Fair Lawn

Public Schools

Fair Lawn, NJ

Physics CP & Honors

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Physics CP is a lab science class developed by the Fair Lawn High School Physics team and aligned to the Next Generation Science Standards which are correlated to the Common Core Standards for Language Arts Literacy and for Math

Science Department

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Committee Credits

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Physics CP & Honors

I. Course Synopsis

The field of physics investigates natural and human created phenomena such as interactions in terms of forces between objects, the related energy transfers, and their consequences. After completing this course, students should be able to recognize that through a common set of physical principles, mechanisms of cause and effect in all system and processes can be understood.

NJDOE Model Curriculum

II. Philosophy & Rationale

This course has been aligned to and developed with the Next Generation Science Standards (NGSS) as its focus. Efforts have been made to integrate aspects of other science standards, particularly the earth and space science standards into this course to assure that students are provided an opportunity to form connections.

All NGSS aligned courses in the Fair Lawn Schools demonstrate a commitment preparing students to become college and career ready as well as the other guiding assumptions of the Frameworks for Science Education (NRC, 2011) and the NGSS including

- Students are born investigators;
- Science instruction should focus on core ideas and practices;
- An understanding of science develops over time;
- Science and engineering require both knowledge and practice;
- Science education must connect to students' interests and experiences; and
- Promoting equity for all students must be a focus of science education.

Additionally, all NGSS aligned courses in the Fair Law Schools integrate the three dimensions discussed in the Frameworks for Science Education and the NGSS, including

- Science & Engineering Practices which describe behaviors that scientists engage in as they investigate and build models and theories about the natural world and the key set of engineering practices that engineers use as they design and build models and systems; (NGSS PDF)

- Cross Cutting Concepts which link all domains of science and provide an organizational schema for interrelating knowledge from various science fields into a coherent and scientifically-based view of the world; (NGSS PDF) and
- Disciplinary Core Ideas which focus and unite K-12 science, have a broad importance across multiple sciences or engineering disciplines or are a key organizing concept within a single discipline; provide a key tool for understanding or investigating more complex ideas and solving problems; relate to the interests and life experiences of students; are connected to societal or personal concerns that require scientific or technological knowledge; and are teachable and learnable over multiple grades at increasing depth and sophistication. (NGSS PDF)

Since coherence is a main dimension of the NGSS, consider reviewing the "story line" for the middle school physical science, life science, earth and space science, and engineering, technology and applications of science, as well as the high school physical science, life science, earth and space science, and engineering, technology and application of science for a full picture of the NGSS philosophy. For a full picture of how these programs are implemented in the Fair Lawn Schools, visit the district curriculum website.

As described in the NGSS, technical writing and reading non-fiction is also a focus of our 6-12 science curricula as required by the CCSS. Students are expected to think critically about data they collect or read about and then express their thoughts through text-based narratives, journal entries, short-constructed response, argument-based writing, and/or in-class discussion.

Differentiated instruction for students at different levels of achievement and specific learning needs (e.g. special education, English Language Learners (ELL), at-risk, and Gifted & Talented) is embedded in targeted scaffolding based on knowledge of each student's interests, needs, and assessment data, including, but not limited to, in class formative and summative assessments.

When deemed appropriate, department teachers will engage students in purposeful paired discussions to share information more effectively, such as the "turn and talk" (Harvey & Daniels, 2009). "Text annotation" could be used, for example to optimize reading comprehension (Daniels & Steineke, 2010).

III. Scope & Sequence

The Chemistry CP program consists of four thematic units reflective of the NJDOE Model Curriculum. Each unit develops new content with consistent emphasis on the science and engineering processes, disciplinary core ideas, and cross cutting concepts reflective of the Next Generation Science Standards and the Frameworks for Science Education.

Unit 1: Forces & Motion (Sept. – Oct.):
How can an object's continued motion, changes in motion or stability be predicted?

Unit 2: Types of Interactions (Nov. – Dec.):
How can the variety of interactions observed be explained by an understanding of underlying forces?

Unit 3: Energy (Jan. – Feb.):
How can interactions between objects and within systems of objects be predicted and explained?

Unit 4: Electricity & Magnetism (Mar. – Apr.):
How do charges interact with electric and magnetic fields?

Unit 5: Waves & Their Applications (May – beginning of June):
How can waves be used to transfer energy, information, and to extend human senses?

IV. Unit Descriptions

Unit 1: Forces & Motion (Sept. – Oct.)

Enduring Understanding:

Total momentum is always conserved in any system.

Essential Questions:

How can an object's continued motion, changes in motion or stability be predicted?

Learning Objectives:

NJDOE Model Curriculum Unit 1

HS-PS2-1 (Newton's Second Law) High School Evidence Statement PS2-1

1. **Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.** [Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force.] [*Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.*]

HS-PS2-2 (Conservation of Momentum) High School Evidence Statement PS2-2

2. **Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.** [Clarification Statement: Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of this principle.] [*Assessment Boundary: Assessment is limited to systems of two macroscopic bodies moving in one dimension.*]

HS-PS2-3 (Collision Design) High School Evidence Statement PS2-3

3. **Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*** [Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.] [*Assessment Boundary: Assessment is limited to qualitative evaluations and/or algebraic manipulations.*]

Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to Classroom Instruction that Works for ELL Learners *or the* SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.
4. **Honors Physics** students would be required to apply their knowledge of Newton's Second Law of Motion and momentum through the solution of advanced problems in friction and 2-dimensioanl collisions. They could also do two advanced labs on these topics.

Cross-Content Connections:

HS-ESS1-4 (Orbital Motion) High School Evidence Statement ESS1-4

1. **Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.** [Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.] [*Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.*]

HS-ESS2-1 (Force on Earth) High School Evidence Statement ESS2-1

2. **Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.** [Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).] [*Assessment Boundary: Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface.*]

HS-ESS2-2 (Feedback) High School Evidence Statement ESS2-2

3. **Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.** [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

CCCS Math: Click on the link to the High School Evidence Statements to see expectations related to mathematics for this unit. Number Quantity, Algebra, Function, Modeling.
CCCS Literacy: Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the LAL standards for science & technical subjects.
8.1: Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.
9.2: Explore careers directly related to this unit.

Unit 2: Types of Interactions (Nov. – Dec.):

Enduring Understanding:

1. Forces at a distance are explained by fields that can transfer energy.
2. Forces at a distance are described in terms of the arrangement and properties of the interacting objects and distances between them.
3. Forces are used to describe relationships between electrical and magnetic fields.

Essential Questions:
How can the variety of interactions observed be explained by an understanding of underlying forces?

Learning Objectives:
NJDOE Model Curriculum Unit 2

HS-PS2-4 (Newton's Law of Gravitation) High School Evidence Statement PS2-4

1. **Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.** [Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational and electric fields.] [*Assessment Boundary: Assessment is limited to systems with two objects.*]

HS-PS2-6 (Material Design) High School Evidence Statement PS2-6

2. **Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.*** [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.] [*Assessment Boundary: Assessment is limited to provide molecular structures of specific designed materials.*]

Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to Classroom Instruction that Works for ELL Learners *or the* SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.
4. **Honors Physics** students would be required to apply their knowledge of Newton's Universal Law of Gravitation quantitatively to advanced problem-solving of orbiting satellites (both man-made and moons of planets) and qualitatively to describing the concepts of the physics of black holes. They could also do two advanced research papers on these topics.

Cross-Content Connections:

HS-ESS1.4 (Orbital Motion) High School Evidence Statement PS1-7

1. **Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.**[Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.] [*Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.*]

CCCS Math: Click on the link to the High School Evidence Statements to see expectations related to mathematics for this unit. Number Quantity, Algebra, Function, Modeling.

CCCS Literacy: Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the LAL standards for science & technical subjects.

8.1: Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.

9.2: Explore careers directly related to this unit.

Unit 3: Energy (Jan. – Feb.):

Enduring Understanding:

1. Energy is a quantitative property of a system.
2. Energy depends on the motion and interactions of matter and radiation within a system.
3. A system's total energy is conserved even as energy within a system is continually transferred from one object to another and between its possible forms, resulting in a single quantity of energy.

Essential Questions:

How can interactions between objects and within systems of objects be predicted and explained?

Learning Objectives:

NJDOE Model Curriculum Unit 3

HS-PS3-2 (Particle Motion & Position) High School Evidence Statement PS 3-2

1. **Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).** [Clarification Statement: Examples of phenomena at the macroscopic scale could include the conversion of kinetic energy to thermal energy, the energy stored due to position of an object above the earth, and the energy stored between two electrically-charged plates. Examples of models could include diagrams, drawings, descriptions, and computer simulations.]

HS-PS3-1 (Energy Change) High School Evidence Statement PS 3-1

2. **Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.** [Clarification Statement: Emphasis is on explaining the meaning of mathematical expressions used in the model.] [*Assessment Boundary: Assessment is limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.*]

HS-PS3-3 (Energy Conversion) High School Clarification Statement PS3-3

3. **Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*** [Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.] [*Assessment Boundary: Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students.*]

Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to Classroom Instruction that Works for ELL Learners *or the* SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.
4. **Honors Physics** students would be required to apply their knowledge of energy transfer through solutions of advanced problems in The First Law of Thermodynamics (e.g., isobaric, isothermal, isochoric, and adiabatic processes) as well as The Second Law of Thermodynamics (e.g., the efficiencies of a regular heat engine and a Carnot engine). They could also do two advanced labs on these topics.

Cross-Content Connections:

HS-ESS1-2 (Big Bang Light Spectra) High School Evidence Statement ESS1-2

1. **Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.** [Clarification Statement: Emphasis is on the astronomical evidence of the red shift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium).]

HS-ESS2-3 (Thermal Convection) High School Evidence Statement ESS2-3

2. **Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.** [Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three-dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments.]

CCCS Math: Click on the link to the High School Evidence Statements to see expectations related to mathematics for this unit. Number Quantity, Algebra, Function, Modeling.

CCCS Literacy: Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the LAL standards for science & technical subjects.

8.1: Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.

9.2: Explore careers directly related to this unit.

Unit 4: Electricity & Magnetism (Mar. Apr.):

Enduring Understanding:

1. Forces at a distance are explained by fields permeating space that can transfer energy through space.
2. Magnets or changing electric fields cause magnetic fields.
3. Electric charges or changing magnetic fields cause electric fields.

Essential Questions:

How do charges interact with electric and magnetic fields?

Learning Objectives:

NJDOE Model Curriculum Unit 4

HS-PS3-5 (Electric & Magnetic Fields) High School Clarification Statement PS 3-5

Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. [Clarification Statement: Examples of models could include drawings, diagrams, and texts, such as drawings of what happens when two charges of opposite polarity are near each other.] [*Assessment Boundary: Assessment is limited to systems containing two objects.*]

HS-PS2-4 (Colulomb's Law) High School Clarification Statement PS 2-4

Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. [Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational and electric fields.] [*Assessment Boundary: Assessment is limited to systems with two objects.*]

HS-PS2-5 (Currents & Magnetic Fields) High School Clarification Statement PS 2-5

Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current. [*Assessment Boundary: Assessment is limited to designing and conducting investigations with provided materials and tools.*]

HS-PS2-6 (Material Design) High School Clarification Statement PS 2-6

Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.* [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.] [*Assessment Boundary: Assessment is limited to provided molecular structures of specific designed materials.*]

Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to Classroom Instruction that Works for ELL Learners *or the* SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.
4. **Honors Physics** students would be required to apply their knowledge of both Coulomb's Law of Electrostatics and Newton's Law of Gravitation by advanced problem-solving in which both laws are applied to a single hydrogen atom to find if electrical forces or gravitational forces are stronger and then related to The Unified Field Theory. They could also do advanced problem-solving on Ampere's Law of Magnetism and Faraday's Law of Induction (Magnetism) to determine a more advanced relationship between electric fields and magnetic fields. They could also do two advanced labs on these topics.

Cross-Content Connections:

CCCS Math: Click on the link to the High School Evidence Statements to see expectations related to mathematics for this unit. Number Quantity, Algebra, Function, Modeling.

CCCS Literacy: Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the LAL standards for science & technical subjects.

8.1: Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.
9.2: Explore careers directly related to this unit.

Unit 5: Waves & Their Applications (May – beginning of June)

Enduring Understanding:

1. A wave is a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.
2. Understanding wave properties and interactions of electromagnetic radiation with matter enables scientists and engineers to design systems for transferring and storing information.

Essential Questions:
How can waves be used to transfer energy, information, and to extend human senses?

Learning Objectives:
NJDOE Model Curriculum Unit 5

HS-PS4-1 (Waves) High School Clarification Statement PS 4-1
Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. [Clarification Statement: Examples of data could include electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, and seismic waves traveling through the Earth.] [*Assessment Boundary: Assessment is limited to algebraic relationships and describing those relationships qualitatively.*]

HS-PS4-4 (Effects of Waves) High School Clarification Statement PS 4-4
Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. [Clarification Statement: Emphasis is on the idea that photons associated with different frequencies of light have different energies, and the damage to living tissue from electromagnetic radiation depends on the energy of the radiation. Examples of published materials could include trade books, magazines, web resources, videos, and other passages that may reflect bias.] [*Assessment Boundary: Assessment is limited to qualitative descriptions.*]

HS-PS4-3 (Models) High School Clarification Statement PS 4-3
Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. [Clarification Statement: Emphasis is on how the experimental evidence supports the claim and how a theory is generally modified in light of new evidence. Examples of a phenomenon could include resonance, interference, diffraction, and photoelectric effect.] [*Assessment Boundary: Assessment does not include using quantum theory.*]

HS-PS4-5 (Information & Energy Capture) High School Clarification Statement PS 4-5
Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.* [Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.] [*Assessment Boundary: Assessments are limited to qualitative information. Assessments do not include band theory.*]

HS-PS4-2 (Information Transmission) High School Clarification Statement PS 4-2
Evaluate questions about the advantages of using a digital transmission and storage of information. [Clarification Statement: Examples of advantages could include that digital information is stable because it can be stored reliably in computer memory, transferred easily, and copied and shared rapidly. Disadvantages could include issues of easy deletion, security, and theft.]

Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to Classroom Instruction that Works for ELL Learners *or the* SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.
4. **Honors Physics** students would be required to apply their knowledge of waves through advanced problem-solving in the Doppler Effect, refraction, interference, diffraction, and polarization. They could also do two advanced labs on these topics.

Cross-Content Connections:
CCCS Math: Click on the link to the High School Evidence Statements to see expectations related to mathematics for this unit. Number Quantity, Algebra, Function, Modeling.
CCCS Literacy: Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the LAL standards for science & technical subjects.
8.1: Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.
9.2: Explore careers directly related to this unit.

V. Course Materials

- Core (Required) Texts
- Lab instructions (both “cook-book”-style and inquiry-based)
- Journal articles (e.g., Scientific American, The Physics Teacher, etc.)
- Mobile devices and computers (Internet-based articles, computer labs, physics-related games, etc.)

- Equipment needed for labs and student-assisted demonstrations and projects

VI. Assessments

Classroom assessments are included to primarily guide instruction (formative assessment) and to support decisions made beyond the classroom (summative assessment).

Sample assessments and classroom activities aligned to the NGSS can be found on the NGSS website.

Assessments in this course measure students' performance of scientific and engineering practices in the context of crosscutting concepts and disciplinary core ideas. These may include quizzes, tests, lab reports, lab questions, experimental design projects, engineering design projects, project-based assessments and other assessments with multiple components. (NRC, 2014)

NJDOE Science Related Assessment Resources

All Fair Lawn High School grading procedures will be followed.

VII. Interdisciplinary Connections and Alignment to Technology standards

Science classes in the Fair Lawn Public schools promote career-readiness skills related to Personal Financial Literacy (9.1) and Career Awareness, Exploration, and Presentation (9.2). Some course concepts from the Career and Technical Education Standards (9.3), but these are not directly correlated since our district is not a CTE program.

The Fair Lawn Public Schools District fosters an environment that promotes career-readiness skills in all content areas. Whereas Career Ready Practices are explored consistently, specific alignment to Personal Finance Literacy (9.1) and Career Awareness, Exploration, and Presentation Standards (9.2) are included in the district level document (below). When appropriate, the Career and Technical Education Standards (9.3) have been reviewed and aligned as well.

Examples: 9.2B: Career exploration in each unit of study.

In addition, every effort is made to integrate technology and engineering into our science classes. Educational Technology (8.1) and Technology Education, Engineering, Design, and Computational Thinking – Programming (8.2) standards are cross connected throughout our science programs.

Examples:
- 8.1A: Use spreadsheets to analyze & interpret data from laboratories, 6-12. Use the internet to increase productivity and efficiency, 9-12.
- 8.1B,C: Use data to solve real-world problems, 6-12. Use online platforms to collaborate & address global issues, 9-12.
- 8.1F: Collect and analyze data using internet and data simulations, 6-12.

8.2A: Become aware of the invention process, 3-5.
8.2B: Become aware of the global impacts on technology, 6-12.
8.2C: Apply the design process to pushes & pulls, K-2.
8.2D: Use tools to reduce work, K-2.

For additional detail on how these standards are integrated throughout the Fair Lawn Schools curriculum, review the Fair Lawn Public Schools District Alignment to Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix.