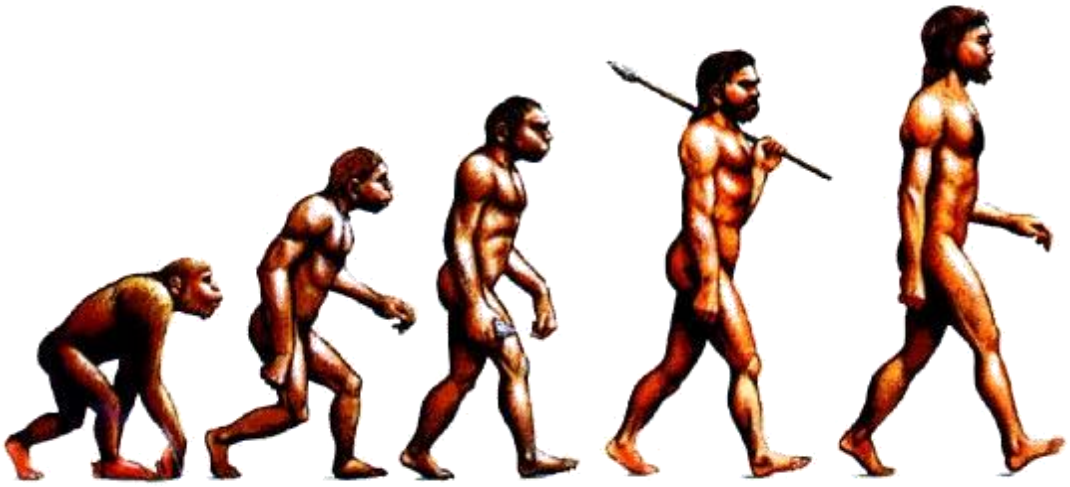

Directed Reading Packet

Paleontology and Evolution

Name:_____

Teacher: _____ Period: ____

Chapter 6, Section 1: ***Evidence of the Past*** Pages 136 to 141

1. What type of scientists use fossils to reconstruct the history of life before humans existed? _____
2. What do fossils show us?

   _____

FOSSILS

3. What are fossils?

   _____

4. List the three steps of fossil development:

   1)

   2)

   3)

5. When scientists look at which layer of rock a fossil is in, they are using the _____ method of estimating the age of rocks and fossils.
6. When a scientist finds sedimentary rock, where are the oldest layers usually found, and WHY?

   _____

   _____

7. Scientists can determine the age of a fossil more precisely than relative dating, using a method called _____.
8. The particles that make up all matter are called _____.
9. As atoms decay, what do they release?

   _____

10. The time it takes for half of the unstable atoms in a sample to decay is the sample's _____.
11. When scientists measure the ratio of unstable atoms to stable atoms in a rock sample, what are they trying to determine?

    _____

    _____

THE GEOLOGIC TIME SCALE

12. Why is the earth's history divided into very long units of time?

    _____

    _____

13. The calendar scientists use to outline the history of life on earth is called the _____ time scale.
14. After paleontologists have dated a fossil, how do they use the time scale to help them understand how organisms have changed over time?

    _____

    _____
15. Paleontologists have divided the geologic time scale into blocks of time. The largest divisions are known as _____.
16. Why is the Mesozoic era referred to as the Age of Reptiles?

    _____

    _____
17. Does the geologic time scale change? Explain why or why not.

    _____

    _____

    _____
18. When a species dies out completely, we say it has become _____.
19. The periods when many species suddenly become extinct are called _____.
20. What are two of the events scientists think could have caused the extinction of the dinosaurs?

    _____

    _____

THE CHANGING EARTH

21. Based on fossil evidence, where was Antarctica once located? _____
22. The continents once formed one huge landmass called Pangaea, meaning _____.
23. J. Tuzo Wilson's theory of how huge pieces of Earth's crust are pushed around by forces within the earth, is called _____.
24. According to the theory of plate tectonics, how many large rigid plates are there? _____
25. How are slow changes, such as moving continents, different than rapid changes, such as a meteorite impact?

    _____

    _____
26. Why are fossils found in some places very different than the organisms now living in the same area?

    _____

    _____

Chap. 6, Sect. 2: *Eras of the Geologic Time Scale* Pages 142 to 147

1. What are the four major divisions of geologic history?

   _____ _____

   _____ _____

PRECAMBRIAN TIME

2. Precambrian time runs from _____ up until _____ years ago.
3. What are two differences between early Earth and the present Earth?

   _____

   _____

4. How do scientists think that life on Earth developed?

   _____

   _____

   _____

5. The first organisms, called _____, didn't need oxygen to survive.
6. The first _____ began to release oxygen gas into the oceans and air.
7. Organisms composed of many cells may have evolved from _____.
8. Before a(n) _____ layer formed to reduce radiation on Earth's surface, life existed only in the oceans and underground.

THE PALEOZOIC ERA

9. The Paleozoic era runs from _____ up until _____ years ago.
10. What are three of the fossils from the Paleozoic era?

    _____

    _____

11. Why is this era given the name *Paleozoic*, meaning "ancient life"?

    _____

    _____

12. Name three of the plant species that covered Earth in the Paleozoic era:

    _____

    _____

13. In the spaces, number the following animal groups in the order of their appearance on Earth:

    _____ salamander-like animals _____ crawling insects _____ reptiles and winged insects

14. What happened to as many as 90% of all Paleozoic organisms about 248 million years ago?

    _____

    _____

    _____

THE MESOZOIC ERA

15. The Mesozoic era runs from _____ up until _____ years ago.
16. The word *Mesozoic* means _____, and this era is often referred to as the Age of _____.
17. Name three types of animals that existed during the Mesozoic era.

    _____

    _____

18. One of the most well-known (but not actually the largest) mass extinctions was that of the dinosaurs and many other plant and animal species, about _____ years ago.

THE CENOZOIC ERA

19. The Cenozoic era runs from _____ up until _____ years ago.
20. *Cenozoic* means _____, and is often called the Age of _____.
21. Name three common Cenozoic animals:

    _____

    _____

22. What are two of the effects the ice ages have caused to organisms in the Cenozoic era?

    _____

    _____

    _____

Chapter 5, Section 1: ***Change Over Time*** Pages 108 to 115

1. One way to tell kinds of animals apart is by their _____.

DIFFERENCES AMONG ORGANISMS

2. Adaptations help organisms by improving their ability to survive long enough to _____.
3. Two organisms which have similar characteristics and can mate to produce offspring capable of reproduction belong to the same _____.

4. When members of the same species live in the same place, they form a(n) _____.
5. Since life began on Earth, many _____ have vanished and many new ones have appeared.
6. Scientists have observed that species _____ over time.
7. The inherited _____ in populations also change over time.
8. What can result as populations of organisms change?

   _____

9. The process by which new species gradually develop is called _____.

EVIDENCE OF CHANGES OVER TIME

10. Where do scientists look for evidence of evolution? _____
11. What is a fossil? _____
12. Describe how a fossil is usually formed.

    _____

    _____

    _____

13. What is the timeline of life formed by studying fossils called? _____
14. How are fossils organized in the fossil record? _____

    _____

15. Fossils in newer layers of Earth tend to resemble current _____.
16. In older layers of the Earth, are fossils more or less likely to resemble today's animals or plants? Why?

    _____

    _____

17. Some fossils may be of earlier life forms that do not _____ anymore.

EVIDENCE OF ANCESTRY

18. What does fossil record evidence explain about ancient life?

    _____

    _____

19. All living things inherit similar traits from their _____.
20. As scientists study the fossil record, they may draw models to illustrate their _____ about the relationships between extinct and living organisms.

21. How is a new species or group of species represented in the scientist's model?

_____

22. List two groups of animals that may share a common ancestor with whales:

_____ _____

23. Scientists think that all mammal species alive today evolved from common _____.

24. Scientists have combined information on hundreds of thousands of organisms to sketch out a _____ that includes all known organisms.

25. What does the lack of a fossil record for some of the Earth's history mean to scientists?

_____

EXAMINING ORGANISMS

26. In addition to fossils, how can scientists learn about an organism's ancestors?

_____

27. List three things about whales that tell scientists that they are not fish:

_____

_____

28. What does a whale body have that indicates it had a common ancestor that lived on land?

_____

29. What evidence did scientists find that ancient land mammals evolved into modern whales?

_____

30. What two things do organisms inherit from their ancestors? _____ and _____

31. What makes the human hand similar to a dolphin's slipper or a bat's wing?

_____

_____

32. What does this similarity between humans, dolphins, cats, and bats indicate?

_____

_____

33. If organisms with similar traits have evolved from a common ancestor, what else should they have in common (at a molecular level)? _____

Chap. 5, Sect. 2: *How Does Evolution Happen?* Pages 116 to 121

1. List three things that scientists learned about Earth beginning in the 1800s:

   _____

   _____

2. What did Darwin do in order to study plants and animals?

   _____

3. What did he do during his travels?

   _____

4. Darwin noticed that the plants and animals on the _____ were similar to, but not the same as, those in Ecuador.
5. How did the finches on different islands differed from each other? _____
6. What was the beak of each finch adapted to? _____

EXAMINING ORGANISMS

7. What puzzled Darwin about the Galápagos finches?

   _____

8. A specific characteristic that can be passed from parent to offspring through genes is called a(n)

   _____.

9. What hypothesis did Darwin develop about the Galápagos finches?

   _____

   _____

   _____

10. What did Darwin do before presenting his new ideas?

    _____

    _____

Write the letter in the space to match each definition with the correct term.

_____ 11. The idea that human populations can grow faster than the food supply.

_____ 12. The idea that Earth has formed naturally over al long period of time.

_____ 13. The practice of breeding plants and animals to have desired traits.

A. Lyell's theory

B. selective breeding

C. Malthus's principle

14. Why do farmers and breeders use selective breeding?

    _____

    _____

15. Why might selective breeding be used in horses?

_____

_____

16. Why might selective breeding be used in fruit trees?

_____

_____

17. After reading Malthus's theory, Darwin realized that any species can produce many _____.

    The number of species' offspring is limited by starvation, disease, predation, or _____.

18. Darwin had begun to think that species could _____ in their environment and

    _____ over time.

19. What idea of Darwin's about species was supported by Charles Lyell's book?

_____

_____

DARWIN'S THEORY OF NATURAL SELECTION

20. What was the name of Darwin's famous book? _____

21. What theory did he introduce in the book? _____

Write the letter in the space to match each definition with the correct term.

_____ 22. Many more offspring are produced than will survive.

_____ 23. No two offspring are exactly alike.

_____ 24. Many offspring will be killed before reproducing.

_____ 25. The best adapted organisms will have many offspring.

D. inherited variation

E. struggle to survive

F. overproduction

G. successful reproduction

27. List two things that Darwin did not know in relation to his theory.

_____

_____

28. Today, scientists explain natural selection in terms of changes in _____.

29. These changes occur when organisms produce _____.

30. When organisms carry genes that make them more likely to survive and reproduce, the process called

    _____ occurs.

Chapter 5, Section 3: ***Natural Selection in Action*** Pages 122 to 125

1. Bacteria passing resistance to a medicine on to offspring is an example of _____.

CHANGES IN POPULATIONS

2. What does natural selection explain about a given population?

   _____

3. Which individuals in a population are most likely to survive and reproduce?

   _____

4. The growing rate of the tuskless elephants in Uganda is an example of _____.
5. Why are the tuskless elephants becoming more likely to reproduce than ones with tusks?

   _____

   _____

6. The ability of some insect species to resist chemicals is called insecticide _____.
7. The period of time between the birth of one generation and the next is known as the _____.
8. Insect species can develop resistance quickly because they have short _____.
9. For natural selection to take place, organisms must survive long enough to _____.
10. When competition for mates is intense, many organisms develop _____ to help attract mates.

FORMING NEW SPECIES

Write the letter in the space to match each definition with the correct term.

_____ 11. Formation of a new species.

_____ 12. Changes in response to the environment.

_____ 13. Loss of ability of separated groups to interbreed.

_____ 14. The moving apart of populations.

H. adaptation

I. division

J. separation

K. speciation

15. Describe the process of forming a new species after separation.

   _____

   _____

   _____

16. When a portion of a population becomes isolated, _____ often begins.
17. Through adaptation, members of separated groups may develop different _____.
18. If environmental conditions differ, _____ will also differ.
19. When members of related groups can no longer interbreed, they have become members of different _____.

Chap. 6, Sect. 3: ***Humans and Other Primates*** Pages 148 to 153

1. Humans, apes, and monkeys had a common ancestor _____ years ago.

PRIMATES

2. Ancestors of primates were _____-like.
3. The first larger-brained primates appeared about _____ years ago.
4. The ancestors of _____ may have co-existed with dinosaurs, but actual primates did not exist until after the dinosaurs.
5. What animal is the closest living relative of humans? _____
6. Humans are in a family called _____, which includes only humans and their human-like ancestors.
7. The main characteristic that separates us from other primates is _____.

HOMINIDS THROUGH TIME

8. What must be true for a fossil to be classified as a hominid?

   _____

9. The oldest hominid fossils have been found in _____ and are about _____ years old.
10. Early hominids that are similar to apes but differ in several ways are classified as _____.
11. What are two of the differences between this group and apes?

    _____

    _____

12. What are two differences between australopithecines and other hominids who lived at the same time?

_____

_____

13. About 2.3 million years ago, a more human-like group of hominids called _____ appeared.
14. How were these new people different from australopithecines?

_____

_____

15. Members of one type of hominid group, _____ could grow as tall as modern humans do.

RECENT HOMINIDS

16. What two types of hominids may have lived in the same areas at the same time as recently as 30,000 years ago?

_____ and _____

17. What happened to the Neanderthals?

_____

_____

18. The group of hominids called _____ seem to be the first to create art.
19. What indicates these early humans had an organized and complex society?

_____

_____

_____

20. Why do scientists sometimes revise their hypotheses about hominids and human evolution?

_____

_____

_____