The Town School
Science Curriculum Summary

School-wide goals:

- **To teach the use of the scientific method emphasizing observation, hypothesis, development, data collection, and hands-on experimentation.**
- **To use the resources of the city to further explore science.**
- **To seek ways of integrating science throughout the curriculum, illustrating science as part of life.**
- **To help students become aware that scientific theory and knowledge are continually evolving and changing.**

NURSERY/KINDERGARTEN: In these early years, children are at their peak powers for exploring, examining, and experimenting as they build concepts of the objective world around them. Using the context of a work-play curriculum, teachers create a climate of active questioning and work to preserve, channel, and develop the true scientific attitude that young children have within them.

Nursery 3: The emphasis is on offering simple sensory experiences which heighten a child's awareness of the natural world and stimulate the child's inquiring nature.

- Use of water, sand, soil, play dough, paint, paper, wooden blocks.
- Identify size, color, shape, texture, sound.
- Discuss seasonal changes, pet care routines.
- Use of science materials (magnets, magnifying glasses, etc.)
- Cooking

Nursery 4: Activities in the Nursery 4 classroom further develop children's ability to observe accurately, ask questions and follow-up their inquiries.

- Help children to express their opinions and to incorporate the ideas of others into their thinking.
- Cooking and measurement.
- Recording observations over time (e.g. moth to butterfly unit, weather, predicting growth of seeds and plants).
- Sorting and categorizing objects.
- Block-building to include planning, problem-solving, and collaboration.

Kindergarten: Children extend and deepen the areas of interest in their surroundings using the social studies core. Focused effort is made to employ scientific methods and language.

- Explore the properties of solids and liquids.
- Observe, log and document life cycles (use of journal entries, bar graphs, charts, digital photography).
- Exploration and use of scientific tools and items (magnifying glasses, magnets, scales).
- Balance, angles, spatial relationships with wood construction, blocks, art projects, stories, drawings.
- Manufacturing processes - raw materials to finished products; (e.g. study of paper).

LOWER SCHOOL: The Lower School science program focuses on the development of the children's inquiry skills. Students are introduced to scientific content through experiments, participatory lessons, and group projects. In the course of their experiments, children engage in observation, prediction, measurement, data collection, and interpretation. The content of the curriculum focuses on plant and animal life, beginning earth and physical sciences, and the procedures of scientific inquiry. Classes in the Lower School science lab are taught by a science specialist. First Graders meet once a week, Second through Fourth Grades twice a week.

First Grade:

- Our bodies
- Animals

Second Grade:

- Rocks and minerals
- Plants
- Forests

Third Grade:

- All about water
- The Environment
- Electricity and magnetism

Fourth Gade:

- Simple machines
- The human body
- The solar system and space

UPPER SCHOOL: The Upper School science program is centered around full-year courses for every grade, each meeting at least four periods per week. Content each year includes elements of earth, life, and physical sciences. Experts in relevant field of study visit class as guest speakers whenever possible. Experiments and classes are held in the Upper School science lab. In addition to continuing their training in the scientific method of inquiry, students acquire fundamental information in the sciences and science skills**:**

Fifth Grade:

I. Ecology and Environmental Science. This curriculum is designed to augment the environmental education trip to Nature's Classroom, during which students keep science journals and record ecolog- cal notes.
- ❖ Ecosystems, Food Webs and Food Chains
- ❖ Animal Habitats and Adaptations (Research Project)
- ❖ "Microcosmos"
- ❖ Biomes of the World
- ❖ Maps and Navigation
- ❖ Cycles in Nature
- ❖ Conservation and Pollution/Natural Resources

II. Earth Science and Geology
- ❖ Layers of the Earth
- ❖ Geologic changes, time and history
- ❖ Fossil Fuels
- ❖ Volcanoes, Earthquakes and Plate Tectonics
- ❖ Rock Cycle, Types of Rocks and Minerals

III. Forms of Matter and Electricity
- ❖ Liquid, Solid and Gas: Phases of Matter
- ❖ Atomic Structure and Theory
- ❖ Elements and Periodic Table
- ❖ Chemical Reactions
- ❖ Atoms and Bonding
- ❖ Static Electricity and Fundamentals of Electricity (includes safety lessons)
- ❖ Building Circuits

IV. Brains and Neural Circuitry
- ❖ Neurons and Parts of the Brain
- ❖ Exploring Current Research about How People Learn
- ❖ Multiple Learning Styles

IV. Science Fair Projects: Comparing Consumer Products
- ❖ Scientific Method: Defining Problem, Hypothesis, Background, Research, Materials, Procedure, Data Collection, Analysis, Results and Conclusion
- ❖ Display Boards, Class Presentation and Visitor Presentation

Text Book: 5th grade textbook: Scott Foresman, *Science*
Additional Textbooks: Prentice Hall, *Science Series*

Sixth Grade:

I. Review of Ecology and Environmental Science to augment the environmental education trip to Nature's Classroom, during which students keep science journals and record ecological notes.
- ❖ Relationships in Nature: Symbiosis, Mutualism & Commensalism
- ❖ Invasive Species
- ❖ Ecological Issues in the News

II. The Metric System: Measure Weight, Volume and Length

III. Astronomy
- ❖ Earth in Space: Day/Night, Seasons, Eclipses, Tides, etc.
- ❖ Our Solar System
- ❖ Comets, Black Holes, Meteors
- ❖ The Sun: Fusion, Solar Energy, Sun Spots
- ❖ Formation of Stars and Galaxies
- ❖ Time and Space: Light Years, Space Travel and Research
- ❖ Science Fiction Writing

IV. Biology
- ❖ Living and Non-Living
- ❖ Viruses
- ❖ Kingdoms of Life: Classification and Taxonomy
- ❖ Introduction to Cell Biology and Microscopes
- ❖ Plant Cells and Plant Reproduction
- ❖ Human Biology and Reproduction
- ❖ Genetics and Heredity

V. Science Fair Projects Comparing Consumer Products
- ❖ Review Scientific Method: Defining Problem, Hypothesis, Background Research, Materials, Procedure, Data, Collection, Analysis, Results and Conclusion
- ❖ Display Boards, Class Presentation and Visitor Presentation

Text Book: Scott Foresman, *Science*
Great Source, Life Science Daybook Workbooks

Seventh Grade:

I. Science Skills (Used throughout the year)
- Use and measure in metric system
- Use various pieces of scientific equipment
- Develop hypotheses & support or refute using data
- Display data using graphical representations

II.Cells
- Cell structures and functions
- Osmosis
- Macromolecules
- Importance of water
- Photosynthesis and cellular respiration

III. Genetics
- Mendel and his principles
- Probability
- Monohybrid Crosses
- Protein Synthesis
- Mutations
- Pedigrees
- Disorders

IV. Evolution
- Geological Time
- Darwin
- Evidence for evolution
- Adaptations
- Natural selection
- Speciation
- Fossils and dating
- Concestors

V. Science Fair Projects

Text Book: *Cells and Heredity*, Prentice Hall, 2002

Eighth Grade:

I. Science Skills (Used throughout the year)
- Use and measure in metric system
- Use various pieces of scientific equipment
- Develop hypotheses & support or refute using data
- Display data using graphical representations

II. Chemistry
- Matter and changes of matter
- Periodic Table
- Chemical reactions and type of reactions
- Bonding
- Acids and bases
- Radioactive decay

III. Earth Science
- Earth's interior
- Minerals
- Types of rocks
- Mantle Convection
- Plate tectonics and continental drift
- Geological structures
- Earthquakes and volcanoes
- Topographic maps

IV. Forces and Motion
- Motion and reference point
- Speed and velocity
- Acceleration
- Newton's laws of motion
- Types of forces
- Momentum
- Energy
- Power
- Temperature

V. Science Fair Projects

Text Books: *Chemical Interactions*, Prentice Hall, 2000
Inside Earth, Prentice Hall, 2002
Forces and Motion, Prentice Hall, 2000