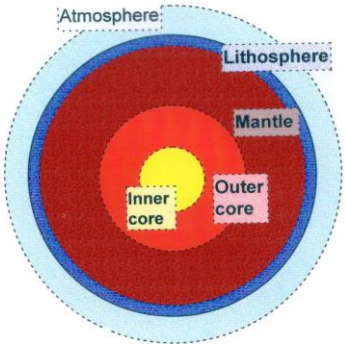
U3A Geology
Summary of Session 1: Rocks Telling Stories

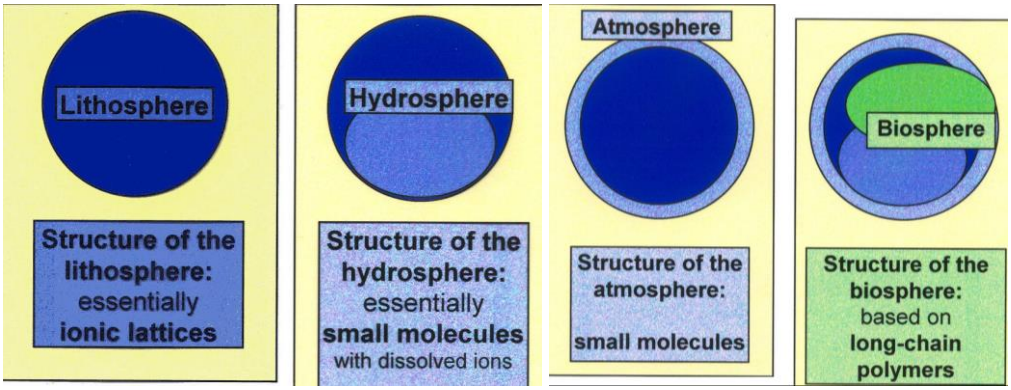
- The development of ideas about the shape of the Earth, from Ancient Greece to the present day.
- The long-running conflicts between religion and early science about the place of the Earth in the Universe.
- The first direct and accessible evidence – photographs of Earth from space taken by Apollo astronauts.
- The inside of the Earth – much less accessible and drill-holes have not gone deeper than about 11 km!

So we rely on indirect evidence, just like Galileo had to do! That evidence comes from earthquake waves travelling through the Earth, and from meteorite compositions.



Lithosphere: the cool, solid outer shell (the crust is the outer part of this).
Mantle: hot, solid, mainly silicate minerals, capable of plastic flow.
Outer core: molten iron-nickel alloy (mainly iron)
Inner core: iron-nickel alloy, very hot, but solidified by high pressure.

The four spheres we do have access to, and their distinct molecular structures:



- Human make use of the four spheres for primary resources, with very broader interactions with them.
- Late 18th,19th and early 20th centuries: study of the Earth in a host of separate sciences.
- Late 20thC into 21stC: development of Earth Systems Science approach, blending the different disciplines.

Geology begins with the study of the materials of the lithosphere:

- pure substances – elements and compounds, forming **minerals**,
- current total of over 6000 known minerals, about 300 are common,
- **rocks** – mixtures of minerals in varying proportions produced by rock-forming processes.
- classification of rocks according to mode of formation:
  - **igneous:** from molten magma cooling and solidifying.
  - **sedimentary:** from fragments of pre-existing rock being transported and deposited, mainly but not always under water.
  - **metamorphic**: rocks that have been seriously altered by temperature, pressure and/or chemical changes, and turned into new, often distinctly different, types of rock.

Follow-up:
Natural science entries in Wikipedia are usually reliable, and the links provided enable more detailed follow-up. Put the key word(s) into the Google search box, and follow the Wikipedia search result.

Oxford Concise Dictionary of Earth Sciences (Allaby & Allaby), or similar dictionaries of Earth sciences or geology.