Chapter 4: The Habitability of Earth

- How is active geology crucial to our existence? Three main aspects, why important.
- The three basic rock types, how formed, in which do fossils arise? (Figs. 4.2, 4.3, 4.4)
- Rock analysis; How to determining relative ages in layers of rocks (Fig. 4.6)
- Radioactive Decay, its probabilistic nature (Fig. 4.7)
- Determining absolute ages; radiometric dating, concept of half-life (Fig. 4.8)
- Eons, Eras, and Periods of Earth’s history (Fig. 4.10) – main events for life’s evolution
- Period of heavy bombardment, first fossils, rise of oxygen, Cambrian explosion
- Structure of Earth (core, mantle, crust) Fig. 4.14)
- Out-gassing and development of earth’s atmosphere (Fig 4.12)
- Geological activity, differentiation, plate tectonics (Figs. 4.15, 4.18)
- Importance of earth’s magnetic field (Figs. 4.24, 4.25)
- Climate regulation, Greenhouse effect (Fig. 4.26), CO₂ cycle (Figs. 4.27, 4.28)
- Snowball Earth (Fig. 4.30)

Chapter 6: The Origin and Evolution of Life on Earth

- Three main lines of evidence for first life on Earth. What? When? Where found?
- Where did life likely begin? What are possible origins of organic molecules?
- Early Earth organic chemistry; Miller-Urey experiments (hypothesis, results, Fig. 6.4)
- Chemistry to biology; RNA world; early cell structures (Figs. 6.5, 6.6, 6.7)
- “Putting it altogether”; the five hypothetical steps to the rise of life (Fig. 6.8)
- Hypothesis of how Prokaryotes evolved into Eukaryotes (Fig. 6.10)
- Rise of Oxygen (timing and importance for Cambrian explosion)
- The K-T boundary/event; evidence for extraterrestrial impactor (Figs. 6.16, 6.17)
- Mass extinctions (Fig 6.18); Tunguska event (Fig. 6.21); Impactor frequencies (Fig. 6.23)
- Human Evolution (Figs 6.24, 6.27); major misconceptions (Fig. 6.25)
- Beyond Darwinian natural selection; cultural and technological evolution of humans

Chapter 7: Searching for Life in Our Solar System

- Three Environmental Requirements for Life (Sec 7.1)
- Three Environmental Requirements for Habitability (pp 240-241)
- Inverse Square Law of Light (Fig 7.2)
- Four advantages of Water (Tab 7.1, Figs 7.3, 7.4)
Note- we did not cover all lectures on this chapter, so this is the extent of what you are responsible for on the exam.
Some Notes and Advice:

The exam will have a format similar to Exam 1, with (i) true/false, (ii) multiple choice, (iii) matching, (iv) identifications, and (v) short answers.

Study advice. Go through each of the above bulleted concepts using both the class notes and the book. Read the Chapter “The Big Picture” and “Summary of Key Concepts” at the end of the chapters. When a Figure number is given in the study guide, study that figure and the accompanying caption and text in the book, which is usually on the same page. It is highly recommended you also read over the homework solutions sets at least once. Emphasize your intuitive understanding of the material as best you can- this is a much better strategy than memorizing facts. Good luck!