



**Faculty of Science and Technology  
Common Core of Science and  
Mohamed Khider University of Biskra  
Technology**

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# **Civil Engineering**

**Matter : Careers in Science and Technology 2**

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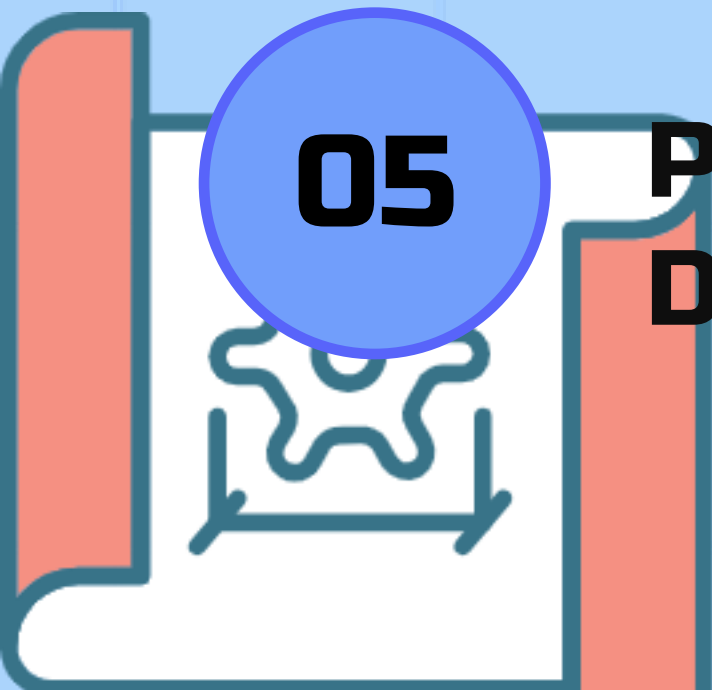
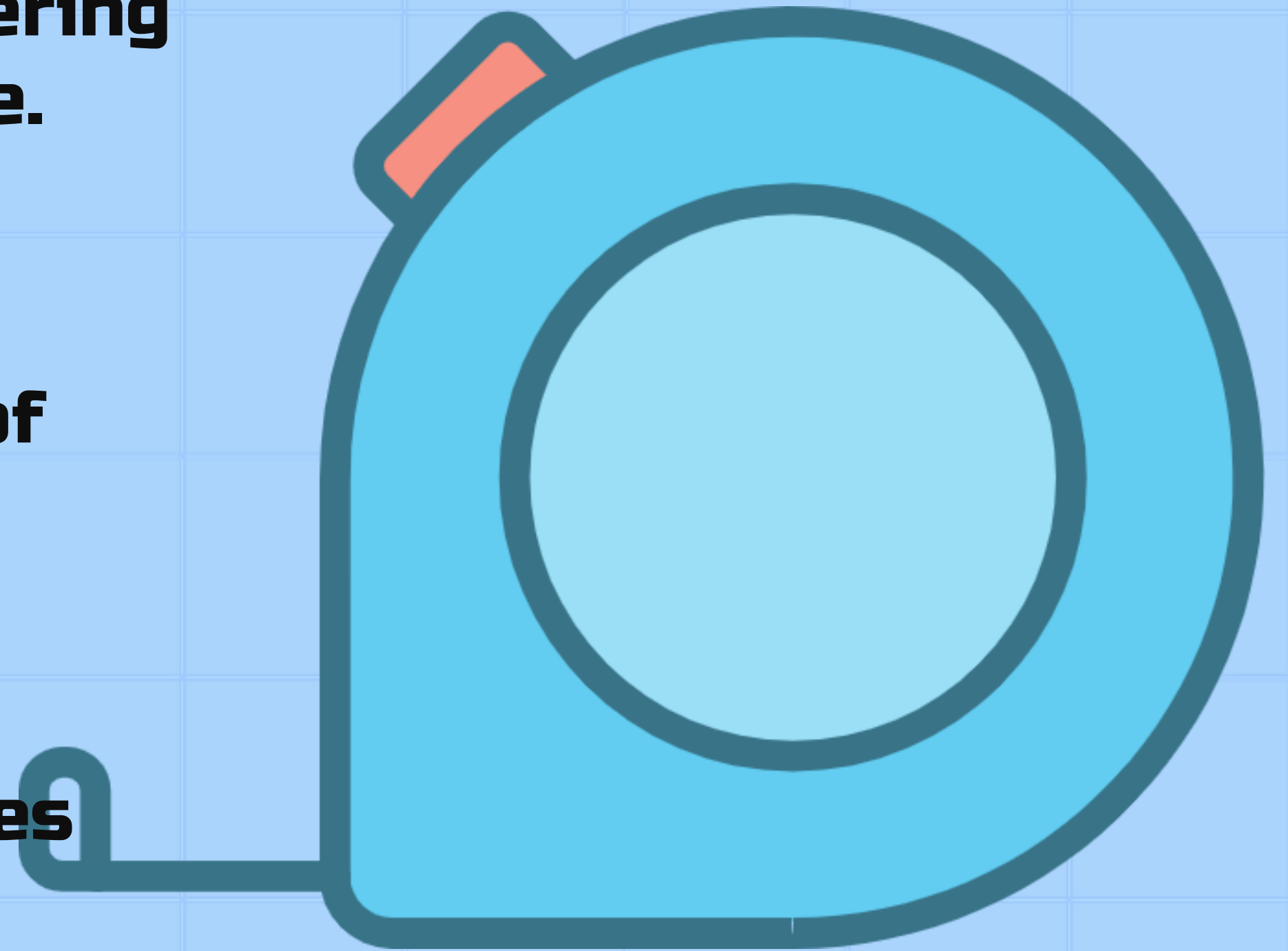
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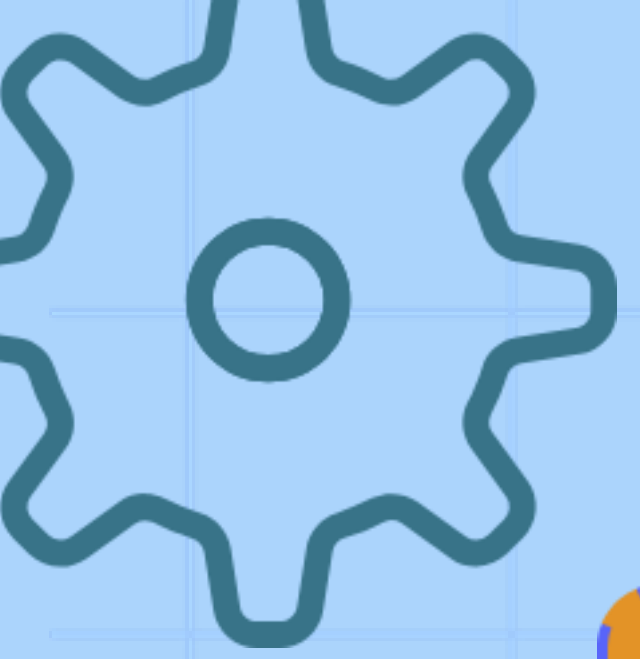
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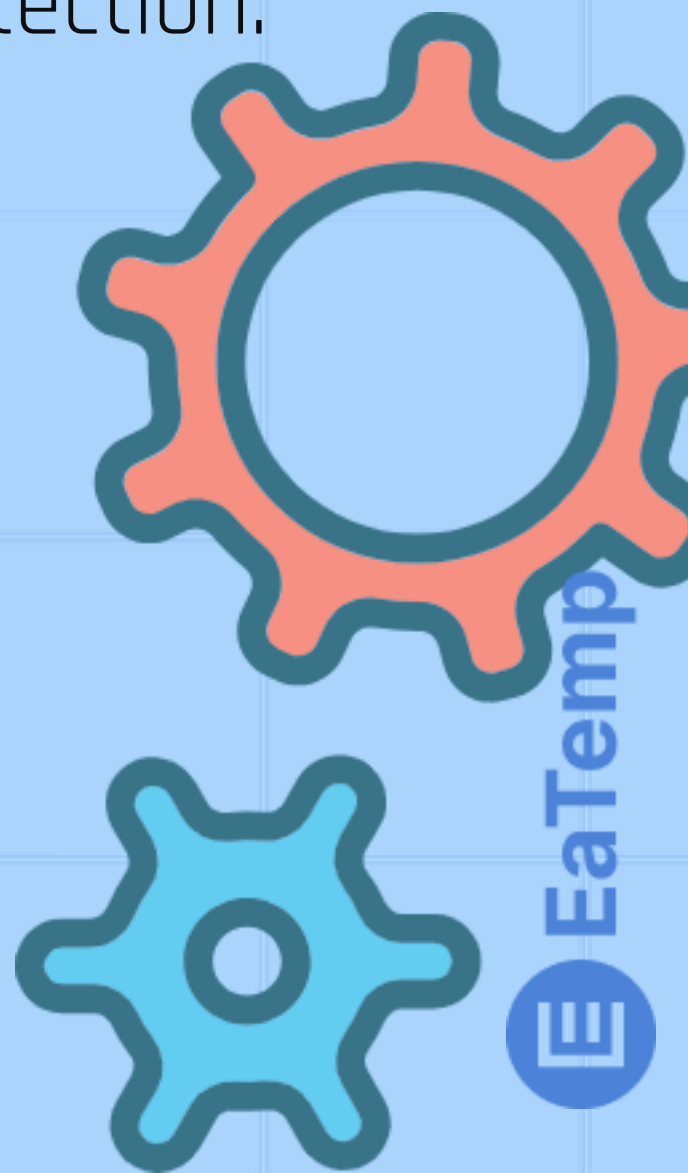




# What is the Civil engineering ?

Civil engineering is the art and science of designing, constructing, and maintaining infrastructure and buildings. It encompasses a set of techniques and engineering principles used to create structures on the ground, making them taller, larger, and more durable. This field includes the construction of essential infrastructures such as buildings, bridges,..... Civil engineers ensure that these structures are safe, sustainable, and efficient, contributing to the development and advancement of modern society.

Civil engineers, or civil engineering professionals, are responsible for the design, construction, operation, and rehabilitation of buildings and infrastructure. They manage these projects to meet societal needs while ensuring public safety and environmental protection.







## Architect

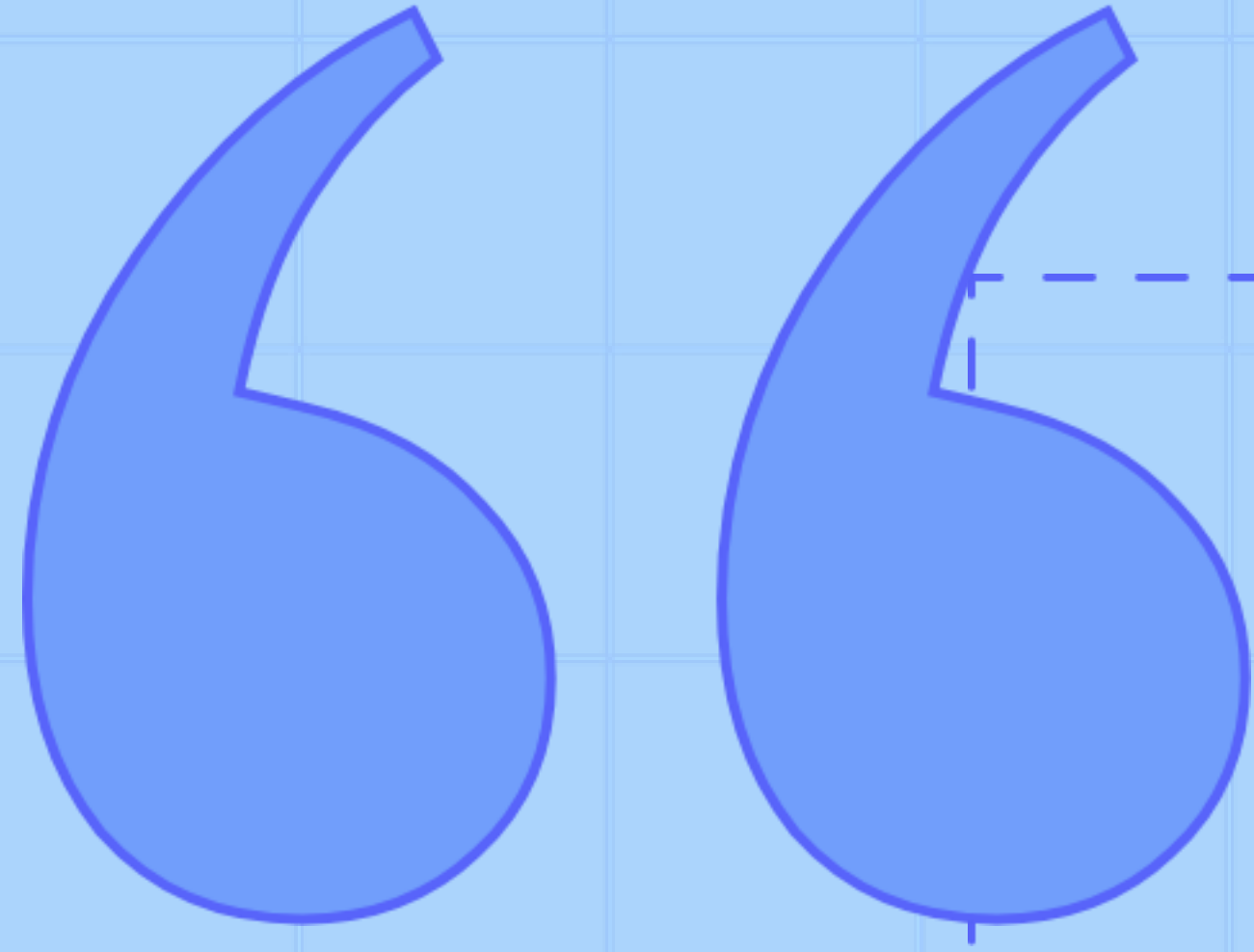


## Civil Engineer

An architect creates the vision and aesthetics of a building, while a civil engineer ensures that the design can be built safely and efficiently. They often work together to bring projects to life.







**Materials are substances used for manufacturing, construction, and production. They can be natural or synthetic and are classified based on properties like strength, durability, and flexibility. Common types include metals, polymers, ceramics, and composites, each serving specific industrial purposes.**





# classification of materials.

## Science-based Classification

### Metals, Polymers, and Ceramics

This classification focuses on the material's atomic structure, properties, and behavior in various scientific contexts.

## Construction Materials

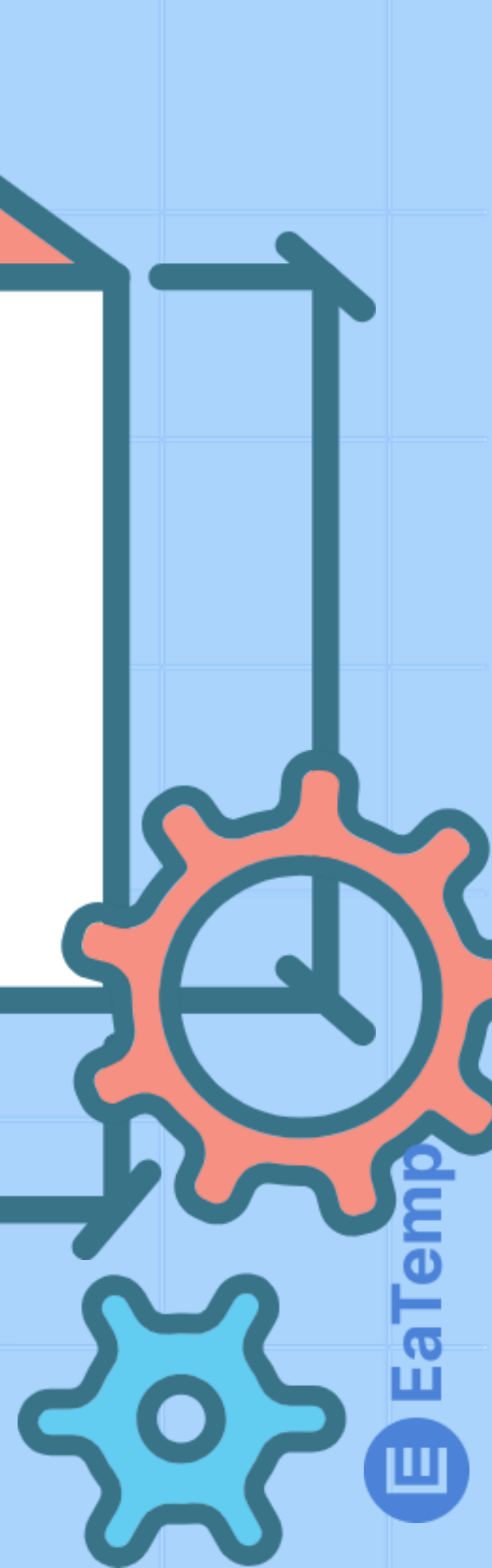
### Wood, Bricks, Glass

These are materials used specifically for building structures and infrastructure. They are chosen for strength, durability, and cost-efficiency.

## Protection Materials

### Paint, One-coat, and Plaster

These materials are primarily used for safeguarding or insulating against various environmental factors.



# Public Works and Developments

The public works and infrastructure development sector encompasses all companies involved in the construction and maintenance of essential facilities and infrastructure, including:

**01**

Roads and utility networks  
(water supply, sanitation,  
and pipelines)

**02**

Water storage  
structures (dams,  
reservoirs)

**07**

Agricultural engineering  
works

**03**

Earthworks, surveying,  
and drilling

**04**

Transportation  
infrastructure  
(railways, waterways,  
airfields, and ports)

**08**

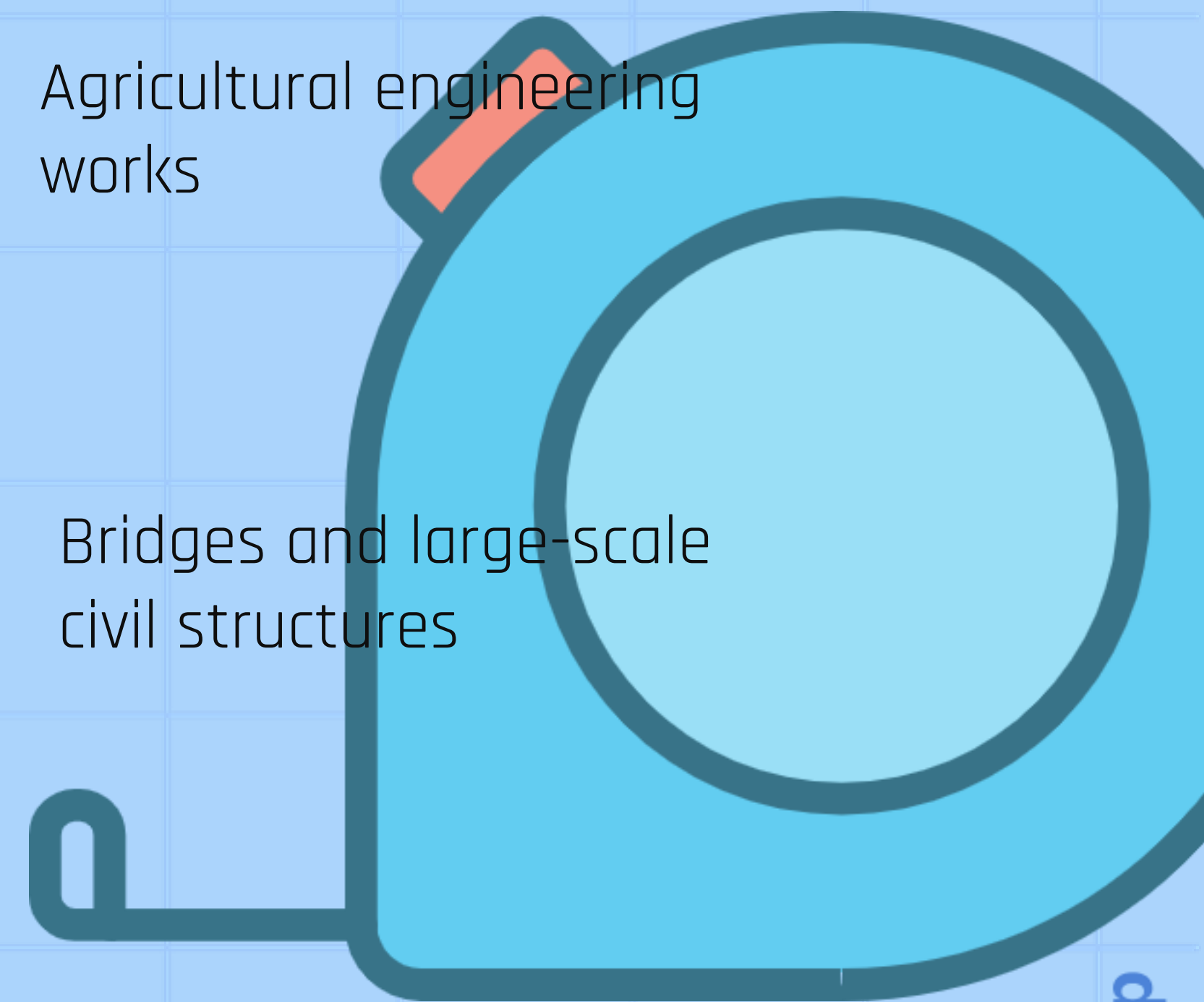
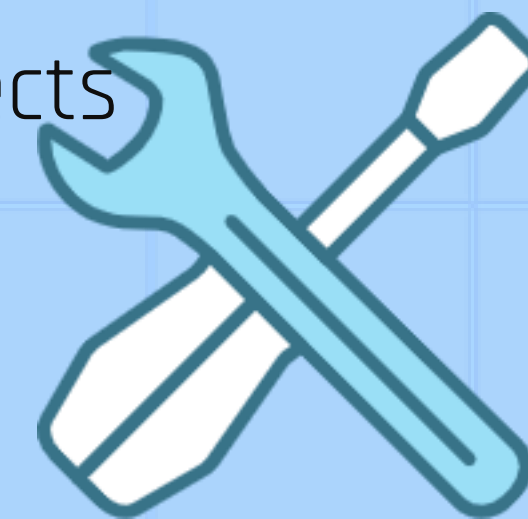
Bridges and large-scale  
civil structures

**05**

Construction of roadways,  
sports facilities,  
engineering structures,  
and underground works

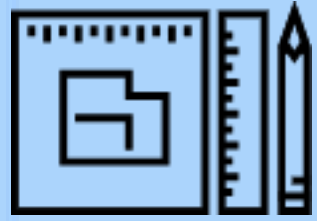
**06**

Maritime and river  
construction projects





# What are the main branches of Civil Engineering?



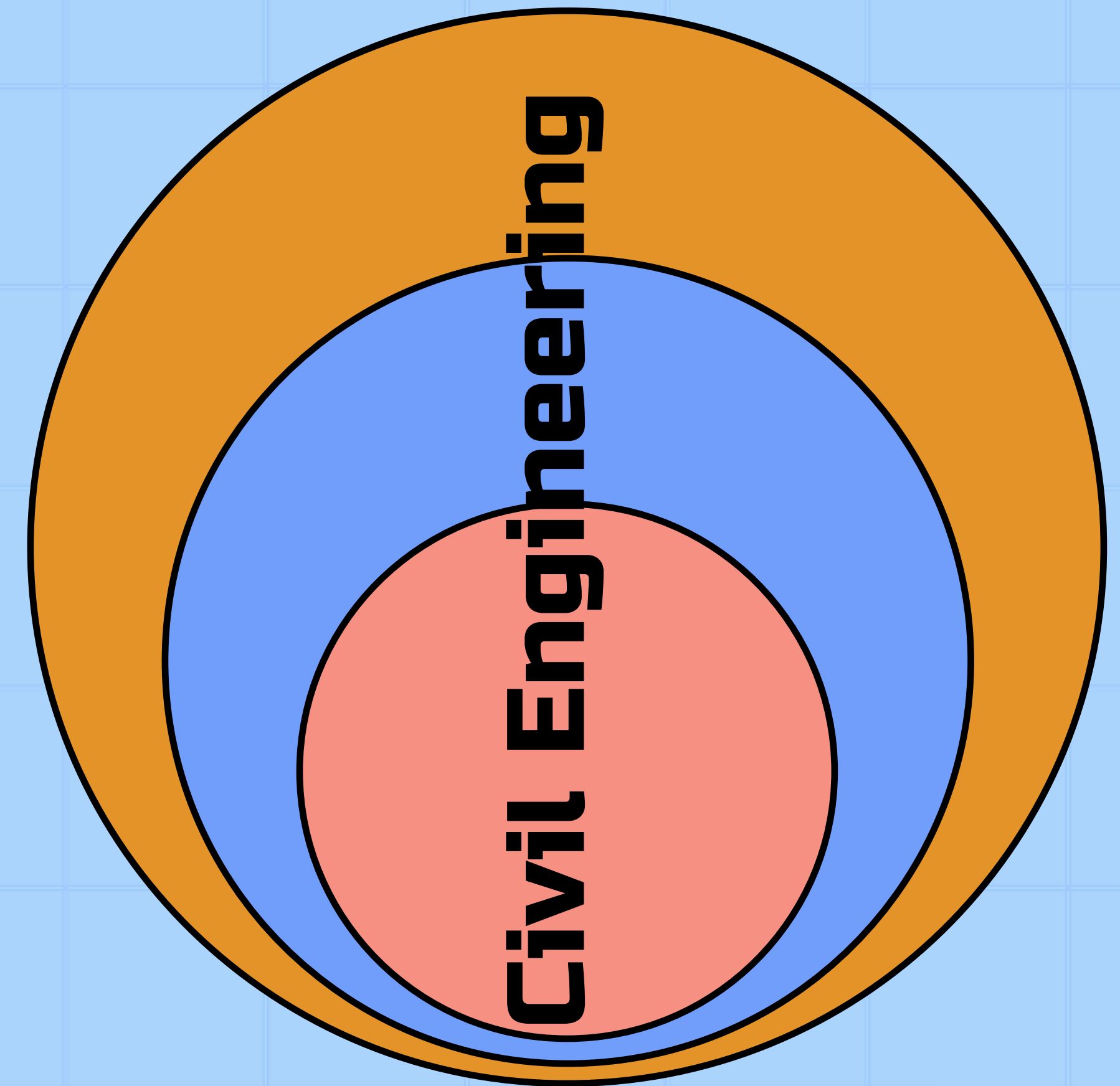
**Structural Engineering**



**Geotechnical Engineering**



**Materials Engineering**





# The main branches



## Structural Engineering

Structural engineering is a sub-discipline of Civil Engineering. The structural engineer is responsible for designing the framework of a structure. They must understand and calculate the stability, strength, rigidity, and, most importantly, the seismic sensitivity of built structures.

## Geotechnical Engineering

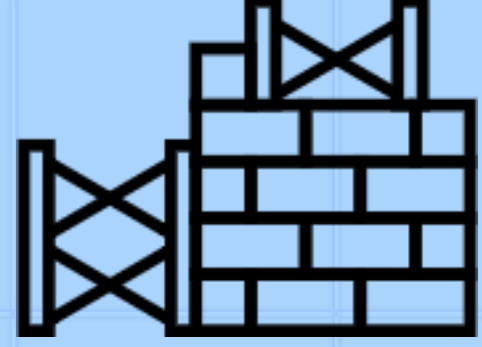
Before carrying out any project, it is essential to study the foundation, particularly the ground, as the stability of the structure directly depends on the stability and load-bearing capacity of the soil. Geotechnical engineering focuses on studying the soil from a mechanical, physical, and chemical perspective. Some of the most dangerous geotechnical phenomena include: Settlement, especially differential settlement. Landslides, particularly those triggered by earthquakes.



## Materials Engineering

Materials Science and Engineering is a branch of modern science that focuses on studying the structures and functional properties of polymers, metals, concrete, and composite materials to understand and even predict their behavior in service. It also explores their applications in the construction industry. This field relies on fundamental sciences such as physics and chemistry, as well as various engineering disciplines..





## classification of structures

Structures can be classified into two types: civil structures or industrial structures, such as buildings, offices, and warehouses, as well as technical facilities like bridges, tunnels, and water reservoirs.





