Concrete thinking

MCDS' youngest students focus on nurturing their intrinsic sense of wonder and curiosity about the world. As students explore and experience science all around them, they develop a more concrete sense of the scientific method. They learn to hypothesize, make detailed observations, and study the results of their experiments.

Beginning in grade three there is a greater emphasis on using data to support conclusions. Instead of filling in pre-set data tables, students begin keeping their own personal lab notebooks where they record their observations and drawings. By grade four, students are able to formulate and write their own conclusions based on analyzed data.

More analytical thinking

As students mature, so does their scientific thinking ability. In grade five, students begin designing their own experiments, based on their own questions. They learn to manipulate and control dependent and independent variables. Communication of scientific thinking—both oral and written—is practiced and strengthened.

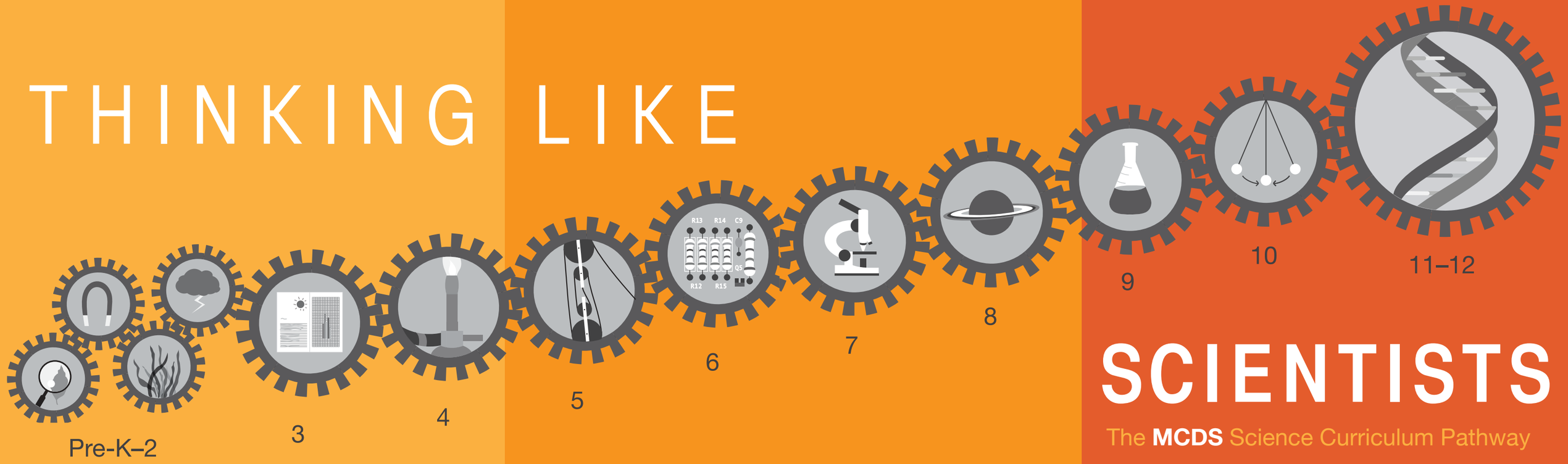
In grades six and seven, students design, conduct, and present their own experimental research for the Middle School Science Fair. In grade eight, the students write a five- to seven-page research paper on a debatable science topic. Students gain skills in scientific investigation, research, and persuasive writing.

Deeper thinking

Students take on increasingly complex science topics and venture into deeper analysis. Students continue to design and revise their experiments, but integrate more technology, statistics, and multiple science disciplines to improve and support their investigations.

Challenging coursework includes honors-level chemistry and physics, followed by a rigorous two-year college-level IB Advanced Biology course. Students gain advanced research skills from completing a demanding interdisciplinary research and lab project.

THINKING LIKE SCIENTISTS



The **MCDS** Science Curriculum Pathway

	LOWER SCHOOL			MIDDLE SCHOOL			HIGH SCHOOL		
TOPICS INCLUDE:	The five senses, gravity-powered cars, simple construction and structure stability, decomposition, the solar system, weather phenomena, nutrition, aquatic habitats, and structural adaptations of plants and animals in different ecosystems. **MCDS' expansive campus is explored and utilized as much as possible for experiments.**	Life cycles of flowering plants and insects, soil profiles, properties of air and water, measuring movement of shadows, using thermometers, and heat absorption. **Personal lab notebooks are used and treasured.**	The interaction of human joints and muscles to create movement; the human pulse; the effects of exercise on respiration rates and temperature; series and parallel circuits; the water cycle; and heat transfer in solids, liquids, and gases. **Bunsen burners are used for the first time.**	The human body, simple machines, solutions, and animal reproduction through breeding fish. **Students design their first independent experiments in class.**	Atomic theory, electricity, magnetism, chemical interactions, forces, and fluids. **Individual independent experiments are presented at the Science Fair.**	Longitudinal study of the MCDS prairie, ecology, plant identification, taxonomy, cellular level of organisms, genetics, forces in fluids, plate tectonics, and boat construction competition. **Individual independent experiments are presented at the Science Fair.**	Celestial movement, weather, respiratory system, circulatory system, and nervous system. **Science research skills are developed through persuasive research paper by each student. High school level "Biology I" topics are covered during grades seven and eight.**	**Honors-level Chemistry.** Quantitative chemistry; atomic structure; the periodic table; chemical formulas; chemical reactions; molecular structure; kinetic theory; liquids, gases, and solids; acids, bases and salts; oxidation and reduction; kinetic molecular theory; nuclear chemistry; and organic chemistry.	**Honors-level Physics.** Projectile motion, centripetal force, energy, momentum, rotational mechanics, gravity, oscillatory motion, relativity, vibrations and wave phenomena, optics, electricity and magnetism, sound and light, and thermodynamics.	**Two year, college-level Advanced Biology (IB Biology I & II), requiring 60 hours of lab work that allows students to earn college credit.** Cell size, cellular structure, biochemistry, cellular processes, DNA, genetics, genetic engineering, ecology, evolution, plant science, human anatomy, and physiology. **Students also complete an interdisciplinary research and lab project.**