Austin Road Middle School

"Exceeding Expectations Every Day"

High School Physical Science Course Syllabus

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Austin Road Middle School Vision

Austin Road Middle School will cultivate an environment for creativity, innovation and leadership where we exceed expectations every day.

Austin Road Middle School Mission Statement

Austin Road Middle School strives to develop a nurturing school community that encourages academic success for each student through a rigorous curriculum and extracurricular opportunities supported by dedicated teachers and staff.

Course Description

The Physical Science curriculum is designed to continue student investigations of the physical sciences that began in grades K-8 and provide students the necessary skills to have a richer knowledge base in physical science. This course is designed as a survey course of chemistry and physics. This curriculum includes the more abstract concepts such as the conceptualization of the structure of atoms, motion and forces, and the conservation of energy and matter, the action/reaction principle, and wave behavior. Students investigate physical science concepts through experience in laboratories and field work using the processes of inquiry.

High School Physical Science Content Standards

SPS1. Obtain, evaluate, and communicate information from the Periodic Table to explain the relative properties of elements based on patterns of atomic structure.

a. Develop and use models to compare and contrast the structure of atoms, ions and isotopes.

b. Analyze and interpret data to determine trends of the following:

- Number of valence electrons
- Types of ions formed by main group elements
- Location and properties of metals, nonmetals, and metalloids
- Phases at room temperature

c. Use the Periodic Table as a model to predict the above properties of main group elements.

SPS2. Obtain, evaluate, and communicate information to explain how atoms bond to form stable compounds.

a. Analyze and interpret data to predict properties of ionic and covalent compounds.

b. Develop and use models to predict formulas for stable, binary ionic compounds based on balance of charges.

c. Use the International Union of Pure and Applied Chemistry (IUPAC) nomenclature for translating between chemical names and chemical formulas.

SPS3. Obtain, evaluate, and communicate information to support the Law of Conservation of Matter.

a. Plan and carry out investigations to generate evidence supporting the claim that mass is conserved during a chemical reaction.

b. Develop and use a model of a chemical equation to illustrate how the total number of atoms is conserved during a chemical reaction.

SPS4. Obtain, evaluate, and communicate information to explain the changes in nuclear structure as a result of fission, fusion and radioactive decay.

a. Develop a model that illustrates how the nucleus changes as a result of fission and fusion.

b. Use mathematics and computational thinking to explain the process of half-life as it relates to radioactive decay.

c. Construct arguments based on evidence about the applications, benefits, and problems of nuclear energy as an alternative energy source.

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SPS5. Obtain, evaluate, and communicate information to compare and contrast the phases of matter as they relate to atomic and molecular motion.
a. Ask questions to compare and contrast models depicting the particle arrangement and motion in solids, liquids, gases, and plasmas.
b. Plan and carry out investigations to identify the relationships among temperature, pressure, volume, and density of gases in closed systems.

SPS6. Obtain, evaluate, and communicate information to explain the properties of solutions.
a. Develop and use models to explain the properties (solute/solvent, conductivity, and concentration) of solutions.
b. Plan and carry out investigations to determine how temperature, surface area, and agitation affect the rate solutes dissolve in a specific solvent.
c. Analyze and interpret data from a solubility curve to determine the effect of temperature on solubility.
d. Obtain and communicate information to explain the relationship between the structure and properties (e.g., pH, and color change in the presence of an indicator) of acids and bases.
e. Plan and carry out investigations to detect patterns in order to classify common household substances as acidic, basic, or neutral.

SPS7. Obtain, evaluate, and communicate information to explain transformations and flow of energy within a system.
a. Construct explanations for energy transformations within a system. b. Plan and carry out investigations to describe how molecular motion relates to thermal energy changes in terms of conduction, convection, and radiation.
c. Analyze and interpret specific heat data to justify the selection of a material for a practical application (e.g., insulators and cooking vessels).
d. Analyze and interpret data to explain the flow of energy during phase changes using heating/cooling curves.

SPS8. Obtain, evaluate, and communicate information to explain the relationships among force, mass, and motion.
a. Plan and carry out an investigation to analyze the motion of an object using mathematical and graphical models.
b. Construct an explanation based on experimental evidence to support the claims presented in Newton's three laws of motion.
c. Analyze and interpret data to identify the relationship between mass and gravitational force for falling objects.
d. Use mathematics and computational thinking to identify the relationships between work, mechanical advantage, and simple machines.

SPS9. Obtain, evaluate, and communicate information to explain the properties of waves.
a. Analyze and interpret data to identify the relationships among wavelength, frequency, and energy in electromagnetic waves and amplitude and energy in mechanical waves.
b. Ask questions to compare and contrast the characteristics of electromagnetic and mechanical waves.
c. Develop models based on experimental evidence that illustrate the phenomena of reflection, refraction, interference, and diffraction.
d. Analyze and interpret data to explain how different media affect the speed of sound and light waves.
e. Develop and use models to explain the changes in sound waves associated with the Doppler Effect.

SPS10. Obtain, evaluate, and communicate information to explain the properties of and relationships between electricity and magnetism.
a. Use mathematical and computational thinking to support a claim regarding relationships among voltage, current, and resistance.
b. Develop and use models to illustrate and explain the conventional flow (direct and alternating) of current and the flow of electrons in simple series and parallel circuits.
c. Plan and carry out investigations to determine the relationship between magnetism and the movement of electrical charge.

Tentative Course Outline

Unit 1	**Matter**	**August 7-11**
Unit 2	**Atoms & Periodic Table**	**August 14-25**
Unit 3	**Chemical Bonding**	**August 28-September 8**
Unit 4	**Chemical Reactions**	**September 11-October 4**
Unit 5	**Acids, Bases, and Solutions**	**October 5-October 20**
Unit 6	**Nuclear Chemistry**	**October 23-November 3**
Unit 7	**Motion and Forces**	**November 8- January 19**
Unit 8	**Energy**	**January 22-Februuary 9**
Unit 9	**Waves**	**February 12-March 9**
Unit 10	**Electricity and Magnetism**	**March 13-March 30**

Textbooks and Materials

Textbook used sparingly as reference in class only: Physical Science: Concepts in Action published by Prentice Hall

The student must provide:

- **Composition Notebook (used for Science Fair)**
- **Writing Utensil (Pencil/ Pen- blue or black ink ONLY)**
- **Glue Sticks**
- **Lined loose-leaf paper (Daily)**
- **Color Pencils**
- **Scissors**
- **(1) 2" binder with at least 3 tabs (shared with mathematics)**
- **Metric Ruler**

Course Evaluation Categories

Semester Final Average:

Final exam/EOCT- 20%

Course Final Average- 80%

This course utilizes Standards Based Grading. All Standards/Standards Groups will share equal weight within each term. Students will take Assessments to demonstrate understanding of the standards have opportunities for re-assessment when needed. The percentage sum for the standards will total 100% in the Course Final Average category, which will be 80% of the Semester Final Average.

Expectations

Assignments that are not submitted on time will receive an "M" (missing) within Infinite Campus gradebook. Not submitting assignments is a behavioral characteristic that should not receive an academic penalty. ARMS wishes to create a more responsible scholar/person and address said behavior(s) through reflection activities, as well as constructive dialogue. In doing so, our hope is that scholars will begin assuming responsibility for ensuring that their work is submitted on time, and that the quality therein far exceeds our expectations. All scholars will be given ample opportunities to submit their work through activities to include but not limited to amnesty day(s), working lunch, before/after school tutorial, etc. All work assigned an "M" (missing) within Infinite Campus will remain as such during the term in which the scholar's assignment was due. **Upon the completion of the term, any assignment that is not submitted, as required, will then result in the scholar receiving a grade of zero (0%) to remain permanently within the gradebook. Finally, all assignments submitted after the assigned due date will not receive a late penalty and will be graded accordingly contingent upon satisfactory completion of all requirements within the assignment.**

Parent-Teacher Communication

- **Email is the best way to contact me. austin.crown@henry.k12.ga.us**
- **Homework assignments and announcements will be sent out via Remind 101**

Teacher Availability

Appointments can be made for teacher conferences by emailing austin.crown@henry.k12.ga.us

Please note: It may be necessary to make adjustments in the above course syllabus based on the teacher professional observations and student needs.

Student Name: _____

Student's Signature_____

Parent/Guardian's Signature_____

Telephone Number (hm) _____ (wk) _____ (cell) _____

E-mail address_____