Abstract of
ENGINEERING NOTEBOOK

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CITY SHAPER℠

HANDS ON TECHNOLOGY

Meet the Experts!

AZIZA

Civil engineer, Architect
Expertise: Making buildings fit surroundings
Creating sustainable buildings and public places
Goals: Help people enjoy beauty of nature

JESSICA

Architect
Expertise: Designing and constructing hospitals
Goals: Make buildings and public spaces that are accessible and functional for everyone by looking at the world through the eyes of people with different abilities

WEI

Civil Engineer, Environmental Engineer
Expertise: Designing building envelopes that allow the correct flow of air, heat and humidity
Goals: Create energy efficient buildings that keep people comfortable

LELLI

Structural Engineer, Professor
Expertise: Designing buildings and structures to resist earthquakes
Goals: Ensure that people and the things survive earthquakes by testing structural designs and inspecting how seismic damage occurs

Project Spark 1

Site: Sapmi Region in Scandinavia

Location: 50 km (30 mi) south of the Arctic Circle

Conditions: Gentle hills, thick forest. Extreme weather from - 16° C (3° F) til 3° C (37° F), snowfall up to 225 days a year.

Client: European hotel chain

Needs: New hotel

Goals: Guests feel like part of the forest with comforts of home. Keep views and don't disturb settings.

The game

The "Treehouse" mission demonstrates how architects solved the problem of the forest hotel. Their solution was a series of treehouses that seem to float in midair.

Project Spark 2

Site: Northeast United States

Conditions: Flat ground with a few rolling hills. Easy access for people, material and equipment

Client: Townspeople

Needs: Redesign and update an old playground

Goals: Playground equipment that can be used by everyone

The game

The "Swing" Mission shows you exactly how architects and engineers solved this problem: a swing built just for a wheelchair!

Project Spark 3

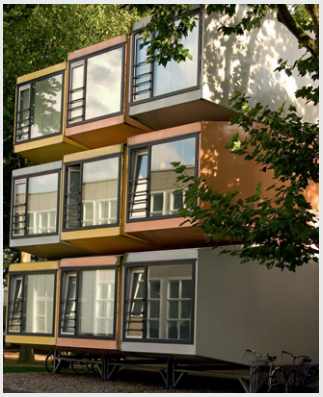
Site: Valparaíso Region on the coast of Chile.

Conditions: Steep, beachfront property with difficult access for builders. Prone to earthquakes.

Client: Homebuyers in Coastal Chile

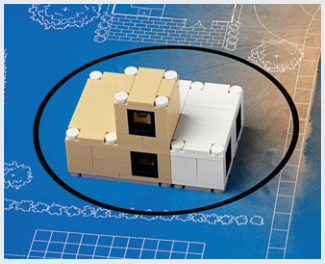
Needs: Affordable housing that can be constructed quickly.

Goals: Energy efficient homes that meet local building codes for earthquake safety.



The game

The “Building Units” Mission shows a great way to build homes swiftly. Modular construction is a way to create sections of a building in a factory that can be assembled quickly at the building site.



Project Spark 4

Site: Midwest United States

Conditions: Mainly flat prairie land with numerous lakes, rivers and streams.

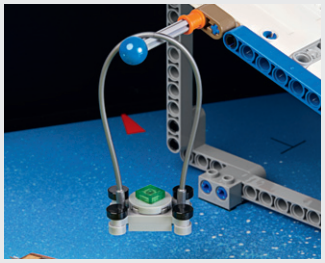
Client: State Department of Transportation

Needs: Inspection of about 20,000 road bridges.

Goals: Conduct inspections quickly and safely for as little cost as possible.

The game

The “Inspection Camera Drone” Mission reveals an inexpensive way to check out bridges and other tall structures. Drones can fly for hours and send back detailed pictures and even 3D scans.



APPENDIX

- **Architecture** – the art and science of planning, designing, and constructing buildings, structures and spaces
- **Engineering** – the use of mathematics, science and technology to create products and systems to improve the world
- **Vitruvius** – one of the first architects to develop a systematic approach to design – advised that building designs should strive for strength, usefulness, and beauty
- **Building** – a human-made assembly with a roof and walls intended as a place for people to live, work or play
- **Structure** – a system of connected parts used to support a weight or a load that is not designed for continuous human use
- **Public space** – an area or place that is open and accessible to all people
  Examples: plazas, squares and parks, and connecting spaces like sidewalks and streets
- **Site survey** – the process of selecting and developing the best available location for a building or structure
  Example factors: topography, landforms, drainage, community and environmental impact
- **Infrastructure** – the fundamental services that supply a place with modern the facilities necessary for its society to function
  Examples: roads, bridges, tunnels, waterways, water and sewer; electrical grids, and telecommunications (including Internet)
- **Modular building** – a design and build process that involves creating sections of a building away from the construction site, and then delivering the sections to the site for permanent construction
- **Inspection drone** – a small remotely-operated unmanned aerial vehicle (UAV) that can be employed to inspect bridges and infrastructure using high-definition cameras and other sensors; can serve as a cheaper and safer way to conduct some inspections
- **Tree house** – a structure or building constructed adjacent to or among a tree or trees; can be designed for play or leisure, or give people a more authentic experience when visiting forest areas for "eco-tourism"
- **Accessibility (in architecture)** – ensuring that building design and construction addresses the needs of potential users, with special emphasis placed on meeting the requirements for people of all levels of physical, cognitive, emotional and health abilities
- **Architect** - a professional skilled in the art and science of the design and construction of buildings and structures; architects decide how buildings will look
  Example factors: client needs, energy and cost efficient, strong and durable
- **Client** – the customer or user for whom a building or structure is designed and built
- **Civil engineer** – a professional who designs and constructs public and private infrastructure projects
  Examples: roads, buildings, airports, tunnels, dams, bridges, and systems for water supply and sewage treatment
- **Structural engineer** – a professional who use math, science and engineering principles to make sure that forces won't damage or destroy a building or structure
- **Environmental engineer** – a professional who protects people from negative environmental effects
  Examples: reduce air and water pollution, and improve recycling, waste disposal, and overall public health