

# Fair Lawn Public Schools

Fair Lawn, NJ

Home  
Ownership  
& Repair

August

2015

Revised 2015  
Developed August 2012

The focus of the Engineering and Technology Department is to promote the development of **innovation** skills in all students. This is an introductory course in which students will explore the process of home ownership and repair for one semester followed by or preceded by a semester of Personal Financial Literacy.

**Engineering &  
Technology  
Education**

**Learn. Innovation.**

# **Fair Lawn School District**

## **Committee Credits**

### **Written By**

Steven Mondadori

Ronald Durso, Supervisor

# Home Ownership & Repair

## I. Course Synopsis

Home Ownership and Repair is a 2.5 credit (semester) course offered with Personal Financial Literacy. Home Ownership and Repair is a hands-on technology education class which will prepare students for the challenges of home ownership.

## II. Philosophy & Rationale

One of the goals of the personal financial literacy course is to help students learn how to succeed financially. This course will help students develop the skills they need to succeed independently with regarding to home ownership or rental. Students will learn the basic skills involved in purchasing or renting, repairing and maintaining, their home.

This course has been aligned to and developed with the [NJCCCS for Technology](#) as it's major focus, with a supplemental focus on the [Standards for Technological Literacy for the Content Study of Technology](#) (ITEA). In addition, the Next Generation Science Standards, particularly in [physical science](#) and [engineering and design](#) have been addressed along with the CCCS for [literacy in science and technical](#) subjects and [math](#). This demonstrates the integral nature of engineering into "STEM" education.

*"Innovation"* is defined as *the act or process of introducing new ideas, devices, or methods*". The philosophy of the Engineering and Technology Department to focus on the development of innovation in all students through the application of true, STEM education.

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. Students in these courses are provided with clear, concise rubrics which describe and define expectations for project based, authentic assessment which involves written and/or performance based requirements.

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

Unit 1: Introduction to Home Ownership Throughout	1 Week +		
Renting vs. Buying Choosing a Home The Basics of Insurance The Process of Purchasing & Inspecting		Unit 4: Introduction to Electricity and Plumbing	4 Weeks
Unit 2: Basic Carpentry Skills 4 Weeks		Safety Electrical Theory Plumbing Theory Installation & Design Building Codes When to Call An Expert Heating & Cooling Common Electrical & Plumbing Repairs	
Unit 3: Framing A Wall 3 Weeks		Unit 5: Sheet Rock & Finishing 2 Weeks	
Safety Structural Integrity Building Codes Design and Building		Safety Installation & Design Building Codes Common Repairs	
		Unit 6: Finish Work 3 Weeks	
		Safety Painting, Trim & Molding Tile	

## IV. Unit Descriptions

### Unit 1: Introduction to Home Ownership

*These topics may be spread out throughout the course.*

#### Enduring Understanding

Making the right decisions related to home ownership is essential for financial and emotional security.

#### Essential Question(s)

What information must be considered when making home ownership decisions?

#### Learning Objectives

1. Compare and contrast the costs and benefits of renting or purchasing a home.
2. Identify individual preferences such as value, location, size, in choosing a home.
3. Research and select a home based on individual needs.
4. Understand the importance of home owners or renters insurance.
5. Research the process of purchasing a house.
6. Understand the importance of the home inspection.

#### Suggested Activities

1. Guest speaker – real estate broker
2. Guest speaker – insurance broker
3. Guest speaker – home inspector
4. Episode of Holmes Inspection or other DIY show
5. Research Project – Selecting a Home

#### New Jersey Core Curriculum Content Standards

8.2.12.A; 8.2.12.B; 8.2.12.C; 8.2.12.D

9.4 F

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

1. Practical exam on proper use of key tools, equipment and machines.
2. Modifications may include providing students with a template, diagrams, and additional resources for special education and ELL students.
3. Gifted students may be asked to assist their classmates in tool, equipment and machine identification.

#### **Cross-Content Connections:**

**Standards for Technology Literacy (9-12)**– 8 Attributes of Design, 10 Trouble Shooting, 11 Apply the Design Process, 13 Assessing the Impact, 19 Manufacturing Technology, 20 Construction Technologies

**Common Core Standards for English & Technical Subjects: 9-10; 11-12:**

A focus in this unit will be following multistep processes.

**\*Safety will be stressed and monitored throughout the course.**

## Unit 2: Basic Carpentry Skills

### Enduring Understanding

1. The ability to correctly utilize tools is essential for a successful home owner.
2. Personal needs must be considered before purchasing a home.

### Essential Question(s)

1. How are the needs of an individual related to choosing and designing the correct living environment?

### Learning Objectives

1. Safely use hand tools, power tools and machine tools as they were intended.
2. Know the purpose of all applicable tools.
3. Be familiar with different house designs (ie: ranch, colonial).
4. Design a functional floor plan that addresses individual needs.

### Suggested Activities

1. Introduction to Tools
2. Review of Safety Rules
3. Instant Architecture

### New Jersey Core Curriculum Content Standards

8.2.12.A; 8.2.12.B; 8.2.12.C; 8.2.12.D

9.4 F

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**Common Core Standards for English & Technical Subjects:** [9-10](#); [11-12](#):

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### Unit 3: Framing a Wall

#### Enduring Understanding

Engineering and safety must be considered in home building and design.

#### Essential Question(s)

How is safety considered in building a home?

#### Learning Objectives

1. Be familiar with and apply proper shop safety.
2. Know and apply proper building codes related to structural integrity.
3. Build scaled model sections of a home.
4. Frame a section of a wall.

#### Suggested Activities

1. Wall Framing
2. Model Building

#### New Jersey Core Curriculum Content Standards

8.2.12.A; 8.2.12.B; 8.2.12.C; 8.2.12.D

9.4 F

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

1. Practical exam on proper use of key tools, equipment and machines.
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A focus in this unit will be following multistep processes.

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## Unit 4: Introduction to Electricity and Plumbing

### Enduring Understanding

Various considerations related to electricity and plumbing must be considered before buying a home.

### Essential Question(s)

How are decisions related to electricity and plumbing important?

When is it necessary to seek the help of a professional?

### Learning Objectives

1. Be familiar with and apply proper shop safety.
2. Know and apply proper building codes related to plumbing and electricity.
3. Draw and explain a circuit diagram.
4. Successfully and correctly wire a circuit, including switches and outlets.
5. Install proper wiring into the section of the wall.
6. Understand when a given task requires an electrician.
7. Understand how water comes into a home and how waste water leaves a home.
8. Draw and explain a plumbing installation including proper venting, traps, sizing, etc.
9. Successfully and correctly install plastic and copper pipes.
10. Compare and contrast types of heating and cooling and the benefits of each.
11. Compare and contrast the PSEG, water, and fuel oil bills of various types of heating.
12. Be able to perform common plumbing repairs such as leaky sinks and toilets.
13. Be able to perform common electrical repairs such as lighting and circuit failures.

### Suggested Activities

1. Create a model of a circuit using LED lights and install them into their model.
2. Comparison of bills and costs.

### New Jersey Core Curriculum Content Standards

8.2.12.A; 8.2.12.B; 8.2.12.C; 8.2.12.D

9.4 F

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

1. Practical exam on proper use of key tools, equipment and machines.
2. Modifications may include providing students with a template, diagrams, and additional resources for special education and ELL students.
3. Gifted students may be asked to assist their classmates in tool, equipment and machine identification.

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**Common Core Standards for English & Technical Subjects:** [9-10](#); [11-12](#):

A focus in this unit will be following multistep processes.

**\*Safety will be stressed and monitored throughout the course.**

## Unit 5: Sheet Rock & Finishing

### Enduring Understanding

There are many finishing touches which go into building and designing homes.

### Essential Question(s)

How are personal preferences related to the finishing touches on homes?

### Learning Objectives

1. Be familiar with and apply proper shop safety.
2. Know and apply proper building codes related to finishing a home.
3. Successfully and correctly sheet rock a wall.
4. Successfully perform repairs to wallboard.

### Suggested Activities

NA

### New Jersey Core Curriculum Content Standards

8.2.12.A; 8.2.12.B; 8.2.12.C; 8.2.12.D

9.4 F

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

1. Practical exam on proper use of key tools, equipment and machines.
2. Modifications may include providing students with a template, diagrams, and additional resources for special education and ELL students.
3. Gifted students may be asked to assist their classmates in tool, equipment and machine identification.

### **Cross-Content Connections:**

[Standards for Technology Literacy \(9-12\)](#)– 8 Attributes of Design, 10 Trouble Shooting, 11 Apply the Design Process, 13 Assessing the Impact, 19 Manufacturing Technology, 20 Construction Technologies

**Common Core Standards for English & Technical Subjects:** [9-10](#); [11-12](#):

A focus in this unit will be following multistep processes.

**\*Safety will be stressed and monitored throughout the course.**

## Unit 6: Finish Work

### Enduring Understanding

There are many finishing touches which go into building and designing homes.

### Essential Question(s)

How are personal preferences related to the finishing touches on homes?

### Learning Objectives

1. Be familiar with and apply proper shop safety.
2. Successfully finish a wall, including trim, molding and painting.
3. Understand the various methods of finishing and decorating a home, including tile, hardwood floor, etc.
4. Understand the differences between building a bathroom or kitchen with regard to moisture concerns.

### Suggested Activities

#### New Jersey Core Curriculum Content Standards

8.2.12.A; 8.2.12.B; 8.2.12.C; 8.2.12.D

9.4 F

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

1. Practical exam on proper use of key tools, equipment and machines.
2. Modifications may include providing students with a template, diagrams, and additional resources for special education and ELL students.
3. Gifted students may be asked to assist their classmates in tool, equipment and machine identification.

#### **Cross-Content Connections:**

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**Common Core Standards for English & Technical Subjects:** [9-10](#); [11-12](#):

A focus in this unit will be following multistep processes.

**\*Safety will be stressed and monitored throughout the course.**

## V. Course Materials

This is a hands on course.

## VI. Assessments

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

Summative assessment will be authentic in nature. Students will be asked to complete design challenges and other performance based assessments. These assignments will typically involve a design, build, test, and redesign competent. Assessment will be rubric based.

## VII. Interdisciplinary Connections and Alignment to Technology Standards

Interdisciplinary connections have been noted within each unit in the previous pages.

Careful attention will be paid in this course to form meaningful connections between the application of literacy for technical subjects, math skills and standards, career exploration, and the Next Generation Science Standards.

Engineering & Technology Education 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.



**Unit 2: What is Engineering & Design? (2-3 Weeks)**

*In this course, this unit will most likely be completed as an independent project with guidance from the teacher.*

**Enduring Understandings**

1. Engineering is the application of math and science to solve real world problems.
2. The design loop can be applied to continually improve upon their designs and ideas.

**Essential Questions:**

1. How can math and science be applied to solve real world problems?
2. How does the function of the design loop aid engineers in the design process?

**Learning Objectives:**

1. Define engineering as the application of math and science to solve real world problems.
2. Describe and apply the steps of the design loop to complete the design of a usable finished product. (8.2.12.C.1)
3. Analyze a product and describe how it has changed over time to meet human needs and wants, such as a sneaker. (8.2.12.C.2)
4. Compare and contrast the concepts of “engineering design” with “design”.
5. Apply techniques such as product poling, research, ergonomics, material selection, measurement, CADD, mechanical drawing, and/or 3D modeling to the design process. (8.2.12.C.3; 8.2.12.C.5.8.2.12.D.2, 8.2.12.D.3)

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

1. Design/Marketing Activity
2. Modifications may include providing students with a template to support the process.
3. Gifted students may be asked to present their product to an official representative or enter a contest.

**Cross-Content Connections:**

[Standards for Technology Literacy \(9-12\)](#) – 8H-K: Applying the Design Loop; 9I-K: Prototyping

**Next Generation Science Standards** - A focus in this unit will be on the [real world applications of technology](#) (HS-ETS).

**Common Core Standards for English & Technical Subjects: [9-10](#); [11-12](#):**

A focus in this unit will be following multistep processes, key idea development and craft/structure.

**Common Core Standards for Math:**

A focus in this unit will be on [geometry](#), particularly the use of right triangles.

A focus in this unit will be on [numbers and quantities](#), particularly for the use of measurement.

**Unit 3: Fields of Engineering (5-6 Weeks)**

*In this course, this unit will be completed as an independent project guided by the teacher. The student will self-select at least one area of interest to research and explore. The student will complete a design project to the specific specifications of the teacher.*

**Enduring Understandings**

1. Various fields of engineering exist.
2. Each field of engineering employs similar techniques to solve different types of problems.

**Essential Questions:**

1. How do engineers in each field apply the design loop to solve different types of problems?

**Learning Objectives:**

1. Differentiate between the focus of mechanical, electrical, civil, biomedical, chemical, and design engineering.
2. Using a specific field of engineering research an issue to develop a product.

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

1. Research based assignment related to a field of engineering.
2. Modifications may include providing students with a template or to support the process and/or design specifications with reduced variables.
3. Gifted students may be asked to complete additional steps or address additional variables.

**Cross-Content Connections:**

[Standards for Technology Literacy \(9-12\)](#)– 8H-K: Applying the Design Loop; 9I-K: Prototyping; 10I-L: Other Problem Solving Approaches

**Next Generation Science Standards** - A focus in this unit will be on the [real world applications of technology](#) (HS-ETS).

**Common Core Standards for English & Technical Subjects: [9-10](#); [11-12](#):**

A focus in this unit will be following multistep processes, key idea development and craft/structure.

**Common Core Standards for Math:**

A focus in this unit will be on [geometry](#), particularly the use of right triangles.

A focus in this unit will be on [numbers and quantities](#), particularly for the use of measurement.

**Career Readiness Practices:** A key idea in this unit is the focus on [career exploration](#) (NJCCCS 9.2).

**Unit 4: Production Line (5-6 Weeks)**

*In this course, this unit will be completed as an independent study project. The student will select at least one area of interest. The student will create a proposal which must be approved by the teacher. The student will research and design an authentic project to meet the specifications of that proposal.*

**Enduring Understandings**

1. The manufacturing of products is made more efficient properly engineer production lines.
2. Engineers consider product feasibility.

**Essential Questions:**

1. How does the material selection affect the manufacturing of a product?
2. How does the design of a product affect the features of a product line?

**Learning Objectives:**

1. Design a functional manufacturing system for a specific product.
2. Determine the feasibility of different materials and tools during the manufacturing process.
3. Develop multiples of a product within tolerance levels.

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

1. Manufacturing Project
2. Modifications may include providing students with a template or to support the process and/or design specifications with reduced variables.
3. Gifted students may be asked to complete additional steps or address additional variables.

**Cross-Content Connections:**

**Standards for Technology Literacy (9-12)**– 15 Agricultural & Related bio-technologies, 16 Energy & Power Technologies; 4 Cultural, Social, Economic, and Political Effects of Technology; 5 Effects of Technology on Environment; 6 Role of Society

**Next Generation Science Standards** - A focus in this unit will be on the [real world applications of technology](#) (HS-ETS)

**Common Core Standards for English & Technical Subjects: [9-10](#); [11-12](#):**

A focus in this unit will be following multistep processes, key idea development and craft/structure.

**Common Core Standards for Math:**

A focus in this unit will be on [geometry](#), particularly the use of right triangles.

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**Career Readiness Practices:** A key idea in this unit is the focus on [career exploration](#) (NJCCCS 9.2).

**Unit 6: Applications of Engineering (5-6 Weeks)**

*In this course, this unit will be an independent study. The student will research a local problem which may be addressed by an engineering solution. The student will attempt to make multiple community connections to resolve the problem. A culminating project will include a community based presentation which is to be approved by the teacher.*

**Enduring Understanding**

1. Engineering skills may be applied to address real world problems.

**Essential Questions:**

1. How can engineering be applied to improve a local issue?

**Learning Objectives:**

1. Identify a local engineering problem.
2. Apply the design loop to address the problem. (8.2.12.B.1, 2, 3)
3. Integrate current engineering principles to develop a reasonable solution.
4. Present a solution in a realistic situation.
5. Analyze a current technology and the resources used to identify trade off. (8.2.12.A.2)

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

1. Identification of Problem & Designing A Solution
2. Modifications may include providing students with a template or to support the process and/or design specifications with reduced variables.
3. Gifted students may be asked to complete additional steps or address additional variables.

**Cross-Content Connections:**

[Standards for Technology Literacy \(9-12\)](#)– Culmination of All

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**Common Core Standards for English & Technical Subjects:** [9-10](#); [11-12](#):

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**Career Readiness Practices:** A key idea in this unit is the focus on [career exploration](#) (NJCCCS 9.2).

## V. Course Materials

### Core (Required) Texts

Technology Engineering & Design (2008) Pearson  
*Will be used as a classroom reference book.*

Understanding Technology (1993) Goodheart-Wilcox  
*Will be used as a classroom reference book.*

## VI. Assessments

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