE AND ENVIRONMENTAL STUDIES**

The Willow School science and environment curriculum brings children together with the natural and physical world in a program of exploration and discovery. Throughout the curriculum, children are taught and encouraged to act in a context of inquiry and research: to ask probing questions, to formulate and test hypotheses, to draw conclusions, and to verify the accuracy of their conclusions. They are taught to experiment, to record results, and to analyze results for both expected and unexpected findings. The science program is integrated with other subjects, allowing students to explore such concepts as the impact of science on cultures, religions, and civilizations, the connections between scientific thought and the arts, and the many uses of mathematics in the scientific world. They also learn to apply scientific methods to research and thought in other subject areas.

The study of science continuously builds in ever widening circles of depth and understanding, like ripples on a pond. Using this analogy, as they touch their fingers to the surface of the water, children in the kindergarten learn that plants grow from seeds with light, water, air and nutrition. As the ripples flow outward in later elementary years, children study the basic concepts of photosynthesis and learn how plants make use of these ingredients. As the circles expand to the edges of our pond, in Middle School (grades 6-8) students expand on their knowledge of photosynthesis by studying cell structure and cell growth. These foundational elements in natural and physical sciences establish the background they need for an in-depth study of chemical and biological concepts in their high school years.

Through the study of the ecology (the balance of nature), woven together with elements of chemistry, biology and physics, students learn about many aspects of the natural world, including plants and animals, earth and space, and land and water. Environmental studies are a vital part of the Willow School science program at all levels. The school's 34-acre site is integral to the curriculum, allowing for on-site studies of forests, wetlands, water quality and groundwater systems, seasonal changes, environmentally sensitive building design, renewable resources, sustainable growth, and regeneration.

By the time students enter Middle School, science becomes a more discrete subject area. Sixth grade is predominantly Physical Science, seventh grade is Life Science and eighth grade is predominantly Earth Science. Environmental Science is woven throughout all grades with an in-depth focus in eighth grade.

### **Kindergarten**

Children plant and care for a deciduous and an evergreen tree. Observations of their growth, changes, root systems, branches, and the shelter they provide for animals is measured, photographed, and scientifically drawn from September to June to help firmly establish the Life Cycle of these trees in the students' minds. They keep a journal of their observations and graph the changes they see. They also compare their tree with the many species of trees found on The Willow School campus. Students feel the different textures of bark, collect leaves and make rubbings of them, explore the properties of

wood, learn about the rings inside the trunk of a tree, and learn how humans have used natural resources for their needs as well as the importance of recycling those resources. In focusing on the self, kindergarteners explore the role of the senses as a means to get to know the world. They take blindfolded guided walks outside and experience the natural world through hearing, smell, and touch alone. They learn to recognize and describe various textures of natural objects, and to discriminate the scent of different plants. Similarly they learn about their bodies and what nutrients their bodies need to grow in a healthy way.

Project Feeder-Watch is conducted in cooperation with The Department of Ornithology at Cornell University. Resident birds that come to three different types of feeders are identified and recorded along with the temperature, weather, and time of day. This study begins in November and continues through March and allows the students to be citizen scientists in partnership with the Ornithology Department at Cornell.

An overview of human anatomy and physiology is imbedded in the study of the following systems: central nervous system, skeletal system, respiratory system, circulatory system, digestive system, excretory system. The function of the above systems, the relationship among the parts, and how a healthy body is dependent on a balanced environment is discussed and brought to life through diagrams and games. Each system's function is connected to the natural world with examples and outdoor explorations.

“Sifting Through Science” examines the following physical science principles: floating & sinking, magnetism, and filtration. Exploration of these concepts allows students to make observations, test their hypotheses, collect and record data, and draw conclusions. Ultimately the students apply what they learn to explain their direct observations in nature. For example, the local pond plants and animals are observed and drawn with their specific adaptations for floating.

All life begins, has a middle, reproduces, and ends. Students create a *Desk Top Pond* to observe the concept of the life cycle of a frog. Students compare and contrast natural and man-made environments. The students keep a scientific journal noting the life cycle changes in the eggs. They discuss metamorphosis of the tadpole and frog anatomy. Discussions and group activities reinforce each student's individual understanding. Finally the frogs are released into pond with a song and a poem.

### **First Grade**

The school year begins in the “Sunflower House,” a portion of The Willow School garden that was planted by the fifth grade and previous years' first grade classes. Using the school garden as a classroom for hands-on investigations, the students begin to understand the meaning and importance of a community. This “sunflower community” offers a year-round point of interest for understanding the plant and insect interdependence, as well as plant parts and their function, including photosynthesis. Students then investigate the significance of plants in their lives.

During the winter season, first graders focus on the question: “What are the five essential needs a species requires for survival?” For the five groups of animals, students discuss cold weather adaptations such as: migration, hibernation, and dormancy. A simple research report is developed by the student, for each of the five groups of animals in New Jersey, that tell about a specific animal’s cold weather survival strategies. Mammals, reptiles, amphibians, birds, and fish are categorized & a dichotomous key is created for each species.

The unit on solids and liquids begins with the question, “What is matter and why does it matter?” The characteristic components of a mixture, solution, and suspension are studied and students make a connection between how they effect and where they exist in our lives.

The students’ study of life cycles continues when they observe the metamorphosis of a caterpillar. During this process, the students feed, care for, and research each phase. They identify the adult butterfly species, then observe, draw, and finally release the butterfly into nature during a Butterfly Releasing Ceremony.

The final unit of first grade investigates the properties and characteristics of balls and the things that affect the ways balls behave. The students begin by looking at the difference between various size balls and how size affects the properties of balls and ends with the students making their own ball based on the unique traits of balls they have learned. These experiments are followed by construction of roadways made from ramps and tubes to look at the different behaviors of balls as they roll down inclines, through tunnels, up hills, and around bends.

## **Second Grade**

Grade two students begin the year with a review of sorting and classifying of non-living collections. Children are asked to classify using one and two rules. Classification skills are then applied to animal and plant groups.

In the next unit, students generate questions about a mystery invertebrate (*Tenebrio Molitor*) and then answer their questions by observing and designing a series of experiments. Students carry larvae home where they complete a food preference experiment. This unit also reinforces lessons learned in earlier grades about life cycles and prepares students for the Willow Pond Population Study.

In this school site based study students collect, identify, sort, tally, graph and publish invertebrate findings on the internet. These activities integrate well with data activities in the second grade mathematics program. Food webs and food chains are created that demonstrate interdependence in the Willow Pond. The current study is also compared to previous year’s studies and to pond population data available on an internet website.

The grade two class investigates the idea of adaptation as they study North American bears and their biomes. Students study bear differences and how these differences promote success in their separate and sometimes overlapping North American biomes.

The unit is supported with resources from the New Jersey Division of Fish and Wildlife and the Morris Museum School Loans Program.

Light and color is the first physical science unit in grade two. This is an experimental unit where students identify the characteristics of light through a series of student and teacher designed activities. Light sources, reflectors and refractors are investigated. A highlight of this unit is the creation of a school yard and personal sun dial.

The Willow Water Cycle is another school site based unit that explores the Willow School's unique water system. Grade two students study the basic states of matter as they apply to water, as an introduction to this unit. Later in the unit, children observe the basic processes in a water cycle including evaporation, condensation, transpiration and infiltration.

"Fossils - did we ever get that wrong!" is the title of the next grade two unit. Students learn about the exploits of early paleontologists with a focus on the idea that scientific knowledge changes as result of new discoveries. Fossil creation and dinosaur types are examined during this unit. Children practice paleontology when they create models and describe behaviors based on real fossil samples.

The final unit of the grade two program is about the science of sound. "What vibrates?" is the question that leads this exploration. The origin and characteristics of sound including its behavior in solids, liquids and gasses are explored through student activities and integrated with a language arts theme about the history of jazz.

### **Third Grade**

Students in third grade undertake a yearlong study of decomposition by examining the connections between soils, decomposition, compost, the garden, and the food we eat. During this study student explore the properties of soils, the form and function of words, the life cycle of a pumpkin, and the compost cycle at the Willow School. As part of this study, the third graders weigh the lunch compost daily, and keep track of how much food is being added to the school's compost pile.

To introduce basic chemistry and scientific inquiry, the students analyze a set of "mystery" powders. They learn accurate measuring techniques, proper handling of chemicals, and the scientific process, as they determine the identity of each powder.

Their introduction to physical science is through a study of the six simple machines: lever, wheel and axle, pulley, inclined planes, wedge, and screw. The students explore the concepts of force, friction, effort, and motion through hands on labs and activities. At the end of the unit, students demonstrate their understanding of simple machines by constructing their own simple machines and demonstrating the machines' functions.

In the final unit of the year, the third graders study the planets in our Solar System. The students investigate and gain understanding of the origin and organization of our solar

system, and the relationships among various bodies that comprise it. At the end of the unit, the students create a scale model of the Solar System taking into account the size, mass, density, composition of each planet, as well as its distance from the sun and its neighboring planets.

### **Fourth Grade**

The 4<sup>th</sup> grade year begins with students sharing what they know and asking questions about what they want to know regarding the interaction between land and water. Included in this introduction is a discussion of the Big Bang Theory and a brief overview of the formation of the Earth. Students also write their own creation legends after listening to stories from a variety of other cultures.

Students investigate and observe the water cycle to understand the essential processes: evaporation, condensation, precipitation, transpiration, surface runoff and ground water. As a culmination, models are created that represent the water cycle. Experiments are conducted to investigate what happens to land, and to the water on land, after it rains. Weathering, sheet wash, and gullying are discovered. Stream table investigations take place and students summarize what happens when water from a single source flows over and through the land. Similarities and differences among streams are discussed. Components of soil (sand, silt, clay, and gravel) are observed. Students conclude how soil properties affect the way in which soil is eroded and deposited by water in their stream tables. Using this information, students investigate how much water these components will hold and how much will be runoff. Other such topics explored in this unit include: drinking water, erosion, deposition, parts of a stream, and river flow.

An introduction to the unit on Rock Cycles begins with an understanding of the Earth's crust and the many elements that make up its composition. Exploring the physical properties of rocks and minerals begins with students making observations and then grouping items by similar characteristics. Distinguishing rocks from minerals is achieved through discussion, observation, and experimentation. Students learn key concepts: organic, inorganic, mineral, rock, crystal, and grain. Shapes and properties of crystals are examined as students grow and "build" their own crystals. Other topics that are explored in this unit include: igneous rocks, metamorphic rocks, sedimentary rocks, tectonic plates, and rock cycles

In terms of Electricity, a simple one-bulb, one-battery circuit is assembled to examine how the energy that is stored inside batteries causes a flow of electrons (electric current) through the pathway of conductors that make up the circuit. Students examine and operationally define closed and open circuits. Battery terminals and their relationship to the direction of electric current flow within a circuit are discussed. Symbols used to represent parts of circuit are examined which students use to make circuit diagrams. Volts are introduced and series and parallel circuits are constructed. Switches are added to observe how they mechanically close and open the pathway through which electric currents flow. Conductors and nonconductors are also tested, including a variety of liquids. To understand resistance, two sizes of Nichrome wire are explored to see how each allows different amounts of electric current to flow through it, as evidenced by the

different degrees of bulb brightness. Other topics that are explored in this unit include: filaments, fuses, and circuit testers

After the students understand electricity, they move on to Magnetism. Students learn that magnets produce an invisible force, and that some things respond to magnetic force and others do not. Going on a “magnetic hunt”, students make predictions about classroom items that are magnetic or not, and then test their hypotheses using horseshoe magnets. Objects are then classified by their magnetic properties. Students will conduct experiments to discover that a magnetic force field is always present and magnetic pull is greatest when the object is closest to the magnet; magnetic power passes through objects it attracts, however the magnetic force decreases with distance; a magnetic force can hold a limited amount of weight. Students will create their own magnetized compass and use it to find the cardinal directions. They will also magnetize a nail and compare its properties to non-magnetized nails.

Fourth grade students describe and give examples of the classes within the animal kingdom. Through labs and demonstrations that often use live animals, the students gain an understanding of the structure, characteristics, and basic needs of organisms and investigate the diversity of life.

### **Fifth Grade**

The Watershed and Stream Study will begin the fifth grade science program. The unit starts with students presenting what they know about water and water resources because we learn about the world through our senses and by integrating new observations, experiences, and perceptions with existing thoughts and feelings. Ideas are grouped into common links and become “water pools.” Using these ideas, students write creative stories that address the theme in one of the pools. Water has been on Earth for 3.8 billion years. In exploring the timeline of Earth’s existence, students will compare the proportion of time that water and life processes have existed on Earth. They will also see how a fixed amount of water has been here since that time and the percentage that is potable. Watershed will be defined and will be applied to life at the Willow School and its relationship to the United States watershed system. The grounds will be mapped in terms of ridges, basins, flow branches, and reservoirs. Then the Middle Brook will be mapped as students expand their knowledge and observations.

Macroinvertebrates and their significance in terms of water quality will be studied. Students will become experts in particular macroinvertebrates, create models of them, and find their distinguishing characteristics, including their tolerance to pollution. We will go to Middle Brook to collect, count, and observe these critters. Using the Enviroscope watershed model, we will see the effect of point, and non-point pollution and their relationship to the watershed. Students will explore the effects of man on water pollution and ways to decrease our effects. Chemical tests will be conducted to determine the quality of the stream water and understand Ph balance. They will also compare this

to the quality of our drinking water. Students will also conduct a home water use inventory to determine how much water is being used in their household over a two-day period of time.

To explore chemistry, Mixtures and Solutions will be made with different solid materials and water. They will be measured, compared by mass, and separated using screens, filters and evaporation. The behavior of solid materials in water will be investigated. The concept of saturation will be explored, the volume and mass of solids and liquids will be measured, and experiments in solubility will be conducted. Concentration will be explored and students will determine the relative concentrations of solutions. This will be accomplished through the sampling of soft-drink recipes, creating salt-solutions, and trying to identify mystery solutions.

There are many aspects of the atmosphere that are important to understand, and students will concentrate on cloud type and amount, air temperature and precipitation. Using their senses, students will go outside and make observations about the atmospheric elements. They will explore thermometers and the variables that might effect interpreting their information. Other tools, such as rain gauges, will be used to measure precipitation.

In the next unit, students will explore how the Earth, Moon, and Stars are all interconnected. Students will observe and describe the moon over a period of about a month and identify a pattern in the changes of the moon's appearance. Using models, maps of the universe, and scientific data, students will gain a deeper understanding and appreciation of the Earth and its relationship to the Sun, the Moon, the stars and gravity. They will explore how the moon affects the tides and the weather. One of the feature activities will be making a star clock.

As the fifth grade year winds down, the students will explore the idea of Energy Transformations. Included in this unit will be the Greenhouse Effect, Photosynthesis, and the Energy Pyramid. Students will build "solar houses" to help illustrate the greenhouse effect. They will also take a closer look at plants to see how they transform the sun's energy into energy of their own. In understanding the energy cycle of plants, students will also be able to describe the interdependent relationship between plants and animals. Ultimately, these ideas will be tied into the causes, effects, and possible solutions of global climate change.

## **Sixth Grade**

### The Nature Of Science

The beginning of Sixth Grade Science introduces students to the Scientific Method. They use one version of the Scientific Method to compare the quality of different paper towel brands and to investigate the properties of UV beads. Students exercise scientific habits of mind as they design and conduct controlled experiments, measure physical characteristics, record results and draw conclusions. By designing fair-test investigations they will practice important science process skills involving using data to construct reasonable explanations.

### Light and Color.

Why does an apple look red? This is one of the essential questions that drive a series of investigations to deepen student's understanding of the properties of light and color. They use color analyzers to observe phenomena that are normally hidden from view. Students use the investigations to work toward explaining color and light phenomena in their own words. They refine their explanations through group discussions. In the process important concepts and abilities are addressed involving the transfer of light energy and the nature of the electromagnetic spectrum. Students gained practice in using appropriate tools and techniques to gather, analyze and interpret data. They also developed descriptions, explanations, predictions, and models using evidence.

### Atomic Theory and the Periodic Table

Thousands of years ago, people began asking the question, "What is matter?" This unit follows the discoveries and ideas that have led to our current theories about what makes up matter. The students learn about the atom - the building block of all matter- and its structure. They also learned how the periodic table is used to classify and organize elements according to patterns in atomic structure and other properties. In the *Adopt an Element Project*, students have an opportunity to apply their knowledge by creating an advertisement that features the atomic structure and properties of an element of their choice. They continued to build on this knowledge as they described and demonstrated chemical bonding by creating models of ionic and covalent compounds.

### Chemical Reactions

This unit explores endothermic and exothermic chemical reactions. It serves as an effective and inviting introduction to many aspects of chemistry. Students observe changes when several chemicals are mixed together. They design experiments to determine which reactants are responsible for producing specific changes. Students also design experiments that quantify the amount of calcium chloride used and the amount of heat produced during a chemical reaction. In pursuing their own experimental plans the students are practicing science skills and are learning about conservation of matter and patterns of change.

### Thrill Ride: Forces and Motion

This is an *Event-Based Science Module*. In *Thrill Ride*, students responded to a request for proposals from an amusement park developer. Tackling a real-life project, working in teams, they design and build a model thrill ride that demonstrates Newton's three laws of motion. A series of lab activities have the students experimenting with pendulums, parachutes, swing devices and balls and ramps to help build an understanding of the laws of motion and how to apply them to their thrill ride design. "In the News" and "Discovery File" articles also help students discover the information they need to design their thrill ride. Interdisciplinary activities with math and English contribute to the final elements used for *Sir Isaac's Inertia Land Amusement Park*. As an added bonus, students have an opportunity to apply their learning on Physics Day at Six Flags Adventure Park in Jackson, New Jersey.

## Seventh Grade

### Phenology

Phenology is a theme that is explored throughout the entire year and involves continuous outdoor explorations. It is the study of the response of living organisms to seasonal and climatic changes. Seasonal changes include variations in the duration of sunlight, precipitation, temperature and other life-controlling factors. Blooming wildflowers, migrating birds, spawning fish, flashing fireflies, thunderstorms, falling leaves, harvest moons, rutting deer, frozen ponds, births and death are all part of the cycles of life that we experience each year. Keeping track of cyclical events like these from year to year and how they relate to the weather patterns is in a large part what phenology is all about. Like many great naturalists, students will be keeping a *Phenology Journal* to record events that occur through the seasons. Their journal is essentially their personal record of riding the planet Earth through one annual journey around the Sun. Our phenology focuses often support concepts that are explored in all other seventh grade units.

### The Real Reason for Seasons

This Sun-Earth connections unit systematically guides the students toward an understanding of what causes our seasons. As the students reflect on and discard some of their familiar old concepts about the Sun-Earth relationship they build a new understanding of the real reason behind the seasons. The process of revising models or explanations is at the heart of science. In this unit, students must think like scientists as they constantly challenge and revise their own ideas in the same way that scientist do.

### Cells

Students build an understanding of the diversity, structure and function of cells through a variety of labs and activities. They explain the parts of *The Cell Theory*, compare the similarities and differences between Eukaryotic and Prokaryotic cells, observe and draw organisms in a drop of pond water, and make and compare cell slides of onion, cheek and elodea. To learn the structure and function of the cell organelles and how they operate as a system the students create giant animal and plant cell models, individual cell models, and make organelle flash cards. In all of this the students move toward a deeper understanding and appreciation for the complexity of this basic unit of life.

### Characteristics and Classification of Life

Life science is the study of living things –from the tiniest bacterium to the largest tree. In this unit, student will discover the similarities of all living things. They embark on a learning journey that leads them to understand that classification systems are not a part of nature. Rather, they are frameworks created by biologists for describing the vast diversity of organisms, suggesting relationships among living things. This course of study provides an opportunity to enrich their growing knowledge of the diversity of life on the planet by connecting to the local fauna and flora of our area.

### Life Through Time

This unit introduces students to the unifying theme in life science: evolutionary change. Through the concept of time travel, changes over time are captured in rotating station activities that focused on the concepts of diversity and adaptation of organisms,

relatedness of species, and ‘deep earth time’. The students demonstrate their understanding of major evolutionary themes through weekly *Time Travel Journal* observations, predictions and analysis of station material, comparing the digestion systems of dissected starfish and worms, modeling the evolution of an imaginary organism, relating adaptations to environmental conditions due to continental drift patterns, dramatizing the *Geological Time Line*, and explaining the reason for the extinction or the explosion of an organism during a specific geological time period.

#### Plant Growth and Development

Students are involved in an in-depth study of plant growth, development and reproduction with the amazing Wisconsin Fast Plants®. Fast plants are a type of crucifer that have been bred to complete their life cycle within 40 days. Students study the rapid changes of their plants as they explore and explain germination, flowering, pollination, and fertilization and seed development.

### **Eighth Grade**

#### Exploring Ecology

Ecology is the study of the interdependencies between living organisms and their environment. One of the best ways to learn about ecology is to see it in action. Key ecological concepts will be introduced and applied as the students explore some of New Jersey's physiographic regions. This approach not only gives students a direct experience with the concepts it also deepens their sense of place as we explore different habitats of New Jersey. The ecological focus for the fall is the outer coastal plain highlighted by a trip to The Pine Barrens and a connecting coastal estuary. Other trips throughout the year could include the Great Swamp and Pyramid Mountain, Sandy Hook Nature Center, and the Willow School site, which is considered an “Ecotone”.

#### Project Earth Science

This program consists of three separate units. The grand theme of all the Project Earth Science units is the uniqueness of Earth among all the planets in the Solar System. Concepts and activities were chosen that elaborate on this theme.

#### Project Geology

Students will be immersed in a study of Earth's geological process and cycles. This course of study also integrates the two broadest groupings of scientific activity identified by the National Science Education Standards: (1) developing skills and abilities necessary to perform scientific inquiry, and (2) developing an understanding of the implications and applications of scientific inquiry. Content includes: Earth's Geologic Layers, Causes of Earthquakes, Plate Tectonics and Seafloor Spreading, Formation of Volcanoes, The Rock Cycle, Rock and Mineral Identification.

#### Project Meteorology

Students will study climatic affects on life and learn about weather patterns that drive Earth Cycles through a series of hands-on activities. Some of the activities include,

building weather maps, tracking hurricane, exploring smog, ozone depletion and acid rain.

#### Project Oceanography

The Project Oceanography focuses on the uniqueness of water, the effects of its special characteristics on Earth's ocean, and the forces that cause currents waves, and tides. The effect that humans have on the marine environment is also addressed. Concepts covered include: Ocean Layers, Ocean Currents-, Wave Motion and Energy, Oil Spills and Oceans, Decomposition of Ocean Pollution and Global Warming.

## **THE WILLOW SCHOOL: WORLD AND CLASSICAL LANGUAGES**

The study of world languages is vital to increasing communication among peoples and promoting cross-cultural understanding. The main objective of learning a foreign language at The Willow School is to gain an appreciation for one's native language together as well as a better understanding of others. Recognizing these differences allows the students to develop self-confidence and self-knowledge, cultivating inner flexibility as well as social flexibility. This, in turn, allows them to express themselves more easily.

Willow School students begin their study of a second language in the Kindergarten, when they experience their first exposure to French language and culture. Upon reaching the sixth grade, Willow School students have the opportunity to select either French or Spanish and continue with an intensified study of the language of their choice through the eighth grade. All students come to the language room for instruction. Kindergarteners have French once a week, grades 1-5 twice per week and grades 6-8 French or Spanish three times per week. Additionally, in sixth, seventh, and eighth grade, students study Latin.

### French: Kindergarten – Second Grade

French in the early grades is taught through a conversational approach where the emphasis on oral comprehension, communication and pronunciation strives to reproduce a child's exposure to her native language. Their power of imitation carries them through the early grades. Stories are the focus and foundation of the lessons. Their timeless themes and moral values also reinforce the Virtues Program that is at the core of Willow's philosophy. Classes are conducted through an abundant use of games, songs, dance and rhymes. Students acquire vocabulary, expressions, sentence-structure and communication skills. They also develop a sense of the French culture. Students learn the basics of communication via a variety of expressions: greetings, directions and questions. They learn the alphabet, numbers, and the ability to count in French. Content words for colors, parts of the body, clothing, animals, everyday objects at home or at school and foods are introduced. This basic vocabulary is associated with frequently used verbs to form a strong foundation in the language.

### French: Third – Fifth Grade

Entering third grade, the students build on their oral capital from the early grades to approach reading and writing. Sound combinations and silent letters are discovered. Familiar words take shape on the written page. Writing becomes a part of each lesson.

Students build vocabulary through stories and conversations. Conversations are based on their daily experiences at home and at school. Skits and acting out certain situations add to the students' comfort level in expressing themselves.

Fourth graders are introduced to formal grammar, the ‘skeleton’ of any language. Most sentence structures are familiar to them from their oral knowledge. The students are introduced to grammatical terms and learn to recognize parts of speech. Conjugations are an integral part of the French language and the students awaken to the challenging concept of matching personal pronouns with their respective verb endings, in the present tense only. They learn to replace nouns with pronouns, and in so doing clarify the process in their native language. Other skills, such as recalling and retelling stories through questions and answers, continue to deepen their comprehension abilities.

In fifth grade, students continue the study of grammar with the ‘passé-composé’ tense and *être* and *avoir* as irregular verbs. They practice negative and interrogative forms and explore simple translation. Exchanges and short presentations about their daily lives involving hobbies, sports, food, trips etc. encourage interaction.

Fourth and fifth graders practice fluency through the performing of simple skits, often shared during Morning Gathering. They also receive light homework assignments and are expected to prepare for regular quizzes.

#### French and Spanish: Six – Eighth Grade

In the middle school years a stronger emphasis is given to cultural/geographical and historical perspectives. This allows the students to examine how language reflects unique ways of representing the world, and to appreciate cultural diversity as an enriching aspect of life, which fosters looking at reality through a different angle. These are habits of mind we want our young adolescents to cultivate, so these can become a tool in functioning within a global community in an interdependent world.

In sixth grade, while the beginning Spanish students focus on language acquisition. French students get a taste of the early history of Paris and learn to relate to the everyday life of a child in a few ‘francophone’ countries. They are later introduced to the geography of France. Each student presents a region of his/her choice to the class. The beauty of French grammar continues to be revealed in all its complexities. The students write weekly journal entries and give regular oral and written presentations. In the middle school, their work is graded. They are encouraged to express their opinions on a variety of topics. Music, art, poetry and cooking enliven the lessons.

Students learn about the French explorers to Canada in the 16<sup>th</sup> century, whereas the Spanish students are discovering Mexico with the ‘conquistadores’ of the same period. The Age of Discovery presents them some of the same ethical dilemmas they confront in adolescence.

In the spring, French students study and perform scenes from Molière’s ‘Bourgeois Gentilhomme,’ while Spanish students read ‘Lazarillo de Tormes.’

Technological tools are available to support language learning, including pod casts, language CDs and computer work.

### Latin: Six – Eighth Grade

The Willow School Latin program supports the school's emphasis on the mastery of the English language. The program highlights learning how to read Latin, building strong vocabulary skills, and broadening an understanding of grammar as it applies to both the Latin and English sentence. Students read about the Romans in their own language; they review topics such as the family, dress, mythology, the slave market, the Roman Villa, major gods and goddesses, and key historical figures including Aeneas and Romulus and Remus.

In the first year of Latin, students develop beginning vocabulary and translation skills. They study declensions (nouns and adjectives in the first three groups, focusing on the nominative, accusative, and ablative cases), while learning the present and the perfect tense. Our text is *Ecce Romani IA, Prentice Hall 4<sup>th</sup> Edition: 2009*.

## **WILLOW SCHOOL: LIBRARY RESOURCES**

The Willow School library is at the heart of the school. It is a place to discover new and exciting genres of books, to study, to listen to stories, to do research, and to simply enjoy the art of reading. Kindergarten through fifth grade classes visit the library once a week for formal instruction on how to use resources and age-appropriate lessons focusing on literacy activities. The aspect of ecology is covered through providing both nonfiction and fiction books that encompass the idea of sustainability and nature. These books reinforce, not only what is discussed in grade level science curriculums, but also the philosophy of the school which is to be a steward of the environment and to live in balance with the natural world. In the library, the students are given the opportunity to discover texts and expand their knowledge. Children are encouraged to self-select books and pursue their own interests that stimulate an authentic love of learning. Through wide reading and listening to the rich language of stimulating read-alouds in the Willow Library, the students develop their mastery of the English language. Higher level thinking is promoted through discussions of these various texts. The Virtues Program is an important part of the library curriculum, as well as the entire school. A variety of books are selected and provided for the children to read which are Caldecott and Newberry winners; many books discuss these virtues of the heart, and the behavior of the characters encountered in these stories reinforce the virtues being discussed. Reinforcing these concepts in library through literature provides another avenue of reflection on these most important topics. Well-chosen books have very defining messages that the children are able to recognize, understand and discuss. In addition, the children are also given the opportunity to select books that relate to classroom studies or research projects that are happening simultaneously.

### **Kindergarten - Second Grade**

Students learn library routines that include how to care for books, the check out and return system, and the practice of returning books to proper the place. Students are introduced to the organization of the library. These students are exposed to language such as, fiction books that are alphabetized by the author's last name, and nonfiction, which are categorized by subject. Towards second grade, the students are introduced to the language of the Dewey Decimal System and are expected to understand how to find informational books. The students come to the library once per week to enjoy listening to a story, usually depicting the current virtue of the month for Willow School. Students are challenged through "think- aloud" discussions and are beginning to use basic meta-cognitive reading and listening strategies such as predicting, wondering, and making connections to understand the stories. The students also have the opportunity to choose books to coordinate with classroom studies and for the enjoyment of reading.

### **Grades Three - Five**

Students continue to use their skills to find age level appropriate books for enjoyment as well as for classroom studies or research. At this point, they are able to find books independently and use the Dewey Decimal System. Read-alouds are provided which may be a bit beyond the reading level of the students, but well within their interest level; this

eliminates whatever challenges children may encounter during the reading process, while exposing students to rich vocabulary and allowing everyone to focus on the thinking process. In addition to predicting, making connections, and questioning, we also practice higher level meta-cognitive skills such as noticing, figuring out, and visualizing. It is here that children become familiar with great authors whose works contain enough depth of content and craft techniques to offer upper elementary students multiple opportunities for thoughtful reflection. Students also have individual time to read silently and explore studies from the classroom.

## **THE WILLOW SCHOOL: TECHNOLOGY**

Students in grades three – five take a weekly technology class. Technology classes teach students to access information efficiently and effectively, evaluate information critically and competently and present information accurately and creatively. By the end of fifth grade, students are be able to use proper keyboarding techniques, use a search engine, deliver a report using electronic presentation software and complete a report using word processing software. In addition, by the end of fifth grade students are be able to use technology to perform computations, develop simple graphs and collaborate online.

### Grade 3:

- Begin the process of keyboarding
- Use appropriate internet search engines to assist in research
- Learn the basics of presentation software
- Create a simple electronic presentation
- Utilize word processing software

### Grade 4:

- Continue keyboarding practice
- Learn the “rules” of proper electronic presentations
- Explore more components of presentation software
- Continue utilizing word processing software
- Utilize the internet for online research, explore good search techniques
- Use internet based learning games
- Create pamphlets using electronic publishing software

### Grade 5:

- Reinforce and attain proficiency in keyboarding techniques
- Understand and demonstrate knowledge of CyberSafety
- Create a detailed report using electronic presentation software
- Use the Internet for research, collaboration, e-mail, and educational games
- Write a well-formatted document using word processing software
- Utilize a spreadsheet program for keeping statistics and creating graphs

## **THE WILLOW SCHOOL: MUSIC**

To be able to appreciate fully the complexity of a musical piece, feel comfortable making music with others, sing with confidence, and have the tools to read and follow a piece of music, students need rigorous training early in life. The Willow School music program is designed not only to develop a series of fundamental musical skills, but to help children achieve a level of musical literacy that will allow them to think of themselves as musicians.

Our program uses the Kodály Method: a comprehensive, developmental approach to musical education, which provides an experiential and highly sequential framework to support student understanding, knowledge, and love of music. The Kodály method is primarily vocal based. It stresses musical literacy, and focuses on repertoire that is multi-cultural and historical in nature. Students experience musical concepts first through their senses: listening, singing, moving, and clapping. Then, through a process of teacher-guided deduction, they discover a new musical concept. Students continuously reinforce the new concept through singing, games, dancing, musical dictation, and sight-singing. They deepen their understanding of the new concept by exploring how it functions in a wide variety of musical contexts.

In addition to the Kodály curriculum, our program also incorporates elements of Orff-Schulwerk, an approach to teaching music which offers an array of instruments, including glockenspiels, xylophones, metallophones, and drums. The work that children do on these instruments serves a variety of purposes: large muscle control and coordination for the younger students, visualization and aural exploration of musical concepts for the older ones, and most important, opportunities for sophisticated ensemble playing, improvisation, and composition for all students in first through eighth grade.

By the end of grade 5, students have sung, played, and performed pieces from many different cultures in North, Central, and South America, Asia, Africa, and Europe. By the end of grade 8, students have learned and performed a selection of pieces from each of the major periods of music history: the Middle Ages, Renaissance, Baroque, Classical, Romantic, and Twentieth Century. Music in grades K-5 uses mostly pentatonic and extended pentatonic scales. Beginning in the second half of fifth grade, the emphasis begins to shift to diatonic music.

Lower School students at the Willow School attend music twice a week for forty-five minutes. Students in grades six, seven, and eight meet together twice a week to work on two and three-part choral music, sight-singing, and vocal technique. For 30 minutes each week, students participate in a smaller mixed age group focused on instrumental music. In this class, students improvise, play canons on the Orff instruments, and work together on larger ensemble pieces from various periods in music history. Two musical electives are offered over the course of the year to Middle School students. The first, "Mallets and Gongs," allows participants to work in a smaller group on more challenging percussion music of their choice. In the spring, a vocal elective is offered, "Popapella," in which

students can choose a cappella music from the pop, rock, and Broadway genres. Student choice and responsibility play a large role in the elective offerings: they choose the course, the repertoire, and assume a large part of responsibility for the rehearsal and final arrangement of the pieces.

Willow School students are given a wide range of both formal and informal performing opportunities. They present two concerts per year: in January and May. Middle School students also perform outside in the larger community twice per year. Fifth Grade students organize a talent show in the spring. Students who study music privately have the opportunity to perform in a music recital held in June. Lower School students sing two days per week to conclude Morning Gathering, and they join their Middle School classmates for a song during Morning Gathering on Mondays and Fridays. Students also perform music periodically throughout the year to enhance class presentations such as plays, research projects or culminating events. These experiences, coupled with the concrete development of musical skills, enable students at the Willow School to develop confidence and pride in their musical accomplishments and to present themselves professionally and joyfully in public settings.

Below are curricular summaries by grade level.

**Kindergarten:**

In Kindergarten, students begin to learn the fundamental underpinnings of all music as a series of relationships: beat / rhythm; high / low pitch; melody / harmony; loud / soft dynamics; fast / slow tempo. Children begin to refine their understanding of rhythm as the relation of longer and shorter notes to each other and to the beat. They acquire a repertoire of folk songs, singing games, and movement games from around the world.

**First Grade:**

In first grade, students begin to learn music notation. They learn the staff, and beginning solfège (so/mi, la/so/mi). In rhythm, they learn quarter notes and eighth notes, and the quarter note rest. They use this knowledge to learn two-part music on the Orff instruments, and to sight-sing new music. They acquire a repertoire of folk songs, singing games, and movement games from a variety of different cultures. On the instruments, they begin to develop basic skills needed to play in an ensemble: beginning and ending together, playing on the beat, and listening to one another while playing.

**Second Grade:**

In second grade, students continue to gain more tools for musical self-expression. They build on the solfège that they know by adding re and do. This gives them the full pentatonic scale, and opens the door to a whole new repertoire of music! In rhythm, students learn sixteenth notes, half notes, and whole notes. They read, write, and learn to recognize these new elements in their folk songs and singing games. They also improvise and compose in the pentatonic scale. They broaden their repertoire of folk songs, singing games, and movement games. On the instruments, they continue to refine the basic skills needed to play in an ensemble: beginning and ending together, playing on the beat, and

listening to one another more carefully as they explore more complicated music in two and three parts using the full pentatonic scale.

**Third Grade:**

In third grade, students build on what they know of the pentatonic scale by adding low la and low so. They learn about major (do-centered) and minor (la-centered) pentatonic scales. In rhythm, students learn syncopated quarter and eighth note combinations. They learn to read, write, and identify these new elements in their folk songs and singing games. They sing rounds regularly to develop their intonation and musical independence. On the instruments, third graders continue to refine basic skills such as playing on the beat without rushing, and listening more closely both to their own part and to the whole ensemble as they incorporate more syncopated rhythms into their working knowledge.

**Fourth Grade:**

In fourth grade, students strive for fluency in sight-singing pentatonic music using moveable-do solfège. Fourth graders learn absolute note names in the treble clef and begin to learn how to find their way around a vocal score (measure numbers, rehearsal letters, systems). They begin to work with eighth / sixteenth-note combinations. They learn to read, write, and recognize these new elements in their music. On the instruments, fourth graders continue to learn more complex music in three or more parts, using simple meters, eighth/sixteenth-note combinations, and the extended pentatonic scale.

**Fifth Grade:**

In fifth grade, students continue to develop their reading, writing, and listening skills. Students learn fa and ti, and the diatonic major and minor scales. They learn about half and whole steps. Fifth graders learn to read, write, recognize, and perform dotted rhythms. On the instruments, students learn music in four or more parts, as they explore major and minor diatonic music. In addition, students will begin to sing two-part choral pieces from the folk repertoire.

**Middle School, Grades Six, Seven, and Eight:**

Grades six, seven, and eight meet as one large mixed-age group for sight-singing, vocal technique, and chorus. They sight-sing in two-part harmony using moveable-do solfège. Students sing rounds in two, three, and four parts and in foreign languages. Students use time during sectional rehearsals to work at their own pace on topics in music theory and music history. By the end of Grade Eight, students will have learned at least one piece from each of the major periods of music history: the Middle Ages, Renaissance, Baroque, Classical, Romantic, and Twentieth Century.

In addition, students participate in a smaller mixed age group focused on instrumental music. In this class, students improvise, play canons on the Orff instruments, and work together on larger ensemble pieces from various eras of music history.

## THE WILLOW SCHOOL: WELLNESS

The Willow School's Wellness Program empowers students with the knowledge, skills, and values along with the experiences to maintain a healthy lifestyle into adulthood. The Willow School seeks to develop students who are health literate (have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions) and physically educated (acquired knowledge, skills, and confidence to enjoy a lifetime of healthful physical activity), individuals who take responsibility for their own wellness and promote the wellness of their families and communities. The school community recognizes and fosters the intrinsic value of wellness and promotes sustainable wellness.

Sustainable Wellness is the active process of becoming aware of making choices toward an improved level of health. We aim to increase student knowledge about the *physical, intellectual, social, emotional, and environmental* dimensions of wellness, enabling them to make informed choices about their wellness now and in the future.

By applying the Five Dimensional Model, a person becomes aware of the interconnectedness of each dimension and how they contribute to healthy living.

**Physical Wellness:** Physical wellness has to do with the bodily health and fitness. It involves understanding that eating well, exercise, seeking medical assistance when necessary and healthy lifestyle choices are important; that making healthy lifestyle choices today will affect how you feel tomorrow, how long you live, and, perhaps most importantly, the quality of your life.

**Intellectual Wellness** is evidenced by self-directed behavior, which includes continuous acquisition and creative application of critical thinking skills focused on the achievement of improved health. Intellectual wellness is also evidenced by a demonstrated commitment to life long learning. The intellectual dimension of wellness encourages creative and stimulating mental activities. An intellectually well person uses the resources available to expand one's knowledge in improved skills along with expanding potential for sharing with others.

**Social Wellness:** A socially well person works for mutual respect and cooperation among the individuals within a community. Social wellness involves: developing and building close friendships, practicing empathy, effective listening, caring for others and allowing others to care for you. As we develop social wellness, we discover that we have the power to make conscious choices to enhance personal relationships, our community, the environment and, ultimately, the world.

**Emotional Wellness:** An emotionally well person accepts a wide range of feelings in themselves and others and is continually open to personal development. Emotional wellness includes the capacity to manage one's feelings and related behaviors in a constructive manner. Willow students develop the skills needed to make a realistic

assessment of their limitations and to cope effectively with stress. They develop habits that support good mental health, a positive attitude, and a strong self-image. Students are encouraged to synthesize feelings, thoughts, and personal philosophies when making behavioral choices.

**Environmental Wellness:** Environmental wellness is an awareness of the precarious state of the earth and the effects of one's daily habits on the physical environment. It reflects the fact that personal health depends on the health of the planet. Willow students learn the importance of protecting themselves against environmental hazards. It refers to living in harmony with earth by becoming aware of one's interactions with nature and environment and the impact such interactions have. Our curriculum encourages students to be aware of the impact that their choices have on themselves individually, and on the environment as a whole.

### Kindergarten-Second Grade

Learning experiences for kindergarten through second grades are characterized by large muscle, vigorous activity featuring locomotor skills (walking, running, jumping, hopping, skipping, galloping, leaping), non-locomotor skills (bending, twisting, reaching, lifting, turning, lowering, raising), and manipulative skills (throwing, striking, kicking).

Teachers provide experiences that encourage children to question, integrate, analyze, apply, and communicate cognitive concepts. Children learn to search for answers and use critical thinking skills to understand concepts that are presented to them.

### Grades Three - Five

These grades focus on cooperative learning, enhanced fitness, and movement education. Teachers design lessons that provide frequent practice opportunities that are both meaningful and appropriate based on previous movement experiences and maturation. These experiences enable individuals to develop a functional understanding of movement concepts (body awareness, space awareness, effort, and relationship) and provide opportunities for children to build competence and confidence in their ability to perform a variety of motor skills (locomotor, non-locomotor, manipulative).

### Grades Six – Eight

The middle school Wellness Education curriculum is a continuation of the elementary school program. Learning experiences are designed to help students gain an understanding of mechanical principles and the effects of exercise on the body. Along with the development of physical fitness, counseling is done on how to make the correct choices to fit the individual's needs for self-fulfillment and self-actualization. Because this period is an age of rapid physical and social growth, challenging activities that provide an opportunity for the development of interpersonal relationships are offered.

**THE WILLOW SCHOOL:**

## VISUAL ARTS

The Willow School visual arts program provides students with a wide variety of artistic experiences that broaden their artistic abilities, challenge their minds and facilitate their individuality through creativity.

At the Willow School we present art as a vehicle for self-expression that encompasses four primary components: *seeing*, *thinking*, *feeling* and *making*. By developing and addressing these four components students have a more comprehensive understand of art and gain respect for the individualism present in the works of others.

**Seeing** -Students learn to observe their world more closely, to look beyond the surface and identify the visual elements that exist within. Students also look at works of art from a variety of cultures and time periods in order to gain an understanding of the many different approaches, styles, techniques and perspectives that exist within art. As students learn to see they will have an opportunity to identify artistic elements and develop knowledge of their own aesthetic choices and preferences.

**Thinking**-Students are exposed to numerous works of art that challenge their conception of art, as more than just beauty but a collection of ideas. Students learn the importance of creating a sketch in order to work out ideas and create a plan before beginning a final project. Projects are designed to challenge students to think critically and formulate creative solutions in their artwork. Students also become aware of audience, and they learn to approach works of art as a vehicle for communicating their ideas and opinions.

**Feeling** - Students learn that there is more to art than just technical ability. They look at different artists that depict similar subjects and analyze how their approaches differ in feeling and tone. Students will work on their ability to express emotion and individuality through their own artwork.

**Making** – Students are exposed to a wide variety of media including collage, drawing, painting, sculpture, digital art, and photography. Students learn the techniques, tools and procedures of each of the mediums they encounter. Through the assigned art projects, students will encounter the elements of art and principles of design and learn when and how to apply them. Students also work on the development of their fine and gross motor skills in order to achieve their desired artistic outcomes.

Another unique component of the arts program at The Willow School is the “Artist Café.” The Artist Café is a designated portion of class time that focuses on exposing students to a wide range of artwork that includes: historic art, cultural art, contemporary art, and peer artwork. This provides students with a wide variety of visual imagery and artistic ideas to draw from as they work to develop their own individual aesthetic. The Artist Café discussions also help students develop vocabulary, articulate thoughts and ideas, enhance skills in critique, and generate peer discussion. The art room is a safe environment where students learn to respect the ideas, individuality, and artistic expressions of their classmates.

At the Willow School, we encourage our students to be stewards for the earth and to work towards sustainability. In the art program students address these issues in a number of ways. Our students explore a number of non-traditional materials such as discarded objects, non-sustainable materials and even the Earth itself. Willow students also learn about the concepts of “Art for Awareness” (art work that creatively informs an audience of a problem or need) and “Art for Change”(art designed to cause a positive change locally or globally).

### **Visual Arts: Handcrafts, Architecture and Design**

Working in the Handcrafts and Architecture studios the Willow students use all of their senses to whet their appetites for discovery and curiosity as they learn by experience. They make use of tools, natural materials and specific techniques to further their understandings of the processes and strategies involved in making an item with a specific intended purpose. The intent is to excite new ways of seeing and understanding in each student. Through the development of their own dexterity, they expand their awareness of concepts and skills that have influenced cultures and traditions throughout time. Additionally, in the course of their studies, the students build an understanding of the relationships between the nature of a place and its people’s designs. They begin to recognize that crafting an article by hand is an act of self-expression. Each project that they create is a unique piece that has both a specific purpose and an esthetic value. Thinking imaginatively, recognizing patterns and connections, working independently, becoming self-reliant, taking pride in accomplishment, mastering hand/eye coordination, planning ahead, being self aware, and appreciating the consequence of our decisions/actions are outcomes of the process.

Because handcrafts and architecture are both an amalgam of all of the main subjects that the children study throughout the day, this curriculum reinforces their classroom lessons in an authentic, creative and tangible manner. Throughout the grades the students learn, among other things, that weaving and knitting have traditionally been used to tell stories (language arts), classic toys are really simple machines (science), creative design processes are built on patterns (math) and each culture has a unique set of handcrafts and architecture that tell who they are (social studies). The Handcrafts/Architecture design sequence serves as a laboratory for creative thinking and self-discovery and prepares the students to be observant, perceptive learners.

The beginning handcrafts curriculum is designed to integrate nature with the child’s development of fine motor skills, his or her sensibility to the textures and colors of the natural environment, the harmony between human activity and the seasons, and to the ways humans can use natural resources thoughtfully and respectfully. During the Kindergarten year, the students are exposed to a variety of handcrafts. They explore finger knitting, weaving, paper-making, sewing and wood working. By tying classic children’s literature (ex. Aesop’s, *The Tortoise and the Hare* and Shel Silverstein’s *The Giving Tree*), and the core virtues lessons (ex. diligence and loyalty) to the projects, the

crafts are easily integrated into the rhythm of kindergarteners' daily lessons. The projects are simple and easy to master, allowing the children to experience the joy of creating a purposeful object and to develop their pride in their own accomplishments.

First grade studies begin by becoming familiar with wool. The curriculum uses stories such as Elsa Beskow's *Pelle's New Suit* to illustrate the processing of lambs wool to cloth. Learning about how geography and weather impact different cultures' choices for handcrafts is also part of this early introduction. By sharing with their classmates handmade articles brought in from home, the students have an opportunity to hone their presentation language skills as well as their awareness of global differences. They practice the simple patterning involved in knitting by working with a partner on a knitting board. Before they can begin knitting with needles, each student must use both his fine and gross motor skills to roll their yarn from a skein to a ball. Once they have prepared their wool in this way, they master casting on the correct number of stitches and begin to knit. Another project taken on during the first grade year is the creation of a child sock doll to be used in their social studies curriculum. In preparation, the students practice some basic sewing stitches, by making a small burlap pouch, for example. The woodworking project for first grade centers on the process of assembling (gluing and nailing) pieces as per a pattern. Each child creates a wooden trug to carry their knitting work. They finalize their piece by sanding and finishing, a task that they prepared for by sanding and waxing their own pair of knitting needles.

Second grade studies center around weaving. The year begins by building fluency with weaving materials and terminology. Paper weaving helps them recall the process of over-under mechanics and forms the introduction of weaving terms such as warp and weft. The students have the opportunity to create a loom and weave outdoors with found natural objects. Lap loom weaving (pot holders) allows the students to learn to follow a prescribed pattern and then to create a geometric pattern on graph paper to weave from. At the same time the students discuss weaving in different areas around the world and where fibers originate (flax, cotton, recycled plastics etc.). In coordination with the language arts program, the students write a story from their own experience, which they then represent in weaving using a variety of materials. The woodworking project for second grade is a small heddle loom. This project is an introduction to woodworking tools for cutting and follows a study of First Nation tools and artifacts that the students have just completed. As the children build their own loom, they develop an awareness of the wood and its properties and build a deeper understanding for how the loom itself works. Once the loom is finished, the students will create a weaving that tells the story of the Willow School, building on their awareness of their sense of place. With a knowledge of the working parts of their own loom, they can transfer this basic understanding and practice weaving on a variety of other looms. Having mastered the basic concepts behind looms and weaving, the students finish the year with a weaving of their choice.

Third grade focuses primarily on hand sewing. The projects this year are centered around the theme of children's activities. The intent is to support the students' studies of colonization and western expansion. Handcrafts serves as an ideal way to show that during these times in our history children had obligations to family chores as well as the

responsibility for their own fun. Their studies begin by sewing finger puppets. All of the students work with an identical base pattern, which they transform into a specific bird character by making their own design decisions. The puppet play is based on Aesop's fable *King of the Birds*, which, emphasizes a number of the virtues as well as the importance of celebrating one's own uniqueness. Simultaneously, the students continue to work on sheets of example stitches that they combine into a handmade book at the end of the year. The third grade wood working projects are a series of wooden toys that work on the principles of simple machines that they study in science. This is another opportunity for the students to follow a prescribed pattern as they hone their skills with simple hand tools. To round out the year, the students concentrate their studies on two early American crafts that tell stories: cross stitch and quilting.

Fourth grade serves as the culminating year of handcrafts and is an opportunity for each student to advance their individual skills. The theme for the year is ceremony and celebration. They begin the year designing banners that celebrate the virtues. Each student is assigned a specific virtue that they must represent through the use of sewing, knitting and weaving. The intent is not only to show their understanding of the crafts and the virtue, but to begin to work effectively and independently with the process of design. The classroom environment is an open studio where the children interact with each other to test out their ideas, evaluate the outcome and rework appropriately. Throughout their social studies curriculum, the students investigate a variety of unique cultures from around the globe, which leads to the next project. After considering the traditional costumes of a number of cultures each student designs and builds a celebratory costume of their own including shoes, hat and accessories. The purpose of this project is again, an opportunity to hone their handcraft skills while learning to use precedents to inform their design ideas and then to make full use of the process of design. The final project for the fourth grade year is a woodworking project that parallels the costume project by focusing on using precedents for the design and construction of a basic ceremonial object. In this way, the fourth grade year is a graceful transition from the skills oriented handcrafts program into the more complex study of design principles to be studied the following years.

The intent of the fifth grade architecture program is to develop critical thinking and problem solving skills through the process of design. By working both independently and cooperatively towards a solution, the students must consider the constraints and consequences of their design decisions as they work within a given set of parameters. Throughout the curriculum, students will utilize architectural design tools and vocabulary to express their ideas. As an introduction to an architect's kit of tools, the students begin the year by making a sketchbook. The sketchbook then becomes a tool that they use throughout the year to record their out of class observations. They learn to sketch in both model and drawing form as a process for recording and evaluating their ideas leading up to the creation of a final representation in both two and three dimensions. Throughout the year they continue to use examples of historical architecture in order to develop an understanding of basic architectural principles such as pattern, hierarchy, orientation/site, circulation, axis, form, and order. For example, during the winter trimester, the students study the proportion/modular systems used by the Ancient Greeks and employ these

concepts to create their own Orders (column base, shaft, capital, entablature, pediment system). Ultimately, the students will develop an understanding that all of these elements and systems are interrelated and interdependent and contribute to the design as a whole. As a reflection of all of these concepts, the students final project is one based on the principles of biomimicry.

The Middle School design elective is an opportunity for the students to continue to build confidence in their own ideas and abilities and to explore their interests. The goal is for the students to be able to conceive of a multi-faceted idea, effectively represent the idea both visually and verbally and then to continue to evaluate and redesign it appropriately. By continuing to work with the skills they built in the architecture and handcrafts programs, the students further investigate the basic concepts of form and space, proportion and balance, esthetics, movement, scale, and other organizing principles inherent in design. These elements are considered in a variety of environments, for example, landscape and park design, building design, and furniture design. However, the process of design is not limited to these disciplines. The skills they learn are universal and will empower and enable the students to go out and shape the world.