



# VICTORIAN INVENTIONS

The content for 'Victorian inventions' consists of three episodes, each about 6 minutes long, which can be listened to individually or sequentially. A synopsis of each episode clip is below.

## Lesson plan:

### Learning intention 'We are learning to...'

We are learning to understand developments in technology during the Victorian era.

### Assessment criteria 'What I'm looking for...'

As an outcome I am looking for a diagram that shows modern inventions sorted into groups to show the Victorian inventions that came before them.

Share and discuss a listening focus for each episode by asking the key question and instructing the children to make the following notes.

Resources needed: note-making paper and pencil.

## 1: The Crystal Palace

Before listening: one key fact to discuss

- The Great Exhibition of 1851 was staged in a giant special building made of sheets of glass fixed on steel girders.

Discussion question: 'What buildings do you know that look like they are built of metal and glass?'

During listening: one question to focus on

- Key question: 'What did the other engineers think would go wrong with the Crystal Palace?'

- Instruction: 'Write down the problems that the other engineers thought would come up.'
- (Answers: The building might not stand up; the steel might bend; the glass might break; the sound of the orchestra might shatter the glass.)

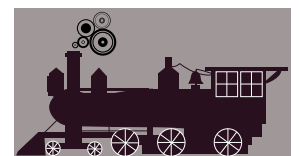
## 2. The telephone

Before listening: one key fact to discuss

- The telephone - patented by Alexander Graham Bell in 1876. The first telephones sent sounds from one place to another through a wire. They could not send pictures, play music, send messages or work without wires the way that mobile phones do. Discussion question, 'Can you think of something you did this week that would not be possible without using a telephone?' (Long distance calls, making arrangements to meet quickly, etc.)

During listening: one question to focus on

- Key question: 'How does a telephone send sound from one place to another?'
- Instruction: 'Draw or write down how you think a telephone can send sound from one place to another.'
- (Answers: The sound is converted into an electrical signal by the phone that is sending the sound. The phone that is receiving the signal changes the electrical signal back into sound.)





### 3. The phonograph

Before listening: one key fact to discuss

- Recording sounds. Before the 1870s there were no recorded sounds.

Discussion question: 'How many modern machines can you think of that play back recorded music?' ('Radios, televisions, computers, mobile phones and CD players.')

During listening: one question to focus on

- Key question: 'How is the sound recorded and played back?'
- Instruction: 'Draw or write down how you think the phonograph recorded the sound.'
- (Answers: When sound goes into a phonograph machine, the machine makes marks on a cylinder of silver paper. When the marks on the paper are read by the phonograph the sound is played back.)

### After listening

Activity: Draw groups of different inventions that you think would not be possible without the telephone and the phonograph. Some inventions will fit into more than one group. Some groups of inventions you might use are:

- inventions that play recorded sounds: CD player, computer, MP3 player, answer-phones
- inventions that send sounds over a distance: telephone, mobile phone, computer
- inventions that make sounds electronically: keyboard, drum machine, computer, etc. (These are also based on the technology of the telephone and the phonograph.)

### Differentiation and teacher support for SEN / Focus group / Whole class

Teacher to demonstrate drawing a selection of inventions in different groups on a piece of paper or whiteboard to provide hints and starting points for children's own drawings.

#### Challenge for gifted and talented learners

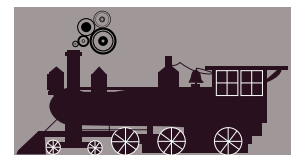
Can you use your knowledge of maths and science to sort your inventions into a Venn diagram? It might take some thinking and planning to find two groupings of inventions that overlap but have different qualities of their own. (Eg Inventions that can record sound; answer-phone; tape recorder. Inventions that can play music: CD player, MP3 player. Inventions that can do both: mobile phone, computer.)

### Plenary and assessment

In table groups or as a class, share and comparing groupings of different inventions. Give the children an opportunity to improve their drawings or change their groupings after making comparisons.

### Episode synopses

This programme covers three inventions made during the Victorian era, each of which had a huge impact on people's lives: the Crystal palace, built to house the Great Exhibition of 1851; the telephone; and the phonograph, which facilitated the first recording and playback of sound.





## 1. The Crystal Palace

John Russell, an engineer who worked on the construction of the Crystal Palace describes how it came to be built. He and the other two members of the organising committee, the famous engineer, Isambard Kingdom Brunel, and Sir George Airy, a leading scientist, were considering designs submitted for a building to house the Great Exhibition. Initially they were dismissive of the plans submitted by Joseph Paxton, a gardener, and likened his design for a large building made of glass and iron to an oversized greenhouse.

However, the public liked the idea and the committee were forced to adopt it. Despite their reservations that it should not be possible to build something so large out of metal that would bend and glass that might break, the Crystal Palace was successfully built and opened by Queen Victoria at a magnificent ceremony. When even the striking up of the orchestra failed to shatter the glass, the two engineers were forced to admit their admiration for the building...and, indeed, Isambard Kingdom Brunel based his design for his next project, Paddington Station, on the Crystal Palace.

## 2. The telephone

Thomas Watson, assistant to Alexander Graham Bell, tells the story of how he helped to make the first version of the telephone. Bell was an expert in sound, but had no knowledge of electricity, which Watson had. Their first breakthrough happened by accident, while they were experimenting with some apparatus consisting of two springs connected by a long piece of wire. The idea was that Bell and Watson would be in different rooms, each with a spring, and when one of them waggled their spring, the spring at the other end of the wire would waggle too.

However, that wasn't what happened. Instead, the sound of the spring twanging in one room travelled along the wire and could be heard at the spring in the other room. After further work on the apparatus, it became possible to hear the sound of their voices along the wire, although the sound was very muffled and the connection was only intermittent. It was far from perfect, but Bell decided to patent his invention anyway. He needed to act quickly as there were other inventors who could come up with the same idea, and by patenting his device, he effectively prevented other inventors from making theirs. And he was just in time, as two hours after he had taken out his patent, another inventor tried to take out the same patent and was refused. All that remained was for Bell and Watson to make the final adjustments to create a fully working device.

## 3. The phonograph

John Kruesi, an engineer, describes how he helped make machines designed by the inventor, Thomas Edison, and in particular the phonograph in 1877. Edison was demonstrating to John and another engineer, Harry, how a telegraph machine worked and told them that he had invented a similar machine which he thought might reproduce speech rather than the usual clicks of the telegraph. Harry and John had to make up the machine according to Edison's sketches, even though they were unsure about what it was supposed to do.

Eventually the machine was ready to be tested and John was amazed when Edison shouted the words 'Mary had a little lamb' into the machine and then was able to replay them. Edison couldn't wait to announce his invention and summoned journalists from all the New York newspapers to demonstrate his device for recording and playing back the human voice and to share his vision for how it would be used in the future.

