TN Department of Education | College, Career and Technical Education

Green Architecture (PLTW)

Primary Career Cluster:	Science, Technology, Engineering, and Mathematics (STEM)
Consultant:	Deborah Knoll, (615) 532-2844, Deborah.Knoll@tn.gov
Course Code:	0888
Prerequisite(s):	None
Credit:	N/A
Grade Level:	8
Graduation Requirement:	N/A
Coursework and Sequence:	This is a course in the *Project Lead the Way (PLTW)* middle school sequence of coursework.
Necessary Equipment:	Visit www.pltw.org for more information.
Aligned Student Organization(s):	Technology Student Association (TSA): http://www.tntsa.org Tracy Whitehead, (615) 532-2804, Tracy.Whitehead@tn.gov
Coordinating Work-Based Learning:	Teachers are encouraged to use embedded WBL activities such as informational interviewing, job shadowing, and career mentoring. For information, visit https://tn.gov/education/topic/work-based-learning
Available Student Industry Certifications:	N/A
Dual Credit or Dual Enrollment Opportunities:	N/A
Teacher Endorsement(s):	001, 007, 013, 014, 015, 016, 017, 018, (042 and 043), (042 and 044), (042 and 045), (042 and 046), (042 and 047), (042 and 077), (042 and 078), (042 and 079), (043 and 044), (043 and 045), (043 and 046), (043 and 047), (043 and 077), (043 and 078), (043 and 079), (044 and 045), (044 and 046), (044 and 047), (044 and 077), (044 and 078), (044 and 079), (045 and 046), (045 and 047), (045 and 077), (045 and 078), (045 and 079), (046 and 047), (046 and 077), (046 and 078), (046 and 079), (047 and 077), (047 and 078), (047 and 079), (077 and 078), (077 and 079), (078 and 079), 070, 081, 105, 121, 122, 123, 124, 125, 126, 127, 128, 129, 144, 145, 147, 157, 210, 211, 212, 213, 214, 230, 231, 232, 233, 400, 401, 402, 407, 413, 414, 415, 416, 417, 418, 440, 460, 461, 470, 477, 480, 481, 482, 483
Required Teacher Certifications/Training:	Teachers who have never taught this course MUST attend the training provided by PLTW and receive PLTW certification. This course has an associated fee through the vendor.
Teacher Resources:	https://tn.gov/education/article/cte-cluster-middle-school-cte-coursework

Approved April 11, 2014

Course Description

This is a course in the series of *Project Lead the Way (PLTW)* curriculum. For more information, visit the PLTW website at http://www.pltw.org/.

Program of Study Application

These courses build knowledge and skills related to the following career clusters:

1) Architecture & Construction
2) Information Technology (IT)
3) Manufacturing
4) Science, Technology, Engineering & Mathematics (STEM)
5) Transportation, Distribution, & Logistics

Course Standards

The course standards outlined below are the copyrighted property of *Project Lead the Way*. Teachers must participate in *Project Lead the Way* training in order to be able to teach this course. This course is one in a series of PLTW middle school courses. The lesson numbers below reflect the recommended sequence.

Lesson 1 – Architectural Basics (16 days)

Understandings

1) The ability to measure accurately is important at school and at home, at work, and when pursuing hobbies.
2) Precision measuring tools are needed for accuracy, but tools must be used correctly to ensure that accurate measurements are taken.
3) Quality of workmanship and accurate measurements with precise instruments are necessary to successfully solve problems.
4) The use of scale is important in design in order to create a functional space that is proportional and aesthetically pleasing to the client.
5) Dimensioning and measuring are required for any architectural project as well as many careers in related fields.
6) Area and perimeter are used to find the square footage of a floor, a wall, or the length and width needed to build the exterior of a home.
7) When designing a home, standard rules must be followed in regards to traffic flow, room sizes and relationships, and the layout of kitchens and bathrooms.
8) A set of architectural plans includes: plot plan, foundation plan, floor plan, elevations, 3-D views, and construction details.

Knowledge and Skills

It is expected that students will:

- Demonstrate the proper use of a standard ruler and an architectural scale.
- Use proper notation in regards to dimensioning an architectural drawing. Calculate area and perimeter of a floor plan given dimensions.
- Measure a room and draw it to scale using common symbols.
- Identify the systems required in a residential home, including electrical, plumbing, heating, ventilation, and air conditioning.

- Describe the three areas of a house and the rooms that belong to them.
- Identify common roof styles.
- Describe the working triangle and its purpose.
- Identify and use appropriate symbols in a basic floor plan for a residential home.
- Read and interpret a blueprint of a floor plan.

Lesson 2 – Introduction to Sustainable Architecture (12 days)

Understandings

1) Sustainable building solutions are an important part of the world today as our resources are dwindling.
2) Many different processes are used to recycle a variety of materials.
3) Researching the various recycling processes helps one better understand the requirements and the complexity of recycling processes.
4) The air we breathe inside a room can contain contaminants and particles, making it potentially dangerous for humans.
5) The health consequences of poor indoor air quality include coughs, colds, cancer, and even death.
6) Building green refers to methods of fabricating both commercial and residential structures to reduce their impact on human health and the natural environment.
7) Architectural designs are created based on the needs of humans and function of the building in relationship to the climate, region, and culture.
8) Within a local community there can be a variety of construction materials and architectural styles depending on purpose.
9) Architects, engineers, designers, and engineering technologists are in high demand for the development of future technology to meet societal needs and wants.

Knowledge and Skills

It is expected that students will:

- Communicate, using a variety of media, the effects that daily living has on the environment.
- Describe the steps of the recycling system.
- List ways to improve indoor air quality.
- Explain the consequences of poor indoor air quality.
- Categorize concepts related to building eco-friendly.
- Identify the local home styles in the region and outside of the region.
- Describe different house styles and how they can be built green.
- Provide examples of STEM careers and the need for these professionals in our society.

Lesson 3 Architectural Challenge (17 days)

Understandings

1) The ability to measure precisely and accurately is important at school and at home, at work, and when pursuing hobbies.
2) Numerous symbols are part of architectural plans. It is important to be able to identify such symbols.
3) Wood frame construction is popular because it is economical and strong.

4) Using graph paper and an architectural scale can help in the visualization of a space before the start of the prototype phase.
5) Architecture today uses computer-aided design (CAD) systems to quickly generate and annotate working drawings.
6) Three-dimensional computer modeling uses descriptive geometry, geometric relationships, and dimensions to communicate an idea or solution to a technological problem.
7) Using alternative materials in construction is beneficial to our environment.
8) Architecture and construction emphasize using environmentally friendly practices in their career fields.
9) Architects and engineers use the design process when designing and building structures.
10) Shipping containers stack up as waste unless they are repurposed; they offer many benefits as construction materials that are strong, water proof, pest proof, recycled, easy to build with, etc.
11) Creating a functional and environmentally friendly home is considered sustainable housing that could be adapted for emergency shelter in disaster areas.

Knowledge and Skills

It is expected that students will:

- Demonstrate knowledge of measurement, construction, and design.
- Identify the parts of a wall section.
- Measure accurately using a tape measure and architectural scale.
- Read and interpret a blueprint of a floor plan.
- Construct a model of the framing of a wall section.
- Demonstrate use of the Design Process including a Design Brief, Sketching, and Decision Making Matrix.
- Use Autodesk Revit Architecture to create an architectural drawing.
- Design an environmentally friendly home