Geology

Brief Overview of the Course *(for further details, please see our Sixth Form Prospectus* *https://strschool.co.uk/sixthform/prospectus)*	
Exam Board: WJEC/EDUQAS **Specification web link:** https://www.eduqas.co.uk/media/rckbdnax/eduqas-a-level-geology-spec-from-2017-e-24-01-2020.pdf	
Topics Covered: **Year 12** Fundamentals of Geology: F1 Elements, Minerals and Rocks F2 Surface and Internal processes of the Rock Cycle F3 Time and Change F4 Earth Structure and Global Tectonics Interpreting the Geological Record: G1 Rock Forming Processes G2 Rock Deformation Practical Techniques in the field and laboratory	**Topics Covered:** **Year 13** Interpreting the Geological Record: G3 Past Life and Past Climates G4 Earth Materials and Natural Resources Geological Themes: T1 Geohazards T2 Geological Map applications + 1 from: T3 Quaternary Geology or T4 Geological Evolution of Britain or T5 Geology of the Lithosphere Practical Techniques in the field and laboratory

Please follow the instructions in the boxes below. The aim of these activities is to introduce you to the study of this subject at Advanced Level by:

- reinforcing your core knowledge and understanding of your chosen subject;
- encouraging you to think more deeply about your subject;
- supporting you to develop a deeper understanding of and appreciation for your subject as an academic discipline.

Core Knowledge and Understanding Task

Whether you have studied this subject before or not, there are elements of core knowledge and understanding which you must have prior to starting the A Level course.

Please provide a written answer to each of the following questions. There are links below to help you discover the answers.

To many people, the vast majority of whom will never have studied the subject at school or university, Geology is either a fairly pointless enigma and/or a stuffy discipline concerned with boring rocks and fossils! Once you discover what it is really about, it becomes very exciting!

Use the links below to try to answer the following questions:

1. Define Geology
2. What is the difference between Physical and Historical Geology
3. Make a list of the things that Geologists do
4. Make a list of the things that are of value to humanity that stem from Geology
5. We cannot travel back into the vastness of geological time (hundreds and thousands of millions of years, going back to 4567 million years) and we can only see what is happening today on the Earth's surface (the deepest drill hole is only 13km deep, and it is 6370km to the Earth's centre), and yet we claim to be able to interpret how the Earth works and its development over those millions of years. How do geologists do this?
6. As an example of the above, there are rocks in Greenland that are 3,800 million years old [Ma} (approximately 800 Ma after the formation of the solar system and Earth). They include sedimentary rocks called conglomerates, which have rounded pebbles in them. What does the presence of these pebbles tell us about the Earth and its environment at that time? For example was it a boiling mass of magma?

Links to support:

You will find pdf copies of several relevant books at the link below.

https://www.dropbox.com/sh/0tc1dhf6l3l0of7/AABT4EOcbPeqhsKxa6BYWZ3oa?dl=0

Do **not** attempt to read all the way through these books! They are meant to be "dipped into", and the answers to the above questions will be found in the Introduction, Preface or Chapter 1 (though, as with much of Geology, you will find some differences!). You may find that you become interested in other parts of the books, four of which are textbooks of different styles, and three of general interest.

The Bigger Picture Task

As well as reinforcing your core knowledge and understanding, our A Level curriculum will expose you to the 'established orthodoxies' within each subject, which can include key research, important people who have contributed to the field, as well as broader methods and theories that exist within the subject.

Prior to starting the A Level course, it is important that you are aware of the following themes and topics so that you can develop an understanding of how they contribute to some of the established orthodoxies within Geology.

The study of Geology is only about 250 years old. In that time there have been two major "revolutions" in thinking about the Earth. The first, in the late 18th and early 19th century, brought about a recognition:

- that different rocks (such as igneous, sedimentary and metamorphic) had different origins,
- that processes that could be observed today (such as weathering, erosion, transport and deposition of sediments) operated much the same in the geological past, and
- that the Earth had a history of immense length.

The second, in the mid to late 20th century, produced the hypothesis of Plate Tectonics, which explained the formation of earthquakes, volcanoes, mountain building and continental drift and enabled the reconstruction of past geography, climate etc.

These revolutions did not happen without a fight from the people with conservative views…so we have controversies between:

- Neptunists and Plutonists (the formation of different rock types)
- Catastrophists and Uniformitarians and NeoCatastrophists (were geological processes gradual or sudden?)
- Contractionists and Drifters (the formation of fold mountain belts, such as the Alps)

Question:

Draw a table to show what effect the following key figures in Geology had on the way that people saw the Earth. Apart from the personalities, there should be two columns: one to state the previous beliefs on the topic and the other on the new belief.

- James Hutton
- Georges Cuvier
- William Smith
- Charles Lyell
- Louis Agassiz
- Charles Darwin
- Alfred Wegener

- Arthur Holmes
- Harry Hess
- J. Tuzo Wilson

Links to support:

Once again I refer you to the following link where you may get access to several e-books:

https://www.dropbox.com/sh/0tc1dhf6l3l0of7/AABT4EOcbPeqhsKxa6BYWZ3oa?dl=0

Most of these have at least a chapter on the history of Geology. You will also find lots of information on line via your browser.

Recommended Reading List and the Department's 'Top Pick' Title

As an A Level student, we want you to value academic endeavour (scholarship) and develop a thirst for learning in your chosen subject. Our curriculum will help you to understand that scholarship is not just about learning facts, it is about nurturing powerful knowledge.

We will help you with this by directing you to resources that will not only deepen your knowledge and strengthen your understanding of the A Level content, but also broaden it beyond that of the exam board specification.

Please find the full subject reading list alongside our prospectus on the Sixth Form section of the STRS website here: https://strschool.co.uk/sixthform/prospectus. We would encourage you to explore as many of these titles as you can.

From the published reading list and the e-books at https://www.dropbox.com/sh/0tc1dhf6l3l0of7/AABT4EOcbPeqhsKxa6BYWZ3oa?dl=0, the most highly recommended book(s)/article(s) to read before September are:

"Why Geology Matters" by Doug Macdougall – this is "a window into the multifaceted world of earth science" rather than a textbook. It doesn't have much in the way of illustration, but is a very interesting and readable book.

"Introducing Geology" by Graham Park is a relatively short introductory textbook, that is very well written and explained, with lots of illustrations.

"Essentials of Geology" by Frederick Lutgens et al is a comprehensive, well written and lavishly illustrated textbook.

"A Brief History of Geology" by Kieran O'Hara is an excellent account of the development of the subject, putting its concepts into perspective.

Once you have read the recommended book/chapter/article, consider the following:

- What did you learn from the reading?
- Have you identified any patterns or made any connections?
- What unanswered questions has the reading left you with?
- Did you agree entirely with what you have read? If so, why? If not, why not?
- Are there any themes or topics that you would like to explore further?

Other Recommended Activities

Please find below a selection of suggested additional activities that the department feel it would be useful for you to explore prior to starting the A Level course in September.

One of the very best TV series on Geology was made in the late 1990s and is called "Earth Story" A box set can be purchased very cheaply. The first episode (The Time Travellers) can be seen at https://youtu.be/UFcKEcyWhGQ

Professor Ian Stewart, of Plymouth University, has produced many TV series on Geology, one of the best being "The Rise of the Continents".

David Attenborogh has made two series about fossils "Lost Worlds, Vanished Lives (1989) and First Life (2010), both available on DVD, and both excellent.

Men of Rock BBC Documentary Episode 1- All about James Hutton and presented by Prof. Iain Stewart. https://www.youtube.com/watch?v=FYfuI2uZLmg
https://www.youtube.com/watch?v=w1wH3cGQLjE

Men of Rock BBC Documentary Episode 2. About Earth's tectonic history and the volcanic past of Scotland.

TED talk about how volcanic eruptions can influence climate.
https://www.youtube.com/watch?v=fAnacf4eboQ

TED talk about mass extinction and current threats to biodiversity.
https://www.youtube.com/watch?v=envK-qWyDU0

TED talk on underwater earthquakes and volcanic processes:
https://www.youtube.com/watch?v=dhMoQrLEJe0

TED talk: The complete geological history of our planet in 18 minutes:
https://www.youtube.com/watch?v=yqc9zX04DXs

A video about the most important fossil finds in geology:
https://www.youtube.com/watch?v=Kj_eSURwGas 36

Media and web links:
https://www.bgs.ac.uk/ British Geological Survey
https://www.geolsoc.org.uk/ The Geological Society
https://geologistsassociation.org.uk/gamagazine/ The Geologists Association Magazine

Downloads:
https://www.reddit.com/r/geology/

Podcasts:
https://player.fm/series/history-of-the-earth
https://player.fm/series/the-geology-flannelcast