

# Ready Notes

for use with

# Physical Geology

Eighth Edition

**Charles C. Plummer**  
**David McGeary**  
**Diane H. Carlson**

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# **Physical Geology**

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**McGraw-Hill**

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## Welcome to

# READY NOTES

Your life just got easier! This booklet includes *Ready Notes* to accompany your textbook. *Ready Notes* were designed as a classroom supplement to accompany *Ready Shows*. More importantly, *Ready Notes* were developed for you, the student.

Somewhere in your educational experience, you have undoubtedly encountered a common dilemma facing many students; the feeling of helplessness that comes from trying to write down everything your instructor says and, at the same time, actually paying attention to what is being taught. *Ready Notes* addresses this problem by providing pre-prepared lecture outlines to accompany the *Ready Shows* your instructor will be using in class. Rather than spending time copying material that is already in the book, you will be able to focus on the most important aspects of what your instructor is actually saying. You will still be expected to take notes, but the nature of those notes will change.

Each page in *Ready Notes* includes reproductions of some of the actual projected screens that you will be seeing in class. The *Ready Notes* booklet includes the information for many of the examples that your instructor will be presenting.

It is your responsibility to attend class regularly and to be prepared for class. However, used properly, *Ready Notes* will help you to achieve your goals for the course. Good luck!

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## Chapter 1

# Physical Geology

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## INTRODUCTION TO PHYSICAL GEOLOGY

### Chapter 1

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## Who Needs Geology

Understanding our dynamic planet  
through ***Physical Geology***

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## Who Needs Geology

- Avoiding Geologic Hazards
  - Earthquakes
  - Volcanoes
  - Other geologic hazards

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## Who Needs Geology

- Supplying Things We Need
  - Energy
  - Metals
  - Other
- Protecting the Environment
- Understanding Our Surroundings
  - Appreciating scenery while traveling

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## Overview of Geology--Important Concepts

- Internal Heat Engine--Internal Processes
  - Hot rock from earth's interior flows upward
- External Heat Engine--External Processes

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## Earth's Interior

- Core
  - liquid outer core; solid inner core
- Mantle
  - most of earth
  - rock
- Crust
  - Oceanic Crust-- denser, thinner
  - Continental Crust-- lighter, thicker

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## Earth's Interior

- Lithosphere
  - Crust + Uppermost Mantle
  - Rigid (tectonic plates)
- Asthenosphere
  - Beneath lithosphere
  - Mantle
  - Soft-- near the melting point
- Tectonic forces
  - due to movement within the mantle

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## Theory of Plate Tectonics

- **Plates** in motion
- **Divergent Boundaries**
  - Mid-oceanic ridges
  - **Magma** enters fissures
  - Lithosphere moves away from boundary
- **Transform Boundaries**
  - Plates slide past one another

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## Theory of Plate Tectonics

### ■ **Convergent Boundaries**

- **Subduction Zone**
- Magma created at depth
  - Moves upward, solidifies into **igneous rock**
- **Metamorphic rock**--changed rock that doesn't melt

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## Scientific Method

- Question raised or problem presented
- Data gathered
- **Hypotheses** proposed
- Predictions made
- Predictions tested
- hypothesis that withstands testing becomes a **theory**

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## Surficial Processes

- Driven by solar power & gravity
- **Erosion**--due to water, ice, wind, gravity
- Rock formed at high temperature becomes unstable at surface
  - Form new material stable under conditions at earth's surface
  - **equilibrium**
- **Sediment**
  - can solidify into **sedimentary rock**

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## GEOLOGIC TIME

- Earth is around 4.5 billion years old
- Major subdivisions of geologic time
  - Cenozoic Era- youngest
  - Mesozoic Era- middle (dinosaurs lived then)
  - Paleozoic
    - Began around 545 million years ago
    - Oldest abundant fossils
  - PRECAMBRIAN- all time before Paleozoic

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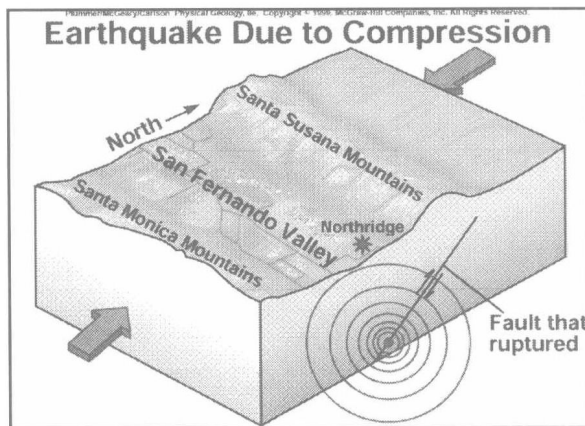
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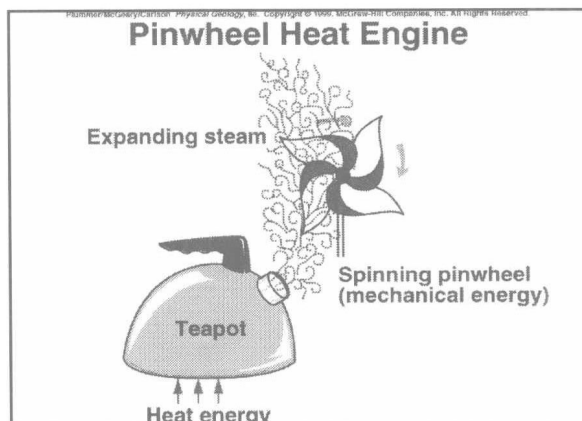
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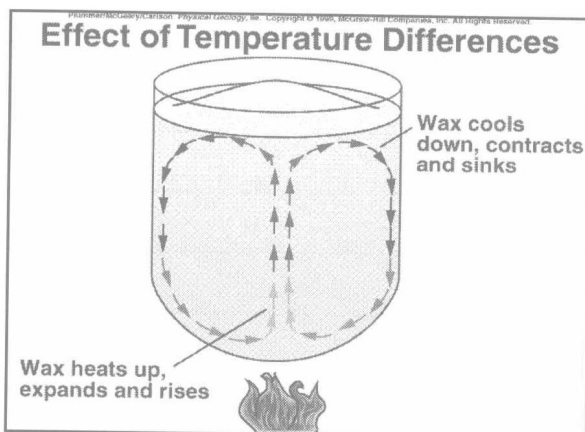
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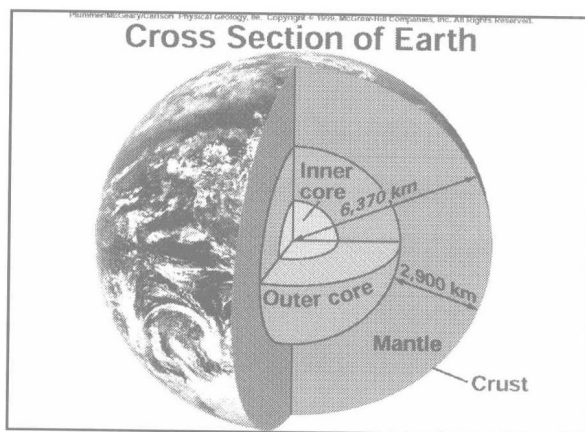
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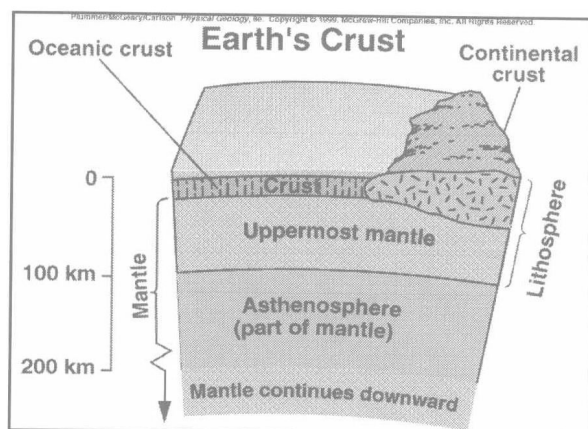
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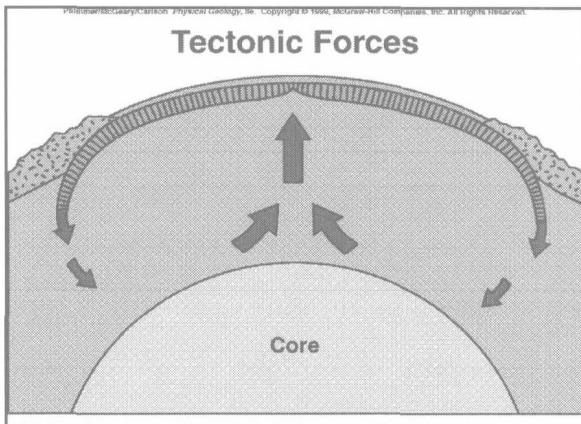
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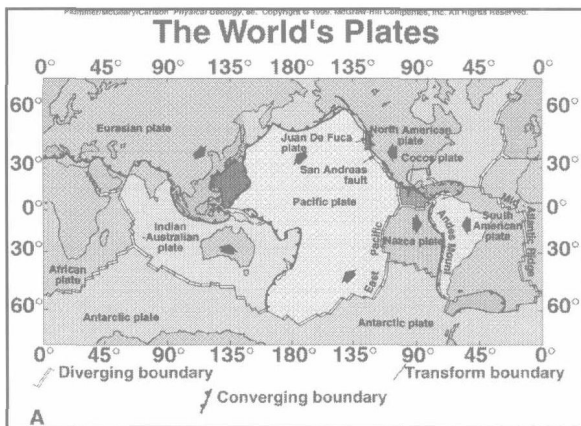
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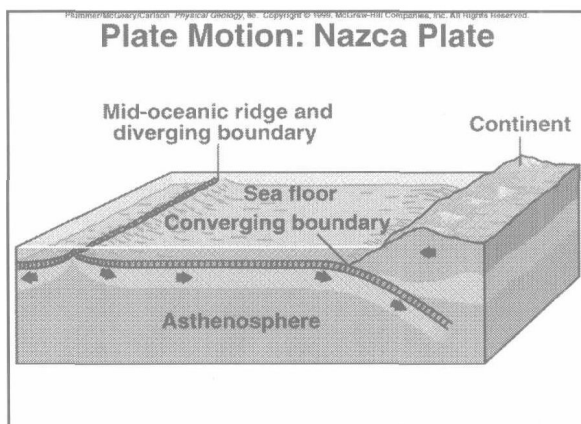
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## World's Sea Floors



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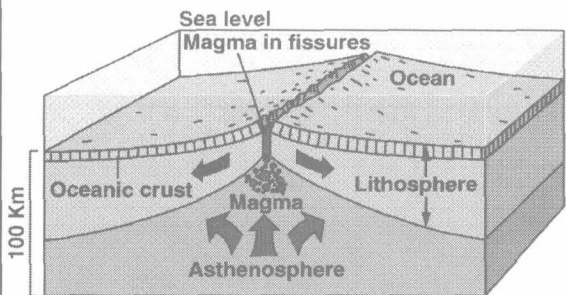
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## A Divergent Boundary



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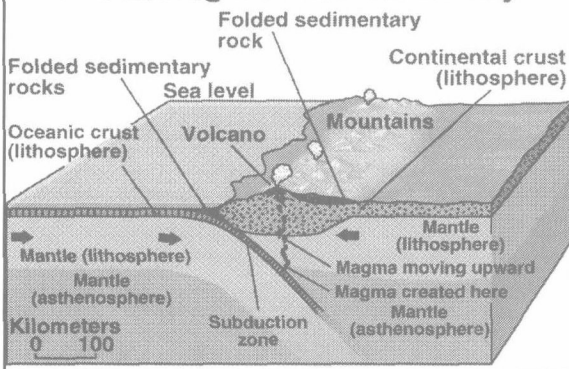
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## A Convergent Plate Boundary



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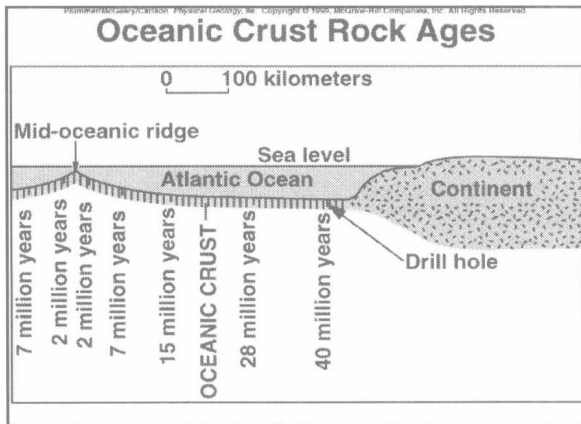
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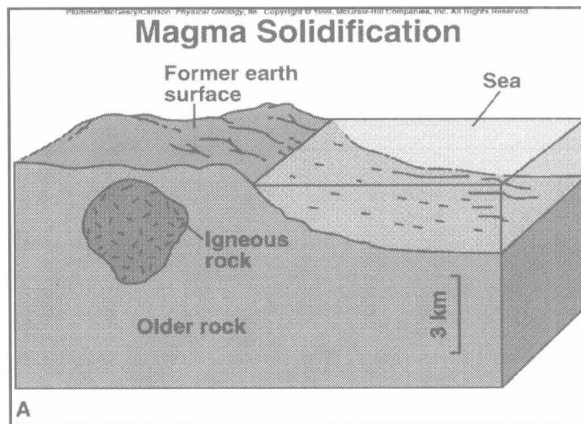
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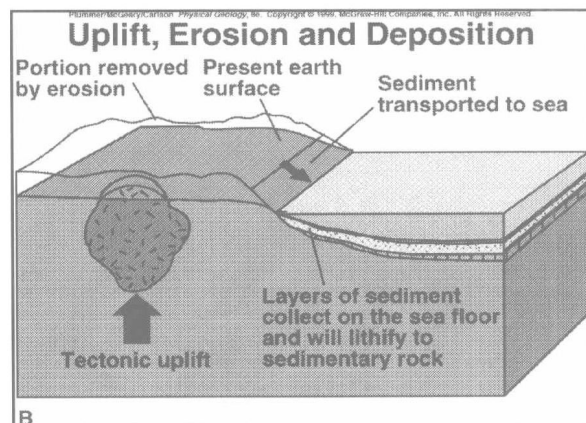
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## Chapter 2

# Physical Geology

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## MINERALS

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### MINERAL vs. ROCK

- ◆ ROCK
  - An aggregate of MINERALS (usually)
- ◆ MINERAL
  - Crystalline- orderly arrangement of atoms
  - Naturally occurring
  - Inorganic
  - Definite chemical composition
    - ▼ e.g.  $\text{SiO}_2$  for quartz;  $\text{KAlSi}_3\text{O}_8$  for feldspar

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## Atom & Elements

- ◆ Atoms
  - Nucleus
    - ▼ Proton, neutron
  - Electron
- ◆ Molecule- e.g. water molecule

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## Element

- ◆ Atomic number
- ◆ Isotope
- ◆ Atomic weight

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## Chemical activity

- ◆ Stable atoms want
  - positive & negative charges balanced
  - electron shells full
- ◆ Ions
- ◆ Bonding
  - Ionic
  - Covalent
  - Metallic
  - Van der Waal's

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