

# Rain and Fire

STUDENT A

1. Read the text and then re-tell the story, in your own words, to Student B.

In Glasgow, Scotland in 1818, Charles Macintosh was busy running his factory, which produced dyes for fabrics. He used ammonia produced from coal tar to make his dyes, but this left a lot of waste coal tar sludge. A brilliant chemist, Macintosh discovered that naphtha oil could be obtained from the coal tar sludge. He found that naphtha was an excellent solvent for natural rubber. This gave him the idea to produce a rubberised cloth. He dissolved the natural rubber in the naphtha and produced a rubber solution. Then he laid out a cloth and spread a layer of his rubber solution over the top of it. Finally, he placed another layer of cloth on top, producing a 'rubber sandwich' and created the first rainproof fabric. He used his rubberised cloth to make a raincoat, but when he stitched the material, the water got in through the holes.

Another chemist, Thomas Hancock, was also interested in developing a rubberised fabric. He had discovered a method of sticking pieces of rubber together by heating them. In 1824, Hancock and Macintosh went into business together producing raincoats called *mackintoshes*.

Although the raincoats were popular in Britain, they weren't as popular in the United States because of the country's temperature extremes. In the north it gets very cold in winter while summers in the south are very hot. When this particular rubber got cold, it became stiff and brittle, and when it got hot, it became sticky and gooey.

STUDENT B

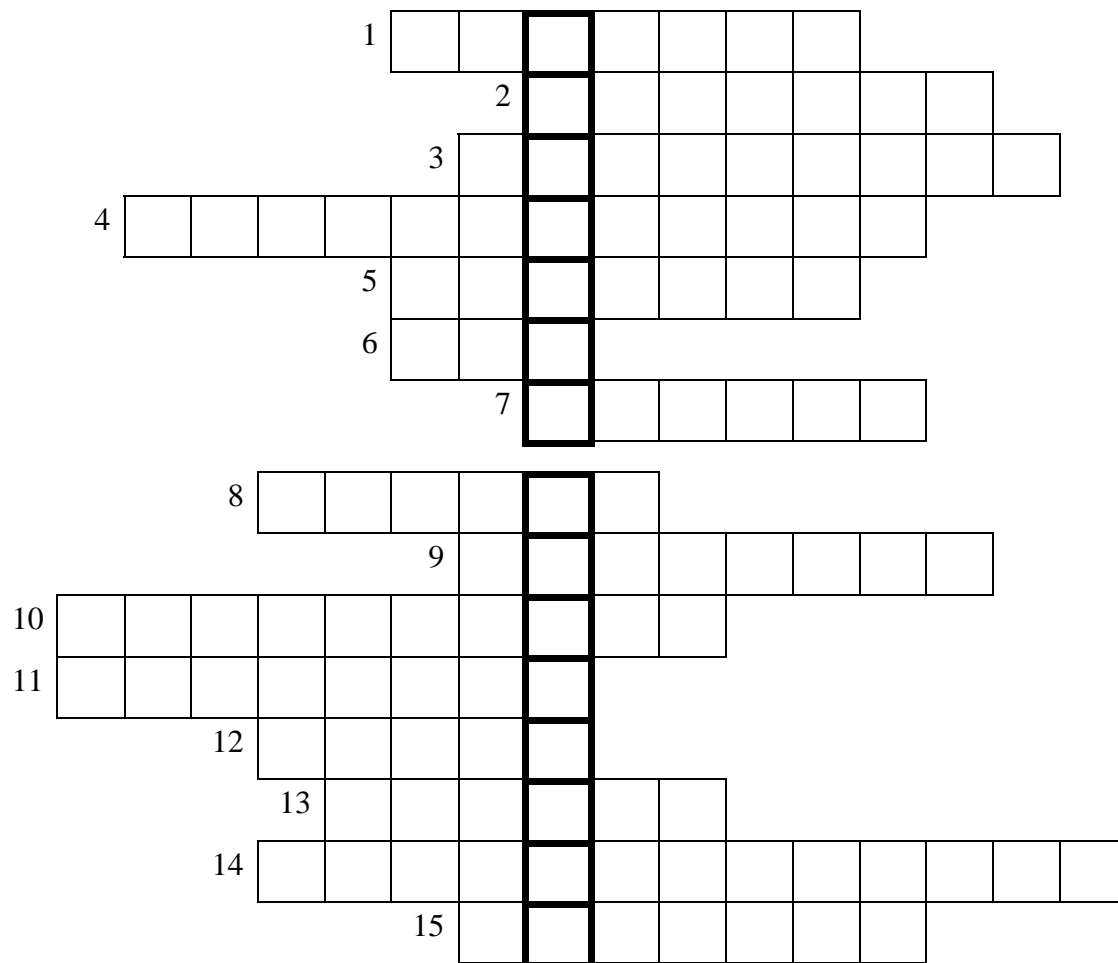
1. Read the text and then re-tell the story, in your own words, to Student A.

Meanwhile, in Massachusetts, U.S.A., one man was busy working on producing a rubber which would be stable at any temperature. He spent all his time (and money) on this project; he couldn't even afford to feed his family and was sent to jail more than once because of his debts. However, in 1839 he finally succeeded, and took out a U.S. patent on his invention.

He sent his agent to Britain to see if Hancock and Macintosh, two very important men in the rubber business, were interested in buying his idea. Hancock analysed the rubber and discovered that the American had added sulphur and applied heat to make it temperature stable. Instead of buying it, Hancock took out a British patent on the rubber and named the process *vulcanisation*, after Vulcan, the Roman God of Fire.

The American inventor fought Hancock with lawsuits, without much success, until his death in 1860. Despite the importance and significance of his invention, he died poor. In Britain, the *mackintosh* raincoat grew ever more successful and earned international fame for its quality, but his name was never connected to it. Years later, his surviving children (six of his twelve children died of malnutrition) received a lot of money for his invention and his name became famous in the world of rubber.

2. The words below are taken from the text. Read the clues and complete the puzzle to find the name of the American inventor in the story.



1. Macintosh ran one of these in Glasgow (7)
2. The name of the chemist who went into business with Macintosh (7)
3. This word means 'impenetrable by rain' (9)
4. Poor condition of health caused by lack of food (12)
5. The American added this chemical to his rubber formula (7)
6. A colouring for material or hair (3)
7. Firm, fixed, doesn't change (eg in different temperatures) (6)
8. Thick, soft, wet mud. Often waste material (6)
9. A liquid in which something is dissolved (8)
10. The name of the product invented by Macintosh and Hancock (10)
11. The country where Macintosh came from (8)
12. Soft and sticky (5)
13. The official right to be the only person to make, use or sell a product or invention (6)
14. The process invented by the American and named by Hancock (13)
15. Stiff and easily broken (7)