

## Materials

### A Very Short Introduction

By Christopher Hall

#### Questions for Thought and Discussion

- What is a good definition of *materials*?
- Imagine if glass suddenly didn't exist. What wouldn't you be able to do anymore?
- If you removed semiconductors, transistors and LEDs from your life, what wouldn't you be able to do anymore?
- If you care about reducing CO<sub>2</sub>, which materials should you give up?
- Roughly how many atoms are there in a ten pence coin (or a dime)?
- If you wanted to play football with a single atom, how many times would you have to shrink yourself in size by a factor of ten?
- What is a crystal? Without moving, point to the nearest crystalline material.
- Why do some materials conduct electricity and others do not?
- Why are some materials stiffer than others?
- What does it mean to say that a material is tough?
- What can you do with an electron microscope?
- Pick an everyday article. What is it made of? And how and where was it made?
- With the same everyday article: how long would you expect to use it for? Could it be used for twice as long? Could it be recycled?
- How much steel, concrete and aluminium did the world make last year? How much is that for every person?
- How many ways are there to make colour?
- How long is a piece of string?
- Water is an important material. What do engineers use it for?
- Is wood still important? Or are we post-wood?
- Why can't the world live without ivory?
- How does old-fashioned photography work?

#### Further Reading

J. M. Allwood, J. M. Cullen, M. A. Carruth, D. R. Cooper, M. McBrien, R. L. Milford, M. Moynihan, and A. C. H. Patel, *Sustainable Materials: with Both Eyes Open* (Cambridge: UIT, 2012)

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T. J. Misa, *A Nation of Steel: the Making of Modern America, 1865-1925* (Baltimore: Johns Hopkins University Press, 1995)

J. W. Orton, *The Story of Semiconductors* (Oxford, 2008)