

Introduction to our home planet Earth

Mars:

- Highest T: about 35°F (2°C) • Winter T: about -200°F (-125°C)
- >> cold enough to freeze carbon dioxide (CO₂)

Venus:

- ~ 30% closer to the Sun than Earth
- Atmosphere: 96% CO₂ • Clouds of sulfuric acid • T ~ 900 °F (480°C)

Earth:

- atmosphere: 0.04% CO₂ • liquid water, solid water (ice), water vapor • a reasonable climate • recognizable form of life. • T ~ 59°F (or 15°C)

Life exists by water's consent.

How we manage rivers affects not only our own well-being, but also the health of other species.

The Scientific Method

- Provides a systematic way to:
 - Find answers to questions
 - Solutions to problems
 - Evidence to support or refute ideas
 - Scientific Method Steps
 - 1) **OBSERVATION** of a problem/question to be answered
 - 2) **FORMULATE A HYPOTHESIS** • Hypothesis should explain observations/data
 - • Multiple working hypotheses 3) **TEST** the hypothesis
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 - **FOUR RULES** for testing a hypothesis
 - 1) Results must be reproducible
 - 2) Explains all related observations
 - 3) No contradictions to other observations and scientific principles
 - 4) Internally consistent
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 - **The Scientific Method**
 - • Once a hypothesis has passed many tests it may become a **theory**.
 - • A theory is a scientific idea capable of
 - explaining a broad range of observations
 - and is supported by abundant evidence. • South America and Africa were once part
 - of the same continent (**Theory of Plate Tectonics**)

Geology involves the use of the scientific method to understand how the Earth works

Within the Earth System, chemical elements cycle between different types of rock and sea, between sea and air, and between all these entities and life.

Geology is the study of Earth and the other planets

- Earth is ~4.57 billion yrs old. • The planet has changed profoundly during its existence.
- Rocks and sediments are pages in the book of Earth history.
- The planet is a unique, evolving system. Humans are powerful agents of change.
- Geologic phenomena and issues affect our lives.