Directions: Read Chapter 14, pages 392-407 and carefully answer each question.

1. ***ON THE BACK*** *MAKE A T-CHART* that describes the similarities and differences between Earth’s early environment and Earth’s current environment?

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| Earth’s Early Environment | Earth’s Current Environment |
| Started as a molten body 4.6 billion years ago | Gases in the atmosphere due to volcanoes: water vapor, CO2, sulfur dioxide, carbon monoxide, hydrogen sulfide, hydrogen cyanide, nitrogen, and hydrogen |
| Surface rich in lighter elements (silicon) | Less active volcanoes |
| Lots of volcanoes | Warm surface that enables life to thrive |
| Cooling interior radiated a lot of heat | No meteorites |
| Meteorites crashed onto the surface | 71% of surface covered in ocean |
| Atmosphere--gases expelled by volcanoes, little to no oxygen | Large diversity of life exists |

1. How are fossils formed?

 Organisms (both plant and animal) that are buried rapidly in sediment are readily preserved. This occurs more frequently with organisms living in water because the sediment in aquatic environments is constantly settling, covering, and preserving the remains of organisms.

1. The age of fossils is determined by what techniques?

 Relative dating--method used to determine the age of rocks by comparing them with those in other layers (aka law of superposition) and radiometric dating--uses the decay of radioactive isotopes to measure the age of a rock.

1. How is the Geologic Time Scale organized?

 By major geological and biological events in Earth’s history.

1. When were the 5 mass extinctions?

 Two in the Paleozoic Era, one in between Paleozoic and Mesozoic Eras, one in the Mesozoic Era, and one

in between the Mesozoic and Cenozoic Eras.

1. Which major group of organisms arose after each mass extinction?

 After the first--invertebrates, land plants and insects appeared; after the second--amphibians appeared; after the third--mammals and dinosaurs appear; after the fourth--birds appeared; after the fifth--mammals dominate.

1. When was the Precambrian? What major events happened during this time?

 The first 4 billion years of Earth’s history.

 Earth formed; life first appeared. Prokaryotes enriched atmosphere with oxygen and eukaryotic cells

emerged; thus by the end of the Precambrian, life was flourishing and the first animals had appeared. Extensive

glaciation marked the second half of the Precambrian. Simple organisms inhabited a marine ecosystem. Food chains were short and dominated by animals that consumed tiny particles suspended in the water and by animals that ate debris on the bottom of the sea.

1. When was the Paleozoic Era? What was Earth like during this time?

 488.3 mya-251 mya

 Diverse group of living organisms; changes in ocean life occurred; life on land emerged. Fish, land plants, and huge insects appeared; tetrapods (first land vertebrates) emerged; and first reptiles arrived. Mass extinction occurred, where 60-75% of species became extinct and 90% of marine organisms disappeared due to increased volcanic activity.

1. When was the Mesozoic Era? What major events happened during this time?

 199.6-65.5 mya

 Mammals were dominant land animals; mammals and dinosaurs first appeared, along with flowering plants. Birds evolved and reptiles were the dominant organisms on the planet. 65 mya a meteorite struck Earth (evidence found in the K-T boundary with presence of iridium in rock), which caused mass extinction. This eliminated all dinosaurs, but bird/reptilian descendants, marine invertebrates, and plant species survived. Caused global climate change, which affected many species. Pangaea started to break up.

1. When was the Cenozoic Era? What was Earth like during this time?

 55.8 mya to present

 Mammals dominated, most were small and resembled shrews. After the extinction at the end of the Mesozoic era, mammals began to diversify--including primates. Humans appeared very recently; they survived the last ice age but many mammals did not. Land looks similar to today.