

# Sedimentary & Metamorphic Rocks

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- 1 What do you think this photograph shows?
- 2 The skeleton in the rock appears far below the surface of the ground. Explain why.

# Formation

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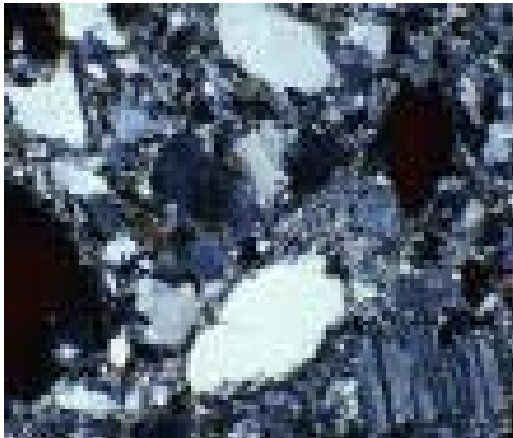
- Much of the Earth's surface is covered with sediments
  - Pieces of solid material that have been deposited on the Earth's surface
- Rocks are formed when sediment cement together



# Weathering

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- Physical and chemical processes that break rock into smaller pieces
- Produce **clastic** (fragments) of all sizes



# Erosion and Transport

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- Removal and movement of surface materials from one location to another
  - Wind
  - Moving water
  - Gravity
  - Glaciers



WIND



MOVING WATER



GRAVITY



GLACIER



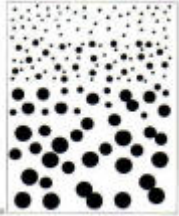

# Deposition

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- Sediments are laid down on the ground or sink to the bottoms of bodies of water
- Most sediments are deposited in depressions called sedimentary basins
  - Often contain layers causing **lithification**
    - Pressure and temperature cause sediment to start chemical and physical changes (**cementation**)
      - Can cause different mineral to become embedded

# Features

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- Contain horizontal layering (**bedding**)
  - **Graded bedding**: heavier and coarser layers at bottom 
  - **Cross bedding**: inclined layers move forward across a horizontal surface 
- Contain fossils and other evidence of past life

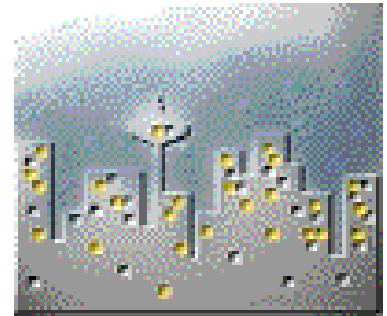
# Classification

Rock type	Rock name	Method of formation
<b>Clastic:</b> coarse, medium, fine grained	Conglomerate, sandstone, shale	Lithification of clastic sediments
<b>Organic:</b> calcium carbonate – shells, plant	Limestone Coal	Accumulation and lithification of remains of living things
<b>Chemical:</b> Calicite, halite, gypsum	Evaporite	Precipitation of dissolved minerals from water

# Importance

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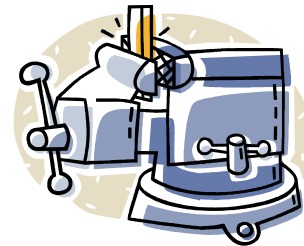
- ❑ Provides a geological “snapshot” of surface conditions in Earth’s past
- ❑ Provides information of past rivers
- ❑ Helps geologists learn how Earth has changed over time
- ❑ Source of oil, natural gas, and coal
- ❑ Source of Uranium
- ❑ Source of building material



# Metamorphic Rocks

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- Changes of rock composition from increased pressure and temperature, but still in a solid state
- High pressure caused by vertical pressure of overlying rock or from compressive forces from mountain building



# Types of Metamorphism

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- Varies based on temperature and pressure
- **Regional metamorphism**: large belts of metamorphic rock consisting of low, medium, or high grade
- **Contact metamorphism**: small zones where high temperature and moderate to low pressure meet solid rock
- **Hydrothermal metamorphism**: caused by very hot water which change rock composition

# Metamorphic Textures

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## □ Foliated

- Wavy layers and bands
- High pressure
- Schist and gneiss are common types



## □ Nonfoliated

- Lack mineral grains with long axes in one direction
- Blocky crystal shapes
- Quartzite and marble are common types

## □ Porphyroblasts

- Large crystals
- Example: garnet

# Rock Cycle

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- Any rock can be changed into another rock over time with the forces of temperature, pressure, and weathering
- The cycle may go in many different directions

