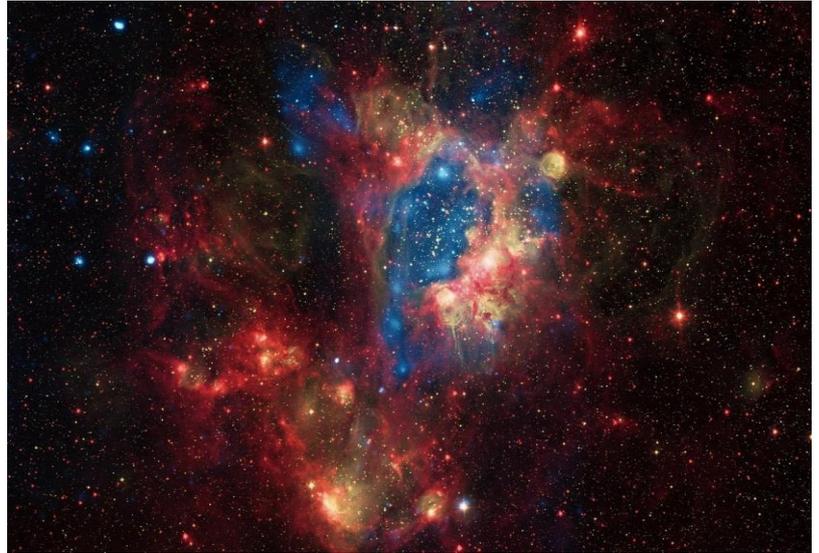


# Berwick Educational Association

## Astronomy to Geology

A mini-series of two lectures  
by Dr. Dave Smith

Saturdays 21<sup>st</sup> and 28<sup>th</sup> April  
2018: from 10 a.m. to 12  
noon, Berwick Voluntary  
Centre, Tweed Street,  
Berwick



**A Brief Introduction:** I aim to put atoms back to where they belong – in the centre of things!

Ever since Galileo Galilei tweaked the nose of the Catholic Church we have been learning more and more about our place in the universe. Less well known is that we have our own British equivalent (albeit over the border): James Hutton, “The Father of Modern Geology” (1726 - 1797), who crystallised his understanding of geological processes in part by looking at our very own Berwickshire coast. As the realisation of geological processes dawned “*the mind seemed to grow dizzy by looking so far into the abyss of time*” (John Playfair).

This short course has been stimulated by the recent discovery of heavy elements during neutron star collision (LIGO – 17August 2017). It seems to me that this opens up new understanding of element synthesis in space: fission instead of fusion. I have also taken the opportunity to look at the earth-forming elements: carbon to iron and the rare spices: gold to uranium. Then there’s the earth-shaping mineral: ice! The idea is to supplement existing courses in astronomy and geology by looking at the real stars of the show: the atoms themselves...

There is an increasing understanding of the role of microbes. Bacteria live everywhere on and in the earth. Do they catalyse mineral formation? Are bacteria the “enzymes” of mineralogy?

**PTO**

## Aim of the Course

In common with my previous courses, this course is emphatically not aimed at any exam. Rather it is an *awareness* course and is done entirely for the love of the subject and in the firm belief that chemistry can be understood and appreciated by anyone. No prior qualifications are needed.

*Scientific Issues:* I shall attempt to explain any technical terms used. It is worth noting that a complete understanding of complex issues is not necessary, indeed, much of what I will say is still the subject of scientific debate. However it is important to realize that, although the conclusions of the science may change, the underlying physics and chemistry will remain the same.

## Course Content

### **Saturday 21<sup>st</sup> April:**

#### *Including*

The nature of science  
Energy: photons, nuclei and atoms  
Stars: nuclear fusion up to iron  
Supernovae: elements heavier than iron

Core collapse: white dwarfs  
Neutron stars: elements by fission?  
Isotopes: radioactivity and stability  
Cosmic "rays", rocks and planets

### **Saturday 28<sup>th</sup> April:**

#### *Including*

Elements: atoms and minerals  
Plate tectonics: volcanoes  
Erosion: ice and water  
Uranium: a natural nuclear reactor

Carbon, oxygen and calcium: pearls  
Silicon and oxygen: opals and feldspar  
Sulfur and iron: pyrites  
**Gold! And lead...**

I have designed this talk to both entertain and enlighten. *Enjoy!*

**The cost of the course is £12** including refreshments. No previous knowledge is assumed.

[To book online, please click here](#)

To book by mail, please fill in the booking form below, and mail to BEA, 7 Ravensdowne, Berwick-upon-Tweed TD15 1HX along with a cheque in favour of Berwick Educational Association. If you have any queries, please email [berwickea@gmail.com](mailto:berwickea@gmail.com) or phone Cian McHugh on 01289 303254

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Email

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(Astronomy to Geology)