

Unit 1: Rocket science

A Reading

1 Read the letter below.

Passage A: New Year's Eve fireworks

Dear Mum and Dad

Happy New Year! Hope you had a good New Year's Eve. I had the most amazing time here in Dubai, watching the biggest firework display ever – an **extravaganza** lasting six minutes, which set a new world record for a single **coordinated** display. The 500 000 fireworks were set off from 400 firing locations, **synchronised** by 100 computers. It took the **technicians** ten months to plan!

There was a countdown to midnight in fireworks in both roman and arabic numerals. Organisers said they wanted to create a burst of light to imitate a sunrise and dazzle spectators with a United Arab Emirates flag that could also break records for being the largest ever made of fireworks. They certainly did that!

I was down with thousands of watchers standing by the fountains at Burj Khalifa, the world's tallest tower, which was used as a backdrop for the display. Everyone got there early and the anticipation beforehand was **electric**; it wasn't only the children who were excited! The Burj is shaped like a rocket itself, and was the launch pad for thousands of smaller rockets. It was turned into a whole series of famous monuments, like the Eiffel Tower, by patterns of light flashing on it. And that was just a small part of it... it was a helter-skelter, with showers of sparks sliding down it. It was an **incandescent** pine tree with thousands of starry branches. It was a castle unleashing arrows of fire. Down below there was an orchard of trees bursting into blossom; there were pulsing globes like dandelion heads sending out seeds; there were tiered birthday cakes with exploding candles. **Iridescent** rings climbed the tower. **Scintillating** fountains leapt up to meet the cascades of light. Bouquets of bright flowers of every hue filled the sky.

Everyone was holding up their phone to capture the images, holding their breath, **mesmerised**. It was too much to take in; there were too many places to look **simultaneously**. The soundtrack of sci-fi film-type music matched the display of dancing light and water, and made it a space-age experience. There was huge applause at the end, cheering and whistling that went on for ages. It was unforgettable, and I really wish you could have seen it too.

Maybe next year! I'm really enjoying the job and the lifestyle, so I'll still be here then!

Love,

Lee

Cambridge IGCSE First Language English

D Reading

6 Read the following encyclopedia article.

Passage B: Facts about fireworks

Fireworks are believed to have been invented more than 2000 years ago in China, where they were used in the form of firecrackers to accompany many festivities, in order to ward off evil and invoke prosperity. It is believed that the first firecrackers were actually accidental: chunks of bamboo thrown onto a fire. (Bamboo traps air inside the segments so that when heated, it expands and bursts through the sides, and this could have started the idea.) China is the largest manufacturer and exporter of fireworks in the world; 90% of all fireworks originate from there. They are still made by hand, and it is a hazardous job assembling the sections of the cardboard tubes.



and the phenomenal New Year display in Dubai in 2014 was masterminded by the Italian-American Phil Grucci.

Every year, people in China celebrate the invention of the firecracker on 18th April. Fireworks are also an integral part of the Chinese New Year celebrations. The big occasion for fireworks in the UK is Guy Fawkes Night (5th November) to celebrate the failure of the Gunpowder Plot to blow up parliament. France uses fireworks to celebrate Bastille Day, commemorating the storming of the prison during the French Revolution. Firework displays are also a major part of Independence Day celebrations in the United States.

In 1240, the Arabs acquired knowledge of gunpowder, and in the same century firecrackers arrived in Europe, with the crusaders or Marco Polo. The key ingredient in making fireworks is gunpowder, which consists of saltpetre (potassium nitrate), charcoal and sulphur. Early fireworks were enjoyed less for the show than for the sound; simple gunpowder explodes quickly with a terrific bang but with little colour. Over time, people discovered that using chemical compounds with greater amounts of oxygen made the explosives burn brighter and longer. At first fireworks were only orange and white. In the Middle Ages, new colours were achieved by adding different minerals. They had least success with blue. This became available with the discovery of copper compounds, but this is an unstable metal and so is less frequently used.

It wasn't until the 1800s that fireworks developed into what we know today. Italy was the first country in Europe to truly master and experiment with pyrotechnics, by loading firecrackers into cannons and shooting them into the air. Multi-hued displays were an innovation of the 1830s, when metals that burn at high temperatures and create colours, sparks and noises were added to gunpowder. The Italians are still at the forefront of pyrotechnic development,

The world record for the largest firework display before January 2014 in Dubai consisted of 77 282 fireworks set off in Kuwait in November 2011 as part of the country's 50th anniversary celebrations. The largest firework rocket – 13 kilograms – was produced and launched in Portugal in 2010. The biggest annual firework display event in Europe is the International Festival concert held in Edinburgh, Scotland, in which no fewer than a million fireworks are set off in less than an hour. A string of firecrackers lasting 22 hours marked the New Year's Day celebrations in Hong Kong in 1996. The world's largest single firework was seen at a festival in Japan in 1988; the burst was over a kilometre across and the shell weighed over half a tonne. A rocket can reach speeds of 240 kilometres per hour, and the shell can reach as high as 200 metres. People will always see the explosion of a firework before hearing it. This is because although they both travel in waves, light travels at 1080 million kilometres per hour whereas sound travels only at 1225 kilometres per hour.

In public shows today, specialists use computers to control the electronic ignition of fireworks, as well as to synchronise the aerial bursts with music. Firework displays are becoming ever more spectacular and are an established way of celebrating any global, national or local event or anniversary.