

ARETE HONORS SCIENCE - COURSE SYLLABUS

9th Grade Accelerated Physics & Chemistry

Accelerated Studies in Physics and Chemistry

2026–2027 • Grade 9 • Weekly two-hour tutorial

“And by the power of the Holy Ghost, ye may know the truth of all things.”

—Moroni 10:4

“Oh, how great is the power of truth! Which of its own power can easily defend itself against all the ingenuity and cunning and wisdom of men, and against the treacherous plots of all the world.”

—Marcus Tullius Cicero

Scale How School - Arete Honors Living Science

Course Description

Arete Honors [Accelerated Studies in Physics and Chemistry](#) (ASPC) is a mastery-oriented introduction to quantitative physics and chemistry using John D. Mays's text. The course is intentionally cumulative: students repeatedly retrieve essential concepts, equations, units, and problem-solving methods so that knowledge is retained rather than merely prepared for a chapter test.

The course combines a regular Monday tutorial from 1:00 to 3:00 p.m. with disciplined home study. Laboratory work meets in person on a separate day selected after enrollment according to classmates' availability. Online problem-solving through Moodle will be scheduled as needed for difficult problem sets and calculation practice. Major topics include scientific models and method, measurement, motion, Newton's laws, variation and proportion, energy, heat, waves, electricity, circuits, fields, magnetism, substances, atomic models, bonding, reactions, and reaction rates.

The tutorial adapts Mays's recommended methods to a once-weekly format. Weekly cumulative quizzes, complete-sentence responses, computation drills, study questions, demonstrations, six principal experiments, lab journals, and Weekly Review Guides form the core. The two-session DC Circuits and Solubility experiments receive protected laboratory time, as recommended in the teaching overview.

Calendar: The tutorial follows the Davis County School District's 2026–2027 calendar. The first tutorial is Monday, August 24, 2026. Semester finals are Monday, December 14, 2026, and Monday, May 10, 2027. No tutorial is held on the holidays and breaks shown in the pacing guide.

Course Information	
Instructor	_____
Tutorial Meeting	Mondays, 1:00 p.m. to 3:00 p.m.
Location	_____
Course Text	Accelerated Studies in Physics and Chemistry by John D. Mays
First Tutorial	Monday, August 24, 2026
Semester Finals	Monday, Dec. 14, 2026 and Monday, May 10, 2027
Grade Level	9th Grade

Course Color

Plum - used for the 9th Grade ASPC Anki deck and coordinated course materials.

Course Promise

Complex does not mean impossible. Every major concept is taught with a visual model, an analogy or memory tool, guided practice, and repeated opportunities to explain the idea in the student's own words.

Primary Course Objectives

- Use models, controlled experiments, and the cycle of scientific enterprise to explain how scientific knowledge develops.

- Use SI units, metric prefixes, scientific notation, significant digits, unit conversion, algebra, and graphing accurately.
- Analyze velocity, acceleration, Newton's laws, variation, proportion, energy, work, heat, and wave behavior.
- Construct and solve quantitative problems by identifying variables, selecting equations, showing work, and reporting correct units and precision.
- Explain static electricity, electric current, Ohm's law, series and parallel circuits, Kirchhoff's laws, electric power, fields, magnetism, motors, generators, and transformers.
- Classify substances and explain solutions, solubility, phases, physical and chemical properties, and changes.
- Trace the development of atomic models and explain spectra, the Bohr and quantum models, electron configurations, isotopes, and atomic mass.
- Explain metallic, ionic, and covalent bonding, polyatomic ions, reaction types, balanced equations, reaction energy, and collision theory.
- Develop long-term mastery through cumulative quizzes, Anki, QR cards, Weekly Review Guides, objectives lists, and repeated computation practice.
- Maintain a complete lab journal and produce individual, evidence-based lab reports with quantitative and graphical analysis.

Course Structure and Expectations

In the Tutorial

- Open with gratitude, prayer, hymn, and catechism.
- Review the previous quiz and handwrite a quiz-review (QR) card for each missed or incomplete item.
- Complete a timed, cumulative written quiz in complete sentences and, when appropriate, show all quantitative work clearly.
- Discuss the assigned reading, difficult concepts, worldview questions, exercises, and student questions.
- Participate in demonstrations, interpretation or problem-solving practice, calculation practice, and project presentations.
- Complete all quizzes, chapter assessments, and semester finals in person during the regular tutorial; complete laboratory investigations during the separately scheduled in-person lab sessions.

Laboratory Sessions and Online Problem-Solving

- Laboratory work is completed in person on a separate day from the Monday tutorial. The specific day and time will be selected after enrollment based on when classmates can meet.
- Online problem-solving through Moodle will be scheduled as needed for difficult problem sets and calculation practice. Families will receive the schedule in advance.

At Home

- Attend online problem-solving through Moodle when scheduled and come prepared to participate, ask questions, and work through difficult problem sets and calculations.
- Students will have access to supplemental instructional videos to reinforce difficult or unfamiliar concepts. These videos support, but do not replace, assigned reading, tutorial instruction, problem-solving practice, or active participation.
- Use the Read, Recall, Check (RRC) study regimen for every assigned text section and record organized notes in the commonplace journal. (daily)
- Complete daily Anki study (normally 15–30 minutes), rehearse handwritten QR cards, and continue cumulative review rather than cramming. (daily)
- Complete assigned chapter exercises, problem sets, study questions, or Review Guide work. (as needed)
- Complete the weekly Moodle check-in and any assigned class discussion or submission. (weekly)
- Write individual lab reports after investigations, revise work from instructor feedback, and complete one independent science project or presentation per semester.
- Plan for approximately 45–75 minutes on most weekdays (about 4–6 hours per week) of focused home study during a typical week, with additional time near lab-report, project, or final-exam deadlines.

Mastery and Study Systems

RRC Study Cycle: Inspect–Question–Read–Recall–Check

Students use this complete cycle for every assigned Upper School text section. Begin by surveying a text's structure and signposts, then read it closely with a governing question.

1. Inspect. Survey the assigned section before close reading: notice the title, headings, subheadings, diagrams, captions, bold terms, summaries, and overall structure.
2. Question. Turn the section heading into a question that the reading should answer.
3. Read. Read the section attentively with that question in mind.
4. Recall. Close the book. Answer the question from memory and reconstruct the main idea, process, diagram, and key words in the student's own words.
5. Check. Reopen the text. Correct errors or omissions in a different color. If the idea remains unclear, write a specific question to bring to the tutorial.

Five-Step Study Rescue

If the Check step shows that one important idea is still unclear, use the rescue on that one idea, then return to normal RRC study.

1. Shrink it. Choose one process, diagram, relationship, or paragraph—not the whole chapter.
2. Sketch it. Draw the parts and arrows before trying to memorize precise wording.
3. Say it. Explain the idea aloud as if teaching a younger student.
4. Compare it. State what the idea is and what a nearby, easily confused idea is not.

5. Retrieve it. Close every source and rebuild the explanation or diagram from memory; then check once more in a different color.

Enrollment and Code of Conduct

Enrollment is not complete until a parent or guardian submits the required Scale How School Student Code of Conduct and Host-Home Agreement. The digital agreement addresses respect for the host residence and property, authorized areas of the home, class etiquette, electronic devices, academic integrity, laboratory safety, and consequences for misconduct.

Parents are responsible for reviewing the agreement with each enrolled student. Completion of the agreement is a condition of enrollment and continued attendance. Serious misconduct—or repeated failure to follow the agreement—may result in dismissal or expulsion from the tutorial.

Required before enrollment: parent or guardian digital acknowledgment and signature.

Required Materials

- [Accelerated Studies in Physics and Chemistry](#) by John D. Mays
- [The Student Lab Report Handbook by John D. Mays](#) (a resource intended for continued use through high school and college)
- Standard lab journal with quad ruling
- A set of lined index cards with a ring; bring it every week for handwritten quiz-review cards. The ring may be clipped into the binder or stored in the binder pouch.
- Three-ring binder with five dividers labeled Syllabus, Reference, Quizzes, Class Notes, and Lab
- A durable commonplace journal for independent RRC notes; a journal with page numbers and a table of contents is recommended, and it must come to class each week; this journal may be used in other classes and is encouraged to be used from year to year
- Pencils, pens, scissors, and a three-hole ruler that can remain in the binder
- A three-ring binder pouch large enough for writing utensils, calculator, and quiz-review cards
- Independent project supplies; students and parents are responsible for materials used for individual science projects and presentations
- Advanced scientific or graphing calculator; a TI-84 or equivalent is recommended for repeated computations and graphing

Encouraged Family Outside Reading

Each Arete family is encouraged to keep one shared family copy of *The God Proofs: How Science Points to YOUR Creator* by Douglas Ell. This is optional family outside reading, not a class-specific text, and it may or may not be referred to during tutorials.

Laboratory and Investigation Program

Following the author's teaching overview, the course includes three principal experiments per term and a scored lab-journal check. The DC Circuits and Solubility experiments require two laboratory sessions; demonstrations and Voltaic Pile Day are recorded in the lab journal.

No.	Investigation	Primary Skill or Product
1	Pendulum Experiment (p. 381)	Control variables, collect repeated measurements, graph, and write a formal report.
2	Soul of Motion Experiment (p. 384)	Analyze motion data and connect an empirical relationship to theory.
3	Hot Wheels Experiment (p. 389)	Predict and analyze energy transfer and conservation.
4	DC Circuits Experiment (p. 391; two sessions)	Build circuits, measure voltage/current, apply circuit laws, and report.
5	Solubility Experiment (p. 398; two sessions)	Collect and graph solubility data and compare prediction with result.
6	Density Experiment (p. 402)	Measure mass and volume, calculate density, analyze uncertainty, and report.
7	Lab Journal and Demonstrations	Document Charles's law, heat-capacity, field, electricity, wave, and reaction demonstrations.

All experimental work and data collection take place during the separately scheduled in-person laboratory sessions. The instructor may designate selected activities as journal-only investigations rather than full formal reports.

Grading Plan

Weekly cumulative quizzes form the large majority of each term grade. All quizzes and semester exams are completed during the regular tutorial. Laboratory investigations occur during separately scheduled in-person lab sessions; students write reports independently at home and prepare special projects for presentation.

How Each Term Average Is Calculated

Component	Grade Contribution
Weekly cumulative quizzes	70%
Homework assignments	5%
Lab reports and lab journal	15%
Special projects or presentations	10%
Total	100%

How the Final Course Grade Is Calculated

Component	Grade Contribution
Fall term average	40%
Fall semester exam	10%
Spring term average	40%
Spring semester exam	10%
Total	100%

Semester exams are given during the final tutorial meeting of each term: Monday, December 14, 2026, and Monday, May 10, 2027.

Course Policies

Attendance: Regular attendance at the Monday tutorial, separately scheduled laboratory sessions, and assigned online problem-solving through Moodle is essential. Notify the instructor in advance when possible. Quizzes, labs, and finals may not be completed independently at home; any permitted make-up must be arranged and supervised by the instructor.

Preparedness: Arrive with the assigned RRC study and notetaking complete, required materials in hand, QR cards reviewed, and questions marked for discussion.

Late Work: Late work is accepted according to the instructor's stated policy. Lab reports are ordinarily due within one week of the investigation unless the schedule or instructor provides a longer report window.

Lab Safety: Follow all oral and written safety directions. Unsafe conduct may result in immediate removal from an activity, an alternate assignment, dismissal from class, or expulsion under the behavior policy.

Academic Integrity: Submitted work must represent the student's own thinking and effort. Data, sources, quotations, digital assistance, and collaboration must be acknowledged when appropriate. Students may discuss an investigation but may not share or copy report text, calculations, graphs, or digital files.

Schedule Changes: Weather, material availability, class progress, and student needs may require adjustments. The instructor will communicate changes through Moodle or the usual family communication channel.

Optional Science and Nature-Lore Reading

These optional selections are adapted from AmblesideOnline's current science and natural-history recommendations for AO Year 9. They are not required, graded, or a substitute for assigned course reading. Families may choose according to interest and reading level; parent read-alouds and audiobooks are welcome.

- The Land of Little Rain — Mary Austin (AO Year 9)
- The Natural History of Selborne — Gilbert White (AO Year 9 alternative)
- Microbe Hunters — Paul de Kruif (AO Year 9)
- The Sea Around Us — Rachel Carson (AO Year 9)
- Great Astronomers — Robert S. Ball (AO Year 9)

Current source schedules: [AmblesideOnline Year 9 schedule](#)