

A Life Without STEM

Resources: Teacher notes, Pupil Activity sheet, PowerPoint slide

 **Additional Resources:** Online resources lifewithoutstemgame.co.uk/

Introduction

This set of activities explores five different areas of everyday life which have been changed and continue to be changed significantly by new technologies. Each of these can be explored through a series of animated cartoons where children are challenged to identify the impact of the change, the advantages offered by them and also any possible downsides.

Learning objectives	Learning outcomes
To identify changes and benefits through progress in technology.	To suggest how developments in STEM areas have affected society positively or negatively.

Activities

The five areas explored are IT, transport, communications, healthcare and energy provision.

- The **IT section** looks at the advantages of tablet devices compared with firstly laptops, then desktop and finally mainframe computers. There is no assumption that tablets are automatically better than all of the others but rather that children should be encouraged to suggest advantages and disadvantages. The cartoons are provided as a stimulus to discussion.
- The **Transport section** compares a modern car with an older car, a bicycle and a horse. Again, children are encouraged to suggest advantages with different modes of transport and to recognise that newer technology may bring disadvantages as well as advantages.
- The **Communications section** compares mobile phones with landlines, telegrams and letters. Children should be looking critically at different solutions from a number of perspectives including speed, sustainability and effectiveness.
- The **Energy section** focusses on entertainment and space heating technology. The advantages of a plentiful supply of cheap reliable energy will be apparent to children but discussion can draw out some other aspects as well, such as pollution and renewable energy creation. The coal fire might be attractive but it produces smoke and soot. The modern home is well lit, warm and with multiple entertainment sources but where is the energy coming from and is this causing pollution elsewhere?
- The **Healthcare section** is structured slightly differently in that rather than going back in time it looks at different diagnostic technologies. It can be usefully used in conjunction with 'The Human Body' resource as it shows how the example images are obtained. Rather than trying to communicate a detailed explanation of how the technologies work it is more an opportunity for considering how these enable a more accurate diagnosis to be made. It features the use of:
 - MRI scans of the inside of the body
 - Endoscopy, which uses optical imaging into bodily orifices
 - ECG, which provides data about heart rate.

The section on provision of charge points is topical and relevant to many people. The lack of charging infrastructure, which is one of the main barriers to the widespread adoption of EVs, poses a classic “chicken and- egg” dilemma.

Answers to support Pupil Activity Sheet

Part 1:

Q1:

Advantages include being faster, more reliable and more economical regarding fuel consumption. Modern cars also tend to be safer in terms of how well they protect occupants in an accident. There is also a wider range of power sources now available with drivers able to choose not only petrol or diesel but also electric or a hybrid combination.

Q2:

The older car will have a simpler design and therefore easier to maintain. Children may think that it's more robust and therefore better at protecting occupants but in fact what modern cars are better at doing is absorbing energy in an impact by means of crumple zones and air bags.

Q3:

A significant part of the negative environmental impact of a new car is in the manufacture. Building cars uses energy and materials. It's therefore important that cars last for a long time and are reliable. However what is also important is for the parts of cars to be recycled, such as metal body panels. Older cars weren't designed to be dismantled at the ends of their lives whereas newer ones are better so there is less waste. It is important that an ever greater proportion of a car can be dismantled and recycled when it reaches the end of its life.

Part 2:

Q1:

It's likely that as more electric vehicles are used, so more charge points are made available.

Q2:

If more charge points were installed it would encourage people to buy electric cars and so they would get used.

PowerPoint slide:

Q1:

Depends on personal response.

Q2:

Advantages include: can be used in a wide range of places, not having to be close to the base unit, phone being used for other things such as camera, internet access etc.

Q3:

Advantages include: can't be lost and less likely to be broken, cheaper, won't run out of charge, won't lose signal, etc.

A World Without STEM
Understanding technology with purpose



1. Suggest reasons that might influence her to change to an electric car. Make a list of the potential advantages.
2. Now make a list of factors that might persuade her to buy another petrol engine car.
3. What might happen over the next few years that persuades more people to select electric vehicles?

SIEMENS

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Green City

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Green Leader

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