



Introduction

Driverless cars are on the horizon, combining automation, which means using machines for controlling systems; digital technology (digitalisation); and electrical power (electrification) to change the way we travel.

1. Driverless Car diagram

Using the Ingenious Engineering app, annotate the diagram. Include details on how each feature of a driverless car works.

Make sure that you have labelled the Lidar, Video Cameras, Central computer, Odometry sensor, Radar Sensor, Ultrasonic sensor.



AUGMENTED REALITY IMAGE KEYS

Simply point your device's camera at the page using the Ingenious Engineering app and watch the inventions come to life in 3D.



1. Questions

a. What is a driverless car and how has it been developed?

b. What are the positive impacts of driverless cars on individuals, society & the environment?

c. What are the potential negative impacts of driverless cars on individuals, society & the environment?

d. How has automation, digitalisation, and electrification affected the development of the driverless car?



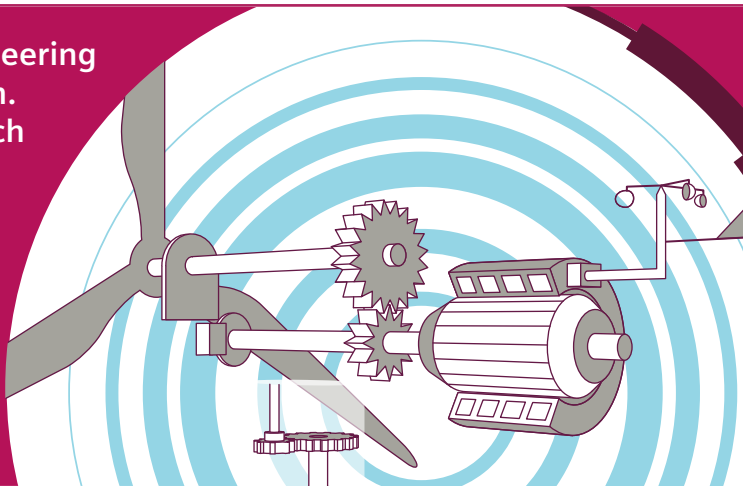
Introduction

Wind turbines are one of the most reliable sources of renewable energy production, as a sustainable energy source that generates electricity across the world.

1. Wind Turbine diagram

Using the Ingenious Engineering app, annotate the diagram. Include details on how each feature of a wind turbine works.

Make sure that you have labelled the Blades, Yaw motor, Tower, Pitch, Generator.



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2. Questions

a. What is a wind turbine and how has it been developed?

b. What are the positive impacts of wind turbines on individuals, society & the environment?

c. What are the potential negative impacts of wind turbines on individuals, society & the environment?

d. How has automation, digitalisation, and electrification affected the development of the wind turbine?



Introduction

Rollercoasters have been delivering thrills since the 1800s, but there is some serious engineering behind the amusement.

1. Rollercoaster diagram

Using the Ingenious Engineering app, annotate the diagram. Include details on how each feature of a rollercoaster works.

Make sure that you have labelled the Box girder track support, Tubular rail, Track section, Main support structure, Foundations.



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1. Questions

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a. What is a rollercoaster and how has it been developed?

b. What impacts have rollercoasters had on individuals, society & the environment? Can you think of other ways engineering may be involved in fun, recreational activities?

c. How has automation, digitalisation, and electrification affected the development of the rollercoaster?



Introduction

The first ever computed tomography scan in 1967 enabled doctors and scientists to look inside the human body helping to save and improve lives. This caused a revolution in medicine and diagnosis - this invention helped doctors and scientists treat their patients with more precision than ever before.

1. CT Scanner diagram

Using the Ingenious Engineering app, annotate the diagram of the human body below.

Make sure that you have labelled the Rib cage, Back bone, Lungs, Stomach, Intestine, Heart.



AUGMENTED REALITY IMAGE KEYS

Simply point your device's camera at the page using the Ingenious Engineering app and watch the inventions come to life in 3D.



2. Questions

a. What is a CT Scanner and how has it been developed?

b. What are the positive impacts of CT Scanners on individuals, society & the environment?

c. What are the potential negative impacts of CT scanners on individuals, society & the environment?

d. How has automation, digitalisation, and electrification affected the development of the CT scanner?



Introduction

The inventions that you have researched are all examples of how automation, digitalisation and electrification have revolutionised our world, from transport and energy production, to leisure and healthcare.

1. Enablers of Change



Figure 1 A lithium ion battery

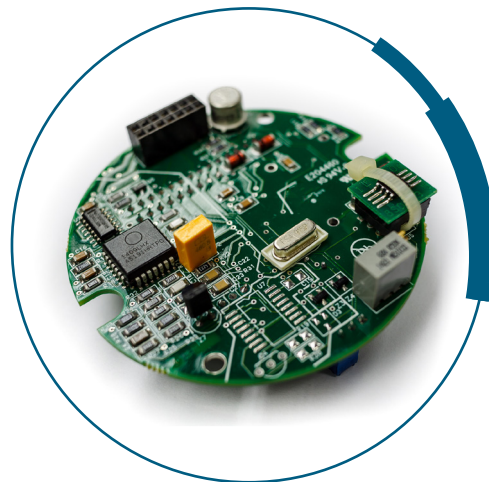


Figure 2 An integrated circuit or microchip

Using the wind turbine and CT scanner information in the Ingenious Engineering app, and your wider research skills, answer the following questions:

Questions

a. What is a lithium ion battery, and how are they used?

b. What is the advantage of a lithium ion battery over a conventional battery?

c. What has been the impact of the lithium ion battery on automation, digitalisation and electrification?

d. What are integrated circuits and how are they used?



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