

# Fair Lawn Public Schools

Fair Lawn, NJ

Exploring  
Environmental  
Issues CP

August

2015

Updated August 2015  
Developed UK

Horticulture CP & Honors is a high school science class developed by the Fair Lawn Schools high school science faculty and aligned to the 2009 NJCCS in science and correlated to the Common Core State Standards for Literacy & Math.

**Science  
Department**

# Fair Lawn School District

## Committee Credits

### Written By

Al Coesfeld

# Environmental Issues CP

## I. Course Synopsis

Environmental Issues is a hands-on student centered science course. Understanding the complex interconnected nature of the environmental problems is crucial to developing responsible citizens seeking to create a sustainable world in the 21<sup>st</sup> century and beyond. In this course students investigate important issues plaguing Earth today. The format of the course is focused around student research and laboratory investigation.

## II. Philosophy & Rationale

The 21<sup>st</sup> Century citizen must be aware of his or her effect on the environment and the interdependence of living and nonliving things on the Earth.

As we transition to toward the NGSS, 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](#))

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

Introduction to Environmental Issues (Sept-Oct)

Ecology (Oct-Nov)

Resources & Resource Depletion (Dec-Jan)

Human Impact on the Environment (Feb-April)

Human Health & The Environment (May – June)

### IV. Unit Descriptions

*Standard 5.1 will be addressed throughout the study of this course.*

#### Introduction to Environmental Issues

- Scientific Method & Scientific Inquiry
- Laboratory Safety

#### Ecology (5.3.12.C.2)

- Components, structure & functioning of ecosystems
- Biomes of the world (different major ecosystems)
- Threats to the world's biomes
- Population dynamics of natural populations (including natural selection & evolution, Hardy-Weinberg, founder effect, etc.)

#### Resources and Resource Depletion (5.3.12.F.3; G.1-7)

- Human Populations, Natural Resources, Economics and the Environment
- Natural Resources and Resource Depletion focus Mining & Mineral extraction  
(including mine site reclamation and restoration ecology of mine sites)  
(including flow and cycling of matter through the geosphere)
- Alternative Energy (solar, wind, hydropower, etc.)
- Conventional Energy (including focus on reducing energy use)
- Forest Resources
- Water Resources
- Soil & Soil Conservation

### **Human Impact on the Environment (5.3.12.C.2, E.2, F.2)**

- Atmospheric & Climate Change
- Human Disasters
- Landscape Change and Topography
- Considerations in Selecting Automobiles
- Impacts of Deforestation
- Use of Indicator Species in Assessing Environmental Health
- Loss of Biodiversity
- Impact of Human Activities on the Oceans (including reduction & mitigation)

### **Human Health and the Environment**

- Human Population and the Threat and Spread of Pandemic Diseases
- Occupational Health and Safety
- Environmental Disasters and Humans
- Pandemic Disease

## **V. Course Materials**

1. Videos/United Streaming
2. Laboratory supplies and equipment
3. Computer simulations, book websites, and reinforcement applications
4. Technology: Computers, Videoscope, SmartBoard, PowerPoint program
5. The following websites from the NJDOE are available for science curriculum reference.

<http://www.nj.gov/education/aps/cccs/science/http://www.njcccs.org>

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

- Plant Growth (Scientific Method) Laboratory
- Biome Presentations
- Plant Identification Laboratory
- Population Dynamics laboratory
- States Project (investigating different states relating: Human Populations, Natural Resources,

- Minerals Laboratory
- Igneous Rock Laboratory
- Sedimentary Rock Lab Laboratory
- Metamorphic Rock Laboratory
- Mineral Project (focus on: methods of mineral extraction for specific mineral resources and the reclamation of these sites to limit effects on the environment)
- Country Project (investigating different states relating: Human Populations, Natural Resources, Economics and the Environment)
- Climate Change Presentation
- Landscape Change and Topographic mapping Laboratory (focus on: the hydrologic and ecological impacts of landscape change in different topographies and ecosystems)
- Automobile Presentation (investigate, research, and present findings relating to choosing specific automobiles including, fuel efficiency, pollution, safety, and environmental friendliness in operation, production, & maintenance)
- Energy Presentations
- Energy Debate (Conventional vs. Alternative energy)
- Energy Self-Assessment Survey (focus energy use and on potential methods conservation)
- Human Disaster Presentation
- Forestry Laboratory
- Biological Indicator Species Laboratory (macroinvertebrates of streams)
- Pandemic Disease Presentations
- Occupational Health and Safety Presentations
- Recently Extinct Species Presentation
- Hydrology Laboratory
- Water Quality Laboratory
- Ocean Presentation
- Pandemic Disease Presentation
- Soils Laboratory

- [ELL](#)/Special Education Students:

- Provide ELL students with short lists of essential academic vocabulary terms to assist with language development such as word walls;
  - Provide ELL students with opportunities for peer to peer interactions;
  - Explicitly teach ELL students academic language and link to main ideas;
  - Support ELL students through the use of graphic organizers, modeling, and visual aides.
  - Support special education students through the use of physical activity, modeling, role-play, dialogue, reading assignments based on ability, etc.
- **Gifted Students**  
*Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.*

## VI. Assessments

Each unit will have a variety of tests, quizzes, labs, projects, written homework assignments, presentations and class activities. These assessments will be geared toward the main learning objectives for each unit. In addition there will be a Midterm exam, Final exam, and Final project.

## VII. Cross Curricular Aspects

Horticulture teachers will work with Algebra 1 teachers to enhance student understanding of graphing, equation calculations, and basic statistical analysis.

**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](#).

**CCCS Math:** Students will be expected to perform measurement, [modeling](#), apply [algebra](#), and [geometry](#) and [statistics](#).

### 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.