Lesson Overview

The Ingenious Engineering app comes complete with a set of student activities, aimed at facilitating student's exploration of the app and also meeting the key curriculum criteria from the 'evaluate' section of the KS3 Design & technology curriculum.

Spread over a one hour lesson, students work in groups of four to explore the app, with each student in the group exploring a separate invention, before sharing their research together.

An included extension further explores the impact of automation, digitalisation and electrification on individuals, society and the environment.

Learning objectives

In this lesson, students will learn:

- To name examples of new technologies and explain their use
- To understand the impact of automation, digitalisation and electrification on everyday life innovation
- To understand the impact of developments in design and technology on individuals, society and the environment

Curriculum links

This lesson has been designed to explore the following strands of the KS3 design and technology curriculum:

Evaluate

- Analyse the work of past and present professionals and others to develop and broaden their understanding
- Investigate new and emerging technologies
- Understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists

What you will need:

1

The Ingenious Engineering app, loaded onto suitable devices

2

The Ingenious Engineering worksheets

3

Ingenious Engineering presentation

Note: The Ingenious Engineering app requires use of an app enabled device with camera. If you have a bring your own device policy, students can download the app onto their smartphones or tablets.

Before you start

Review the presentation, presenter's notes and worksheets. Whilst this lesson is based on a one-hour period, you may wish to spread the content across two lessons to suit your own lesson length and requirements.

Lesson Plan

Time (60 mins)	Activity
5 mins	**Starter:** Introduce the topic and learning objectives, placing students into groups of four. Each student in the group will become an 'expert' in one of the inventions, sharing their research back at the end of the session. Student 1 will research driverless cars, Student 2 will research the wind turbine, Student 3 will research rollercoasters and Student 4 will research CT scanners.
5 mins	Demonstrate the app and augmented reality features.
20 mins	Students will have 20 minutes to become an expert on their assigned invention. Depending on the availability of devices, students could work alone or be split into research groups based on their number and invention, working collectively.
20 mins	Students will then have 5 minutes each to share their answers back to the base group, with each member of the group filling in their own worksheets based on their group expert's research.
5 mins	**Plenary Questions:** • How has each invention impacted individuals? • How has each invention impacted society? • How has each invention impacted the environment? • Name an example of automation • Name an example of digitalisation • Name an example of electrification
5 mins	**Extension Homework:** Using their research from the lesson, students should complete the extension worksheet, exploring automation, electrification and digitalisation.

Differentiation

Easier	Harder
Students photocopy their worksheet to give to students in the next lesson.	Students work alone rather than in groups, changing the activity to a longer form research project.

Extension - Enablers of change

Included is an extension worksheet which enables students to explore the interlinking themes from across the activity, including the impact of the microchip and lithium ion battery. Students explore each innovation before commenting on the overall impact of automation, digitalisation and electrification on individuals, society and the environment. You should encourage students to argue whether the impacts have been overall positive or negative on each sector.

CT Scanning T-shirt
Using the downloadable images, you can create your own augmented reality CT scanner t-shirt for use in the session. You could use iron on transfer paper or a heat press. Your textiles department may be able to assist you with this.