

CURRICULUM OVERVIEW

Introduction to Careers in Architecture and Construction

Career and Technical Education Series



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Introduction to Careers in Architecture and Construction Course Overview

The goal of this course is to provide students with an overview of careers in Architecture and Construction in order to assist with informed career decisions. This dynamic, rapidly evolving career cluster is comprised of three pathways (fields): Design and Pre-Construction (Architecture and Engineering); Construction (Construction and Extraction); and Maintenance and Operations (Installation, Maintenance, and Repair). The Architecture and Construction career cluster is defined as careers in building, designing, managing, maintaining, and planning the built environment.

The built environment is not limited to buildings and structures—or to urban environments. A much broader view of the built environment helps students gain a better and more holistic understanding of the impact of the Architecture and Construction industries. The built environment encompasses all zones of human activity—from natural conservation areas with minimal human intervention to highly dense areas with tall skyscrapers and intricate highway systems to suburban cul-de-sacs. The interrelated components that make up the built environment are as varied and unique as the professionals who help shape it.

- **Unit 1: Introduction to Careers in Architecture and Construction:** Students will learn that shaping the built environment is an ongoing, cyclical process involving three phases (CCTC Pathways): Design and Pre-Construction, Construction, and Maintenance and Operations. All components within the built environment fall into one of these phases in the cycle—with the exception of places that are no longer in use and left to neglect. In other words, every man-made element is being designed, constructed, altered, repaired or maintained, or demolished. Components of the built environment include structures (residential, commercial, industrial, educational, recreational, institutional, etc.); site (landscaped grounds, parking lots, pathways, sidewalks, etc.); public utilities (water, sewer, streetlights, etc.) and right-of-way (public sidewalks, streets, bike lanes, etc.); civic infrastructure (bridges, canals, highways, railroads, trolleys, etc.).
- **Unit 2: Building the Future—the Art and Science of Buildings:** Students will learn that architecture and structures have often been used as symbols of the greatness, might, and power of a civilization or kingdom. Our advances in technology and art have served as metaphors for our advancement as a collective people, kingdom, or nation. The great pyramids of Egypt signaled a civilization that valued energy, the cosmos, and the afterlife above the mundane existence on the Nile. Gothic cathedrals with their spires reached for the heavens and were part of elaborate pilgrimage routes in the middle ages. The skyscraper, arguably the architectural symbol of the United States, is now a symbol of greatness and wealth around the world—and constant competition seeks to build taller and taller. Modernist architecture expressed a love for mechanization, standardization, and great design through simplicity, truth to materials, and ergonomic considerations. Today, a tall, dense skyline is one of the key markers of a world-class city. Through architecture, society defines itself and builds symbols its collective aspirations. However, to fully understand the impact of construction, we must understand the breath of typologies and sectors of the construction industry. This unit explores architecture's love affair with technology, science, and innovation. It explores the art and science of building, through the professions that have been most influential: the architect and the engineer.

- **Unit 3: Green Jobs in Architecture and Construction:** Students will learn that the building industry consumes a tremendous amount of resources, contributes significantly to landfills, and produces a large percentage of the world's greenhouse gases. The U.S. Green Building Council reported that in 2008, buildings accounted for 30%-40% of the world's energy use and associated greenhouse gas emissions. Building construction is responsible for half of the U.S.'s total greenhouse emissions and close to one-third of its solid waste stream. The practice of sustainable design is referred to as green building. Green construction has grown dramatically to form a large sector of the economy. Fundamentally, green building takes into account energy efficiency, building in accordance with climate (not against it), using natural sources of energy (sun, wind, water, air), and using materials that are sustainable, renewable, and reusable. Green building accounts for and considers the life cycle of a building from cradle to grave, including logistics and transport of materials used in buildings, construction site management, and the energy efficiency of the building itself. No single agency has had a more profound impact on green building than the U.S. Green Building Council (USGBC) and their LEED (Leadership in Energy and Environmental Design) rating program for construction projects and professionals. Currently the USGBC boasts 76 chapters, 13,000-member companies and organizations, and more than 181,000 professionals who hold LEED credentials. Buildings are assessed on a project scorecard tallying up points in various categories.
- **Unit 4: The Arts and the Built Environment:** Jobs For Creatives: Students will learn that creativity and artistic expression are not solely the responsibility and purview of the architect. Aside from problem solving skills, there are many careers in Architecture & Construction, often considered specialties, which employ creative skills and artistic personality types. From illustrators using computer animation, to an ironworker commissioned to create a one-of-a-kind ornamental fence, to a preservation tradesman skilled in historic construction methods, there are many careers that range from conceptually driven technology to hands-on artistry. Fundamental to these highly specialized careers in all pathways of Architecture & Construction is the interdisciplinary integration of history, the building arts, the visual arts, botany, and fashion to create a unique product.
- **Unit 5: Building the City:** Students will learn that a building does not exist in isolation. A building exists not only on its site and in relation to its landscape, but also in relation to other buildings and often to a cityscape or an agricultural area. Even if there is not another structure or person for miles, an infrastructure connects that building to a port, village, town, urban center, or metropolis. The idea of urbanization dates back to the first settlements of the Bronze Age over 6,000 years ago. Ever since societies shifted from nomadic, hunter-gatherer tribes to sedentary, agricultural societies, there have been urban centers. The Roman Empire marks the true beginning of civic building and the unofficial beginnings of the profession of civil engineering with the building of these streets, public aqueducts, bridges, and ports. Urban planners are a relatively new profession when compared to the history of human urbanization itself. Professionals working in the field are guided by fundamental concepts of planning, working with civil engineers to create vibrant spaces for people and communities.

Intro. to Careers in Architecture and Construction	Unit 1: Introduction to Careers in Architecture and Construction	
	Assignments	
	1. Course Overview	11. Project: Learning to Teach Others About What You Know
	2. Design and Pre-Construction: The Field at a Glance	12. The Bigger Picture: The Role of Architecture and Construction in the US Economy
	3. Project: Exploring Nonprofit Construction	13. Quiz 2: How You Can Shape the Built Environment
	4. Construction Site Management	14. Special Project*
	5. Project: Analyze a Local Construction Project	15. Test
	6. Maintenance and Operations	16. Course Project Part 1: Architecture and Construction: Industry and Careers in Focus*
	7. Quiz 1: Pathways: The Built Environment as an Interrelated System	17. Glossary and Credits
	8. Department of Labor O*NET Career Tools	
	9. Project: Maker Essay	
	10. Job Zones and Resources	
Intro. to Careers in Architecture and Construction	Unit 2: Building the Future: the Art and Science of Buildings	
	Assignments	
	1. The Architect and Engineer	9. Commercial Construction
	2. Project: Visualization for Architects and Engineers	10. The Role of Innovation in the Built Environment
	3. Education for Licensed Professions: Architects and Engineers	11. Project: Materials
	4. The Design-Build Revolution	12. Quiz 2: The Evolution of Buildings
	5. Project: Design Professionals Doing Humanitarian Work	13. Special Project*
	6. Quiz 1: The Architect and the Engineer	14. Test
	7. Residential Construction	15. Course Project Part 2: Understanding LEED Certification and Green Building: Preparing Your Building for LEED Certification*
	8. Project: New Directions in Residential Construction	16. Glossary and Credits
Intro. to Careers in Architecture and Construction	Unit 3: Green Jobs in Architecture and Construction	
	Assignments	
	1. Green Building	9. Project: Preparing Your Own Emergency Kit
	2. Regulation and Assessment of Green Building	10. Green Certification and Green Skills
	3. Project: Find a LEED Certified Building and Analyze It	11. Project: Design a New School Locker
	4. Research and Development and its Impact on Green Building and Construction	12. Quiz 2: Green Jobs
	5. Project: Home Energy Audit Assignment	13. Special Project
	6. Quiz 1: The Green Economy	14. Test
	7. Green Economy	15. Course Project Part 3: Courses of Study for Architecture and Construction Careers
	8. Green Jobs	16. Glossary and Credits
Intro. to Careers in Architecture and Construction	Unit 4: The Arts and the Built Environment: Jobs for Creatives	
	Assignments	
	1. Pre-Construction and Design Specialists	9. The Trades: The Almost-Lost Arts of Master Craftsmen
	2. Project: Landscape Architecture in Large-Scale Action Essay	10. Project: Master Craftsmen Resources
	3. Interdisciplinary Work Within Specializations	11. The Future of the Past
	4. Project: Drawing and Geometry: Sketching Exercise	12. Quiz 2: History and Tradition of the Building Arts
	5. The Role of Art, History, and Research in Design	13. Special Project*
	6. Quiz 1: Pre-Construction and Design Specialists	14. Test
	7. Historical Research and Preservation in Architecture and Construction	15. Course Project Part 4: Sustainable Development Presentation*
	8. Project: National Register of Historic Places Project	16. Glossary and Credits

Unit 5: Building the City	
Intro. to Careers in Architecture and Construction	Assignments
	1. Planning
	2. Project: Future City Design
	3. Zoning
	4. Project: Retrofitting Urban Sprawl Assignment
	5. Overview of Prevailing Planning Trends
	6. Quiz 1: Planning
	7. Evolution of Civil Engineering
	8. Project: Tinkercad 3D Modeling Assignment
	9. Environmental and Civil Engineering
Intro. to Careers in Architecture and Construction	10. Project: The Well-Photographed Bridge Assignment
	11. The Need for Resilient Infrastructure
	12. Quiz 2: Civil Engineering
	13. Special Project*
	14. Test
	15. Course Project Part 5: Computer-Aided Design and You*
	16. Glossary and Credits
Unit 6: Course Review, and Exam	
ICAC	Assignments
	1. Course Project Part 6: Now That You Know: Where Do You See Yourself in the Architecture and Construction Career Cluster?*
	2. Review
	3. Exam

(*) Indicates alternative assignment