

GLY1000

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Exam #02 Study Guide

### Chapter 14:

Deformation- the general term that refers to all changes in the original shape, size, or orientation of a rock body

Stress- forces that deform rocks

1. Elastic deformation- when stress is gradually applied to rocks, rocks deform elastically
  2. Brittle deformation- rocks that break into smaller pieces
  3. Ductile deformation- a type of solid state flow that produces a change in shape of an object without fracturing
- Rock strength is affected by temperature, pressure, time, and rock type

Ductile deformation forms...

1. Folds- sedimentary and volcanic rocks is bent into series of wavelike undulations
    - a. Anticlines- upfolded arches in fold
    - b. Synclines- down folded troughs in fold
    - c. Domes- upwarps of basement rock
    - d. Basins- downwarp structures of rock
    - e. Monocline- large, step-like folds in otherwise horizontal sedimentary strata
  2. Faults- fractures in the crust along which appreciable displacement has occurred
  3. Dip-slip faults- faults in which movement is primarily parallel to the dip
- Hanging block is the rock surface above the fault and the footwall block is the surface below
    - a. Normal faults- when hanging block moves down relative to the footwall
  - Fault scarps are vertical displacements along dip-slip faults

Horst- uplifted fault blocks

Graben- down-dropped fault blocks

- b. Reverse faults- dip-slip faults in which the hanging wall moves up relative to the footwall
  - c. Thrust faults- reverse faults having dips less than 45 degrees
  - d. Strike-slip fault- a fault in which the dominant displacement is horizontal and parallel to the trend, causes motion between plates
- A transform fault is a type of strike-slip that cuts down through the lithosphere
4. Joints- fractures along which no appreciable displacement has occurred

Orogenesis- processes that collectively produce a mountain belt

Andean-type plate margins- plate boundaries that produce continental volcanic arcs

Accretionary wedge- chaotic accumulation of sedimentary and metamorphic rocks with occasional scraps of ocean crust

Terrane- any crustal fragment that has geological history distinct from that of the adjoining terranes

Isostasy- the concept of floating crust in gravitational balance

Gravitational collapse- ductile spreading at depth

## Chapter 15:

Uniformitarianism- James Hutton (1700's)

Relative dating- placing rocks in their proper sequence of formation

Law of Superposition- states that in an undeformed sequence of sedimentary rock, each bed is older than the one above it and younger than the one below it

1. Principle of original horizontality- layers of sediment are generally deposited in a horizontal position
2. Principle of cross-cutting- When a fault cuts through other rocks or when magma intrudes and crystallizes, the fault or intrusion is younger than the surrounding rock
3. Principle of fossil succession- fossil organisms succeed one another in a definite and determinable order and therefore any time period can be recognized by its fossil content

Inclusion- pieces of one rock unit that are contained within another

Unconformity- a long period in which deposition ceased

Conformable- layers of rock that have been deposited essentially without interruption

Unconformities:

1. Angular- tilted or folded sedimentary rocks overlain by younger ones
2. Disconformity- more common, rocks are laid in a parallel strata
3. Nonconformity- the break separates older metamorphic rock or igneous rock from younger sedimentary strata

Fossil- the remains or traces of prehistoric life (paleontology is the scientific study of such) (petrified/replacement/molds/carbonization/impression)

Index fossil- widespread geographically and are limited to a short geological span

Radiometric dating- reliable means of calculating the ages of rocks and minerals that contain particular radioactive isotopes

Half-life- the time period it takes for one half of the nuclei in a sample to decay

Time scale: Largest to Smallest length

Eon- (Phanerozoic "visible life") > Era- (Paleozoic/Mesozoic/Cenozoic) > Period > Epoch

## Chapter 16:

4.6 bya- solar system (including earth) formed from the solar nebula (rotating cloud of gas and interstellar dust)

Planetesimals- condensed clump, asteroid size object

Protoplanets- collided and accreted planetesimals (8 of them and their moons)

\*\*\*Familiarize with geological time scale on pg. 481\*\*\*

Outgassing- process by which atmosphere formed, gases are trapped in the planet's interior are released

- Cyanobacteria produced first atmospheric oxygen as a byproduct of photosynthesis
- $Fe + O \rightarrow$  iron oxide (rust), formed banded iron formations on ocean floor

Precambrian- earth's first 4 billion years (88% of geological time)

Craton- large crustal blocks formed by ascended silica-rich magmas (shield is the portion of a modern craton that is exposed at the surface)

Pangaea (supercontinent)- north=Laurasia/south=Gondwana

Earth's Life...

Prokaryote- single-celled bacteria (first known organism), DNA not separated from cell

Stromatolites- limestone mats built up by lime-accreting bacteria

Eukaryotes- oldest fossils (2.1 bya), cell structure contains nuclei

Cambrian explosion- huge expanse of biodiversity including all invertebrates, \*Paleozoic Era

- Lobe-finned fish were the first to begin to adapt to terrestrial life
- Reptiles are considered first true terrestrial vertebrates, \*Mesozoic Era (dinosaurs)
- Certain reptiles were the first to adapt/evolve in organisms with flight

Cenozoic (Age of Mammals)- increase in size, brain capacity, specialization in teeth and limbs

## Chapter 10:

Glacier- a thick ice mass that forms over hundreds or thousands of years

1. Alpine glacier- also known as a "valley" glacier
  2. Ice cap- covering uplands and plateaus
  3. Ice shelf- glacier flows into the ocean
  4. Piedmont- occupy lowlands at the bases of steep mountains
- Crevasses or cracks in the glacier may form as the zone of fracture is subjected to tension as the glacier moves over irregular terrain

Zone of accumulation- where snow accumulation and ice formation occurs

Zone of wastage- location of a net loss to the glacier when the snow from the previous winter melts

- Glacier erosion is affected by rate of glacial movement/thickness of ice/hardness and abundance of rock in the glacier/erodibility of the surface beneath the glacier