

## Grades K - 2 Science

### Stories of our Earth's Amazing Features (Grade K)

Unit Name	Key Topics
Paleontology I	The earth forms and then life begins, you know, everyday stuff!
Paleontology II	Fossils tell us the earth was teeming with evolving life, and it still is
Geoscience	Rocks, minerals and and ever changing earth
Microcosmos	There are lots of wonderful little critters all about us
Eco-seekers	Understanding how it all works together - plants, animals and the earth
Transportation	The cool, simple physics of moving over land, on water, and through air

### Stories of Light, Sound and Nature (Grade 1)

Unit Name	Key Topics
Light I	Light and color don't just appear, there is physics behind them
Light II	Optical illusions, perception, and the tricks light and color play
Sound I	The physical basis of sound
Sound II	The application of sound science, mainly in music
Biomimicry I	The amazing structures plants and animals possess
Biomimicry II	Engineering inspired by nature

### Stories of Earth/Space Systems and Human Systems (Grade 2)

Unit Name	Key Topics
Water I	The science of water
Water II	The life science of water, how life adapts with and without water
Earth	The earth is changing on the inside
Space	Moon phases, mars expedition, solar system, and star life cycles
Anatomy I	Circulatory, respiratory and digestive
Anatomy II	Skeletal, muscular, nervous, and immune

## Grades 3 - 5 Science

Stories of the Elements, the Plant Kingdom, and the Science of Civilizations (Grade 3)

Unit Name	Key Topics
Elements I	Identifying the elements based on their intriguing properties
Elements II	Cu, Fe, Bi, Al Mg, C, Ga, Sn, Bi
Simple Machines	The forces at play in pulleys and levers
Civil Engineering	The architecture and materials that make massive structures work
Botany I	Plant parts and functions, let's dissect and probe
Botany II	Plant behaviors, adaptations, and ecology, plants really have intentions

Stories of the Animal Kingdom, the Earth's Atmosphere, and the Science of Food (Grade 4)

Unit Name	Key Topics
Zoology I	Animal physiology, in other words, the interesting parts of animals
Zoology II	Animal behaviors, adaptations, and ecology, animals shape our earth
Meteorology I	The physics of gases, a challenge to measure, but easy to understand
Meteorology II	Weather phenomena explained by the physics of gases
Nutrition	Carbohydrates, proteins, and fats, the science of what we eat
The Science of Taste	The chemistry of flavors

Stories of Physiology, Geochemistry and the Solar System(Grade 5)

Unit Name	Key Topics
Solar System I	Using data and physics to model the motion of the planets
Solar System II	Designing rocketry, terraforming mars, and space travel
Dissection	Straight-up anatomy
Neuroscience	Brain science deduce by testing the five senses
Geochemistry I	Crystals, minerals, and rocks
Geochemistry II	Chemistry of rocks, extraction of metals from ores, and mining

# Middle School Science

## The Story of the Periodic Table

Unit Name	Key Topics
The Chemistry of Atoms	Writing chemical equations requires actually knowing what atoms do
The Elements	The elements are reactive, some more than others
Fire and the 3rd State	Hint, it is not a solid nor a liquid
The Mass of an Atom	The gas laws help determine atomic mass
The Periodic Law	See all of the matter in the universe? Good, go organize it
Chemistry in Nature	Chemistry actually is occurring now, like as you read this

## The Story of the Atom

Unit Name	Key Topics
The Steam Engine	Elephants on your head. Just saying, atmospheric pressure is quite big
Entropy	Order and disorder in nature
Electricity	The physical basis of electricity, what does the electron actually do
Circuits	Kirchoff's laws of circuits, making electrons do what you want
The Color of Light	Waves, interference, and the physical basis of color
The Hydrogen Atom	It gets weird inside the atom, you only need algebra to prove it

## The Story of Life and Earth

Unit Name	Key Topics
Floating Continents	How we know plates are buoyant
Plate Tectonics	How we know plates move
Darwin	Natural selection and speciation
Theory of Evolution	The genetic mechanism of evolution, what is actually changing
Biochemistry I	The molecular makeup of life
Biochemistry II	The molecular makeup of the stuff life needs - proteins, fats, and carbs

# High School Science

## The Story of Chemistry

Unit Name	Key Topics
Thermochemistry	Following the historical development of thermodynamics in the late 1700's and early 1800's, students uncover the grand principle governing when all of chemistry happens.
Physical Chemistry	Students probe the interesting and surprising properties of solutions and discover there are two distinct types of chemical bonds, bringing them to the turn of the 20th century.
The Chemical Bond	Through experiment, students uncover details of the chemical bond, revealing wonderful explanations of a broad variety of chemical phenomena.

## The Story of Physics

Unit Name	Key Topics
Mechanics and Motion	Starting with Galileo's experiments, students conclude with Newton's grand framework describing everything from a falling apple to the orbits of the planets
Optics and Waves	Through a series of experiments on light, students probe the nature of waves and eventually derive the wave equation
Electromagnetism	Following a 50-year explosion of scientific achievement in the mid 1800's, students unite the theories of magnetism and electricity

## The Story of Biology

Unit Name	Key Topics
Biochemistry	Students explore the properties and structures of carbon-based molecules such as carbohydrates, proteins, lipids, and nucleic acids and learn the chemical mechanisms governing biology
Cell Biology	As the basic building block of life, students employ ingenious laboratory methods to make sense of cells and see how they work
Genetics	Following the footsteps of Gregor Mendel and Thomas Morgan in classic genetics, students foray into modern molecular genetics and explain the beautiful unity and diversity of life on earth.

# Grades K - 2 Mathematics

## Stories of Geometry and Numbers (Grade K)

Unit Name	Key Topics
Shapes in Space	We describe our space with shapes
The Number Line	The idea of negative numbers is not intuitive, you need to see them
Visualizing Numbers	The brilliance of place values
Combining Numbers	Addition and subtraction are not just skills, they are fascinating ideas
Collecting Data	Data tables, charts, graphs are great ways to describe things
Relate and Equate	Comparing magnitudes, weights, and areas. Everything is relative.

## Stories of Measurement and Data (Grade 1)

Unit Name	Key Topics
Units of Measurement	Identifying the unit that is being measured: distance, mass, and time
Distance, Area, Volume	The metric system makes more sense
Number Patterns	Counting in 5's, 10s, and beyond, grouping Numbers, counting money
Ready, Sets, Go!	There are many types of numbers to be discovered and categorized
Visual Patterns	Artistic and natural patterns can be described mathematically
Interpreting Data	Dot plots, bar graphs, stem and leaf, pictographs, pie charts, you get it

## Stories of Number Patterns and Relationships (Grade 2)

Unit Name	Key Topics
History of Numbers	Mayan, Yoruba, Roman, Hindu-Arabic number systems
Duplicating Numbers	The rules of multiplication are to be discovered
Splitting Numbers	The rules of division are to be discovered
Distance, Time, Speed	This is where math really can be applied
Balancing Equations	A little algebra is good! Solving for unknowns by adding and subtracting
Formulas	Mathematical formulas can describe patterns around us

# Grades 3 - 5 Mathematics

## Stories of Numbers In Between Numbers (Grade 3)

Unit Name	Key Topics
Factors	Primes, factors, and multiples. Numbers get even more interesting.
Fractions	Adding and subtracting the parts
Proportions	Multiplying and dividing the parts leads to ratios and proportions
Decimals Percentages	Let's slice it even more. Decimal place values related to fractions
Math in Art and Music	Connecting math patterns to art and music
Applying Percentages	Simple interest, radioactivity, and other fascinating applications

## Stories of New Dimensions (Grade 4)

Unit Name	Key Topics
Plotting Locations	The Cartesian coordinates plan, mapping the 2D and the 3D
Absolute Value	How far are you from zero?
Perimeter, Area, Volume	Let's come up with some formulas on our own
Distances & Triangles	You can come up with a distance formula by investigating triangles
Chances	Just count things and you will then see how predictions are made
Fibonacci and Friends	Sequences and geometry in nature

## Stories of the Order of Operations (Grade 5)

Unit Name	Key Topics
Exponents	Playing with exponents, even negative and fractional exponents
Properties of Math	Commutative, associative, distributive, and identity properties
PEMDAS	Can you prove the order matters?
Interpreting Math	Let's just have fun with real-world word problems
Applying Math	Let's use math to describe whatever we want to describe. You pick.
Visualizing Math	Graphing is just a way for us to make sense of lots of numbers

# Middle School Mathematics

## The Story of Algebra

Unit Name	Key Topics
Building up Algebra	Setting up and working with simple equations
Linear Equations	All things in the world that can be graphed as a straight line
Quadratic Equations	All things that follow the quadratic form, ie the arc of a water fountain
Conic Sections	Things from a cone, specifically, parabolas, ellipses, and hyperbolas
Recursions and Series	Simplifying natural phenomena by looking for patterns
The Fundamental Theorem	Tying it all together in one grand idea, oh and polynomials

## The Story of Geometry

Unit Name	Key Topics
Euclid	A systematic, logical way of thinking about math, and life
Measuring Shapes	Deriving Perimeters, Areas, Volumes
Triangles	Pythagorean theorem, special right triangles
Circles	The discovery of Pi leads to a discussion on circles
Trigonometric Values	The calculator doesn't just make up numbers, triangles do
Trig Formulas and Identities	The power of trig comes alive

## The Story of Statistic and Sets

Unit Name	Key Topics
Counting	More ways than one! (! is not meant to be an exclamation here)
Permutations/Combinations	Counting can be reduced to these two formulas
Probability	Calculating the likelihood
Distributions	Ways to describe and visualize amounts
Visualizing infinity	The limit can be really big or really small
Infinity	Did you know there are different sizes of infinity?

# High School Mathematics

## The Story of Probability and Statistics

Unit Name	Key Topics
Probability and Predictions	Starting with coins and dice, student build up the basic ideas of probability and statistics leading to the ability to make predictions
The Bell Curve	Broadening out to large scale analysis of various phenomena, students develop ways to depicts different kinds of distributions
Testing and Confidence	Fine tuning and digging deeper on probability and distributions, students develop techniques for determining likelihood of outcomes

## The Story of Calculus

Unit Name	Key Topics
The Derivative	Following in Newton's and Leibnitz's footsteps, students analyze motion and invent the derivative.
The Integral	Following Greek analysis of shapes and areas, students develop a mechanism to find the area of curved shapes
Applied Calculus	After seeing the stunning relationship between the derivative and the integral, the sky is the new limit on applying the newly found connection

## The Story of Euler

Unit Name	Key Topics
Logarithms	This useful tool, originally invented for making large calculations without calculators, reveals deeper truths in mathematics.
e	The story of the natural number, e, uncovers a surprising array of connections across various domains in mathematics
Euler's Formula	Students derive the most beautiful equation in mathematics.