

Unlocking 5 Engineering Principles Behind Railways

解鎖鐵路背後的5個工程原理

Exclusive Classes
for Schools



Course Objectives

To guide students in exploring railway systems and infrastructure in an easy-to-understand manner. Through 3D interactive models and hands-on activities, textbook theories are connected to real-world engineering applications, inspiring interest in STEM and railway engineering careers.

Course Details



Target Audience

Secondary 1 to 3 in a group OR
Secondary 4 to 6 in a group



Class Size

15 students per class
(must be accompanied by at least
one school representative)



Duration

3 hours



Medium of Instruction

Cantonese (supplemented with
Chinese presentation slides)



Venue

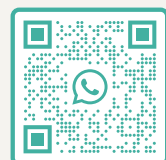
MTR Academy

Learning Outcomes

Upon completion of the course, participants should be able to:

- Explain the key railway systems and infrastructure components using real-world examples and interactive 3D models
- Apply basic engineering principles through hands-on activities

Application Method



This course is exclusively open for secondary school group bookings.

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Course Timetable

Time & Venue Topic & Activity Details

🕒 09:00 – 09:45
(45 mins)

📍 Integrated
Training Facility
Room (ITF) /
Classroom

Part 1

Train Structure

- Introduction to railway infrastructure
- Overview of rolling stock (train) and its major sub-systems

Exercise 1: Introduction to the working mechanism of couplers through hands-on experience of the coupling process

Exercise 2: Exploring functions and components of Bogie via an interactive 3D model

Exercise 3: Exploring functions of pantograph and locating Vacuum Switch Tube (VST) via an interactive 3D model



🕒 09:45 – 10:15
(30 mins)

📍 Classroom

Part 2

Track Design

- Introduction to permanent way (track) and its key components

Exercise 4: Understanding wheel-rail interface design and its self-centering mechanism for stable operation by using a model.



🕒 10:15 – 10:25
(10 mins)

Break

🕒 10:25 – 11:25
(60 mins)

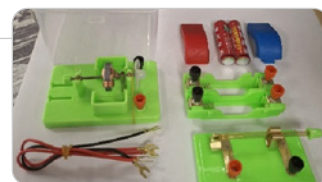
📍 Classroom

Part 3

Power Distribution & Traction Systems

- Introduction to railway power distribution systems and train movement control

Exercise 5: Assemble a simple DC motor circuit using a Double Pole Double Throw (DPDT) switch. Each student will be provided with a DC motor circuit kit to complete the assembly, demonstrating directional control and linking concepts to real-life traction systems



🕒 11:25 – 12:00
(35 mins)

📍 Integrated
Training Facility
Room (ITF)

Part 4

Signalling Systems

- Introduction to signalling systems and train movement control
- Point machine demonstration (by teacher)

