

ATOMIC PEOPLE

Examines how the human understanding of atoms has developed over the past 3000 years.

Year 9

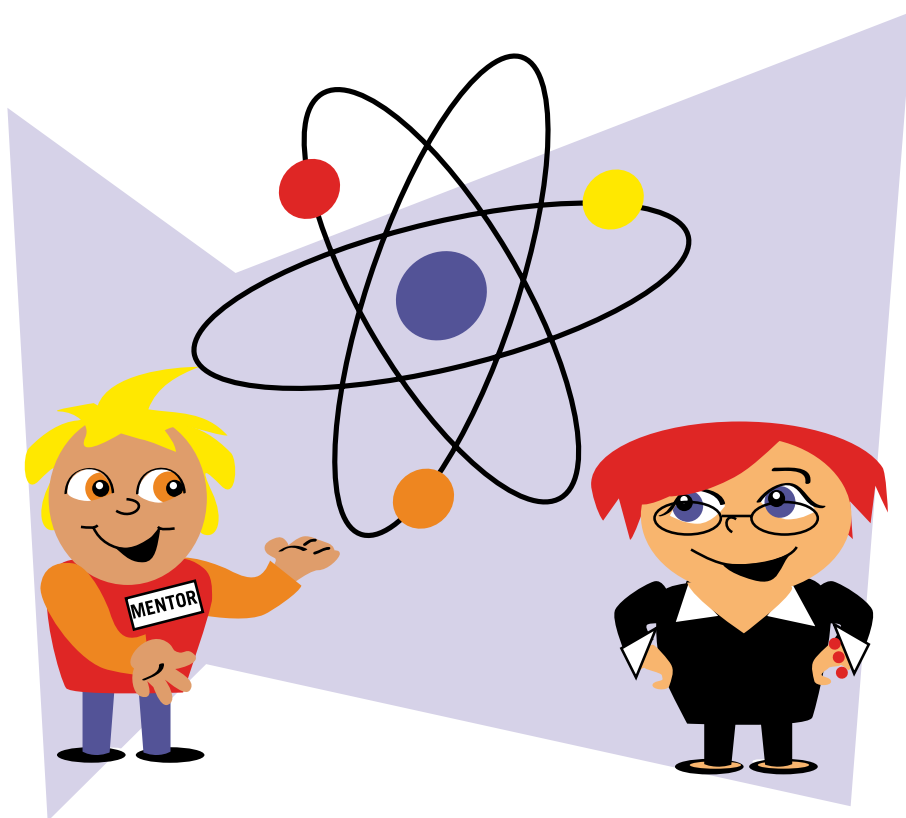
Subject

Chemical Science – Atoms

Covers

SU, SHE & SIS requirements of the Australian curriculum

in2science.org.au



Meet a Mentor

Jennifer is studying Biomedical Science at the Swinburne University of Technology

What or who made you think that you would enjoy the course that you are studying?

I come from a sport-loving family and always enjoyed PE at school but I quite liked science as well. When I was 17 my older brother, who had been competing in athletics at a national level developed a severe injury and I became fascinated with the recovery process and what was going on in his body.

How do you use your science studies in everyday life?

Physiology is my favourite subject. It's all about the chemistry of how your body functions...how muscles move, how proteins are formed, how genes influence our bodies. Having studied physiology I now understand all those healthy lifestyle messages we get about diet and exercise being important.

What would you say to encourage younger people to follow a science-based career?

Everything is science-related – sometimes it just takes us a while to see the science in it. If you're into something, look for the science and go for it. There is a whole world of exciting science at uni – it's so much more diverse than what you find out about at school.



Curriculum Links

Nature and development of science

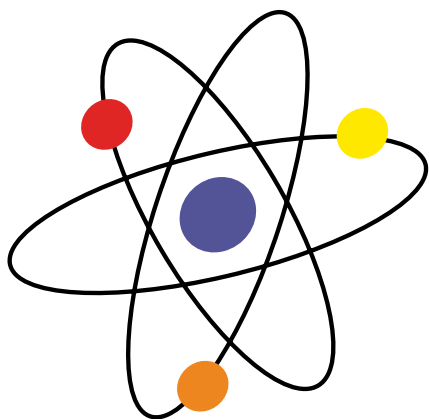
Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community (ACSHE157 and ACSHE191).

- Investigating the historical development of models of the structure of the atom

Evaluating

Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data (ACSIS171 and ACSHE205)

- Identifying gaps or weaknesses in conclusions (their own or those of others)
- Identifying alternative explanations that are also consistent with the evidence



Possible research topics

Produce a timeline explaining what was understood when with key milestones and information about the scientists involved.

- Atomic structure – Dalton, Thomson, Rutherford, Bohr Yr 9 Chem
- DNA – Watson and Crick (+ Franklin) Yr 10 Biological science
- Natural selection – Medel, Darwin et al Yr 10 Biological science
- Periodic table – Medeleev etc. Yr 10 Chemical science
- Radioactivity – Bequerel, the Curies, Rutherford, Yr 9 chemical sciences
- The Universe – Hubble, Brain Schmidt and Penny Scakett Yr 10 Earth and Space Science

Further resources

www.latrobe.edu.au/in2science/resources

australiancurriculum.edu.au/Science/Curriculum/F-10

Lesson Idea

Aim

To investigate how atomic theories developed from 460BC to the present day.

Lesson Outline

- Start with Democritus – what does ‘atom’ mean? Paper clip demonstration of indivisible object (science.howstuffworks.com/atom1.htm)
- What are the parts of the atom? How are they arranged? How do we know this (discuss)? Experiments and theories
- Watch clip explaining overview of history (see below for links). Key points: plum pudding model, gold foil experiment
- Research key people and ideas: Democritus, John Dalton, J.J.Thomson, Ernest Rutherford, James Chadwick. *ICT capability*
- Can the atom be split further? Discuss Quarks and the LHC
- Create timeline, cartoon, presentation etc. *Critical and creative thinking*

YouTube Clips

Brain Cox – electron discovery
youtube.com/watch?v=IdTxGJJA4Jw

Brain Cox – nucleus discovery
youtube.com/watch?v=wzALbzTdcn8

Cute, cartoon overview
youtube.com/watch?NR=1&v=QbWKF9uDF7w

Overview of all developments
youtube.com/watch?v=eXdWlnBlncM

History – starts 2.20 into video.
Very thorough.
youtube.com/watch?v=njGz69B_pUg

Curriculum Links

All matter is made of atoms which are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms. (ACSSU177)

Mentor Support

How your In2science mentor can assist.

Whole class

- Dress up as Democritus – ask what happens if you keep dividing paperclips

Small Groups

- Ask why Democritus wasn't believed? Discuss other instances when scientific ideas have been rejected

One-on-one

- Question for deep understanding (eg: Why was the neutron discovered so much later than the proton and electron?)