

**CAREER
PATHS**

Adrian Hanson PhD
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CIVIL ENGINEERING



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Book

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Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	The Civil Engineer	Webpage	civil engineering, construction, design, environment, geotechnical engineering, maintenance, municipal engineering, structural engineering, water resources engineering	Asking about experience
2	Numbers and Basic Math	Chart	add, comes to, divide by, equals, -hundred, is, less, minus, multiply by, over, plus, subtract, times	Apologizing for an error
3	Analyzing Quantities	Textbook excerpt	convert, decimal number, fraction, mixed number, – out of –, percent, point, quantity, reduce, whole number	Asking about progress
4	Describing Change	Report	decline, decrease, expand, fluctuate, increase, plummet, rise, shrink, skyrocket, stabilize	Describing change
5	Measurements 1	Survey	acre, area, distance, hectare, imperial, kilometer, meter, metric, mile, yard	Asking for clarification
6	Measurements 2	Conversion guide	Celsius, Fahrenheit, gallon, gram, kilogram, liter, ounce, pound, temperature, volume, weight	Checking accuracy
7	SI Units	Textbook excerpt	amount, ampere, base unit, cubic meter, current, derived unit, joule, kelvin, mole, SI units, square meter, temperature, watt	Giving a reminder
8	Large Numbers	Employee manual	cubed, exponent, integer, leading zero, rounding error, scientific notation, significant figure, squared, to the nth power, trailing zero	Expressing uncertainty
9	Community and Regional Planning	Newspaper article	community, expand, growth, neighborhood, projection, reconstruction, region, urban planning, urban sprawl	Describing possibility
10	Land Use Planning	Webpage	environmental planning, industrial, PEST analysis, proposal, residential, situation, smart growth, strategic planning, sustainable, target	Making a recommendation
11	Transportation Planning	Report	bike lane, bus, commuter rail, mode choice, rapid transit, route assignment, subway, trip distribution, trip generation, walkable	Asking for an opinion
12	Construction Materials 1	Product listing	aluminum, brick, cinder block, concrete, glass, lumber, plastic, rebar, rubber, steel	Reviewing information
13	Construction Materials 2	Email	brittle, conductor, ductile, insulator, malleable, opaque, plastic, rough, smooth, transparent	Emphasizing a point
14	Structural Engineering 1	Textbook excerpt	arch, architecture, beam, catenary, column, element, floor, load, plate, shell, structure	Expressing concerns
15	Structural Engineering 2	Article	earthquake engineering, façade engineering, fire engineering, fire exit, hazard, heat loss, sprinkler system, tower engineering, wind engineering, withstand	Asking for an example

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Scope and sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Accounting	Textbook excerpt	closed system, consumption, extensive quantity, final, generation, initial, input, intensive quantity, open system, output, system, universal accounting equation	Estimating
2	Rate Processes	Report	diameter, driving force, flow rate, flux, inlet, outlet, pressure, rate, rate process, resistance, viscosity	Offering an opinion
3	Problem Solving	Email	analysis, approach, attack, iteration, iterative, problem identification, problem solving, procedure, redefine, solution, synthesis	Making a suggestion
4	Statistics	Textbook excerpt	event, independent, intersection, median, mutually exclusive, outcome, population, probability, range, sample, sample space, statistics, union	Requesting an explanation
5	Surveying	Work order	adjacent, face, figure ground study, level, locality, mapping, measure, orientation, serial vision, site analysis, site survey, topographic survey	Agreeing
6	Earthworks 1	Webpage	concrete slurry, deposit, dig, excavation, haul, interlocking sheet piling, payline, sloping, soil swell, steel soldier pile, tieback, timber sheeting	Discussing options
7	Earthworks 2	Advertisement	backhoe, blade, bulldozer, caterpillar tracks, clamshell, dragline, excavator, loader, off-highway tires, ripper, scraper, tractor shovel	Describing necessity
8	Geotechnical Engineering 1	Email	clay, coarse-grain, composition, drill rig, fine-grain, gravel, sand, silt, soil, soil profile, subsurface investigation, test pit	Recommending
9	Geotechnical Engineering 2	Textbook excerpt	bearing pile, building load, cast-in-place pile, deep foundation, drilled foundation, driven foundation, footing, foundation, friction pile, mat-slab foundation, shallow foundation, slab-on-grade	Reaching a decision
10	Wood Construction	Email	dead load, deflection, glued-laminated timber, glulam rivet, live load, pin-type connection, shear plate, split-ring connector, timber connectors, truss plate	Expressing concern
11	Steel Construction	Inspection report	anchor bolt, bearing plate, bearing-type connection, bolting, erection mark, fillet weld, friction-type connection, girder, groove weld, member, section shape, steel frame	Asking for a recommendation
12	Concrete Construction	Work order	concrete frame, coupler, cover, lap splice, mechanical splice, precast, prestressed, splice, tensile strength, welded splice, welded wire reinforcing, wire mesh	Estimating time
13	Construction Management	Job posting	bid, break ground, contract, contractor, crew, foreman, framing, inspection, installation, phase, plumbing, walkthrough, wiring installation	Reporting progress
14	Construction Regulations	Emails	building occupancy classification, building permit, code, easement, FAR, frontage, impervious surface, ordinance, regulation, septic analysis, setback, zoning	Giving reassurance
15	Prints, Drawings and Models	Course description	bird's-eye view, blueline print, CAD drawing, concept model, cross section, detail drawing, detail model, drafting, elevation drawing, orthographic projection, overhead, section drawing	Expressing certainty

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Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Roads and Highways 1	Report	breakdown lane, cambered, curb, divider, drainage, exit, guardrail, gutter, lane, median, ramp, roadway, shoulder, sidewalk, storm drain	Delivering bad news
2	Roads and Highways 2	Email	corner, corrosion, cracking, flexible pavement, interchange, intersection, jointed reinforced concrete, rigid pavement, rolled asphalt, roundabout, slippage, T-junction, 4-way	Discussing progress
3	Bridges 1	Textbook excerpt	abutment, beam bridge, cable, cable-stayed bridge, cantilever bridge, cantilever, double-decked bridge, moveable bridge, simply supported, suspension bridge	Discussing possibility
4	Bridges 2	Inspection report	anchor span, approach span, bent cap, bent, deck, end bent, hammerhead pier, parapet, pier, shrinkage crack, spall, structural crack	Reacting to good news
5	Tunnels	Webpage	blast, bored tunnel, box-jacking, cut-and-cover tunnel, drill, geotechnical investigation, groundwater control, lighting, pipe-jacking, stand-up time, tunnel, ventilation	Asking for an opinion
6	Airports	Email	arrival, Class B airspace, Class C airspace, Class I airport, Class II airport, clearway, concourse, control tower, departure, fuel depot, hangar, runway, stopping distance, taxiway, terminal	Expressing uncertainty
7	Railways 1	Job description	ballast, base plate, creep, foot, gauge, grade, head, lay, rail anchor, rail, substructure, tie, track	Asking about experience
8	Railways 2	Textbook excerpt	ABS, ATO, block, connection, crossing, CTC, depot, freight train, line, passenger train, platform, signaling, station, switch	Making a suggestion
9	Port Engineering	Letter	camel, container shipping, dock, feeder, Feedermax, fender, geared, gemini crane, mooring, port, quay, RO/RO vessel, tanker, tide, ULCV, wave	Asking about certainty
10	Resources and Environment 1	Pamphlet	coal, extract, geothermal power, log, mine, natural gas, nuclear power, oil, ore, petroleum, resources, solar power, sustainable, timber, wind power	Describing hypothetical situations
11	Resources and Environment 2	Journal article	combustion, energy recovery, fly ash, incinerate, post-consumer waste, pre-consumer, primary recycling, recycle, remanufacturing, resource recovery, secondary recycling, waste-to-energy combustion	Discussing results
12	Water Supply and Flow	Textbook chapter	aquifer, bend, critical depth, culvert, dam, fluid mechanics, laminar flow, open channel, reservoir, slope, subcritical flow, supercritical flow, turbulent flow	Asking for clarification
13	Water Service	Guide	backfill, burial depth, floor penetration, groundwater, pipe, sleeve, stub out, trench, trickle indicator, wall penetration, water main, water meter, water service	Describing problems
14	Pollution Prevention	Report	coal-fired power plant, composite liner, cultural eutrophication, FBC, gas desulphurization, heavy metal, methane recovery, non-point source, point source, runoff, scrubber, solid waste landfill, VOC	Discussing priorities
15	Sewers and Water Treatment	Newspaper article	activated sludge, aeration, BOD, coagulation, disinfection contact, filtration, flocculation, primary treatment, recarbonation, screening, secondary treatment, sedimentation, sewer, sludge bioreactor, treatment plant	Describing benefits

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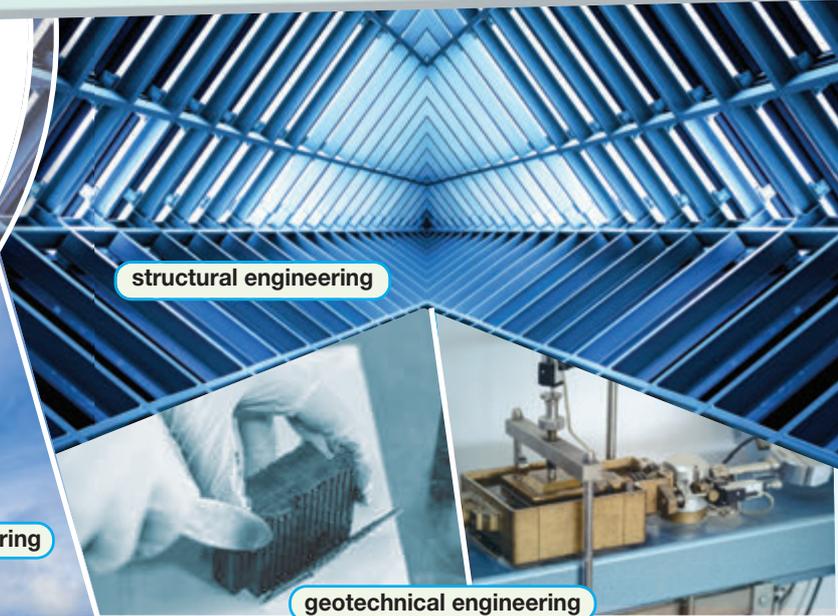
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1 The Civil Engineer

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some of the job duties of a civil engineer?
- 2 What are some types of engineering used when working on projects?



Reading

2 Read the webpage. Then, mark the following statements as true (T) or false (F).

- 1 The structural engineering sector builds bridges and dams.
- 2 The engineering firm's designs are uniform and identical.
- 3 The structural engineering branch decreases the need for maintenance.

Vocabulary

3 Match the words or phrases (1-5) with the definitions (A-E).

- 1 civil engineering
 - 2 municipal engineering
 - 3 structural engineering
 - 4 geotechnical engineering
 - 5 water resource engineering
- A the design of structures meant to hold weight
B the design of structures in a city
C the design that incorporates materials from the earth
D the design of structures that control the movement of water
E the designing and building of physical structures

Quality Civil Engineering Services for Reasonable Prices

- 1 Our **municipal engineering** sector builds streets and sidewalks. Each **design** is unique and practical. The small components combine to create one convenient system.
- 2 We also build bridges and dams. The **water resources engineering** division does this work. Their structures control the movement of water efficiently.
- 3 The **structural engineering** branch analyzes structures that support loads. It designs buildings that are strong and durable. As a result, they require minimal **maintenance**.
- 4 Our **geotechnical engineering** sector selects building materials. It also decides where to build a **construction**. Each structure fits naturally into its surrounding **environment**.

4 Read the sentence pairs. Choose which word best fits each blank.

1 construction / design

A The first step in engineering is creating the _____.

B The actual building of the structure is the _____.

2 maintenance / environment

A The upkeep of structures is _____.

B The surroundings of the structures is the _____.

5 Listen and read the webpage again. What work does an urban engineer do?

Listening

6 Listen to a conversation between an interviewer and a civil engineer. Check (✓) the information that is mentioned during the interview.

- 1 Work experience
- 2 Design examples
- 3 Salary
- 4 Job duties
- 5 Length of time at job

7 Listen again and complete the conversation.

Interviewer: Good morning, Ms. Weller. Thank you for coming in for an **1** _____ today.

Engineer: No problem. Thank you for seeing me.

Interviewer: First, I'd like to know about your **2** _____ in engineering.

Engineer: Well, I worked for a **3** _____ firm for five years.

Interviewer: That's great. What did you work on specifically there?

Engineer: I drafted **4** _____ for buildings.

Interviewer: How long did it take you to design each **5** _____?

Engineer: It took about **6** _____ for each one.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I'd like to know about your experience in ...

What did you work on there?

How long did it take you to ...?

Student A: You are an interviewer for an engineering firm. Talk to Student B about:

- what experience he or she has
- how long he or she worked for past employers
- duties at his or her previous job

Student B: You are a civil engineer. Talk to Student A about your past work experience.

Writing

9 Use the conversation from Task 8 to complete the interviewer's notes.

Interview Questions for Engineering Firm Applicant

What is the applicant's name?

How many years of work experience does the applicant have?

What type of work experience does the applicant have?

Glossary

acre [N-COUNT-U5] An **acre** is a unit of land that is the same as 4,840 square yards.

add [V-T-U2] To **add** a number to another number is to increase it by that amount.

aluminum [N-UNCOUNT-U12] **Aluminum** is a bluish silver-white metal that reflects light easily, and is the most plentiful metal in the earth's crust.

amount [N-COUNT-U7] An **amount** is a quantity of something.

ampere [N-COUNT-U7] An **ampere** is a unit that measures electricity.

arch [N-COUNT-U14] An **arch** is a curved structure with straight sides that supports the weight of something such as a bridge.

architecture [N-UNCOUNT-U14] **Architecture** is the study and practice of planning and designing buildings and structures.

area [N-COUNT-U5] **Area** is the measurement of the extent of land or a surface.

base unit [N-COUNT-U7] A **base unit** is a basic unit of measurement from which all other units are obtained.

beam [N-COUNT-U14] A **beam** is a long, heavy piece of wood or metal that supports a roof or forms part of a structure.

bike lane [N-COUNT-U11] A **bike lane** is a route, often beside a roadway, marked solely for use by persons riding bicycles.

brick [N-COUNT-U12] A **brick** is a rectangular building material made of hardened clay.

brittle [ADJ-U13] If something is **brittle**, it is easily broken or damaged.

bus [N-COUNT-U11] A **bus** is a large vehicle that transfers passengers along a set route for a fixed price.

catenary [N-COUNT-U14] A **catenary** is a U-shaped curve, formed by a chain or cable that is supported at either end.

Celsius [N-UNCOUNT-U6] **Celsius** is a temperature scale on which water freezes at zero degrees and boils at one hundred degrees.

cinder block [N-COUNT-U12] A **cinder block** is a building material made of cement and coal, known for its rectangular shape and its unfilled spaces.

civil engineering [N-UNCOUNT-U1] **Civil engineering** is the type of engineering that involves the designing and building of physical structures such as roads, bridges, and buildings.

column [N-COUNT-U14] A **column** is a tall, thick, upright post that supports a building's roof or ceiling or that is used for decoration.

comes to [PHRASE-U6] To **come to** a number is to amount to the same value as that number.

community [N-COUNT-U9] A **community** is a group of people residing in the same region or neighborhood.

commuter rail [N-COUNT-U11] A **commuter rail** is a train system that runs between a city center and outlying suburban towns.

concrete [N-UNCOUNT-U12] **Concrete** is a strong building material made of cement mixed with sand or gravel, and water, which helps bind the materials.

conductor [N-COUNT-U13] A **conductor** is an object that allows energy, such as heat or sound, to move easily.

construction [N-COUNT-U1] A **construction** is a (usually) large structure that has been built.

convert [V-T-U3] To **convert** a number is to change its form. For example, changing a number from a fraction to a percent. $5/10$ equals $50/100$ which equals 50%.

cubed [ADJ-U8] If a number is **cubed**, it is multiplied by itself three times. For instance, 2 cubed (2^3) is 8 because $2 \times 2 \times 2 = 8$.

cubic meter [N-COUNT-U7] A **cubic meter** is a unit to measure volume of a cube that is 1m on each side and is equal to 1,000 liters.

current [N-COUNT-U7] A **current** is the flow or movement of water, electricity or air.

The logo for 'Career Paths' is located in the top left corner. It features the words 'CAREER' and 'PATHS' stacked vertically in a stylized, bold font. The text is white with a dark outline, set against a dark green background that has a vertical yellow stripe.The title 'CIVIL ENGINEERING' is prominently displayed in the center. 'CIVIL' is in a smaller, teal-colored font, while 'ENGINEERING' is in a much larger, bold, black font. To the right of the title is a stylized illustration of a city skyline with several buildings of varying heights and window patterns, rendered in a dark teal color.

Career Paths: Civil Engineering is a new educational resource for civil engineering professionals who want to improve their English communication in a work environment. Incorporating career-specific vocabulary and contexts, each unit offers step-by-step instruction that immerses students in the four key language components: reading, listening, speaking, and writing. **Career Paths: Civil Engineering** addresses topics including measurements, materials, systems design, quality control, and career options. The series is organized into three levels of difficulty and offers a minimum of 400 vocabulary terms and phrases. Every unit includes a test of reading comprehension, vocabulary, and listening skills, and leads students through written and oral production.

Included Features:

- A variety of realistic reading passages
- Career-specific dialogues
- 45 reading and listening comprehension checks
- Over 400 vocabulary terms and phrases
- Guided speaking and writing exercises
- Complete glossary of terms and phrases

The **Teacher's Guide** contains teacher's notes, a full answer key and audio scripts.

The **audio CDs** contain all recorded material.

Adrian Hanson, PhD, PE, BCEE has been a professor in Civil Engineering at New Mexico State University for twenty-four years. Prior to that, he worked as an engineer in Minnesota and is registered in Minnesota and New Mexico. He holds a Ph.D. in Sanitary Engineering, a Master of Science in Civil and Environmental Engineering, a Bachelor of Engineering in Civil Engineering, and a Bachelor of Science in Mathematics.



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