## Grade 6 Pedagogical Overview

The twelfth year is the gateway to pre-adolescence and idealism, and although the sixth grader is increasingly able to experience internal logic, their sense impressions can often be clouded by emotion and whimsy. Twelve-year-olds are developing a stronger sense for cause and effect, and they enjoy creating causes in order to see what effect they might have. There is a growing orientation towards the world, and peer values become increasingly important. The child begins to anticipate adolescence during this year of dramatic physical, social, and emotional growth.

Throughout this year, students are encouraged to develop strong powers of observation, and precision and accuracy in their thinking. Whenever possible, emphasis is placed on strengthening a connection with the world by means of direct experiences. Mineralogy, geography, and physics lessons provide opportunity for in-depth encounters with the physical world while strengthening powers of sense-observation. In addition to being grounded by the lawfulness of the earth, students are also encouraged to develop expansiveness in their imaginative thinking. Astronomy draws students towards the heavens and provides opportunities for them to explore the mysteries of the cosmos. In an effort to recreate the experience of early astronomers, Astronomy is taught exclusively through observation of the unaided eye.

The sixth-grade history curriculum focuses on the rise and fall of the Roman Empire and the Middle Ages. Throughout the year, students are encouraged to apply causal thinking as they articulate the effects of social change on individual thought and action. Many substantial writing assignments and projects assigned during this year are developed with this aspect of the curriculum in mind.

In geometry, constructions with compass and straightedge meet the students' increasing sense for precision, while strengthening their aesthetic sensibilities. They explore the dimensions of space through distinguishing point, line, and plane, and learn to find perimeter and area. This subject offers a fine blend of beauty, thinking and disciplined technique.

Sixth grade students continue to participate in a variety of special-subject classes, including Spanish, Music, Handwork, Woodworking, Eurythmy, and Games. All middle school students participate in a musical ensemble, developing not only artistic expression, but the art of contributing one's part to the whole as well. Teachers of all subjects design lessons to meet the needs and interests of the budding adolescent.

**Language Arts:**

- Poetry, ballads, and legends from medieval history
- Compositions and short-story writing
- Dictation
- Discussions based on logical reasoning, cause, and effect
- Sentence, paragraph and essay structures
- Conditional mood
- Book reports/ projects

**Mathematics:**

- Business math: percentag**e,** history of money, interest, profit and loss, exchange rates, rates of pay, unit rates, budgeting, negative balances
- Roman numerals
- Statistics: mean, median, mode, range, pie charts
- Pre-Algebra: order of operations, ratio, introductory proportion, algebraic properties, estimation
- Measurement: Metric system
- Biographies of mathematicians

**Social Studies:**

- The rise and fall of the Roman Empire: Topics may include, The Seven Kings, Virgil's Aeneid, and historical figures including, Hannibal, Julius Caesar, Marc Antony, Caesar Augustus, and Jesus
- Medieval society: the cloister, the castle, and the city
- Monasticism and the rise of the church
- Feudalism and the Crusades
- Additional biographies may include, Mohammed and Islam, Charlemagne, and William the Conqueror
- History is explored through architecture, art, literature, speech, and government
- South American Geography, including, wind and water currents, meridians and parallels of latitude, land formations, climates, vegetation, and bodies of water
- Mapmaking

**Science:**

- Physics: sound, light, heat, magnetism, static electricity
- Geology: minerals and crystals, gems, metals, earthquakes, volcanoes
- Astronomy

**Artistic Work:**

- Geometric drawing
- Charcoal drawing
- Watercolor painting: landscapes and color contrasts
- Clay modeling and Roman-style relief

**Specialty Subjects:**

- Eurythmy
- Games
- Handwork
- Music
- Spanish
- Strings
- Woodwork

## English and Language Arts

Grammar in Grade 6 grade begins with a review of the parts of speech, and then moves on to sentence structure, including subject, predicate, direct and indirect object, and adverbial phrases. Spelling expands to include the etymology of words. In composition, the forming of correct sentences and paragraphs is stressed, while the style ranges from accurate descriptions of experiments to the dramatic retelling of scenes from history. The students do written reports on subjects drawn from social studies or science. These are often summarized in brief oral presentations. Long recitations are practiced, such as ballads or Macaulay's *Horatio at the Bridge.* Readers often support historical themes and may include *The Bronze Bow* and legends of Robin Hood and King Arthur. Similarly, the class play is based around scenes from Roman or early Medieval times.

## Writing

During this year, students will begin to experience both the power and beauty of language. While there is continued work on creating accurate and detailed descriptions, students will also be encouraged to imaginatively and dramatically recreate scenes from history. The sixth-grade science curriculum will challenge students to capture their own sense-experiences in words and images.

At the completion of Grade Six, students should be able to:

- Write legibly
- Exhibit clear thinking in writing
- Create graphics and borders to support visual presentation of work
- Add details to clarify meaning or enhance impact of writing
- Show understanding of noun and verb phrases, and independent/ subordinate clauses
- Create compositions with an introduction, topic sentence in each paragraph, and a conclusion
- Compare and contrast conflicting ideas

## Reading

Much of the in-class reading content for this year is derived from Roman and Medieval history. As in previous years, students are expected to continue independent reading throughout the year. Students will be required to select a variety of selections from a sixth-grade reading list provided by their teacher.

At the completion of Grade Six, students should be able to

- Read at least 8 books from an approved reading list
- Complete book report projects with written and oral components
- Draw critical conclusions from reading
- Read aloud with understanding and clear expression
- Research social studies topic and complete written report

## Grammar and Study Skills

By sixth grade, students should begin to experience a strong feeling for the inner mobility of language. In addition to reviewing concepts from previous grades, they will cover many new topics, including: present perfect, adverbial phrases, diagramming sentences, and abbreviations and symbols. Students should also begin to develop sensitivity for the nuances inherent in specific word choices. (Example: differences between *can, may, would, ought*, and *should*)

At the completion of Grade Six, students should be able to:

- Identify and use declarative, interrogative, exclamatory, and imperative statements

- Use correct punctuation and capitalization in all written work
- Use reference materials, including a dictionary, thesaurus, and encyclopedia
- Determine word origins and syllabication
- Recognize and use common abbreviations and symbols
- Achieve accuracy on spelling and vocabulary quizzes
- Take notes during review of oral presentations

## Mathematics

The instinctual sense of gain and profit is strong in the 11-12-year-old; to this can be added powers of discernment and judgment. During this year, students are introduced to practical business operations that govern the flow of monies and commodities. Students continue to review and strengthen skills learned in previous grades, including computation with fractions and decimals, and mental math exercises. The sixth-grade math curriculum requires the student to be able to move freely about in all arithmetic operations.

Introductory algebraic concepts prepare students for a more comprehensive experience of algebra in the seventh and eighth grades. Concepts include: order of operations, negative numbers, roots, exponents, as well as the communicative, associative and distributive properties of addition and multiplication.

During the sixth-grade year, students work very consciously with geometry, developing skill with the classic tools (ruler, compass, and protractor,) and building concepts through orderly and pictorial proofs. They will also learn to copy and bisect an angle and construct parallel and perpendicular lines. Students continue to strengthen skills in this measurement through word problems and practical application.

In Grade 6, the math curriculum begins with an intensive review of all previous material. This is extended into calculations involving several steps, both in number problems and in word problems. The number of weekly practice periods increases. The development of good work habits is essential, including correction of all homework assignments and maintaining an organized notebook.

At the completion of Grade Six, students should be able to:

Whole Numbers

- Express and use math terminology (<, >, =) to the billions
- Round or estimate numbers and decimals to any place
- Know Roman numerals 1-1000
- Recognize prime and composite numbers, factors, and multiples through 144
- Know prime and square numbers and exponents to 144

Fractions and Decimals

- Name and write decimals to the ten-thousandth place
- Round any decimal to a specific place
- Expand and reduce common fractions
- Change mixed numbers to improper fractions and back
- Change fractions to decimals and back
- Identify and use the patterns among a series of equivalent fractions to predict the next fraction in a series

Ratio and Proportion--Percentage

- Demonstrate understanding of ratio and simple proportion
- Define the terms of a ratio statement
- Find percentage and ratio from a decimal fraction

Business Math

- Solve problems involving budgets: income-expenditure
- Identify the terms of selling price (cost and margin), margin (overhead and profit), loss, profit, discount, gross, net

- Apply percentage formula P=BR (Percent=Base x Rate)
- Apply principles of banking: interest, rate, dividends, and principle

## Computation

Students will continue to review and strength skills learned in previous grades, including, counting and rhythmic work, computation with fractions and decimals, and mental math exercises. The sixth-grade math curriculum requires the student to be able to move freely about in all arithmetic operations.

At the completion of Grade Six, students should be able to:

- Access all math facts as a tool for problem solving
- Check one process by using the reverse process
- Solve a problem in a variety of ways
- Use paper and pencil to solve:
    * 4-digit addition and subtraction with regrouping
    * 3-digit multiplication problems with 3-digit multiplier
    * Long division problems with 2-digit divisors and a decimal remainder
    * Fraction and decimal problems involving all four processes
- Mentally solve problems involving all math facts and squares
- Use mental estimation
- Develop ratio out of common fractions
- Derive simple proportions
- Develop percentage from decimals and fractions
- Convert fractions to decimals, fractions to percents, and vice versa
- Use number sense to justify solutions to problems involving whole numbers, fractions, decimals, and percents

## Patterns, Statistics, and Pre-algebra

Introductory algebraic manipulations prepare students for a more comprehensive experience of algebra in the seventh and eighth grades. Concepts may include: balancing equations, order of operations, negative numbers, roots, exponents, as well as the communicative, associative and distributive properties of addition and multiplication.

At the completion of Grade Six, students should be able to:

- Interpret, extend, and create number patterns
- Identify the missing operation in a given equation
- Use formulas to develop and solve equations
- Work problems with the correct order of operations
- Perform four processes algebraically
- Demonstrate understanding of the communicative, associative, and distributive properties with addition and multiplication
- Work with exponents
- Calculate averages
- Create circle, bar, and line graphs

## Geometry

During the sixth-grade year, students work very consciously with geometry, developing skill with the classic tools (ruler, compass, and protractor,) and building concepts through orderly and pictorial proofs. Following a review of the history of geometry and its relationship to the earth's measure, students will be able to name and construct basic geometric polygons. They will also learn to copy and bisect an angle and construct parallel and perpendicular lines.

At the completion of Grade Six, students should be able to:

- Draw geometric shapes using a straight edge and compass
- Accurately divide a circle into fourths, sixths, and eighths using tools
- Construct parallel and perpendicular lines
- Recognize and construct basic geometric polygons: square, rectangle, triangle, parallelogram, pentagon, hexagon, octagon
- Recognize isosceles, right, equilateral, and scalene triangles
- Identify and describe parts of a circle: radius, diameter, circumference
- Calculate the perimeter of any polygon
- Calculate the area of any rectangle or triangle
- Know the geometric terms: point, line, segment, cord, arc, quadrilateral, prism
- Know the number of degrees in various plane figures
- Recognize acute, obtuse, right, straight, and reflex angles

## Measurement

Students will continue to strengthen skills in this area through word problems and practical application.

At the completion of Grade Six, students should be able to:

- Comprehend standard length, weight, liquid capacity, and time measurements, including conversions
- Estimate and measure distance and area in standard and metric units
- Add and subtract units of time
- Comprehend basic metric length, mass, and capacity (mm, cm, m, km; mg, g, kg; ml, l)
- Use money in real life situations to compute change and describe the fractional equivalencies of a dollar

GRADE SIX

# MATHEMATICS SKILLS

| **Number Sense and Computation**<br><br>Student is growing in ability to use the following number sense and computation concepts and processes, as evidenced in main lesson and homework assignments and tests: |
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| Organization: Student is able to keep their notebook organized, with notes in one section and homework in another. Written math work is neat and organized on the paper. |
| Place Value: Student demonstrates understanding of place value of numbers up to and including the ten thousands column. |
| Computation: Student completes written mathematical calculations using all four processes with multi-digit whole numbers. |
| Terminology: Student understands the concept of a fraction and can identify the numerator and denominator of a number. |
| Equivalent Fractions: Student is capable of reducing and expanding fractions and is able to find the “lowest common denominator” when solving problems. |
| Computation with Fractions: Student demonstrates a solid understanding of the four math processes when using fractions and mixed numbers. |
| Mixed Numbers: Student is able to use and convert mixed numbers to solve math equations. |
| Reading Decimals: Student shows emerging understanding and working use of place value of decimal numbers. |
| Computation with Decimals: Student is able to use decimals to solve equations with all four basic processes, including word problems involving decimals. |
| Fraction to Decimal Conversion: Student is able to convert fractions to decimal numbers. |
| Percent: Student is developing an understanding of percent as a fraction with denominator of 100. |
| Percent to Decimal Conversion: Student is able to convert decimals to percentages and percentages to decimals. |
| Percent Calculation with Fractions: Student is able to calculate the percent of a number by the fraction method. |
| Percent Calculation with Decimals: Student is able to calculate the percent of a number by the decimal method. |
| Greater than/Less Than: Student is able to order decimals, fractions, and mixed numbers by value (greater and lesser.) |
| Mental Math: Student is able to listen to a mental math problem and mentally calculate the response. |
| Square and Prime Numbers: Student understands and recognizes perfect square and prime numbers. |
| Integers: Student understands the concept of a negative amount of money and is able to locate negative numbers on a number line. |

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| Exponents and Roots: Student has an emerging understanding of squaring a number and square rooting a perfect square number. |
| Order of Operations: Student can work problems using the correct order of operations. |
| Rounding: Student understands how to round a number to any place value. |
| Roman Numerals: Student understands how to write Roman numerals up to 1000, and convert between standard and Roman numerals. |
| Business Math: Student has an understanding of the principles of banking: budgets, interest, principle, debits, and credits. |
| Business Math: Student has an understanding of calculating simple interest. |
| **Patterns, Statistics, and Pre-Algebra**<br><br>Student is growing in ability to use the following number patterns, statistics and algebraic concepts and processes, as evidenced in main lesson, and homework assignments and tests: |
| Ratio: Student can convert a ratio to an equivalent ratio. |
| Ratio/Proportion: Student has an emerging working knowledge of ratio and proportion. |
| Algebraic Properties: Student has an emerging understanding of the commutative, associative, and distributive properties with addition and multiplication. |
| Statistics: Student has an emerging understanding of how to find the mean, median and mode for a set of numbers. |
| Statistics: Student has an emerging understanding of how to represent and interpret data in a pie chart or bar graph. |
| **Geometry and Measurement**<br><br>Student is growing in ability to use the following geometric and measurement concepts and processes, as evidenced in main lesson, and homework assignments and tests: |
| Geometric Construction: Student is able to construct geometric shapes using a straight edge and/or compass. |
| Geometric Construction: Student is able to accurately divide a circle into fourths, sixths, and eighths using a compass and straightedge. |
| Geometric Construction: Student is able to construct parallel and perpendicular lines with compass and straight edge. |
| Geometric Construction: Student can recognize and construct basic geometric polygons: square, rectangle, triangle, parallelogram, pentagon, hexagon, octagon with instruction and tools. |
| Geometry: Student can identify and describe parts of a circle: radius, diameter, arc, chord, and circumference. |

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| Geometry: Student can calculate the perimeter and area of a parallelogram, square, and rectangle. |
| Geometry: Student has emerging understanding of basic angles: complementary, supplementary, vertical, acute, obtuse, and right. |
| Measurement: Student comprehends and uses standard units of length, weight, liquid capacity, and time measurements correctly. |
| Measurement: Student has an emerging understanding of basic metric length, mass, and volume (mm, cm, m, km; mg, g, kg; ml, l). |
| Measurement: Student has an emerging ability to solve problems involving measurement of length, area, perimeter, weight, time, and money. |

## Science

All Waldorf science education emphasizes a phenomenological approach in which concepts are derived from sense experiences. This allows students to develop a scientific attitude that includes precise observation, detailed mental picturing of a phenomenon, and the capacity to meet all phenomena with clear, logical thinking. The focus in middle school is on identifying laws that come from cause-and-effect relationships in the world. All phenomena are now approached using a three-part sequence of observing, evaluating, and conceptualizing. Many hands-on experiments and visual approaches are employed in order to reach different learning styles in students. In this way, the critical thinking of every student is fostered in such skills as sequential thinking, analysis, pattern recognition, and prediction.

In Grade 6, students apply the phenomenological approach to the subject of physics, where they encounter acoustics, optics, heat, magnetism, and static electricity. A study of geology gives them a broad description of the forces that have formed the earth, while an astronomy Main Lesson acquaints them with the motions of stars and the origin of seasons. Both of these subjects are incorporated into geography, which includes an overview of the continents, topography, flora and fauna, and climatic regions of the earth. In gardening, the practical reality of crop rotation, composting, and pest control encourages an ecological awareness in the students.

Physics

Physics is initially a training of the senses: Students learn to simply “be” with a phenomenon before them, rather than hypothesizing beforehand or drawing conclusions immediately afterward. The children learn to record and illustrate experiments using the Materials-Methods-Observations format. Contrasting demonstrations are presented for comparison, and students are asked to sequence events correctly, thus developing cause-and-effect thinking. In this way, Physics provides a rich experience of physical phenomena.

At the completion of Grade 6, students should be able to:

- Recall, in correct sequence, the materials used in a demonstration, the method employed, and their observations.
- Given one phenomenon, give examples of similar phenomena.
- Describe the way two phenomena differ from one another.
- Suggest alternate ways of demonstrating a phenomenon.

- Identify factors that determine pitch in a material
- Describe the manner in which sound travels through solids, liquids, and air
- Distinguish between transparent, translucent and opaque materials, citing examples of each.
- Describe the expansion and contraction of materials in response to warmth or cold.
- Give examples of conduction in solids, convection in liquids and air, and radiation in air.
- Cite the polarities of a magnet and predict when attraction or repulsion will occur between two magnets.
- Generate static electricity in various materials.

Geology

The study of geology begins with an investigation of the tremendous forces in the earth and the movement of crustal plates. This leads over to volcanoes, magma, and the formation of igneous rocks, followed by the great cycle of rock transformation. Students examine the many crystalline forms, which parallels their study of Geometry during this year. The subject of geologic landforms meanwhile is steadily incorporated into all subsequent study of Geography.
At the completion of Grade 6, students should be able to:

- Learn to use Moh's hardness scale.
- Identify a rock type by examining its hardness, weight, texture, crystal content, and layers.
- Explain the rock cycle, identifying the three basic rock types.

Astronomy

In Astronomy, students must observe directly and then think imaginatively. They make regular observations of both the sun and moon. They learn to predict the motions of stars facing any direction, and to orient themselves by the circumpolar stars. They also study the origin of the seasons, moon phases, and eclipses. What is learned here is applied later to both geography and the Age of Exploration in history.

At the completion of Grade 6, students should be able to:

- Predict motions of stars in all four directions.
- Identify common constellations at our latitude.
- Find the North Star and orient oneself to all four directions.
- Contrast the sun's motion at our latitude with that of the poles and the equator.
- Read a star chart under the night sky.
- Explain how solar and lunar eclipses occur.
- Describe the sequence of moon phases over a month.
- Describe the sunrise and sunset positions over the year.
- Explain how the seasons come about
- Characterize the relationship of the moon and ocean tides.

## Social Studies and History

In Grade 6 the study of Rome begins with early Roman history from its mythological period through the Seven Kings of Rome, and onto the Roman Republic, its conquests, government,

buildings, and constructions. Students follow the transformation from Republic to Empire, and then the decline and fall of the Empire and the unfolding of European civilization in the Middle Ages. This includes the study of feudalism, peasant life, knighthood, and the life of the monasteries. The life of Mohammed and the rise of Islam as a counterforce to Christianity culminating in the Crusades are also studied.

Through the study of Rome and medieval Europe, students encounter a basic geography of the European continent, including major landforms and bodies of water like the Alps, the Rhine, and the Mediterranean Sea.

The geography of South America is the focus of geography in Grade 6. Each country is explored and discussed in terms of the location, climate, resources, and history. Individual reports are written and presented, which provide a more in-depth look at more specific aspects of the countries and their culture.

Central and South American Geography

Studying the geographical features of a region, its people, and life provide a great foundation for understanding and appreciating, not only the geographic foundations of the earth, but also the diverse people around the world. Studying Geography plays a central role in healthy social development as it provides an opportunity to foster the students' interest in understanding the people of other countries.

We started this journey with a concise overview of the world's continents, the biomes throughout the American Continent - North, Central and South, and the factors that influence the biomes' characteristics such as temperature, precipitation, latitude and elevation. We studied Central America, which stands as a natural bridge to South America. We discussed the Maya and Inca people, their accomplishments and common practices, in addition to their choices as the first nations of those lands.

During our second and third weeks, we studied the outstanding features of South America: the Andes, the Amazon, and the Pampas. We looked at the different influences of the landscape and climate on the economy of a region, their customs or traditions, and beliefs. The children were encouraged to use a variety of resources (atlases, maps, world books, magazines) for geographical information and for developing a geographical vocabulary: isthmus, peninsula, plateau, gulf, tributary, longitude, latitude, tectonic plates, equator, etc.

The study of this block concluded with very creative, individual presentations of a country of their choice and a delicious banquet featuring traditional dishes.

In sixth grade, students should be able to:

- Identify all continents and major oceans of the earth.
- Give examples of various climate zones on earth.
- Describe the climate and terrain of *tierra fria*, *tierra templada*, and *tierra caliente* in Central America. Cite major crops grown in each region.
- Use coordinates of latitude and longitude for map reading.
- Memorize the countries of Central and South America.
- Use a wide variety of resources – atlases, wall maps, world book, juvenile literature, magazines – for geographical information.

- Develop a geographical vocabulary: *isthmus, peninsula, plateau, delta, gulf, strait, tributary, longitude, latitude.*