

John S. Davidson Fine Arts Magnet School
Physical Science

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Physical Science is a course that explores the phenomena of the physical world around us. It is a laboratory course that integrates principles of physics and chemistry. The physical science standards include abstract concepts such as the conceptualization of the structure of atoms and the role they play in determining the properties of materials, motion and forces, the conservation of energy and matter, wave behavior, electricity, and the relationship between electricity and magnetism (GSE, 2016). It emphasizes inquiry-based learning, process skills, and higher order thinking skills.

Suggested Supplies and Materials:

Laptop/Computer/Tablet/Phone. 3 ring binder, notebook paper, dividers, and pencils/pens.

Instructional Philosophy:

I am looking forward to having your child in my Physical Science class this year. In order to guarantee that your child is working in the best learning environment, I need their cooperation in the classroom and your help from home. Please encourage your child to come to class everyday on time and prepared with his/her assignments and materials.

Our classroom is designed to provide a conducive learning environment in that students are able to experience the course through any of the four learning styles (visual, auditory, reading/writing, and kinesthetic). This course is not only taught through direct teacher lectures, but also collaborative group work and independent study.

I believe that all of my students can behave appropriately in the classroom. Any misbehavior will disrupt the learning environment and will not be tolerated. Learning is a process and it is my sincere desire to provide your child with the knowledge and experience he/she will need to be successful in class.

Physical Science - 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. (Clarification statement: Properties include atomic number, atomic mass and the location and charge of subatomic particles.)

- 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. (Clarification statement: Properties are limited to types of bonds formed, elemental composition, melting point, boiling point, and conductivity.)

- 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. (Clarification statement: Limited to binary covalent and binary ionic, containing main group elements, compounds but excludes polyatomic ions.)

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. (Clarification statement: Limited to synthesis, decomposition, single replacement, and double replacement reactions.)

- b. Develop and use a model of a chemical equation to illustrate how the total number of atoms is conserved during a chemical reaction. (Clarification statement: Limited to chemical equations that include binary ionic and covalent compounds and will not include equations containing polyatomic ions.)

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. (Clarification statement: Limited to calculations that include whole half-lives.)
- c. Construct arguments based on evidence about the applications, benefits, and problems of nuclear energy as an alternative energy source.

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. (Clarification statement: Using specific Gas laws to perform calculations is beyond the scope of this standard; emphasis should focus on the conceptual understanding of the behavior of gases rather than calculations.)

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. (Clarification statement: Limited to only the structure of simple acids and bases (e.g., HCl and NaOH) that demonstrates the presence of an H⁺ or OH⁻.)
- 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.
(Clarification statement: Types of energy to be addressed include chemical, mechanical, electromagnetic, light, sound, thermal, electrical, and nuclear.)
- 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. (Clarification statement: Mathematical and graphical models could include distance, displacement, speed, velocity, time and acceleration.)
- b. Construct an explanation based on experimental evidence to support the claims presented in Newton's three laws of motion.
(Clarification statement: Evidence could demonstrate relationships among force, mass, velocity, and acceleration.)
- 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. (Clarification statement: Advantages and disadvantages of series and parallel circuits should be addressed.)

c. Plan and carry out investigations to determine the relationship between magnetism and the movement of electrical charge. (Clarification statement: Investigations could include electromagnets, simple motors, and generators.)

Science Georgia Standards of Excellence
Georgia Department of Education
March 31, 2016

Classroom Expectations:

The Richmond County Board of Education discipline policy will be strictly followed. The overriding classroom rule is: Respect is the rule. The rule is respect. Each class will establish their own additional rules if needed. Consequences for violating this rule are managed at the classroom level. If the behavior persists, then the following policy is in effect: The first violation will result in documentation and a warning. The second violation will be documented and a parent or guardian will be contacted. The third violation will be referred to the administration. Plagiarism will result in a zero for the assignment.

Homework Policy & Grading Scale:

The homework policy and grading scale will be the same policies adopted by the Richmond County School Board and included in the student handbook. Please refer to this document for details.

Grades will be earned according to the following standards based grading system. Assignments will include tests, quizzes, laboratories, homework, class work, and various projects. The final grade will be calculated using the following percentages:

Tests = 50%

Assignments (i.e. Labs, Projects, etc.) = 25%

Discussions (i.e. Classwork/Homework, Discussion posts, Quizzes, etc.) = 25%

Total percentage = 100 %

Late Work/Resubmitted Work:

Late work and resubmitted work will result in an eleven points (11 points) deduction per day, up to 5 days.

Make-up Work:

All make-up work should be discussed with the teacher on the first day that the student returns to school following any absence and is the **sole responsibility of the student**. Students will be given one week to complete missed assignments due to **excused absences**.

Course Assessment Plan:

The following forms of assessment will be used to ascertain whether or not the student has mastered the content/standard for this course: written questions (quick-writes) which cover the previous day's topics, quizzes, tests, laboratory activities, oral discussions, exit questions (ticket out the door ~tod) which cover the day's topic and a final exam which is comprehensive.

Instructional Method - Online

- **Netiquette** –
 1. Interact with everyone in the class with courtesy and consideration.
 2. Mute your microphone, unless called on to speak.
 3. You may “raise your hand” icon, or write in the Chat box.

- **Resources:** Teacher, FEV Tutor (online), Canvas (Student guides)

FEV Tutor Contact Information - Click the link below

[FEV Tutor Information-1.PNG](#)

Science Course Acknowledgement

Parent and Student:

I have read this syllabus and understand the content and requirements for the current year. I understand that the topics covered are tentative and course contents may change due to time constraints and other circumstances.

Please initial and sign below acknowledging receipt of:

_____ Science Course Syllabus
_____ Science Course Safety Contract
_____ Science Course Standards

Student Signature

Parent/Guardian Signature

Date

Date