EWCE 203

Geology and Geomorphology

EWCE 203

Geology



Geology

Geology:

- Study of the Earth
- Also known as Geoscience or Earth Science
- Primary Earth Science and looks at
  - How the earth formed?
  - Earth's structure and composition
  - Types of process acting on it.

Geology

How the Universe formed – Big Bang

- In 1973, a group of scientists described the **big bang and the creation of the Universe.**
- Primary Nebula
- Secondary compression – Big Bang, gave rise of
  - -Galaxies,
  - -stars (sun)
  - -moon
  - -planets
  - -earth etc.

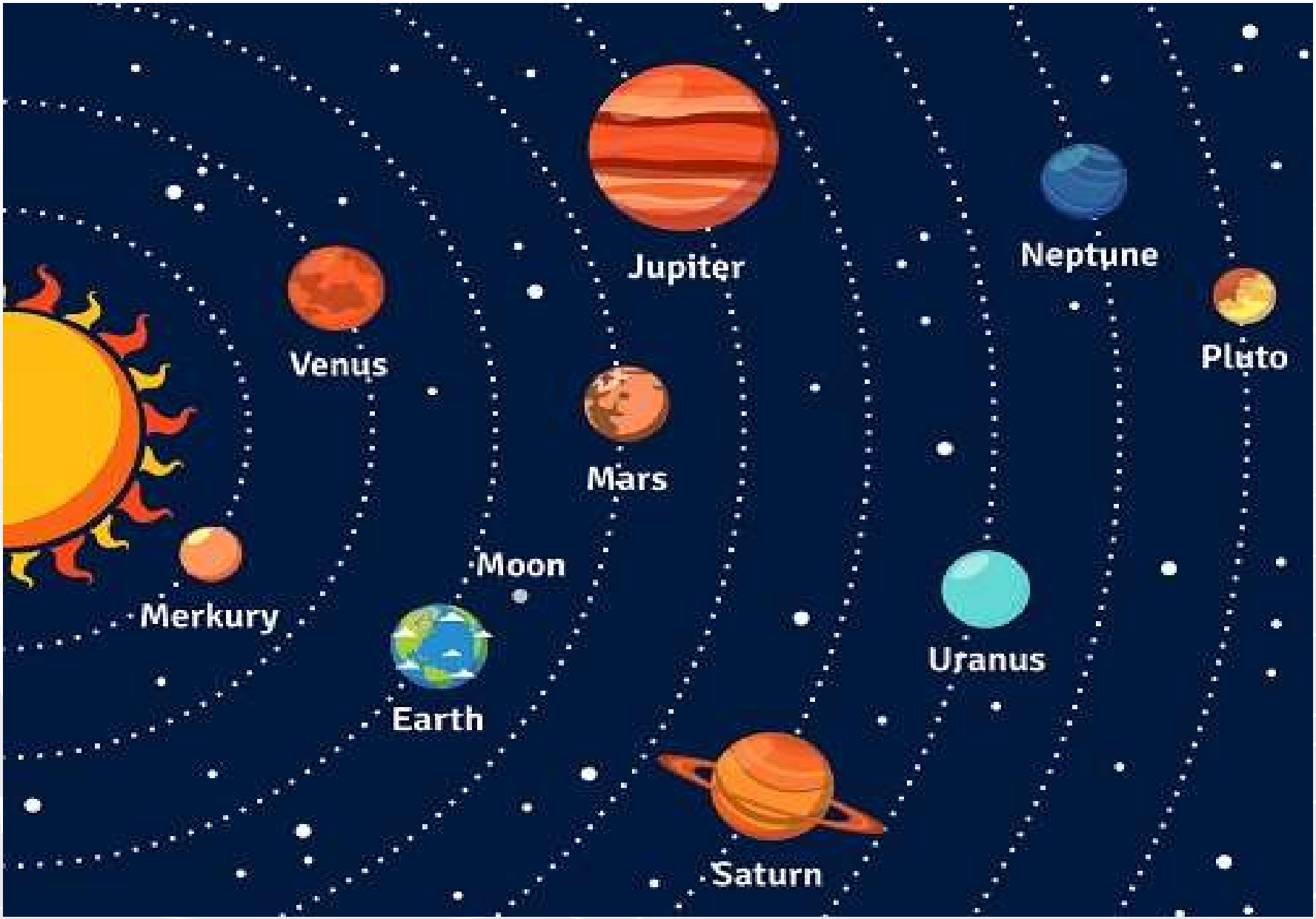


Geology

Earth Science – All aspects of the earth. Main branches are:

- Geology
- Oceanography
- Meteorology
- Climatogy
- Environmental science
- Astronomy

Solar System



Syllabus-Geology

Rocks and Minerals:

- Identification
- Common rock forming minerals
- Physical properties of minerals
- Mineraloids
- Types of rocks
- Rock Cycle

Syllabus-Geology

Structural Geology:

- Faults
- Folds and Fold types.
- Domes and Basins
- Erosional Process
- EQ

Geology of Bangladesh

Geology

References:

- **Physical Geology**, 2nd Edition, by Leet, L Sheldon and Judson, Sheldon.
- A **Textbook of Geology**, by P. K. Mukerjee.
- **Environmental Geology**, 9th Edition, by Carla W. Montgomery.
- **Engineering Geology**, 2nd Edition, by F. G. Bell
- **Geology of Bangladesh**, by F H Khan

What we are going to study today?

- **What is Geology?**
- **Why do you study geology? Or Requirement of studying Geology.**
- **Definition**
- **Branches of Geology**
- **Theory of Uniformitarianism**
- **Continental drift**

Geology

What is Geology:

Geology is an **earth's science** concerned with the **solid earth,** the **rocks** of which it is composed, and the **processes** by which **they change over time**.

Earth's science- study of our planet's **physical characteristics,** from EQ to raindrops, from flood to **fossils**.

Solid Earth- refers to the earth 'beneath our feet,' the **planet's solid surface and its interior**.

Geology

Rocks - Naturally occurring solid mass or aggregate of **minerals**.

Minerals- are **naturally occurring element or compound of elements** that has been formed by the various processes.

Fossils- the **remains or impressions** of prehistoric plants or animals embedded in rocks and preserved in petrified form.

Why study Geology? Or Requirement of study

Geology is the **study of the earth**, and earth provides the basic physical environment in which we live.

- To **know the way** the **earth works**.
- To **know how and why** of **natural phenomenon happens.**
- **To solve the different environmental and engineering problems** facing on the earth's surface and decisions to be taken.



The Earth

Geology

Definition:

- Geology is the **study of the earth** (*geo* means *earth*, and *logy* means *study of*).
- Geology involves **studying the materials** that make up the earth, the **features and structures** found on Earth as well as the **processes** that act upon them.
- Geology also deals with the **study of the history of all life** that's ever lived on or is living on the earth now. Studying **how life and our planet have changed over time** is an important part of geology.

Geology



Geologists study the earth, its subsurface and all the processes acting on the earth

Branches of Geology

- **Geomorphology- Everything related to the surface of the earth** and it **modification**.

- **Engineering Geology- related to Geotechnical engineering**.

- **Geophysics and Seismology-** deals with the **physics of the earth**, **and concerned with earthquake** and related phenomena.

- **Economic Geology-** deals with the **location and exploitation of industrial minerals** obtained from the earth.

- **Petrology**- concerned with the **origin, structure and composition of rocks.**

- **Paleontology**- concerned with the **fossils**.

- **Environmental Geology- all features and conditions surrounding an organism.**



James Hutton, ***the Father of Modern Geology.***

Theory of uniformitarianism .

- In 19th century, **James Hutton** **proved that some rocks are formed** by volcanic (heat & fire) processes and others are formed by sedimentation.

Explanation:

Hutton also **explained that** **"all the processes** **we see going on today**, are the same processes that happened in the **geologic past** and that **they occurred very slowly"**.

Example:

Erosion that is occurring to our mountains today is the same process that eroded mountains in the past.

Theory in Brief:

Theory became known as **Uniformitarianism**, which simply stated says **'the present is the key to the past.'**



Alfred Wegener.

Theory of Continental Drift

In the early 1900s, a scientist, **Alfred Wegener** proposed a theory called **Continental Drift**.

Wegener suggested that the "**continents moved around on the surface of the earth** and **came together** to form a supercontinent known as **Pangea**".

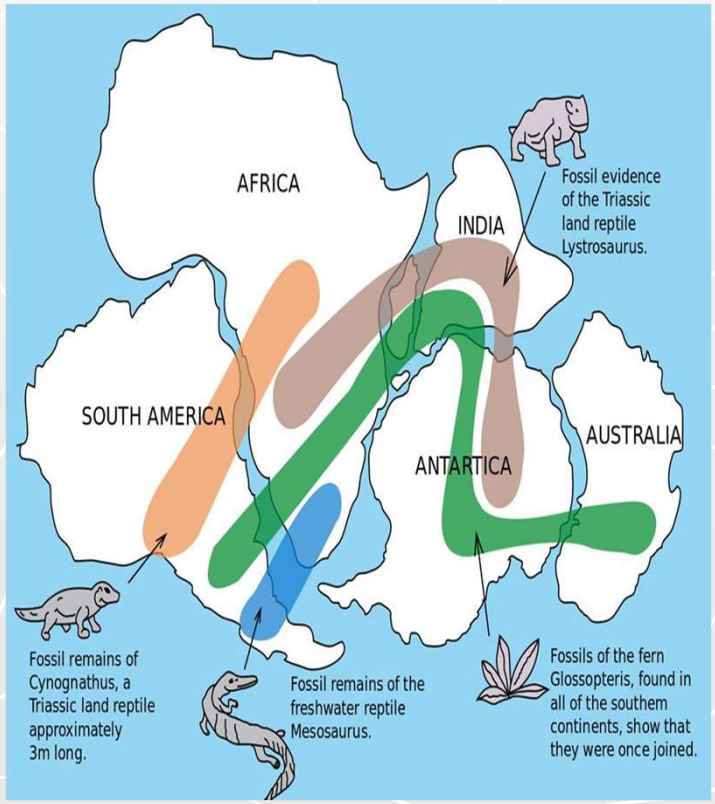
Evidence to prove his theory:

- **Continents all fit** together like **puzzle pieces**,

- **Same rock unit or fossil** could be found **on both sides of an ocean** and

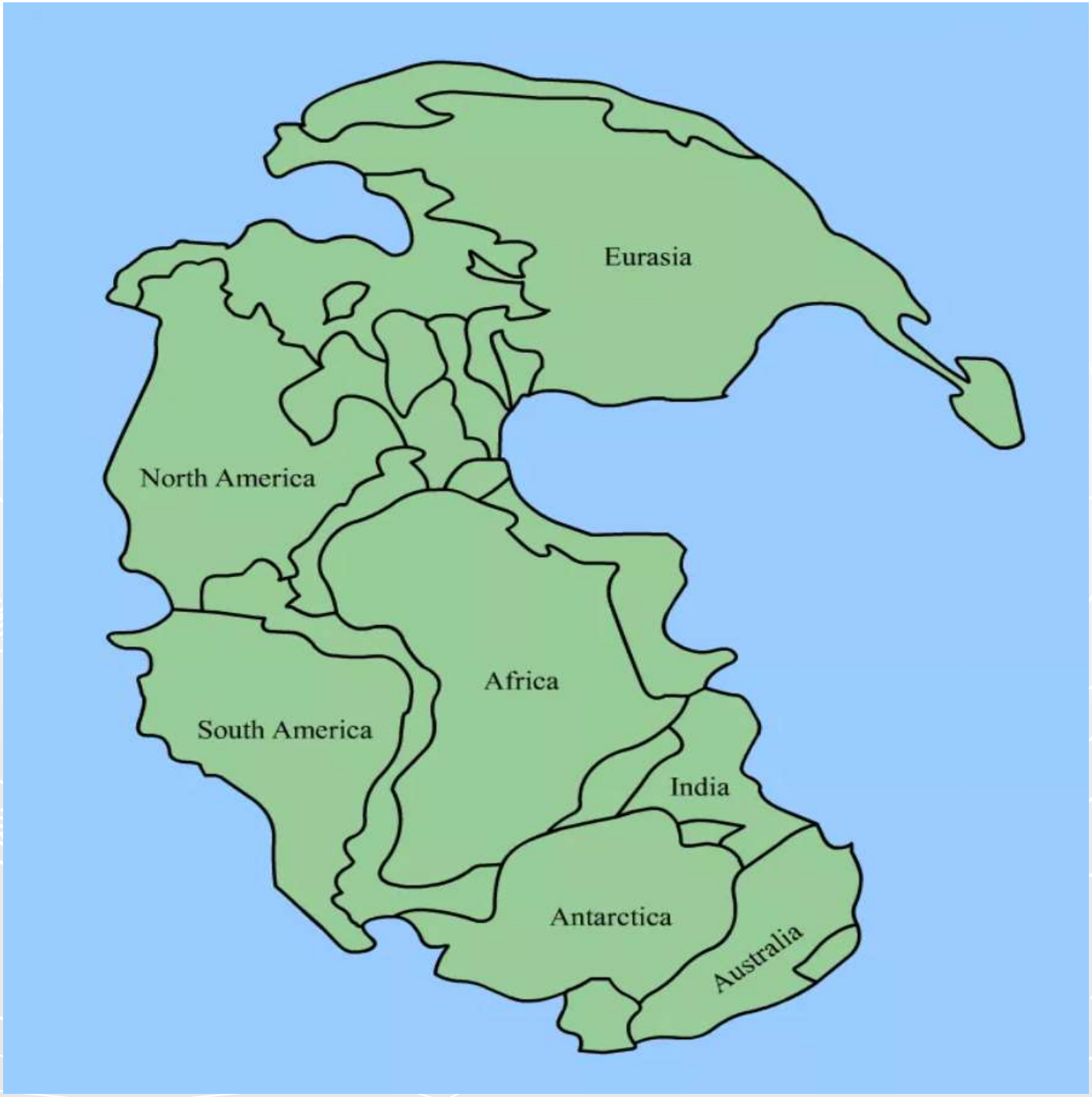
- **Similar features** such as mountains could be **found on continents when they were all together.**



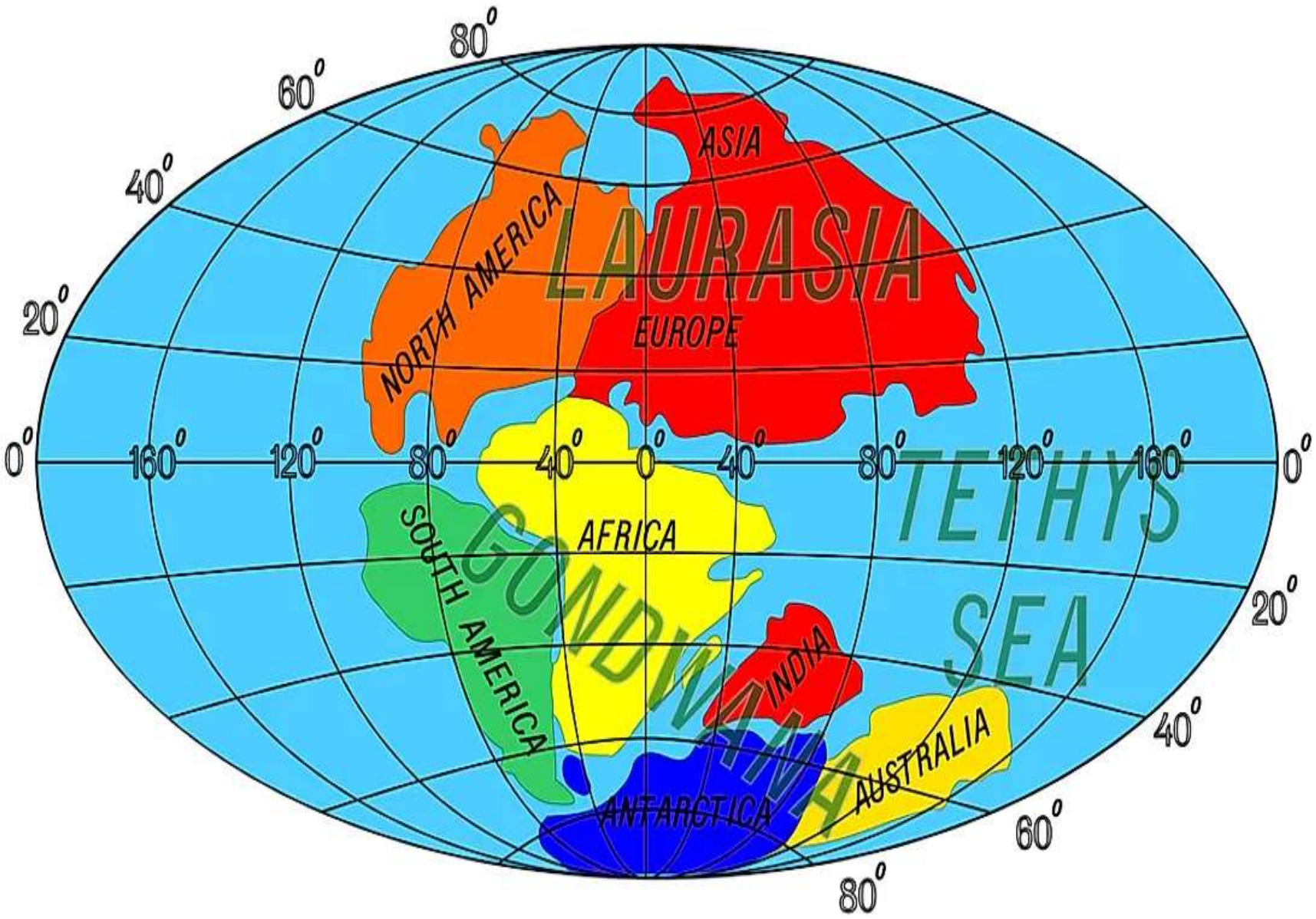




Pangea- Super Continent (200-300 mya)



TRIASSIC PERIOD



200 MILLION YEARS AGO

What we have discussed so far today?

- **What is Geology?**
- **Requirement of studying Geology.**
- **Definition**
- **Branches of Geology**
- **Theory of Uniformitarianism**
- **Continental drift**

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Eurasia
North America
Africa
South America
India
Antarctica
Australia